

The State of Environmental Migration

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Caroline ZICKGRAF,
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François GEMENNE (eds.)

The State of Environmental Migration 2018

A review of 2017



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Table of contents

Introduction	7
<i>Caroline Zickgraf, Elodie Hut and François Gemenne</i>	
Africa	
North-Eastern Madagascar and Cyclone Enawo	11
A discussion of the concept of resilience	
<i>Amandine Le Bellec</i>	
Americas and The Caribbean	
“Cutting off your arms so you can still walk”	35
Resettlement planning in the face of coastal erosion and sea-level rise in South Louisiana	
<i>Emily Albi</i>	
Coyote Creek Flood	57
Redefining flood-induced displacement	
<i>Andrea Ferret-Lambert</i>	
The Divided Island of St Martin	71
Three different worlds confronted with Hurricane Irma	
<i>Franziska Barnhusen and Rosa Hofgärtner</i>	
Hurricane Maria and the Geopolitics of Puerto Ricans’ Environmental Migration	97
<i>Manuel Guerrero and Valentina Guatri</i>	
Disaster-Induced Migration in Small Islands	121
Lessons learnt from Hurricanes Irma and Maria	
<i>Juraj Staron and Paula Puskarova</i>	

Asia

Relocation as a Response to Periodic Floods and Poverty	143
Case of the Yellow River Floodplain Relocation Project in Henan Province, China	
<i>Jiayin Li</i>	

Europe

Moving Villages for Coal	163
A German case study	
<i>Adriana Willms</i>	

Contributors

Editors	191
Authors	193
Editorial Team	198

Images, Figures and Tables

List of Images	199
List of Figures	200
List of Tables	201

Introduction

Caroline Zickgraf, Elodie Hut and François Gemenne

Adverse effects of climate change and disasters have considerably altered migration patterns over the past decades. The year 2017 was no exception. According to the IDMC's latest global report on internal displacement, 18,8 million of the 30,6 million new displacements recorded in 2017 were attributed to disasters and, in majority, to weather-related events such as floods and storms. Storms—specifically cyclones, hurricanes and typhoons—accounted for 7,5 million of the new disaster displacements which occurred in 2017. The hurricane season captured the world's attention, as a series of four major hurricanes—Harvey in August, followed by Irma, Jose and Maria in September—hit the Caribbean and the Americas, causing major losses in lives and assets and provoking unprecedented levels of displacement in the region.

For several years now, students of the course “Environment and Migration” at the Paris School of International Affairs (PSIA) of Sciences Po have sought to investigate cases of disaster-displacement, using qualitative research to complement existing quantitative studies and highlighting the multiplicity of contexts and patterns that prevail from one part of the globe to the other. For the first year, *The State of Environmental Migration* includes contributing authors from external institutions through the Environmental Diplomacy and Geopolitics (EDGE) project that partners the University of Economics in Bratislava, Sciences Po Paris and the University of Liège, and which is financed by the Horizon 2020 EU Research and Innovation Framework Programme.

Through desk studies and interviews with migrants and experts, this year's authors have sought to answer research questions that clearly moved beyond the drivers of human mobility. In particular, the authors described, analysed and interrogated concepts such as socio-ecological resilience (cf. Le Bellec, A.), relocation or resettlement planning in the face of slow-onset environmental changes (cf. Albi, E.), mining projects (cf. Willms, A.), recurring floods (cf. Li J.), as well as disaster preparedness (cf. Ferret-Lambert A.). The authors have also examined the way socio-economic vulnerabilities as well as internal and external politics have affected the (im)mobility decisions and strategies of different categories of islanders during the destructive 2017 hurricane season (cf. Barnhusen F. and Hofgärtner R.; Guerrero M. and Guatri V.; Puskarova P. and Staron J.).

Three years into the adoption of the Sustainable Development Agenda, of the Sendai Framework for Disaster Risk Reduction, as well as of the Paris Climate Change Agreement (and the subsequent establishment of a task force on displacement), recent research findings such as those presented in this volume back the idea that we must operate a shift from short-term and reactive strategies to more pre-emptive, multisectoral and participatory measures that will pave the way for more sustainable and resilient futures in communities most vulnerable to environmental stressors. These case studies further reinforce the narrative that affected populations should be perceived as active stakeholders of the decision-making process rather than as passive “victims” or mere “beneficiaries” of emergency aid.

Africa

North-Eastern Madagascar and Cyclone Enawo

A discussion of the concept of resilience

Amandine Le Bellec

At the beginning of March 2017, the Joint Typhoon Warning Center, an American army centre in charge of analysing meteorological conditions in the Indian and Pacific Oceans, issued a first cyclonic alert linked to the appearance of a meteorological disturbance in the South-West Indian Ocean. A few hours later, Météo France classified the disturbance as a tropical storm, naming it “Enawo”. On the 5th of March, the disturbance was reclassified into a tropical cyclone; reaching its maximum strength on the 6th with winds up to 231 km/h (maximum winds sustained during one minute, Initial Situation Analysis of OCHA-CASS, 08/03/2017) and being finally classified Category 4 (out of 5) category cyclone on the Saffir-Simpson Scale. A few hours after having reached its peak, Enawo landed in Madagascar through the North-Eastern region of Sava, on March the 7th, causing significant wind-related destruction and flooding. It was the strongest cyclone to hit Madagascar since Gafilo, a Category 5 cyclone that destroyed a significant part of the Madagascan infrastructure in 2004.

Located on the other side of the Mozambique Canal, in the Indian Ocean, Madagascar is an insular African country, and is also one of the poorest countries in the world. In 2017, the World Bank indicated that the extreme poverty rate (\$1.90 per day, in purchasing power parity terms) had remained as high as 76.2% (World Bank, 2017). Most of the population works in the agricultural sector, which is the source of income of 80% of Madagascans; a sector which is particularly vulnerable to environmental disasters such as cyclones or droughts. Those events are unfortunately common, as the World Bank reported an average of three major natural disasters every year in the country. In this sense, the Madagascan cyclonic activity appears as going beyond the dichotomy between slow and sudden onsets. Of course, cyclones are once-off events that only last for a few days. However, in Madagascar, they are also recurring disasters. They often take place several times a year and are seen as part of the meteorological context of the island—and they do not stop populations from conducting agricultural activities in areas that are often affected.

Given the coping capacity of communities in those areas, and their strong reliance on natural resources, the concept of “resilience” appears as an interesting contextual approach for North-Eastern Madagascar. Social resilience was defined by Adger as:

The ability of communities to withstand external shocks to their social infrastructure [...] this is particularly apposite for resource-dependent communities where they are subject to external stresses and shocks, both in the form of environmental variability [...] as well as in the form of social, economic and political upheaval (Adger, 2000: 361).

Although the concept easily took over public discourse around environmental disasters (Cretney, 2014), this notion has also been, since then, a productive site of debate, critique, and reflection.

Given the global poverty context of Madagascar, those considerations lead us to wonder to which extent is resilience an appropriate concept in the analysis of the Madagascan displacements after Enawo. The main hypothesis made here is that socio-ecological resilience can indeed be a useful concept in understanding post-Enawo displacement patterns, but that the understanding of such resilience processes should be broadened to cultural, structural, and economical considerations. In order to test that hypothesis, the first part of this article will be dedicated to the framing of Enawo into the broader cyclonic context of Madagascar and will underline its impact on livelihoods. The second part will be dedicated more specifically to the strategies of “quasi-immobility”, deployed by many smallholder farmers in order to cope with the cyclone and its destruction, and will thus seek to understand some of the rationale behind those strategies. Finally, the last part of this work will focus on the blurring of the socio-ecological resilience concept in the Madagascan context, and will try to provide some potential future axis of analysis.

Methodology

Given the ambition of this paper to analyse how the concept of resilience can be used in the Enawo context, a qualitative research approach was chosen, in order to collect information but also to allow for a discourse analysis. All the information presented in this article originates from different bodies of sources. Those can be divided into three main areas: academic books and articles; grey literature (and, in particular, OCHA reports that followed Enawo); and interviews of the Major General and Deputy Executive Secretary of the *Bureau National de Gestion des Risques*

et des Catastrophes of Madagascar (BNGRC), of the humanitarian project manager of the IOM offices in Madagascar, of two disaster and risk assessment managers at MEDAIR (an NGO present in the North of Madagascar during Enawo), and of a Madagascan person who experienced the cyclone, albeit whilst living on the East coast. Those interviews were mostly conducted by phone, following a semi-structured interview grid.

A Country of Cyclones: Framing Enawo in a Broader Context

It is impossible to understand how Enawo can be a meaningful event when questioning the application of socio-ecological resilience to Madagascar without taking into account the broader cyclonic vulnerability of affected areas. In most of the affected districts, the cyclone caused great damage to livelihoods, crops and essential infrastructure; leading us to wonder what was the reaction of communities to such destruction of their resources.

Cyclonic Vulnerability of North-Eastern Madagascar

The South-West Indian Ocean (SWIO) is a basin particularly prone to cyclones, which mostly take place during the Austral summer, from September to April. The peak activity months are January and February, generally accounting for half of the storms of the season. In their 2011 study on the sinuosity of tropical cyclone tracks from 1977 to 2011 in the SWIO basin, Terry, Kim and Jolivet reported that although the basin was less studied than other areas such as Bangladesh or the Caribbean, the SWIO still accounted for 10% of the cyclones worldwide. Furthermore, as they explain, a significant majority of Southern Hemisphere extreme cyclones take place in this particular basin; such as Huddah (2000), Hary (2002), Gafilo (2004), Indialia (2007), Ivan (2008), or Giovanna (2012) which all reached peaks of winds between 230 and 310 km/h. Beyond those numbers, the SWIO basin is also characterized, from January, by cyclones that are more prone to be sinuously moving—in opposition to those following straight tracks. Sinuosity expresses the deviation of the cyclone's path from the straight line that can be traced between the genesis location of the cyclone, and its decay location. This characteristic is important because such cyclones are more unpredictable (posing a challenge in terms of cyclonic alerts, in particular for populations living in low-lying areas) and tend to last longer, too. In this context, the authors

argued that the Mozambique Channel, Madagascar, Reunion Island, and Mauritius are particularly prone to such sinuously-moving disturbances. This raises important questions for Madagascar and Mozambique, and as argued by Klinman and Reason in their 2008 study:

A better understanding of tropical cyclones is vital for the impoverished nations of Madagascar and Mozambique, which face greater risks of damage and loss of life from these systems [...] Their susceptibility to high impact weather like tropical cyclones compounds the poverty issues (Klinman & Reason, 2008: 234).

Due to its position and its significant land surface, Madagascar is indeed very often on the path of such cyclones—comparatively more so than Reunion Island and Mauritius—which generally land on the island through the North-East, North-West, or South-West coasts. Those areas thus have a greater likelihood of suffering from extreme winds, coastal surges and floods that have a destructive impact on the traditional crops, such as vanilla and cloves.

Image 1.1. A Madagascan Traditional Farmer with Vanilla



© Fabrice Le Bellec

However, exposure to climatic events does not necessarily engender high levels of population vulnerability. Vulnerability, in development research, is defined as “a combination of sensitivity, exposure, and response capacity” (Aktber, Mallick, 2013: 114), sensitivity being the degree to which the system is affected, exposure the degree (strength, duration) of

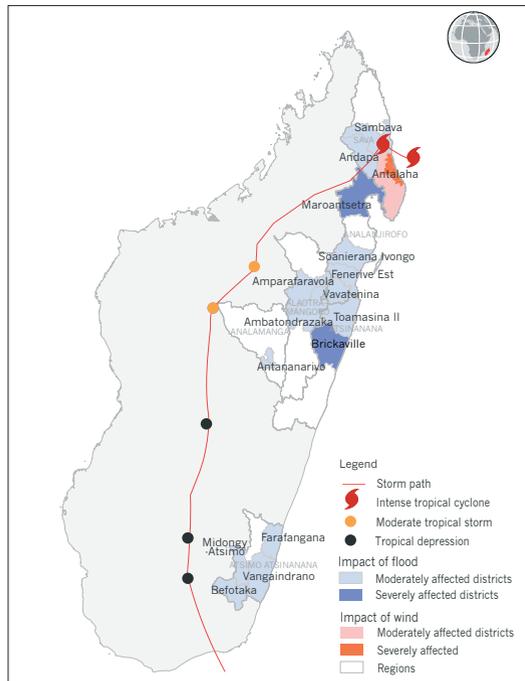
contact with the disturbance, and response capacity being the ability to cope with such disturbance. With high levels of crop, housing, and infrastructure destruction, recurring cyclonic events, hemmed zones and high numbers of post-cyclone displaced people—around 216,500 homeless people were estimated after Gafilo for example (ECHO, 2004)—Northern Madagascar thus fits the definition of cyclonic vulnerability.

The Impact of Enawo: Displacements, Resources, and Infrastructure

Enawo, in this sense, inscribes itself in this broader context, and has affected North-East Madagascar in a typical way, through high winds destruction and floods.

Figure 1.1. Regions Affected by Enawo

Map provided courtesy of the UN Office for the Coordination of Humanitarian Affairs. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations



Source: OCHA, Enawo Flash Appeal, 26 March 2017. Map n° 700 v01, available at: <https://reliefweb.int/report/madagascar/madagascar-cyclone-enawo-flash-appeal-march-2017>

Impact on Livelihoods

The main direct consequences of Cyclone Enawo were emergency displacements due to livelihood destruction and floods, destruction of crops and resources, and impact on critical infrastructure (in particular roads, wells, and public buildings such as schools). In total, 58 districts (out of 119) were impacted, mostly in rural areas, and thus representing 2% of the Madagascan population (Andriamasinoro B., personal communication, 19 April 2018). The agricultural losses were estimated as high as 65% in the Sava region, 85% at Maroantsetra, and finally 60% in the districts of Vangaindrano, Farafangana, and Brickaville, leading the IOM to note that “given the magnitude of the losses caused by this cyclone, farmer households are the most vulnerable and their survival is threatened, and they need immediate assistance regarding food and the recuperation of their means of subsistence” (IOM Madagascar, 2017), underlining that most households only had two-to-three weeks of food left. Houses were principally destroyed in Antalaha and Maroantsetra compared to other districts (due to the increased damage in those areas, but also because of the type of constructions and their locations), and important infrastructure was damaged. Access to drinkable water was a particularly important question since, according to the IOM assessment, 95% of the affected regions were considered as practicing open defecation, which can lead to food and water contamination and potential epidemics when combined with floods.

Table 1.1. Multisectorial Rapid Assessment of Damages

Damaged Houses	Damaged Classrooms	Damaged Health Centres	Water Access
40,520	1,800 totally destroyed 1,500 partially destroyed	104 (16 totally destroyed)	1,300 contaminated 250 damaged

Table created by the author. Source: Internal document provided by IOM Madagascar (Data from BNGRC and cluster members, 16 March 2017)

Furthermore, one of the main difficulties underlined by the IOM was the access to areas of intervention, many of them being only accessible by boat (ten-day trip from the capital) or by plane during the rainy season (expected to last until the end of April, two months later).

Emergency Displacements

Given this significant damage, in particular to houses, Enawo led to many displacements, injuries, and deaths.

Table 1.2. Impacted Regions and Human Toll (Floods and Wind)

Region	Deaths	Disappeared	Affected people	Total number of displaced people	Still displaced
Sava	6	1	236,500	114,500	136
Analanjirifo	7	1	66,800	62,621	470
Analamanga	5	0	33,000	28,783	4,687
Atsinanana	34	1	28,500	19,432	No data
Other regions	24	15	69,500	21,821	No data
Total	81	18	430,000	247,219	5,293

Table created by the author. Source: Internal document provided by IOM Madagascar (Data from BNGRC and Local DRR Committees, 17 March 2017)

What is particularly visible in the data provided in table 1.2. is that the number of affected people¹ is often very close to the number of displaced people. Given that being displaced is a form of being affected, this means that affected people were often displaced (except for the Sava district, where only half of affected people were displaced, as visible in the table above). Mobility was thus a major consequence of Enawo, although most Madagascans returned to their houses very quickly after the end of the cyclone. As reported by Charles Rambolarson, Major General and Deputy Executive Secretary of the BNGRC, “evacuated people went back very quickly to their homes once water levels subsided” (Rambolarson C., personal communication, 24 April 2018), a reaction which also took place more recently after the Ava cyclone (2018) according to Aina Rabodomanantsoa, who lives in Tamatave—an area particularly affected by Ava.

Enawo thus inscribed itself within the historical trend of murderous cyclones hitting Madagascar. It caused significant damages to livelihoods, basic infrastructure and means of subsistence. It also presented a high human toll—leading the Madagascar government to proclaim a state of

¹ The term “affected people” here refers to the portion of the population which suffered damages or losses due to the disaster, and/or were displaced, even momentarily, because of the threat.

national disaster on the 14th of March, and pushing the United Nations and its humanitarian partners to issue an emergency Flash Appeal on the 26th of March, requesting 20 million US dollars (UNOCHA, 2017). Yet, within a few hours or days after the storm, most displaced Madagascans had returned to their homes and started resuming their activities. This leads us to envision socio-ecological resilience as a useful analytical concept in this context.

A Mobile Immobility? Displacement, Adaptive Capacity, and Community Resilience in post-Enawo Madagascar

Indeed, understanding resilience as an academic tool that goes beyond the mere conception of “bouncing back” proves particularly useful in the post-Enawo Madagascar context. It notably allows us to shed light in an analytical way on some of the mobility patterns of North-Eastern Madagascans in this context.

Resilience in the Madagascan Context: An Appropriate Conceptual Approach?

The concept of resilience in social sciences has its origins in ecology, where it was used to describe “a characteristic of ecosystems to maintain themselves in the face of disturbance” (Adger, 2000: 347). Adger was one of the first scholars to question the links between social resilience and ecological resilience, interrogating whether societies dependent on resources, and their institutions, were less resilient or not. In his model, social vulnerability and criticality are the two other main concepts that indicate low levels of resilience. Social vulnerability is here understood as the level of stress of affected groups; and criticality, as defined by Kasperson, “refers to situations in which the extent or rate of environmental degradation precluded the continuation of current use systems or levels of human wellbeing” (Kasperson *et al.*, 1995: 25).

Analysing the Papua New Guinea hurricanes, Adger further underlined how resource dependency upon monocultures created high levels of stress for communities—considerably lowering their level of resilience. For him, the key parameters in the observation of social resilience were both economic and institutional (economic growth, income stability, stability of livelihoods as encouraging human and technological development), but also demographic. Although he argued that resilience could not be simply

inferred from the presence of migrants or variations in the population, he described population displacements as showing high levels of external stress, and “indicating breakdowns of social resilience” (Adger, 2000: 355). His framework was further developed by many scholars, who complexified it by describing the processes of adaptive capacity (ability to learn from previous events and prepare for future ones), transformation (shift of one system from one state to another), and community capacities (social and structural preparedness). In this sense therefore, adaptation refers to “the patterns and processes of behaviour that engage change to maintain a system within the parameters of critical thresholds” (Cretney, 2014: 630).

Although North-Eastern Madagascan communities did not fit very well within the economic and demographic criteria of resilience as defined by Adger—since they often face income instability and displacements—their ability to maintain the system in which they lived pre-Enawo was quite striking. Agricultural diversification as an adaptive response was reported (Alizany *et al.*, 2010). Furthermore, as reported by Aina Rabodomanantsoa:

Everyone went back home, because the houses I told you about, they’re quick to build [...] they can be assembled and disassembled very easily and that’s also why they use it [...] And they repair them quickly because there’s wood everywhere (Rabodomanantsoa A., personal communication, 12 April 2018).

Social resilience in the sense of community-based solidarity also seemed to function quite well during Enawo, with many cases of displaced people staying at friends’ houses (rather than in centres) being reported by NGO workers during interviews. Further disentangling economy from short-term resilience, Aktber and Mallick underlined how, in the cyclonic context of Bangladesh, poorer populations were indeed more vulnerable, but that “this high vulnerability did not necessarily lead to low resilience, as these individuals exhibited a greater ability to withstand the shock” and to restore their pre-cyclone state (Aktber, Mallick, 2013: 114). On a longer-term approach, however, those populations were more affected in terms of socio-economic resilience—trapping them further into poverty. In this sense, the analytical framework of resilience and its current developments provide a key to understand the Madagascan context. Despite recurring and extremely serious damage and losses, Madagascan communities have been persisting—and subsisting on crops—for centuries in the North-East. And if short-term resilience based on social institutions and adaptive responses have almost always been quite effective so far, the

difficulties in developing resistant infrastructures, technology and human capital can also be explained as a longer-term detrimental impact of cyclones on socio-economic resilience—a process in which Enawo has participated by destroying livelihoods and means of subsistence.

Quasi-Immobility? Mobility Patterns of North-Eastern Madagascans During Enawo

As underlined earlier, although the number of displaced people post-Enawo amounted to almost 248,000 persons, the assessment led by the BNGRC and its humanitarian partners on the 17th of March—*id est* ten days after the impact of the cyclone—reported that this number had dropped substantially to 6,634 persons, with most of them located in the district of Analamanga (near Antananarivo, where many preventive evacuations took place, and which faced a particular context due to its high degree of urbanization) (BNGRC & Humanitarian Country Team, 2017). Most of the people located in the North-Eastern districts, however, had already come back to their homes. Several mobility patterns post-Enawo can be underlined: the major response was the one of “quasi-immobility”—emergency evacuations within the same locality—although many cases of total immobility were reported, along with the particular case of the definitive displacement of an entire village.

Emergency Evacuations: The Most Common Paradigm

During interviews, most actors were particularly reluctant to use the terms “migration” or even “displacement” in the Enawo context. Although the definition of environmental migrants given by the IOM includes those who are obliged “to leave their homes or choose to do so, either temporarily or permanently”, the idea that displacement should be at least a medium-term process (with possibly displacement camps) is still very present. Indeed, this idea of “minimum length” of mobility as legitimizing its “displacement” label, does not really correspond to the main type of mobility entailed by Enawo. As explained by Cyril Eicher, risk and disaster assessment manager for the NGO MEDAIR:

For cyclones, people will seek refuge not far from where they live, sometimes in the churches, or in the schools, or in the refuge-house that we have built. But they will not move very far away [...]. This is not a migratory flux like in conflicts for example, when people are forced to leave their

homes [...]. Those dynamics are rather 'closed', let's say, it's not even at the regional or district scale (Eicher C., personal communication, 27 April 2018).

Most people seem to have made the choice of a "mobile immobility": while staying as close to their home as they could (and often staying in the very same village, only a few meters further away), they evacuated for very short-time periods and went directly back to their land once the cyclone had passed or the water subsided. For her part, Ketsia Bonnaz, who was responsible for the MEDAIR emergency response, explained that in Maroentsetra, although the water level rose very rapidly on the 8th (sometimes a meter within a few hours), it also decreased quickly on the 9th, and that, as a result, there was almost no one in the refuges on the 10th, prompting MEDAIR to cancel its visits to the centres as early as the 11th (Bonnaz K., personal communication, 19 April 2018) This seems to have been the principal displacement pattern according to reports (UNOCHA, 2017), and also interviews with the IOM, MEDAIR and the BNGRC.

Immobility

However, cases of non-evacuation and immobility were also reported. As explained during his interview by Charles Rambolarson, Major General and Deputy Executive Secretary of the BNGRC, "the alert system does not cover the full territory, and some risky areas are in remote zones" (Rambolarson C., personal communication, 24 April 2018). Populations in such zones are at particular risk, since they live in non-concrete houses and in areas that are not easily accessible by humanitarian aid, but very often choose not to move. As Aina Rabodomanantsoa underlined:

If they have somewhere to go, they move. The houses made from ravinala [ravenala madagascariensis, a tree from the strelitziaceae family often called traveller's palm], they are not very strong [...] But some people stay in there [...], those who did not have choice, who were too far away from cities [...]. If they are very far away, they won't leave their things, or take their things into centres and then bring them back. Generally, they stay in their houses, and if they can, they go to concrete houses (Rabodomanantsoa A., personal communication, 12 April 2018).

Non-evacuation, in this sense, is often linked to isolation; in particular in a context where all roads will be cut-off after the cyclone (due to fallen trees or floods) and this will stop farmers from going back to their crops.

Furthermore, as underlined by Cyril Eicher, many farmers are reluctant to leave their land and their houses; and even if they do so in case of imminent danger, it is often not their first strategy. Despite the high level of danger, mobility, even for short distances, is far from being a self-evident strategy for smallholder farmers, who prefer to prepare their houses for the cyclone by securing the roof rather than immediately leaving (Rakotobe *et al.*, 2016).

Long-Term Displacements: The Ambodiaramy Village

Finally, the only case of long-term displacement that was reported by Cyril Eicher—and confirmed through a local press review—was the case of the Ambodiaramy village (Maroentsetra district), which disappeared under a landslide two weeks after Enawo, around March the 18th. The landslide having occurred during daylight, no victim was reported, but the entire village had to be resettled—all wood houses being destroyed. The district referee reported to the press that the landslide was caused by the heavy rain that took place during and after Enawo. The Ecology General Director of Madagascar underlined that the erosion processes that led to this disaster—particularly in a district which is not particularly at risk of landslides—were linked to the reduction of forest cover in the area. This last case shows how the combination of traditional factors (cyclones) with more modern ones (deforestation and soil erosion) can lead to new types of displacements; the inhabitants of this village being unable to go back to their land after evacuation, and thus becoming homeless.

Resilience, and its social and environmental components, thus prove particularly useful to understand the North-Eastern communities' displacement patterns as being part of an adaptive response to recurring environmental disruptions. With the exception of the Ambodiaramy village, most farmers prepared their house for the cyclone and made the choice of emergency evacuation only in face of a direct threat. Livelihood reintegration, similarly, took place within a short amount of time—and whilst the death toll remained high and crops suffered significant damage, most of the population was able to return to pre-cyclonic housing and activities within a few days or weeks.

Blurring the Meanings of Resilience: Discussing *tany* and the Politico-Economics of Enawo Displacements

However, focusing solely on a population's ability to return to their homes and rebuild their houses would be extremely simplistic. Thus,

acknowledging the importance of *tany* (land) in the Madagascar context proves essential to understand a community's strength in the face of recurring shocks. This will lead us to a discussion of the blurry frontiers between "adaptive response" and "obligation to stay", analysing some of the shortcomings of the resilience framework before suggesting some developments of the concept in the post-Enawo displacement analysis.

Talking tany: Social and Symbolical Importance of Land in Madagascar

The predominance of Madagascar quasi-immobility responses in front of severe livelihood disruption is particularly interesting in the sense that it illustrates some of the current trends of (im)mobility studies. Following Zickgraf's research, (im)mobility is understood as a spectrum which should encompass at the same time agency (the will to be mobile or immobile) and mobility potential (the potential to act according to this will) (Zickgraf, 2018). As Zickgraf notes, the focus so far has been on environmental migration rather than on immobility; and when the focus moves toward immobility, the emphasis is often put on "trapped" populations (those who want to migrate but cannot) rather than on those who decide to stay. In post-Enawo Madagascar, both perspectives were illustrated: while evacuated Madagascans were well represented in the media, their quick return to their homes was far less mediatized—as if it was a normal, instinctive human behaviour—and those who did not move were generally portrayed as trapped and isolated. Although such situations took place, it covers up the fact that many evacuated Madagascans that were close to shelters first decided not to move—or did not move at all if possible. As Cyril Eicher underlined:

Regarding Enawo, usually people stay where they live. Why? Well, they know very well that it's dangerous, and there are areas where we will really encourage them and tell them, 'you should move because we cannot do anything here, because of the river' [...]. But the people, of course, it's their land, it's theirs. And land is very, very important. It is their livelihood and their mean of subsistence; and at the cultural level, it's their ancestors' land. There are generations and generations which lived there, so they're not going to move, they stay here, because it's here that they have

buried their ancestors. And this also happens in the South (Eicher C., personal communication, 27 April 2018).

When he refers to Southern Madagascar, Eicher alludes to the current dramatic drought affecting Tandroy agro-pastoralist communities. However, those clans are known to stay into place despite such environmental challenges, a decision that was described by some scholars as a “social contract with the ancestors”, underlining the importance of ancestry as an organizing force in Madagascan communities (Von Heland, Folke, 2014: 251). As Adger, Safra de Campos and Mortreux wrote, places do matter—in terms of capital but also as social constructs “that imbue lives with meaning and security” (Adger, Safra de Campos & Mortreux, 2018: 28). This is particularly true in North-Eastern Madagascar, where, as argued by Osterhoudt, “agricultural terrains are ideological terrains, where farmers cultivate crops and meanings” (Osterhoudt, 2010: 284). The traditional term of *tany* expresses the sense of land as a place of spirits, burial grounds, ancestors, and fields; somehow in opposition to the more recent and environment-oriented term of *tontolo’iainana*. In this sense, land has great significance for Enawo-affected communities. Those desires of immobility should not be underestimated, since most interviewees referred to land in order to explain the limited and often reluctant mobility (and sometimes total immobility) patterns of Enawo-affected populations.

However, the socio-symbolical importance of *tany* cannot fully explain how North-Eastern communities can be hit by cyclones sometimes several times a year, and still have the ability to evacuate and come back within a few days.

Going Back Home: The Blurry Frontiers Between Adaptation and Obligation

It is important to take into account adaptation processes in order to understand the Madagascan quasi-immobility. It is indeed almost impossible to understand the coping capacity of communities and their quick reconstruction efforts without paying attention to the materials used for house construction—principally *ravinala*, *raphia*, and sometimes other woods or mud bricks. Such materials are not very cyclone-resistant, but they are local and can be collected from forests (Rakotobe *et al.*, 2016). When used well, *ravinala* also proves to be particularly adapted to the tropical climate of Madagascar; being at the same time waterproof, and an excellent thermal insulator—in contrast to sheet metal materials. As confirmed

Image 1.2. A Traditional Madagascan House Built from *ravinala*



© Fabrice Le Bellec

Image 1.3. A Madagascan House Built from Metal Sheets



© Fabrice Le Bellec

by Aina Rabodomanantsoa and Cyril Eicher, *ravinala* is therefore used as a cheap, local, traditional, and easily mobilized resource—thus explaining at the same time the high numbers of displacements and serious damage, but also the ability of communities to restore quite quickly their pre-cyclonic housing conditions. Traditional adaptive responses, one of the key concepts of resilience, have thus been developed by local communities who have been affected by cyclonic events for generations.

However, analysing the quasi-immobility patterns of North-Eastern Madagascan communities only through the “adaptation” lens would be insufficient, as processes of adaptation and obligation are highly intertwined in this situation. Of course, communities have developed traditional adaptive responses in response to recurring cyclonic events. However, one should also be aware that beyond the question of migration aspirations, the migratory abilities of Madagascan smallholder farmers appear limited; particularly in terms of macro-structural migration barriers and personal characteristics. Evacuating means separating oneself from one’s land, which, beyond being a social construct, is also very often the only means of subsistence for farmers. Among other things, fears of having one’s crops stolen was reported (Rakotobe *et al.*, 2016). Longer-term mobility is also prevented by the specific skills of farmers, which are mostly developed in the agricultural field. Cyril Eicher reported that most long-distance mobilities were developed in order to sell products, and not in order to definitively move away. Finally, macro-structural barriers such as the destruction of roads and infrastructures also explain the choice of some farmers to stay at home, given that they would not be able to leave, or to return later. In this sense, if quasi-immobility can be analysed in terms of cultural symbolism and social adaptive capacity to the cyclonic context, the high limitation of other types of mobilities due to more structural and economic factors should not be underestimated. Both trends appear highly intertwined (the choice of the *ravinala* being, for example, at the same time a choice as a traditional practice, and a non-choice given the unaffordability of other materials) and trying to disentangle them proves tricky—leading to the blurring of the adaptation/obligation frontiers. This entanglement is of particular relevance in the current context of climatic change. While Madagascan communities have always dealt with cyclones, the Major General and Deputy Executive Secretary of the BNGRC Charles Rambolarson underlined that the situation was expected to change, and that “according to the studies and research led, we are expecting an intensification of cyclonic winds, and a tendency for them to have their impact point in Northern Madagascar” (Rambolarson C., personal communication, 24 April 2018).

Traditional responses to cyclonic activity were not exempt from a high human toll (including for Enawo), but the risk appears very likely to increase; and should stronger desires for mobility emerge, the mobility abilities of North-Eastern Madagascan populations appear relatively limited.

Employing Zickgraf's framework, if current economic and socio-cultural factors had outweighed cyclonic threats until now, such an (im) mobile environment could be influenced by environmental changes (the increased intensity and frequency of cyclones being one of its effects). The question of what Madagascan farmers will want and will be able to do does not have any definitive answer yet.

Discussing Socio-Ecological Resilience as a Concept for the Future

Thus, in this particular case, resilience takes a particular meaning. Madagascan communities' ability to restore a pre-Enawo *status quo* is remarkable, but previous considerations on limitations of mobility also echo some of the critiques that were formulated against the concept of resilience. As underlined by Brown:

By considering resilience as an end or an outcome of action, much literature [...] assumes there is a consensus on the 'desired state' or that a desired state even exists. Second, resilience as a process overlooks conflicts over resources and the importance of power asymmetries [...] Furthermore, resilience is depoliticized and does not take account of the institutions within which practices and managements are embedded (Brown, 2014: 109).

Those critiques have led to the "socialization" of the resilience concept by the academic community since then. However, the point made by Brown is still valid in the case of Enawo-induced displacements. The argument here is not to say that it is a bad thing that North-Eastern Madagascans are able to go back quickly to their homes; nor is it to say that they do not aspire to this. However, it is necessary to stress that if communities are able to re-establish a pre-cyclonic state, it is also because the pre-cyclonic infrastructure standards are often low. Houses in *ravinala* or metal sheets are easily destroyable, and yet quick to rebuild. Madagascans living in concrete houses may suffer damage too, and as reported by Aina Rabodomanantsoa, after Cyclone Ava:

Our house door was completely broken [...] we have a big house, quite recent, but there were floods everywhere [...] finally we went to the hostel because we couldn't manage the floods anymore (Rabodomanantsoa A., personal communication, 12 April 2018).

In such cases, the household may have to engage in repairs that are more expensive than re-building a *ravinala* house. Yet, this does not mean that in terms of cyclone-protection it is better to live in a *ravinala* house than in a concrete one that is known to be more resistant. In the Madagascan context, thus, resilience is a useful concept to capture the coping capacity of communities and their strategies of quasi-immobility. However, such usefulness should not stop scholars from analysing what is the *status quo* that is re-established through resilience—in particular when the World Bank remarks that the very positive economic growth of Madagascar has not benefitted most Madagascans (World Bank, 2017).

Leaving those outcome-based considerations for a more processual analysis, one could also wonder whether factors—exterior or interior to the community—could affect (in a positive or a negative way) resilience in this context. In particular, it seems that in North-East Madagascar, resilience is not only enabled by intra-community traditional adaptation processes, but also by the work of NGOs. MEDAIR for example focuses particularly on resilience reinforcement, through trainings aimed at helping communities to “build back better”² (while still using the *ravinala*) and the training of local emergency committees. Those actions have had concrete positive consequences on the handling of Eliakim (2018), according to Cyril Eicher. On the other hand, one should not underestimate the processual nature of intra-community traditional resilience itself. If the symbolic force of *tany* appears as a structural component of Madagascan post-cyclonic mobility patterns, some authors have underlined how those traditional visions were changing for younger generations. Von Heland and Folke, for instance, underlined the decrease of kinship culture in Southern Madagascar agro-pastoralist communities; and Osterhoudt underlined how the concurrence of the *tany* and *tontolo'iainana* terms led farmers to envision their relationship to their fields differently—decreasing part of its symbolical weight. This is one of the potential blind spots of socio-ecological resilience that needs to be addressed for the future: beyond exogenous changes and from an internal point of view, communities are not

² “Build Back Better” is a concept which was initially developed by the United Nations Office for Disaster Risk Reduction. It aims at integrating disaster risk reduction measures to the restoration of infrastructure and systems.

meant to be indefinitely stable objects, and can as such be affected by endogenous factors. This idea of endogenous change as affecting the traditional migration patterns of North-Eastern Madagascar was reported by Cyril Eicher, who underlined that:

Now, young people are more likely to migrate. They do not have the same connection that their parents had, at the cultural level, [with land], and more and more of them are migrating without thinking about it twice, let's say (Eicher C., personal communication, 27 April 2018).

Those endogenous changes and their impact on traditional resilience indeed echo the previous considerations on what the "*status quo*" meant. This leads us to consider not only the analysis of the level of desirability of this *status quo*, but also to question *for whom* is this *status quo* desirable. The answer to both questions is absolutely essential in the analysis of the post-Enawo context and the displacement patterns induced by the cyclone. The argument expressed here is that those questions can be of broader relevance and should be taken into account in the analysis of socio-ecological resilience in general.

Conclusion

The 2017 Cyclone Enawo has considerably affected Madagascar and led to significant numbers of displaced people. Those displacements mostly originated from the destruction of houses, although very high levels of crop damage and infrastructure destruction were reported. The impact is severe for North-Eastern Madagascan communities, which are often located in isolated zones during the austral rainy seasons and rely principally on subsistence and cash-integrated crops. However, and despite the high destruction rate, most displaced people in the North-East returned to their home within a few days. It is this observation that has led us to consider socio-ecological resilience as a relevant concept in the analysis of Enawo displacement patterns. Madagascar being hit regularly by serious cyclones, our hypothesis was that communities had developed some forms of adaptive capacities in order to face such events. Although this hypothesis has not proven wrong, we were led to refine it further; particularly in the light of the critiques that were formulated against the very concept of resilience. Indeed, adaptive capacity and socio-cultural meanings are important elements to consider in explaining the quasi-immobility patterns of Madagascans. The cultural and economic importance of *tany* and of the use of *ravinala* can explain part of the reluctance

of Madagascan farmers to leave their fields, but also the high rates of destruction and quick processes of reconstruction—all those aspects leading to a main mobility pattern that follows an “emergency, short-term, evacuation” scheme. However, those explanations are not self-sufficient, as they are themselves interwoven into a broader economic and structural context that also shapes Madagascans’ choices of immobility. This reality needs to be taken into account when it comes to human losses that occur with almost every cyclonic event. Furthermore, it is also a context of particular importance given the researchers’ expectations of stronger winds and increased cyclonic activity in North-Eastern Madagascar as linked to climate change. Although local BNGRC committees, NGOs and communities seem to be working toward the development of resilience in such context, traditional strategies of coping are likely to be challenged in the future—whether by exogenous changes linked to climate change, or by endogenous factors such as the new migratory behaviours of the youth.

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Americas and The Caribbean

“Cutting off your arms so you can still walk”

Resettlement planning in the face of coastal erosion and sea-level rise in South Louisiana

Emily Albi

In June of 2017, Louisiana officials updated their master plan to protect and restore the coast. The previous plan, published in 2012, was the product of a particularly ambitious and optimistic Coastal Protection and Restoration Authority (CPRA), the state agency created after Hurricanes Katrina and Rita and charged with coordinating a targeted response to coastal erosion and sea-level rise. In the five years between the 2012 report and the 2017 update, climate science and the plan’s authors took a much more pessimistic view of local sea-level rise predictions. The changes in the underlying climate science had a dramatic effect on the CPRA master plan for the Louisiana coast. The 2012 report had been a blueprint for building land to offset losses, banking on enormous federal buy-in for the many large-scale engineering projects required (CPRA, 2012). The 2017 report struck a more pragmatic tone: even with a large, fully funded restoration program, the focus in the future would have to be on limiting the damage and strategically retreating from inevitable land losses (CPRA, 2017). This sharp change in public policy coincided with a declaration of state of emergency by the governor of Louisiana, meant to mobilize federal resources for coastal restoration projects that the state alone could not provide (Office of the Governor of the state of Louisiana, 2017). Coastal populations were going to have to find ways to adapt or to face serious resettlement decisions. In short, 2017 in coastal Louisiana was a year of reckoning with the future.

Since the 1930s, the Louisiana wetlands have lost more than 1.900 square miles—an area equivalent to the entire state of Delaware (Gotham, 2016). The United States Geological Survey uses a sports analogy to describe the rate at which land is vanishing: a football field’s worth—5.000 m²—of Louisiana wetland disappears every 100 minutes (Sack & Schwartz, 2018). Coastal erosion, subsidence, and climate change-induced sea level rise have all contributed to the rapid degradation of the wetlands. Beyond anthropogenic climate change, forces attributable to humans play a significant role in wetland loss: the extensive building of levees

the experience of residents in the area whose homes are just beyond the levees. Although levees and floodwalls surrounding New Orleans failed many during Katrina, protections have since been strengthened, and at a minimum, they exist (Fussell, Curtis, & DeWaard, 2014). Louisianans living in small communities outside the floodwalls live with a completely different reality. Their survival during storms is, and has traditionally been, in their own hands. They face increasingly violent storms and unforgiving sea level rise, due to factors far beyond their control. These populations, which include indigenous groups living on reservations, are especially vulnerable. Because they often depend on the quality of the environment for their livelihoods, coastal erosion, subsidence, climate change-induced sea level rise, and factors like oil spills can severely damage their economies and ways of life (Melillo, Richmond, & Yohe, 2014). Consistent with the CPRA's proclamation of climate realism in 2017 and Louisiana's declaration of a state of emergency, community groups living in the far reaches of Louisiana's swamp land are already facing resettlement decisions and processes. Some communities are moving at a family-by-family pace, others, in a planned community resettlement process. The financial, logistical, and moral challenges they face will serve as one of the nation's first points of reference as climate change renders decisions like theirs increasingly common.

Relocation is often discussed as a last-resort option. Indeed, relocation, as opposed to resettlement, can be thought of as the inevitable moves individuals will make when faced with uninhabitable living conditions. Resettlement, on the other hand, will be used in this paper to describe the intentional community uprooting and movement to a new community site. Although resettlement may also be considered a last resort, this paper will address groups which have already arrived at their last resort and are seeking to limit the damage to their culture and livelihood through their move.

This paper will focus on the resettlement decision-making process in response to environmental pressures facing marginalized communities outside the floodwalls in coastal Louisiana, in particular the community of Isle de Jean Charles. First, the geographic, environmental, and socio-economic background of coastal Louisiana will be explored. Then, the historical, geographic, economic, and legal challenges which directly threaten coastal communities will be discussed. The first official resettlement in the area—that of Isle de Jean Charles—will be documented. This case study will then examine how discussions regarding risk and resettlement have been managed within Isle de Jean Charles and compare that to similar

community engagement used to prepare the 2012 and 2017 Master Plans for the state of Louisiana. A comparison of the government response to Isle de Jean Charles with Newtok, Alaska's similar plight, will expose how policy can evolve to manage the impending crisis of climate change-induced environmental migration. As more and more communities become exposed to severe effects of climate change, this is a process that will need to continue to be improved, especially in coastal Louisiana.

Background

The formation of the Mississippi River Delta plain is crucial to understanding the modern ecological condition of coastal Louisiana. Throughout the past 8000 years, the Mississippi River regularly flooded, slowed, and deposited sediment beyond its banks. Historically, the Mississippi has not followed one single path, rather, it has regularly changed course through siltation and erosion (Economist, 2017).

Once Europeans settled in New Orleans, these regular floods were no longer compatible with the desired way of life. Starting from the 18th century, levees began to be built to control the Mississippi. The Great Flood of 1927 inundated 23,000 square miles of land, displaced 600,000 people (Economist, 2017), and compelled lawmakers to pass the Flood Control Act of 1928 (CPRA, n.d.). This new law authorized the U.S. Army Corps of Engineers to implement new projects to control flooding on the Mississippi River and its tributaries, including a new spillway system. The taming of the Mississippi River cemented its central role in the American economy by creating a dependable and smooth shipping route. However, depriving the delta region of the sediment deposits it had received for millennia has resulted in massive erosion.

In September of 1901, oil fever originating in Texas reached Louisiana. By 1905, Louisiana was a significant oil-producing state, and by the 1930s, shallow marshes in South Louisiana became the focal point of the country's oil production. South Louisiana had built refineries, dug pipelines, and erected rigs and servicing wells. A veritable industry had been created around oil and gas. To this day, the state remains not only a large producer of American oil, but also a major natural gas hub. In order to build out the infrastructure that enabled this industry, wetlands were dredged and canals built (The Times-Picayune, 2011). From an environmental point of view, this only aggravated the ongoing damage to the pre-European ecosystem. The channels built by oil and gas companies introduced salt water to the wetlands, which killed marsh and woodland plants that were adapted

to fresh or brackish water. Fewer plants means less organic matter in the marshes, which makes them more vulnerable to sinkage. The extraction of oil, gas, and groundwater compounds this effect. The lack of organic matter coupled with erosion due to lack of sediment deposits largely explains the subsidence, or sinking, along the Louisiana coast (Melillo, *et al.*, 2014).

Coastal lands are not just threatened because they are sinking, but also because sea levels are rising. Anthropogenic climate change, melting polar ice caps, more frequent and severe storms, and rising global temperatures contribute to a rising sea level disproportionately affecting the Louisiana coast. The National Oceanic and Atmospheric Administration has measured relative sea level rise in coastal Louisiana at above nine millimetres per year, the highest rate in the Americas and one of the highest in the world (NOAA/National Ocean Services, 2013). Climate change in Louisiana is a major contributing factor to communities suddenly finding their homes underwater, as a direct result of sea level rise and more frequent and powerful storms.

Resettlement of Isle de Jean Charles

Isle de Jean Charles is a tiny strip of land in the Louisiana wetlands home to the Biloxi-Chitimacha-Choctaw band of Native Americans, located in Terrebonne Parish, Louisiana. Today, there remains only a narrow ridge of land between Bayou Pointe-aux-Chênes and Montegut that makes up Isle de Jean Charles. The strip of land is only two miles long, and one quarter of a mile across (Maldonado, Shearer, Bronen, Peterson, & Lazrus, 2013). Bayou St. Jean Charles divides the tiny island, which has a road on only one side (Peterson, 2012).

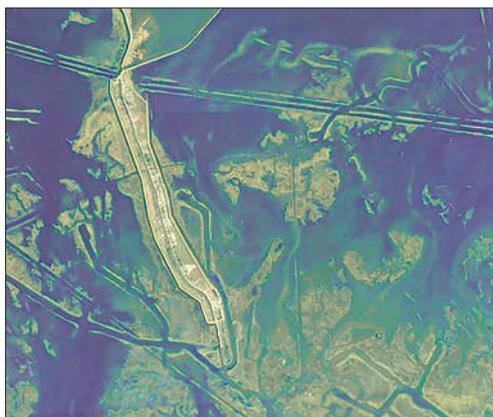
The island was originally founded when Native Americans were violently driven off their land in another migration event: the Indian Removal Act of 1830 (Maldonado, *et al.*, 2013). To avoid persecution, the Biloxi-Chitimacha-Choctaw Tribe escaped to dense forested parts of the bayous then dubbed “uninhabitable swampland” (Stein, 2018, para. 31). If native peoples succeeded in taming the swampland for human habitation, their lease has since run out. The island has lost 98% of its land since 1955, due to climate change and the previously discussed environmental factors affecting south Louisiana. Below in image 2.2. is an aerial photograph of Isle de Jean Charles in 1963. Image 2.3. is a photograph taken in 2016, after 53 years of rising seas, sinking land, and human development.

Image 2.1. Aerial Photograph of Isle de Jean Charles, Taken in 1963



Source: U.S. Geological Survey, 2018

Image 2.2. Aerial Photograph of Isle de Jean Charles, Taken in 2016



Source: U.S. Geological Survey, 2018

Perhaps due to its rapidly decreasing land mass, Isle de Jean Charles has the dubious distinction of being the first recipient of government-provided resettlement funding. In 2014, the Obama Administration announced the National Disaster Resilience Competition (NDRC). The idea behind the NDRC was to help modernize U.S. disaster relief management. The status quo was for federal agencies to react to disasters; Obama wanted his administration to prepare and plan for their inevitability (Stein, 2018).

The community of Isle de Jean Charles already had the will to relocate, having made two unsuccessful attempts, and their submission to the NDRC finally won them the funding they needed to execute their plans. The stated aims of the relocation project funded by the federal government were:

1. To provide a safe resettlement for members of the Isle de Jean Charles tribe who are descendants of the historic Biloxi, Chitimacha, and Choctaw tribes through blood lineage and cultural heritage;
2. Through careful observations of the resettlement process and outcomes to gain practical insights into the process of resettlement as an adaptation strategy that can serve as a model elsewhere and can be reproduced by coastal communities throughout the U.S., a country where more than 13 million people must soon reckon with inundation due to rising seas (Isle de Jean Charles band of Biloxi-Chitimacha-Choctaw Tribe—Lowlander Center Re-settlement, n.d., para. 2).

Based on these principles, Isle de Jean Charles was awarded \$48 million to proceed with their attempt to ensure both environmental and cultural resiliency via resettlement. The process they went through, and the challenges that played into—and continue to play into—the process every step of the way are perhaps the first of their kind in the U.S. Although they are preceded by resettlement decision-making processes in other communities, the level of involvement of the federal government is in fact a novelty. The lessons learned from their experience are important for the country’s leadership to take note of and are worth detailed examination.

Historical Perspective: Considerations in the Resettlement Process

Despite the tiny island’s meagre remaining population of 99, the fate of the community in Isle de Jean Charles has risen to national prominence. Not only is it one of the first places in the U.S. to be forced to relocate due to climate change, but it is the home of native peoples with an extra layer of legitimacy in claiming government support for a move. The Indian Removal Act that pushed the tribe out of their ancestral territory and into the swamplands is widely viewed a blemish in American history for which amends are plainly deserved (Melillo, *et al.*, 2014). Despite the murky circumstances which brought the Biloxi-Chitimacha-Choctaw peoples to Isle de Jean Charles, there is significant place attachment

that has developed in the generations since the tribe has been installed on their island home. “I’ve lived my whole life here, and I’m going to die here”, said Hilton Chaisson, patriarch of a large family rooted in Isle de Jean Charles (Davenport & Robertson, 2016, para. 36). During a workshop to discuss resettlement, another tribal member added colour, saying:

If we lose the Island we lose what brings us back to it. And that’s the idea that that was our place. It was our place. Everybody else can say the government considered it uninhabitable, and we took it and inhabited and we made it our place, and now it’s gone. It’s going. And if it goes we’ll no longer have our special place. That’s the one thing that keeps us together as a community, as a reservation, is we had our place. We don’t have our place anymore. We have no place (Maldonado, 2014, p. 62).

Evident in this quote is the deep connection the Biloxi-Chitimacha-Choctaw tribe feels to their land, despite a relatively recent relocation there. Also striking in this quote is the importance of community to the reservation of Indians. It is clear that the only type of acceptable resettlement for them will need to suit their tribe as a whole, since continuity of culture for them will only exist with continuity of community. Although the prevailing sentiment in 2012, when community discussions were held that generated that quote, was the importance of ancestral lands, many today are fed up with the recurrent flooding, and are ready to go, saying it’s “becoming too frightening [there]” (Economist, 2017, para. 2). During an engagement proceeding in late 2016, 50 percent of island residents expressed a desire to resettle (Hill, *et al.*, 2016).

A broader view of history encompasses a pattern of relocation projects sought by interested groups, resulting in a “long history of dissatisfaction with and resistance to relocation policies” in the coastal Louisiana region (Dalborn, Hemmerling, & Lewis, 2014, p. 18). Because of this healthy historical distrust of government agencies and other offers of “help”, the first step in the resettlement process has been trust-building between the Louisiana Office of Community Development, Disaster Recovery Unit (OCD-DRU) and Isle de Jean Charles community leaders. Despite years of organized consensus intention to relocate, since receiving the NDRC award, progress has been slow. In the words of the Resilience Program and Policy Administrator for the OCD-DRU, Mathew Sanders, “There’s no shortcut to building trust” (Stein, 2018, para. 32).

The delay is partially due to the time it has taken for the leaders of Isle de Jean Charles to develop a relationship with the OCD-DRU, but is compounded by the reality that there is no successful blueprint to work with for a process like this in the U.S. In addition to historical reasons for a delayed move, logistical issues arising from geographic and economic challenges with relocation have contributed to significant debate and delays.

Geographic and Economic Challenges

It may seem like a funded resettlement proposal with a generally willing population has cleared the major hurdles required for the move, however, the hard questions seem only to get harder as resettlement nears. The foundational question of what site to choose generates passionate debate. On the one hand, the farther the new site is away from the water, the safer it will be. On the other, members are reluctant to go too far from the heart of their old lives—homes, schools, jobs, extended family. The new site must have economic opportunities that match those of the land they will leave behind, which necessitates a complex selection process. It will not do to exchange one crisis, the inundation of water, with another—widespread unemployment.

The Biloxi-Chitimacha-Choctaw Tribe of Isle de Jean Charles has historically been a fishing, trapping, and hunting community. Today, because of dramatic loss of wetlands and other forms of storm protection to the south, the island is more vulnerable to storms and hurricanes than ever before. Notably, gardens and hunting grounds are gone. If or when the community resettles away from their ancestral homeland, what will fuel their economy? Climate change and other human factors create a triple blow for the displaced peoples: not only are their natural resources and way of life drying up, but they are compelled to move away from what resources remain, and on top of that, the move could end up costing them money that they do not have.

The process the community members of Isle de Jean Charles went through to work out the answers to these difficult questions will be examined in the discussion section.

Legal and Policy Challenges

Finally, there are particular legal and policy challenges Isle de Jean Charles faces in planning for and executing its resettlement. Ironically,

due to historical injustices, Isle de Jean Charles is unable to receive federal funding because they are not able to prove continuity of political authority and descent from a historical tribe. Having been forced into isolation in the depths of the bayou likely contributed to the lack of formal treaties declaring the tribe's legitimacy. In 2004, the state of Louisiana officially recognized the Biloxi-Chitimacha-Choctaw tribe, but they have yet to receive the federal recognition that would unlock further funding (Maldonado, 2014).

In addition to the struggle for federal recognition, the residents of Isle de Jean Charles face the challenge of pioneering a planned community resettlement process in the U.S. Even though they have the funding they have long requested, there is a myriad of difficulties regarding accessing the money, coordinating relocation efforts, and other aspects of moving an entire community. Much of the challenge stems from the fact that there is no single U.S. federal government agency charged with managing community adaptation and migration in the face of climate change. Without a leading agency, problems arise in all the predictable ways when there is shared responsibility in a high-stakes, high-visibility project. The policy implication is that the U.S. federal disaster relief infrastructure plainly needs to be updated for the current era of climate change. The Federal Emergency Management Agency (FEMA) was built to respond to occasional disasters in a relatively stable climate, but never was intended to mitigate and adapt to serious climate change (Irfan, 2018). Although FEMA's mission statement on their website declares their goal is to help people "before, during, and after disasters", the majority of their work nonetheless concerns post-disaster recovery (FEMA, 2018). This excludes slow-onset climate disasters, like those happening in Isle de Jean Charles. The case study of Isle de Jean Charles' resettlement shows us that the U.S. either needs a new agency, or a reformed FEMA to manage the climate-induced migrations that are sure to come in the future.

Discussion: Resettlement Planning for Isle de Jean Charles and Implications for the state of Louisiana

As one of the stated aims of the Isle de Jean Charles funding proposal was to carefully document the resettlement process to gain insights into resettlement as an adaptation strategy, there are many resources available that have done just that. This section will focus on the proceedings of the Isle de Jean Charles community group's resettlement engagement process, as well as the broader state of Louisiana's CPRA 2017 plan origination

process, in order to draw insights, comparisons, and lessons for the future. The focus on stakeholder engagement and the decision-making process in this section reflects their importance in the eventual success or failure of a resettlement project.

The Isle de Jean Charles—Lowlander Resettlement Project Team, which is a mashup of multiple organizations, claims to follow 26 standards and frameworks from organizations spanning the United Nations, the EPA, LEED, the Union of Concerned Scientists, and many more (Isle de Jean Charles, Lowlander Center, n.d.). One of the frameworks identified by the resettlement team for Isle de Jean Charles is the work of an anthropologist, Anthony Oliver-Smith, in a white paper entitled “Moral and Ethical Principles for Resettlement”. In his 2016 paper, Oliver-Smith details the moral and ethical motivations for a culturally sensitive resettlement process and concludes by underscoring the importance of “authentic participation” for the “recognition and restoration of the rights of affected people” (Oliver-Smith, 2016, p. 3). Oliver-Smith notes that many past resettlement projects that have been unsuccessful have depended “very little on consultation with the affected population”, which is “generally due to a disparagement of local knowledge and culture on the part of policymakers and planners” (Oliver-Smith, 2016, p. 3). In identifying Oliver-Smith’s Principles as a framework for the Isle de Jean Charles—Lowlander Resettlement Project, the team is declaring its commitment to respectful and collaborative engagement with the affected population. In order to make the best plans that will ultimately gain acceptance, the decision-making process must be inclusive and thorough, engaging the affected community in a way that affirms their superior knowledge of their current situation and future needs.

A recent report on the engagement phase of the Isle de Jean Charles resettlement project describes community meetings, resident interviews, and technical surveys of the sinking Isle de Jean Charles (Hill, *et al.*, 2016). The project team previously referred to is comprised of the Louisiana OCD-DRU, the U.S. Department of Housing and Urban Development, and three consulting engineering and architectural firms. In their report, the project team describes weekly calls with tribal leadership, two community meetings, individual household at-home interviews, and land use and infrastructure surveys that took place between July and October of 2016, the same year the funding was awarded from the federal government. Of note is the project team’s persistence in visiting individual household in an attempt to talk to a representative from each, even if that person was staunchly against resettlement. The

report notes that by October, some residents who had previously refused to speak to the project team shared their household information and thoughts on the move. This shows the first important aspect of resettlement planning: building trust. The project team prioritized speaking only when residents wanted to talk and eventually built enough of a rapport with the community that they were able to speak with residents who were not necessarily open to discussions at the outset. A second important takeaway is the importance of listening to as many residents as possible. Concordia, the consulting firm that led some engagement sessions with residents, spoke with all but four of Isle de Jean Charles's residents. Below in figure 2.2. is a summary of residents' desire to resettle at the time of the engagement talks, as reported by Concordia.

Figure 2.2. Isle de Jean Charles Desire to Resettle (by Household and by Resident)

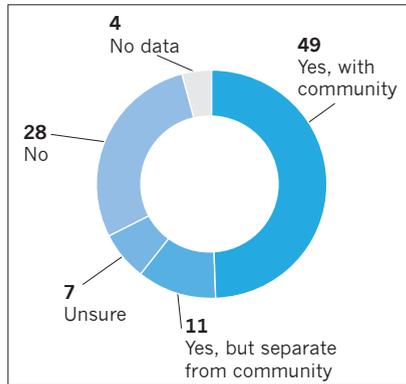


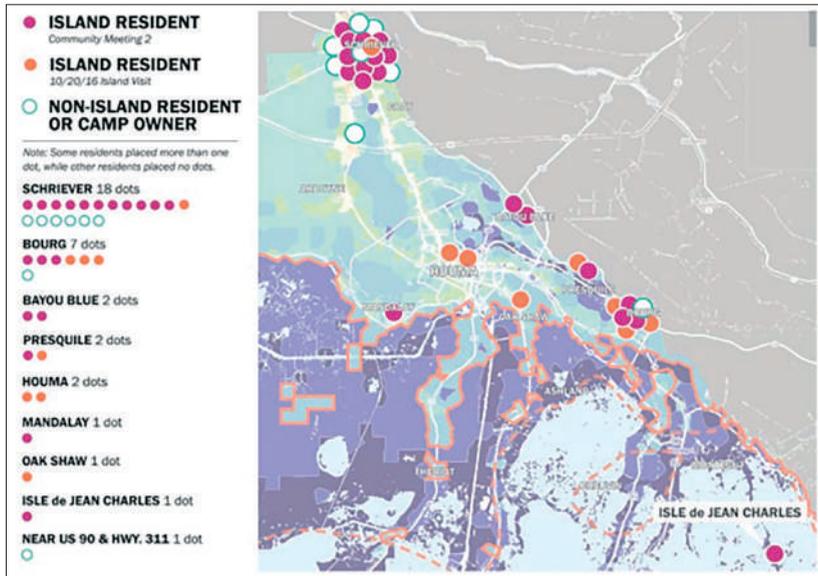
Chart created by author. Source: Hill *et al.*, 2016

Concordia's success in talking with nearly all of the community is crucial. Engagement is a key step in the planning process, since only through engagement and listening can one of the most important outcomes of the project be determined: the location of the new site. Another outcome that can be claimed from the engagement process with Isle de Jean Charles is a narrowing of the options for the new site, and the beginnings of consensus-building. Below in figure 2.3. is a map showing the chosen locations of the new site from different meetings, with consensus starting to grow around the site in the north-western corner of the map, called Schriever.

Finally, the project team that led the talks published broad takeaways from their conversations with residents. The takeaways reflect the main challenges of any resettlement: maintaining social, cultural, and

“Cutting off your arms so you can still walk”: Resettlement planning in the face of coastal erosion and sea-level rise in South Louisiana

Figure 2.3. Sites Suggested by Community Members During Engagement Sessions



A summary map of sites suggested by community members at the second community meeting. Additional site suggestions were recorded on Concordia's final visit to Isle de Jean Charles on 10/20/16
Source: Hill, *et al.*, 2016

economic status for the affected community while moving to a new location. Another interesting aspect raised in the takeaways is the importance of legal and policy terms. Questions regarding access to and ownership of abandoned land, control over the new location, and ownership of future land and housing must be addressed at the outset. Consistent with Oliver-Smith's 2016 work, these takeaways indicate that a resettlement effort with an emphasis on the recognition and restoration of the rights of affected people has the best chance at success.

In parallel with these community engagement meetings, another series of similar talks were happening not too far away. Before addressing those, it is useful to understand some background on the discussions regarding the state of Louisiana's plan for its coast. Soon after Hurricane Katrina, the state of Louisiana set about ensuring it was doing everything it could to prevent another hurricane from inflicting catastrophic damage. The CPRA was created and charged with a simple but monumental task: devising and implementing a master plan to, as the full name suggests, protect and restore the coast. This plan was to be updated every five years, beginning in 2007. The 2012 Comprehensive Master Plan for a Sustainable Coast

promised to use “every tool in the toolbox” to improve flood protection in “every community in coastal Louisiana” (CPRA, 2012, p. 33). The development of the 2012 report involved engaging community members, including three public hearings, ten community meetings, thousands of public comments on draft plans, and more (CPRA, 2012). From these meetings, the report’s authors distilled early on that there were strongly held opposing beliefs about the best or most appropriate ways to handle restoration project identification and execution. However, the results of a poll show some consensus within the state’s constituents. The poll was based on a telephone survey of 1,002 adult residents: 802 in the coastal area and 200 outside the coastal area.

Similar to the community engagement takeaways in Isle de Jean Charles, the poll results from 2012 indicate that economic and cultural ties to home are of utmost importance, summarizing that “citizens strongly believe that it makes sense to invest in protecting and restoring the coast”. The Louisiana residents polled here “are not willing to give up on the coast, nor were they willing to write off areas at risk”. Furthermore, “citizens believe that [state leadership knows] what to do to save coastal Louisiana. They want leaders to get the job done” (CPRA, 2012, p. 51). This is a marked contrast to the takeaways from conversations with residents of Isle de Jean Charles. Residents of Isle de Jean Charles, by and large, have known for years that their island home is rapidly shrinking, and know that resettlement is on the table. In contrast, more broadly in Louisiana the effects of coastal erosion and climate change-induced sea level rise are not so severe in all places as to force a reckoning with the time of resettlement, at least not as of 2012. Perhaps in the spirit of protecting and managing threatened communities, instead of abandoning them, the Master Plan that came out of these meetings struck an optimistic tone on the state’s ability to claw back land losses and preserve the status quo. The proposed budget of \$50 billion was ambitious: \$50 billion is more than the annual budget of the entire state of Louisiana (Louisiana DOA, 2018). The CPRA predicted that their plan, if funded and executed, could neutralize land loss through 2030 and begin to outpace it by 2037. Since 2007, 135 coastal land restoration and protection projects have either commenced, concluded, or were slated for the near future at a cost of \$4.4 billion, a far cry from the \$50 billion that would have funded the full project.

Before more money was sourced or appropriated for further projects, the spending spree was interrupted by the updated 2017 report. As part of the process to develop the new report, during October and November

“Cutting off your arms so you can still walk”: Resettlement planning in the face of coastal erosion and sea-level rise in South Louisiana

of 2016, the planning team for the 2017 CPRA report held seven community meetings with over 500 residents. It is enlightening to compare the tone of the community voices in the 2017 report to the previous poll responses from the 2012 report.

Figure 2.4. Community Voices from the 2017 Master Plan

COMMUNITY CONVERSATIONS

You spoke, and we listened. At seven community conversations held in the fall of 2016, CPRA staff gave quick updates of their work and then let coastal residents do the talking. People shared everything from detailed policy suggestions to one-line reality checks from the front lines of coastal change. We value those ideas and look forward to learning more. Here’s a sampling of what we heard:

“Focus on the people! Tell the truth! No false hope!”

“Our kids and grandkids won’t see the delta; they won’t know what a beautiful place this is.”

“Why should we give up because of sea level rise? The river can build land.”

“People will try to stay with their livelihoods; they’ll fight to the end to stay.”

“Listen to the communities you are trying to protect.”

“Make sure that people understand that things are happening, and they shouldn’t be scared. But everyone will need to be involved.”

“It’s too good to lose.”

Source: CPRA, 2017

While still demonstrating strong local place attachment, the 2017 voices sound like they are more aware of the gravity of their coastal climate changes. Calls for the leadership to “focus on the people!”, “Listen to the communities you are trying to protect”, and “Tell the truth!” paint a clear picture of the community mood. Community members also expressed a new pragmatism, evident in calls for “No false hope!”, and in imploring the leadership to “make sure that people understand that things are happening, [...] and everyone will need to be involved” (CPRA, 2017, p. 56). This is consistent with the climate data that underscores the 2017 report: the relative rate of sea level rise that informs the report nearly doubled between 2012 and 2017 (CPRA, 2017). The abrupt change in tone between reports may be attributable to the changing realities of coastal erosion and sea level rise, or it may have its roots in the willingness of the 2017 authors to face hard truths—in any case, it represents a shift towards climate realism. In the words of Bren Haase, CPRA head of planning, the report’s release signifies the “first time we’ve had this level of discussion about this sensitive of a topic” (WWNO—New Orleans Public Radio, 2018, para. 12).

Implications for the State of Louisiana: Comparing the CPRA Master Plan Development with Isle de Jean Charles Resettlement Plan Development

Although the situation facing the state of Louisiana is currently quite different from that of Isle de Jean Charles, there is a number of distinctions that warrant discussion and closer scrutiny. Isle de Jean Charles is situated in the far reaches of the bayou, and therefore is one of the first places to fall victim to the coastal erosion that threatens south Louisiana as a whole. The state of Louisiana's CPRA Master Plan must address the problems of the entire state. It is charged with making recommendations for which communities should be invested in and saved, and which should be offered buyouts or moved, along with a whole host of other serious decisions that may be life-changing for occupants in affected areas. The CPRA Master Plan does not explore the dynamics of resettlement for a town staring it down in the way that the Isle de Jean Charles planning materials must do.

The two plans have similar ethics of involving communities in the development process, as can be seen by the similarities in the community conversation structure, note-taking, and publication of notes in the eventual public materials. Some major differences, however, stem from group relationships, size, and mandate. A large group, like the ones that met to discuss Louisiana's plan for its eroding coast, can add legitimacy to the plan, make suggestions, and give an overall "temperature" of public opinion, but it cannot realistically address each community's needs. In addition, the group is likely to be relatively unfamiliar with each other, since community meetings were not held for individual communities, but for the local public. This is in contrast with the intimate groups that met to discuss the resettlement of Isle de Jean Charles. Not only did the groups know everyone in the room and likely have a personal relationship, but the number of affected people was small enough that the organizers were able to interview and visit nearly every household. This is perhaps not a model for the future, since not every relocation effort will be for groups as small as the one in Isle de Jean Charles, but it does explain the greater level of detail the group was able to achieve in Isle de Jean Charles. More progress can be made in a year of planning to meet the needs of the group from Isle de Jean Charles than the needs of the entire state of Louisiana. Nonetheless, the community-specific planning sessions for Isle de Jean Charles' resettlement should be mirrored for future relocation planning in coastal Louisiana. Familiarity, comfort, and trust, as well as group

uniformity of culture can significantly help to build consensus and make productive decisions.

The 2017 Master Plan, in contrast with the 2012 plan, is realistic in admitting that “we cannot fix everything”, and that “communities in particularly hard-hit areas [...] will have to adapt” (CPRA, 2017, p. 87). According to a recent report from investigative journalists in partnership with NPR, planners at CPRA recommend relocation for many communities, depending on the expected depth of future flooding (WWNO—New Orleans Public Radio, 2018). However, despite the frank tone and recommendations of the 2017 report, planners at CPRA have not yet launched a campaign to inform affected residents in areas considered to have too high a risk of flooding.

Although the 2017 report states unequivocally that there will be relocations necessary, identifies where those locations are, and even offers a buyout program, no communications from the state have reached affected residents. According to Haase—the official from the CPRA—“to go to an individual homeowner and say, ‘this is what needs to happen in this particular location’ might actually be irresponsible at this point” (WWNO—New Orleans Public Radio, 2018, para. 18). Haase is referring to the near-total lack of state budget to back up the \$1,2 billion buyout program Louisiana officially offers. It’s a tight spot for the state, but the real irresponsibility may be in *not* informing residents in affected areas that their homes are not expected to last. In the words of Scott Eustis, Community Science Director at the Gulf Restoration Network, “the state of Louisiana has a duty to inform its residents that there are threats to their public safety, and they need to be talking to people about that now” (WWNO—New Orleans Public Radio, 2018, Audio 3:45-3:55). A key difference in the proceedings of the Isle de Jean Charles planners and the state of Louisiana planners is the consideration shown for the affected people.

By deciding that because adequate funds are not available it would be irresponsible to inform residents that they should move, state officials have made the judgement that residents cannot handle the information and may not even want to know. Perhaps they are also concerned about their job security if the public is made aware of the conundrum of the state budget and climate outlook. As the outgoing mayor of New Orleans, Mitch Landrieu, said on the subject of inevitable relocation, “nobody ever really has the appetite to have a conversation about cutting off your arms so you can still walk” (Sack & Schwartz, 2018, para. 29). In any case, the failure to reach out may constitute significant overreach on the part of

the state. As was stated in Oliver-Smith's resettlement principles, resettlement projects often fail when "affected people are [...] not considered by elites to have the [...] tools necessary for executive [...] forms of decision-making, planning, and execution" (Oliver-Smith, 2016, p. 3). A clear lesson the state of Louisiana can learn from the project team for Isle de Jean Charles is to prioritize involving the uprooted peoples in an honest, open, and frank way. This is the starkest difference between Isle de Jean Charles planning and the processes used at the state level.

Relocation Elsewhere in the U.S.: Comparison with Newtok, Alaska

Although many headlines in the news media announced Isle de Jean Charles as the "nation's first climate refugees", this is not the case (Davenport & Robertson, 2016). The charged word "refugee" aside, there is another recent and prominent example of climate migrants displaced in the U.S. On the shores of the Ninglick River in Newtok, Alaska, 375 ethnically Yupik people face a rapidly disintegrating habitat. The people in Newtok are experiencing melting permafrost, widening rivers, coastal erosion, and ever fiercer storms from the Bering Sea (Melillo, *et al.*, 2014). Like Isle de Jean Charles, residents in Newtok comprise a Native American tribe, and are subject to all of the same extra difficulties that indigenous people face when their homes are threatened by climate change or other environmental changes.¹ Unlike Isle de Jean Charles, Newtok has not received federal aid for resettlement, or a concerted effort from the government to organize an inclusive and thorough process to facilitate resettlement. In the absence of government funding and relocation resources, the community has taken it upon themselves to lead and form a planning group, taking advantage of the governmental and non-governmental support they are able to access. U.S. government agencies do have tools and competencies to promote the protection and management of coastal retreat, but notably no broad competency for preventative relocation (Bronen, 2015). Despite Newtok's long-standing desire—recognized by the U.S. government in 2009—to resettle (Bronen, 2015), and even its definitive selection of a new site, most residents have not yet moved (Taylor, 2015).

The example of Newtok, Alaska shows that Isle de Jean Charles, despite the many challenges it faces, is lucky to have received government funding and project management support. Newtok has faced many of

¹ For more information, see the National Climate Assessment; Melillo, Richmond and Yohe 2014.

the same difficulties as Isle de Jean Charles, but the lesson seems not to have yet been learned at the federal government level. Even though Newtown’s community leadership towards resettlement is organized and intentional, proactively drawing upon the resources available to it, resettlement has not yet been a success. Although the Obama administration showed interest in preventative management of the effects of disasters, including climate change, no institutional mechanism has yet been created to identify projects such as the resettlement of Newtown or Isle de Jean Charles, and pursue them with the organization and efficiency that can only come from one strong central agency. Therefore, it is my recommendation that state governments and/or the federal government consider creating an agency with a mandate to seek out relocation catastrophes before they happen, or empower an existing agency to lead efforts to do the same.

Conclusion

The plight of Louisiana’s south coast is indeed dire. Subsidence, climate change-induced sea-level rise, years of oil and gas development, and other environmental interference has made for a veritable vicious cycle of climate degradation. In order to respond to these challenges, policy-makers in Louisiana face an extraordinary uphill battle, with very little state or federal funding at that. The complexity of the problems the state and its residents face should not be understated, although that is not to say that officials should not be doing everything possible to help their residents meet their future as prepared as they can possibly be.

One of the inevitable responses that needs to be considered, and is already a daily reality for many, is the prospect of resettlement or relocation. Nearly every aspect of this process is sure to address some concerns but create others, and therefore it is a process that relies heavily on collaborative interactions between planners and affected peoples. In undertaking a relocation project, planners or community leaders should rely on established standards and frameworks in order to pull best practices from groups both domestically and abroad who have faced similar difficulties. A large part of the process should involve building trust with and engaging affected people, always with a keen ear to listen and an overriding sense of respect for their concerns and opinions. At the end of the day, planners and organizers are passing through, but community members both know the subject—the needs of their daily lives—better and are the people who ultimately must live with the choices that are made.

In the same vein, full transparency with the uprooted people and the general public should be a core value of any resettlement process, or climate change study. The notion that the affected public cannot handle the truth or would be somehow better served by delaying the delivery of damning news, is foolish. Once the discussion turns towards resettlement, there has presumably been significant technical climate studying done as well as an exhaustive examination of other options. If those both fail, and resettlement is on the table, there is no resident who would be better served by living blissfully in ignorance.²

The shift towards “climate realism”, though difficult, is what the public wants. As noted in the 2017 “Community Conversations” in figure 2.4., the public has made their voice heard, asking officials to “Tell the truth! No false hope!” even if they do not choose to take the leap and relocate before it is absolutely necessary,³ people will appreciate having full information available when making their own decisions about their lives. The government can help in this process by, at a minimum, being honest and forthcoming about the results of their studies.

On that note, transparency is not the only area where the government could do a better job. There is a clear and present need for an empowered, funded central agency to proactively manage resettlement or relocation for known threatened communities in the U.S. FEMA, though it claims to be a preventative agency, has not demonstrated that in the relocation arena. Policymakers have options: further empower FEMA or another agency at the federal level, create a new federal agency, or do the same at the state level. Any route that is taken to improve preventative response to relocation will be a boon to communities facing urgent loss of land and livelihood, and those sure to share that fate in the future.

² Except perhaps the very elderly, depending on the temporal proximity of climate change effects interfering with their ability to remain where they are.

³ “Cut off their arms so they can still walk”, so to speak.

“Cutting off your arms so you can still walk”: Resettlement planning in the face of coastal erosion and sea-level rise in South Louisiana

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Coyote Creek Flood

Redefining flood-induced displacement

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According to the Federal Emergency Management Agency, floods are the most common natural disaster in the U.S. (FEMA) and have displaced 209,210 people in the country in 2017 (IDMC, 2018). We tend to think of floods as sudden-onset events, alongside hurricanes and earthquakes. Sudden-onset changes have more visible and immediate effects than slow-onset changes, which are incremental and constant. They are often perceived as violent, punctual, and rare crises which displace people on a temporary basis (Keane, 2004). The water rises, people leave. The water recedes, people come back. Government responses to floods are based on the assumption that everybody will be able to come back to the evacuated area once the crisis is dealt with. However, this is not what happens in practice. The framework used to define flooding as a sudden-onset change leads to ineffective and inappropriate policy response which damages government's legitimacy and puts populations in danger. How should governments rethink their approach to floods in order to better prepare for subsequent displacement and protect their populations? There needs to be a critical observation of what a sudden-onset event such as a flood is and how it affects people. This paper studies the Coyote Creek flood of February 21st, 2017 in San Jose, California and the response of the local government to identify the problems of policies based on an erroneous understanding of floods as punctual events.

The first section details the mistakes the city council and the water district made in the risk assessment of the flood. It shows that local risk management agencies did not prepare or warn the population because they did not consider flooding as a constant threat that can be averted, but rather as a random, uncontrollable disruption. The second section looks at the different ways the flood affected the population. It argues that by operating under the assumption that everybody will want and be able to return home, policy response designed by the city failed to take into account the specificities of each citizen. The help provided to the displaced was inadequate because it was not tailored to meet their

needs but rather to fit the general idea of what the victim of a punctual event might require to go back to normalcy.

Sudden-Onset but Constant Threat: Predicting and Preventing Flooding Before it Happens

One of the problems of conceptualizing floods as sudden-onset events is that it allows policy-makers to overlook possible preventive measures that could avoid displacement altogether. It may be impossible to prevent an earthquake or a hurricane, but some floods, the Coyote Creek episode included, can be predicted and averted by using simple monitoring and regulating tools. In the case of the Coyote Creek flood, it is the overflow of the nearby Anderson Dam due to precipitation which lead to the flooding of downtown San Jose. Had the reservoir been less full when the downpour hit California, the water would not have invaded the streets. Moreover, even in the case of unpreventable floods—for example, in places where dams and other infrastructures do not exist—there are protective measures that can be put in place to try and minimize the damage to property (e.g. levees, floodwalls, sandbags) and the danger to people (e.g. timely evacuation, shelters). Proper protection then depends on the monitoring of the river, the prediction of precipitations, and an early warning to the population, which cannot happen if governments think of floods as punctual and unpredictable events.

The Tragedy of a “25-Year Flood”

The winter of 2017 has been a particularly wet one for San Jose. By February 20th, 2017, downtown San Jose had received 14 inches of rain, 14% over the normal rates. Water in the Anderson Dam rose quickly, but no preventive releases of water were organized because of the fear that the resource was going to be scarce the next summer, as San Jose is often hit by droughts. On February 21st, the dam overflowed and water invaded the area around Coyote Creek, flooding the neighbourhoods of Olinger, Rock Springs and parts of Naglee Park. Rock Springs, the neighbourhood which was hit the hardest, is also the poorest. Three mobile home parks which hosted low income families were also hit and had to be evacuated. The contaminated water, which carried debris and residues of oil, pesticides and toxic sewage matter, soiled the houses and impeded the recovery of the neighbourhoods. People were taken by surprise, and

many were unable to save essential items, such as medication, which only made the time spent in temporary housing worse in terms of health conditions. The health crisis that followed, as well as the difficulties for some to go back to their houses, angered a lot of citizens, whom filed complaints against the City and the Water District for the unequal treatment they feel they received, as well as the lack of flood warning.

The people I have interviewed all remarked on the predictability of the flood. Jennifer Wadsworth, journalist for the San Jose Inside, covered the flood and the subsequent debates around the failures of the warning system, and explained to me that the 2017 flood was not different from the last times the Anderson Dam flooded: “It was a predictable event in that every single time that dam overflowed, these areas were flooded, as shown by the flood maps from the last event in 1997. They showed exactly where the water was going to go” (Wadsworth J., personal communication, 24 April 2018). The city reports on the flood and the media coverage talks about a “25-years flood”, which most residents understood as a flood that can only happen once every 25 years. However, this actually means that it has a one in 25 chance of happening in any given year. Theoretically, a 25-years event can happen twice a year or two years in a row (Rogala, Maddocks & Iceland, 2016). The last episode happened twenty years before, which lead some people to question the expertise of the Water District. Some residents who did not experience the last flood of 1997 did not know they lived in a floodplain and had no frame of reference to understand the event in context.

There were, however, legitimate reasons to doubt the local agencies responsible for flood risk management. One resident of Naglee Park remarks: “When the Anderson Dam overflows, Coyote Creek and the areas surrounding it are flooded. Every single time, ever since the dam was built in 1950. And they hadn’t prepared for it?” (Resident of Naglee Park, personal communication, 22 April 2018). The failure of the city and the Water District is two-fold: they lacked a functioning system to monitor and communicate on the level of the water, and they failed to protect the population.

Communication Breakdown

The residents were not given any warning that the water was rising. After the flood, the city recognized that it owed to have warned people, but also accused the Water District of not notifying them in time. Indeed, the city’s flood risk management is shared by the two organisations.

The Water District, which operates and monitors the Anderson Dam, is in charge of producing the data on water levels and notifying the city of potential floods. The city is to warn people and organize the evacuation of flooded areas. Communication between the two is therefore paramount to a good governance of flood risk and effective evacuation management. If the city does not know which neighbourhoods are to be flooded, it cannot prepare adequate help to the displaced in terms of sufficient shelter and financial help for recovery. Public officials were taken aback by the flood and were not prepared to deal with the emergency. There was no predetermined action plan to cope with this kind of flood, even though they are relatively frequent. What went wrong in the monitoring and warning phases of the flood management plan? Is this a simple communication failure?

E-mails that were made public a few months after the flooding show that there was communication between the Santa Clara Valley Water District and the City of San Jose on the water levels in the Anderson Dam. The emails reveal that both sides were aware of the flooding danger from an upcoming storm and were exchanging information until water district management stepped in and restricted the communication. One of the last emails in the exchange, written by a civil engineer working with the Water District reads:

Unfortunately we got some pushback from our management about us communicating directly to you guys at our levels and the District having different outlets of information for the forecasts, so I was told to relay information through the appropriate channels, sorry (Pulcrano, 2017).

It is not clear why the Water District management was uncomfortable with hydrologists and engineers talking directly to the city council members. The appropriate channels mentioned in the email is the Emergency Operation Center of the city, which is supposed to gather different City departments so that they can work closely on an emergency, to allocate resources, and coordinate assistance. This was not enough to prevent the flood and evacuate people in a timely manner. An official communication of the Water District hints that the City did not take the warnings of the Water District seriously. "It's unclear what trigger the City of San Jose was using for its evacuation decision. If it was the flow rates from Coyote Creek, that would have only provided for a maximum of 4 to 6 hour-notice" (Santa Clara Valley Water District website). The two agencies did not have the same language to talk about the situation in Coyote Creek. The Water District's data which is written by engineers and hydrologists may

have been undecipherable to the City, which required concise recommendations. The problem is that the decision on whether the population should be evacuated ultimately rest on the lay man's shoulders, that is to say city officials which might not know the flood maps and FEMA recommendations. Steve Lonergan recommends to "develop a system to help anticipate migrations which might be triggered by environmental disruptions" in order to better deal with environmental migrations (Lonergan, 1998). Had the reservoir been monitored and managed more efficiently, the flood of Coyote Creek could have been averted, and damage avoided. Maps of the previous floods existed and were available to city officials, which could have helped predict which neighbourhoods to evacuate. The problem at the Water District level is that it continues to operate as two separate silos: a water supply branch and a flood control branch (Santa Clara Valley Water District website), instead of working as a single unit in a holistic management of the basin.

The two organizations will need to design a common emergency action plan to automate the public response, so that in the event of another flood, there will be no time lost in communication. Some people who had to work together in the emergency situation had never met before, making coordination effort more complex. Perceiving floods as punctual events led the city and the Water District to be complacent in the monitoring of the creek, as they did not have a systemic approach to flood risk management. The Water District followed the procedures very strictly, but they did not take into account the fact that the data they transmitted to city officials needed translation. The email conversations might have been useful to explain to the City that evacuation was necessary. However, the lack of a systemic approach and the communication breakdown are not the only failures of the city which led to the displacement.

Lack of Preparation

The City had twenty years to prepare for a disaster similar to the 1997 flood, which inundated the same neighbourhoods (Keegan, Santos & Estremera, 2017). Several measures had been voted by the community to protect the area from future floods, such as the construction of infrastructures such a levee along Coyote Creek, for which people paid an extra tax. US\$ 22 million were allocated to flood control work in 2002, but the money sat in the Water District and the floodwalls were never built (Wadsworth & Koehn, 2017). Jennifer Wadsworth, who co-wrote an article on the "Floodgate", explains that it might have been because the neighbourhoods were not rich enough. The neighbourhood of Rock

Springs was the most heavily impacted and is also the one which has the largest immigrant population, a high number of them Vietnamese and Latino. A lot of them were in low-income and rent-controlled apartments. The reason why they were so heavily impacted is that where they lie by the river is lower ground and because the Water District and the Army Corps of Engineers had determined that the value of the property would not make the flood protection cost-effective, as the infrastructure would be costlier than the property it was protecting. Several flood survivors report feeling let down by the City: “I felt like we were nothing, like we didn’t matter to the city. I’m a tax-paying citizen. And I really feel that demographically, we were swept aside like the flood” (Lam, 2017).

As the Rio convention recognized the human right to a healthy environment, one could argue that by failing to protect its population from this preventable flood, the City failed to protect their rights. 400 of the 14,000 displaced by the flood decided to fill claims for US\$ 18 million of damage. 150 of them are represented by Amanda Hawes, who I interviewed. She expects the court case to raise what her clients view as disparate treatment of the communities impacted by the 2017 flood compared to other areas of the Valley—those that are “bedroom communities” for the high-tech industry (Hawes A., personal communication, 1 May 2018). The disparities that really stand out are both ethnic and economic, as another reason Rock Springs was so heavily impacted was because a lot of the apartments were cheaper rent-controlled, built in the 1970s or 1960s, and had not been built with flood protection in mind.

There were no systemic protection measures in those communities, even though floods have happened quite frequently in the area. Floods may be sudden-onset events, but unlike other environmental changes placed in that category, they can be easily mitigated using a systemic approach which reduces the need for migration. Had the local government taken the risk of flood as a permanent threat that needs to be dealt with rather than a hypothetical possibility, a lot of the displacements that took place after the Coyote Creek flood would have been avoided. Furthermore, the framework with which policy makers understand flooding also hinders recovery by failing to provide adequate help to the displaced.

Single Event, Multiple Effects

The idea that once the waters recede everybody will be able to come back and resume “business as usual” fails to take into account the specificities of the way floods affect people. Governments need to tailor the policy

response and aid to the different categories of populations displaced. People in San Jose were all treated the same way, given the same tools, despite their different needs, resulting in some of them leaving the city or being trapped in temporary housing and poor living conditions.

People displaced by the flood had different strategies in dealing with their displacement, depending on their resources and on whether they were homeowners or not. As mentioned, the Rock Springs neighbourhood was mostly composed of rent apartments, whereas the richer neighbourhood of Naglee Park is mostly comprised of homeowners. In dealing with flood-induced displacement, it is important to understand the obstacles to recovery that arise with the flood in terms of reconstruction and cleaning of the houses.

Stuck in Limbo: Tenants and Gentrification

There is no official data on how many residents left San Jose and how many are still to relocate. According to attorney Amanda Hawes, the people who were renting their homes have had more problems to come back to where they lived. Many of the apartments flooded were rent-controlled, affordable housing, but after the flood the landlords jacked up the rent, making it impossible for tenants to return. The areas flooded had some of the most affordable housing remaining in Silicon Valley and the flood has led to even more gentrification. Beyond the disruption that represents the flood, there was already a system in place that made a certain category of people vulnerable in case of displacement: low income, Vietnamese and Latino populations who rented their apartments were the most badly hit. In the short term, because they were in low-lying unprotected areas and in the long term because of a lack of available housing (Hawes A., personal communication, 1 May 2018).

Landlords also were not diligent in the cleaning of the apartments, making them potentially harmful for families. AnnaLisa Wilson, a flood survivor, explains why her and her family had to move away from the neighbourhood: “We realized the owner wasn’t cleaning out the damp drywall properly in the back of the apartment and knew it would be full of mould and not decontaminated, plus we also knew that the place could flood again” (Wilson A., personal communication, 29 April 2018). The cleaning efforts were left to the inhabitants of the neighbourhoods themselves, with no expertise given by the city to remove pathogens and toxic materials such as black mould and lead.

Because the flood is treated as a punctual event and there is no holistic plan for the City to deal with its aftermaths, both emergency and recovery is organized through informal networks of solidarity. The City officials and some County representatives send out health guidelines to deal with contaminated water in the process of the clean-up, and a victim's fund was set up by the City to gather the private donations of corporations and individuals. It gathered US\$ 6.9 million, 5 of which came from a single millionaire. Some charities were commissioned by the city to help relocate residents with these limited funds. Organizations such as Catholic Charities, Sacred Heart and the Red Cross were allowed to help a certain number of people to relocate and could only offer Target US\$ 100 gift cards to those coming forward after that limit was reached. One victim's advocate who did not wish to be named remarked on how the unhoused "get the dregs" and were not helped, despite the promises of the City to house everyone (Victim's Advocate, personal communication, 21 April 2018). AnnaLisa Wilson remembers the limits of the charities in providing housing to the displaced:

Mayor Liccardo said we would all be back in permanent housing and the City would handle whatever to make that happen. Instead we had people with physical handicaps being put out by Catholic Charities and sleeping in cars or squeezing into cramped quarters so they wouldn't be put on the street (Wilson A., personal communication, 29 April 2018).

The charities could only do so much, because for the tenants the problem was not to get financial help for reconstruction, but to find affordable housing in San Jose. Amanda Hawes explains that some have had to give up hope of ever relocating in San Jose and have moved to Hollister, Lathrop, Newman or other more affordable towns and now commute long distances to work. Others have found affordable local rental housing only by doubling up with another family. This issue is recurring in the Silicon Valley, where gentrification and natural disasters such as floods make cheap housing rare (Hawes A., personal communication, 1 May 2018).

Most tenants have had to stay in temporary housing provided by the City, like the Seven Tree shelter, for over a year. Many of them are still in temporary housing. AnnaLisa Wilson retells the difficulties of asking family and friends for help when it came to relocation. The charities that were tasked to find a permanent home to the displaced were trying to minimize the numbers of people still in limbo:

People offered, but we knew it wasn't going to be an immediate return to housing so my Mom didn't want to inconvenience anyone or fall off the radar, because if you were staying with anyone even temporarily Catholic Charities was pretending like people were settled and had found permanent housing when they hadn't (Wilson A., personal communication, 29 April 2018).

Because of that, people who could have lived in better conditions thanks to their network had to go through the hassle of living in overcapacity shelters and seedy motels, in fear that if they did not show that they had no other place to go, they would not be helped. Those were stuck in the limbo between evacuation and relocation.

Considering the economic discriminations that the Rocks Springs neighbourhood faced when the levees were supposed to be built and the poor compensation the families received for the damages caused by the flood, Amanda Hawes, attorney of the plaintiffs, argues that her clients are facing an environmental injustice (Hawes A., personal communication, 1 May 2018). People who suffer from environmental injustice have to face "inequities in risk exposure, risk reduction and risk compensation" (Cutter, 1995). In her analysis of environmental justice, Cutter remarks on the necessity to have mechanisms to assign responsibility of the environmental degradation. The lawsuit against the Water District, the City Council and the County of Santa Clara aims not only at getting compensation for the losses of the residents, but also at recognizing the errors of each actors. For Amanda Hawes, it also about getting the suffering of her clients recognized. They not only contend that the agencies failed to establish and supervise emergency shelters and failed to provide housing for low-income families, but also seek compensation for the emotional distress of being displaced with no notice as well as the consequential damages of the displacement: having to drive long distances to get the children to school, having to pay motels for themselves when the living conditions at the shelters provided by the city became unacceptable (Hawes A., personal communication, 1 May 2018).

People who were forced to move away because of economic reasons after the flood fall between the definitions of environmental migrants and economic migrants, in that case, because of gentrification. By redefining floods and how to deal with the displacement they create, the field of Environmental Migration can bring nuances in how we perceive migration after a natural disaster and improve policy response. There needs to be a discussion on how environmental and socio-economic factors

intersect in the choice to migrate or not, and that discussion can only happen after a clear definition of environmental displacement has been coined, that also take into account the economic trends that can exacerbate migration. Warner, Renaud and Julca remarked that “the definitional issue pertains directly to the recognition and establishment of the human rights of environmentally displaced people and communities” (Warner, Renaud & Julca, 2010). If there had been affordable housing solutions nearby, or if the landlords did not raise the rent, migrations out of San Jose would have been much less important. However, we cannot deny the importance of the flood as a traumatic event in the choice of people to leave. The flood was the trigger to the migration, but it is the economic conditions surrounding it—the lack of affordable housing due to gentrification, the lack of protective measures because the Water District deemed them cost ineffective—that made the relocation of renters so complex.

Trapped in the House: Homeowners and Decreasing Market Value

Homeowners had to face different issues. While renters were struggling to come back, homeowners did not have a choice. The few who wanted to flee Coyote Creek saw themselves stuck in the neighbourhood. First, they had to rebuild and clean their houses before considering selling it. Second, the market value of their houses decreased, because everybody knew of the potential threat of floods. The combination of the expensive recovery work and the low market prices contributed to make people unable to leave their neighbourhoods. Although these represent a minority of the flood victims, they underline another category of population which was let down by public authorities in their efforts to recover and move on from the flood. While tenants are environmental displaced, that is to say people who did not want to leave but were forced to migrate, these homeowners can be defined as trapped populations, individuals who need or want to move but lack the ability and the resources to do so (Black and Collyer, 2014). While the main reasons homeowners were not able to move away are economic reasons, there were other obstacles to migration, such as administrative procedures.

Some homeowners also have been displaced for many months, the time it took them to restore their houses and find the money to pay for the damages. In doing so, they had to deal with the toxic substances in the water, and decontamination for black mould: some are still contending with protracted illness likely caused by unavoidable contact with highly

contaminated flood water during the displacement, clean up and disposal phase (Deruy, 2018). People who owned their homes outright and weren't required to insure their homes in the first place were hit with bills in the hundreds of thousands of dollars. Even for the homeowner enrolled in FEMA insurance, payments are not always immediate or satisfactory. Amanda Hawes explains that many of her clients were unhappy with the assistance provided by the federal agency. Indeed, these insurances only apply to damage to the structure of the house, not its contents. People who lost all their possessions in the flood are not compensated for them. Moreover, FEMA bases its compensation for structural damage repair on a formula that relies on a multi-state analysis of repair costs. That means that people living in areas where such costs are higher than in other states, like in the Silicon Valley, will not receive all the money need (Hawes A., personal communication, 1 May 2018). Amanda Hawes remarks that in most cases for San Jose residents the percentage of the actual repair cost covered by FEMA insurance is well under 50%. Finally, after the insurance claims have been submitted to FEMA, homeowners have found their insurance rates increased (Hawes A., personal communication, 1 May 2018).

Once the repairs have been paid, generally placing homeowners in debt, those who want to leave the neighbourhood, either because of the fear of a future flood or because of other reasons, find themselves stuck because of low housing market prices. Houses in Naglee Park and Olinder that have been affected by the flood have seen their market prices lowered by up to 40% (Resident of Naglee Park, personal communication, 22 April 2018). After the cost of cleaning, indebted households cannot afford housing elsewhere if they cannot sell their property to the normal price. Finally, the heavy administrative procedures to get paid by FEMA, hire contractors, avoid scam artists, and the loan hassles are another obstacle to their recovery. It is not surprising that economic and administrative factors tend to lock these homeowners into place. The policy response to the flood is based on the assumption that people will want to resume their lives, not leave the neighbourhood. As a result, nothing is done to help them move away.

Operating under false assumptions about the needs and the wishes of the displaced population, the City of San Jose did not provide adequate assistance. This is especially worrisome as climate change is expected to make floods more frequent and more severe in the next few years. The World Resources Institute estimates that the global flood toll will triple by 2030 because of climate change and population growth, to reach 50 million

people affected globally (Rogala, Maddocks & Iceland, 2016). For the victims to be heard, there needs to be a shift to a new framework of accountability which recognizes that the rights of the citizens have been infringed in cases where the flood has been mismanaged. Systemic compensation relying on the identification of the adaptation mechanisms of the displaced is the only way vulnerable communities such as the Rock Spring neighbourhood can return to normalcy.

Conclusion

Many mistakes were made by local agencies in every step of flood risk governance because of an erroneous perception of floods as punctual events and the consequences they have on the population. Instead of focusing on finding who is to blame for the 2017 flood, officials need to rethink their approach to flood assessment and create a functioning system of communication between the Water District and the City to ensure that preventable displacement will not happen again. To be effective, recovery policies need to be tailored to the population and take into account invisible factors, such as gentrification and housing market prices. By using the framework of environmental justice, victims' advocates and attorneys hope to obtain compensation for the avoidable damages that they suffered.

Floods are sudden-onset events but many aspects of them can be mitigated if authorities analyse flood-risk as an ongoing issue rather than a punctual event. The monitoring, protection and warning processes of flood risk governance are paramount to reduce and manage flood-related displacement. To move forward, the people displaced do need the help of the government. The efforts of charities to relocate people are useless if there are no houses available, or if they do not have sufficient funds to effectively help survivors. There are lessons to be learned for developed and developing countries alike, especially with the rising weather uncertainty brought by climate change and the expected increase in demography, which will contribute to make communities more vulnerable to floods. The mechanisms and strategies of adaptation need to be explored in depth so that governments can adapt to migration flows and encourage some forms of adaptation mechanisms over others.

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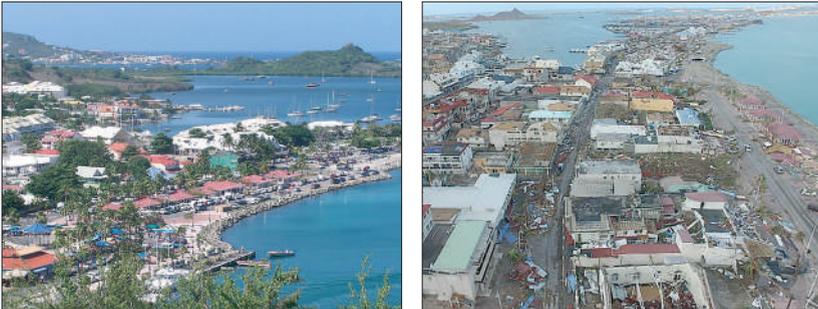
The Divided Island of St Martin

Three different worlds confronted with Hurricane Irma

Franziska Barnhusen and Rosa Hofgärtner

In the night of the 6th of September 2017, the island of St Martin¹ was hit by winds of unprecedented force, finding itself on the direct trajectory of Hurricane Irma, one of the most powerful storms ever observed in the Atlantic. St Martin was the second Caribbean island after Antigua and Barbuda to be hit by the hurricane. It then continued its destructive path over Saint Barthélemy, Anguilla, the British Virgin Islands, Puerto Rico, the Dominican Republic and Haiti, Turks and Caicos, Cuba, the Bahamas, until it finally downgraded to a tropical storm after hitting Florida on September the 10th (Cangialosi *et al.*, 2018).

Image 4.1. Marigot, Capital of Saint Martin, Before and After Irma



Source: Wikicommons

When it made landfall on St Martin, Irma was already classified as a level 5 storm, highest on the Saffir-Simpson Hurricane Scale, with winds reaching a speed of up to 370 km/h (Gustin, 2017). St Martin and its population were 100% affected by the hurricane (IOM, 2017b), which damaged about 90% of the island's infrastructure (National Recovery Plan, 2017) with destructions amounting to an estimated total cost of about 1.5 billion

¹ The island St Martin is divided into a French and a Dutch territory. When referring to the French side, Saint Martin will be used, when referring to the Dutch side Sint Maarten, and when referring to the entire island St Martin.

USD in Saint Martin and 2.5 billion USD in Sint Maarten (Daniell *et al.*, 2017). The storm caused 47 deaths in the entire region (Cangialosi *et al.*, 2018). Four deaths were reported in Sint Maarten and eleven combined in Saint Martin and Saint Barthélemy (Cangialosi *et al.*, 2018).

Hurricanes, Global Climate Change and Migration in the Caribbean: An Overview

Hurricane Irma was the largest disaster event of the year worldwide and led to the displacement of around 2 million people over two weeks (IDMC, 2018). Estimations show that about 13,000 and 11,000 inhabitants were displaced in Sint Maarten and Saint Martin respectively. Furthermore, over 1.7 million people were displaced² in Cuba, 24,000 people in the Dominican Republic, 13,000 in Haiti and 6,000 in the British Virgin Islands following the passage of Hurricane Irma (IDMC, 2018).

The possible relationships between extreme weather phenomena and anthropogenic climate change, as well as their effects on migration and displacement in the Caribbean region, has received increased attention in the light of the more frequent occurrence of hurricanes. In 2017 only, a series of four major Category Four or Five hurricanes hit the Caribbean (Woodward *et al.*, 2018).

The Caribbean is geographically highly vulnerable to disasters. “Fifteen Caribbean islands are in the top-25 positions of most tropical cyclone disasters per square kilometre” (Acevedo, 2016). Models by the IPCC and other researchers (i.e. Knutson *et al.*, 2010) predict “an increase in the mean intensity of tropical cyclones of two to eleven percent (...) resulting from a higher frequency of the most intense storms” (Acevedo, 2016), due to a rise in global temperatures. Furthermore, rising sea levels also contribute to increasing damages caused by these storms (Rebetez, 2011).

There are great challenges in establishing direct links between climate change and migration due to the ‘multi-causality’ of migration and displacement (Kolmannskog & Trebbi, 2010). Nevertheless, the IPCC (2007) has highlighted that small Caribbean islands are particularly at risk when it comes to climate-induced displacement. Therefore, the Caribbean region has an important role to play in the ongoing debates around natural disasters, climate change and environmental migration.

² Some of the displacement, especially in Cuba, was organised and occurred in preparation of the hurricane.

General Introduction to the Political Specificities of St Martin

In order to understand and interpret the events which unfolded in the aftermath of Hurricane Irma on the island of St Martin, some knowledge of its political specificities is necessary. Since the seventeenth century, St Martin has been divided into two territories under French and Dutch colonial rule. The French territory Saint Martin, with its capital Marigot, takes up 54 km² of the total 88 km² island (Riches and Stalker, 2016) and has a population of about 37,000. Today, Saint Martin is an Overseas Collectivity of the French Republic. Formerly part of the region and department of Guadeloupe, the island legally became an independent collectivity in 2007 (Gustin, 2017). Therefore, Saint Martin is under the direct political control of the French government and its president, even though it elects a local assembly, the Territorial Council.

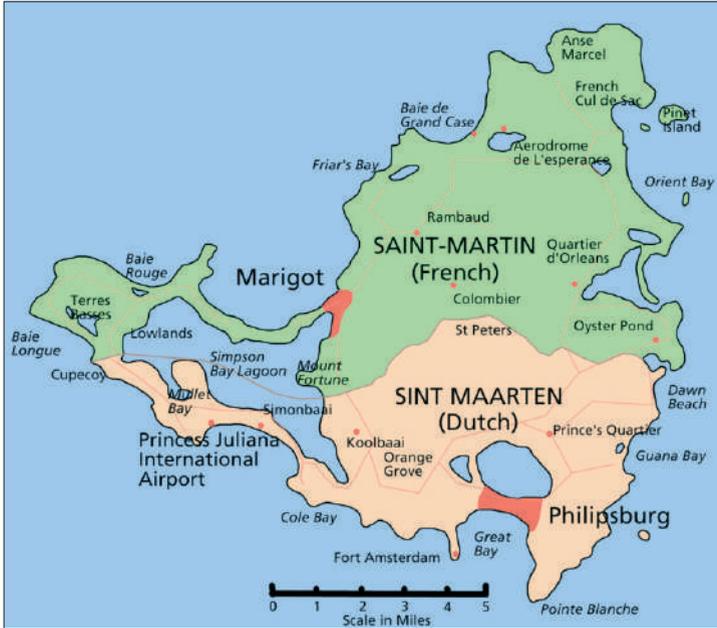
On the Dutch side, we find the semi-autonomous territory of Sint Maarten under the capital of Philipsburg with a population of approximately 38,750 on 34 km² (Central Intelligence Agency, n.d.). The political status of Sint Maarten with regards to the Netherlands differs significantly from Saint Martin and France. Since 2010, Sint Maarten is an “autonomous country within the Kingdom of the Netherlands” which elects its own parliament and has its own government.³ The semi-independent state can make its own laws and policies with some exceptions including defence, foreign affairs, and nationality (Hillebrink, 2013). These remain the responsibility of the Kingdom of the Netherlands as a whole. Sint Maarten is not a member of the EU,⁴ while Saint Martin, as part of the overseas community of France (Hillebrink, 2013), is part of the EU as an Outermost Region.⁵

³ The same status as that of Aruba and Curaçao.

⁴ The Dutch side is part of the EU Overseas Countries and Territories, which still allows for some financial support by the EU, such as the European Development Fund (EU Commission, n.d.).

⁵ This status allows Saint-Martin to receive support from different funds, such as the European Regional Development Fund (Azevedo, 2017) or, in case of a disaster, the EU Solidarity Fund (EU Commission, 2018).

Figure 4.1. The Map of St Martin



Source: Wikicommons

Despite the small size of the island, there has hardly been any cooperation between the two governments. This lack of collaboration can be partly explained by their constitutional differences. According to Ron van der Veer, council advisor for the Kingdom of the Netherlands, it is also the difference in spoken languages (typically French in Saint Martin and English in Sint Maarten) that plays a role (Van der Veer R., personal communication, May 3, 2018). Duvat (2008) points out that the political, institutional and legal factors inherited from the colonial period also partially explain the lack of common policy on natural risk prevention and management.

The economies of both sides are largely dependent upon the tourism industry, which employs about 80 to 85 percent of the island's labour force (Central Intelligence Agency, n.d.). The rapid development of the tourism sector in the late 1980s and 1990s (Alberts, 2016) occurred with hardly any governmental regulation. Unsustainable (urban) planning has increased the island's vulnerability in times of disasters, resulting in densely-built coastal areas with plenty of housing unable to resist the force of hurricanes and without sufficient space for nature-based flood protection (Duvat, 2008; Sinai, 2017).

The tourism boom also had a great impact on the composition of the St Martin's population, which is highly similar on both sides of the island and divided into three almost equal groups. Employment opportunities attracted a large group of (irregular) migrants from the region (Hillebrink, 2013), mostly from Haiti, the Dominican Republic, Dominica and Jamaica (Department of Statistics, 2014; Naulin *et al.*, 2016). They represent about a third of the population both in Saint Martin and Sint Maarten. Only one third of the inhabitants are natives born on the island (De Wit, 2015; Naulin *et al.*, 2016), while another third of the island's population is composed of people born in either French or Dutch territories, who moved to St Martin (De Wit, 2015; Naulin *et al.*, 2016).

The exact share of the migrant population, however, is difficult to measure as estimations on the number of undocumented migrants range from 10,000 to 40,000 people (Hillebrink, 2013). According to Nick Gianni, a Red Cross Information Manager Delegate, many of these migrants have lived on the island for most of their lives and view St Martin as their primary home (Gianni N., personal communication, March 8, 2018). The region also experiences an important share of 'circular migration' of people who eventually decide to go back to the country or island they were born in. Some see St Martin as a stepping stone to other places, such as Puerto Rico, which can ultimately bring them to the United States (Verhoeven *et al.*, 2007). The situation of the migrant population is particularly precarious; they generally have a low education level (70% of immigrants hold no diploma, compared to 36% of the whole population in Saint Martin) and they are often in irregular employment (Gustin, 2017; Ferguson, 2003).

As explained in this introduction, both its geographical and its socio-political characteristics make St Martin a relevant case study of environmental migration. This analysis will explore how the social inequalities and political specificities of St Martin, as two overseas territories with different degrees of attachment to their European patrons on the one hand, and as a hub of immigration in the Caribbean on the other, impacted the patterns and outcomes of migration after the island was hit by Hurricane Irma. This paper will firstly address the preparations and initial response immediately after the arrival of the disaster. Secondly, it will identify and analyse the main migration patterns observed in St Martin and, finally, these patterns will be placed in the larger sociological debate around environmental migration.

Image 4.2. Destroyed Buildings Along the Coast of Sint Maarten



Source: Ministerie van Defensie, 2017

Evacuations Before and After the Hurricane: Preparations and First Response

Lack of Information and Problematic Evacuation Measures Before the Arrival of Irma

Every year, St Martin is confronted with the hurricane season between June and October. However, a similar disaster had not hit the island since Hurricane Luis in 1995. Many inhabitants expressed their disbelief at the magnitude of Hurricane Irma. The instructions given to the population did not differ much from the regular precaution measures taken in times of storm warnings as people were urged to stock up on food and water reserves and to cover up windows in protection from breaking glass (Government of Sint Maarten, 2017).

In the French districts located on the coast, the government organised buses for people to be brought to safer locations before the arrival of

the storm (France Info, 2017a). In addition, police patrolled the most at-risk areas to inform the population about the evacuation orders and the special evacuation shelters which had been put in place. On Sint Maarten, several emergency centres were set up and food, water and tarps were provided (IOM, 2017a). Furthermore, almost 100 Dutch soldiers were sent to Sint Maarten, and other Dutch territories Sint Eustatius and Saba (Rijksoverheid, 2017b).

The spokesman of the French government, Christophe Castaner, said: “We can always do more, but it’s an island. We cannot organize an evacuation, as in Florida, because it is not possible to evacuate 80,000 people in 48 hours” (Europe 1, 2017). Evacuation measures which did take place were not mandatory and highly problematic on both sides. Firstly, the collective emergency shelters were not adapted to the magnitude of the disaster. Some complained about a lack of information concerning evacuation possibilities and a lack of space in the evacuation facilities, leaving people who “didn’t know where to go” (BFM TV, 2017). Secondly, many inhabitants did not see the need to evacuate and were surprised when Irma actually hit the island (L’Obs, 2017). Finally, some of the areas in biggest need of evacuation, due to their proximity to the coast or the poor quality of their housing, have high concentrations of—undocumented—immigrant population. Many members of these immigrant communities refused to seek refuge in the collective shelters (Neyen S., personal communication, April 25, 2018). The French Minister of Overseas Territories afterwards regretted that at least 7,000 people did not follow the evacuation orders (BFM TV, 2017). In Sint Maarten, during the peak of the storm, only 219 people stayed in one of the evacuation centres (IOM, 2017b).

Another big factor influencing evacuation behaviours were the pillages that took place in the direct aftermath of the hurricane. Gangs of plunderers took advantage of the chaotic situation to rob houses and stores. The pillages shocked and destabilized the population. Some of the military officials deployed on Saint Martin stated that inhabitants refused to evacuate because of their fear of looting (Barroux, 2017) and to protect their belongings (IOM, 2017b). For the most part, these were fathers who evacuated their wives and children in the aftermath of the storm and stayed on the island. Julie Martinez, a student from Saint Martin, describes that “the feeling of insecurity, especially for families with smaller children, was for many unbearable” (Martinez J., personal communication, April 20, 2018). She experienced the pillages from close by as the looters targeted her parents’ clothing shop. Image 4.3. shows the chaos that the looters left behind.

Image 4.3. Looted Shoes and Clothing Shop



Source: Julie Martinez, 2017

After the Eye of the Storm: Chaos and First Evacuations of the At-Risk Population

The first evacuations following the storm proved challenging, as the small size of the Grand Case airport on the French side did not allow the arrival of larger aircrafts and as the airport on the Dutch side was significantly damaged by the hurricane. In Sint Maarten, it took about a week before the first people could leave the island (Van der Veer R., personal communication, May 3, 2018), and in Saint Martin only 30-70 people could leave for Guadeloupe or Martinique⁶ in one plane at a time in the first days after the disaster (Barroux, 2017). The people who received priority to be evacuated were the wounded, the sick, tourists and children under the age of six with their guardian (Charrier, 2017). Some of the residents were angered at the evacuation procedures, which they perceived as discriminatory, since they prioritized white tourists (Adamson, 2017).

The Netherlands had sent 100 soldiers and prepared ships with water and food in advance (Rijksoverheid, 2017b). Emergency shelters had a

⁶ Two other French Overseas Territories situated in the Caribbean.

capacity to house almost 2,000 people (IOM, 2017b), but hardly any inhabitants stayed at one of the facilities. Many homeless residents found temporary shelter with family or friends on the island (National Recovery Plan, 2017). On the French side, relief aid started slower, until finally, an air and sea bridge was put in place between Saint Martin and both Guadeloupe and mainland France. The air bridge transported drinking water, food supplies and first respondents to Saint Martin, as well as helped evacuate the prioritized populations (Gustin, 2017). About 1,000 people were evacuated in the first five days after the hurricane using 24 military airplanes as well as civil aircrafts made available by commercial airlines (Duguet, 2017).

Image 4.4. Airplane for Evacuations from Saint Martin to Guadeloupe



Source: Sandra Neyen, 2017

While inhabitants on Saint Martin were furious about the organizational incompetence of the French authorities compared to their neighbours, the Dutch intervention was rather sensitive due to Sint Maarten's sovereign status. In the days immediately following the storm, the Dutch army helped to keep the situation under control and the Dutch government also unlocked 550 million euros for Sint Maarten (Government of the Netherlands, 2017). However, this fund was only available "under some specific conditions" (M. Rutte, Prime Minister of the Netherlands, 2017). Firstly, an integrity committee had to be established to evaluate the allocation of the funds in order to hamper corruption (Rijksoverheid, 2017a). Secondly, the Dutch authorities requested to have more responsibility to patrol the border. The Minister President of Sint Maarten of that time, William Marlin, refused these terms. What followed was a vote of no confidence by the parliament; the majority eventually agreed to follow

the terms set by the Dutch government in order to receive the money. Subsequently, Marlin and five of his ministers had to step down on November 2nd (Knops, 2017). This procedure slowed down reconstruction efforts significantly. Half a year after the hurricane, in April 2018, one fifth of the money was finally made available (NOS, 2018).

In Saint Martin, the majority of evacuations to other French territories, had to be paid for by the people wishing to leave the island. Sandra Neyen, a teacher and resident of Cul-de-Sac in the northeast of Saint Martin since 2005, explains how she managed to evacuate her twelve-year-old son seven days after the hurricane to Martinique, then to French Guiana and from there to Paris, whereby all plane tickets were issued under the regular air fares (Neyen S., personal communication, April 25, 2018). From the 8th of September until about two weeks after the disaster, the airline Air France offered special fares for flights from Guadeloupe, Martinique and French Guiana to Paris at prices between 269 and 301 EUR for the victims of the hurricane (Le Figaro, 2017). Despite such support, the upfront cost of evacuation was very high, making evacuation difficult for the more precarious population groups.

Exact numbers on the number of evacuees are not available and will probably never be. The fate of undocumented immigrants, for instance, remains largely unknown. However, Van der Veer observed that the island felt significantly less crowded. "It would not surprise me if about ten percent of the population had left," he said (Van der Veer R., personal communication, May 3, 2018).

Evacuation, Migration and Immobility: Identifying the Adaptation Strategies Adopted After Irma

As mentioned in the introduction, the residents of St Martin can be divided into three broad categories, which each represent roughly one third of the total population: natives of Saint Martin or Sint Maarten, French or Dutch nationals who moved to the island from other French or Dutch territories, and both regular and irregular immigrants who mainly come from other Caribbean islands. These three groups are characterized by strong discrepancies in the socio-economic capacities they dispose of with regards to adapting to Hurricane Irma. The following sub-sections will compare the respective migration behaviours of each population category as a result of Hurricane Irma.

Short-Distance Migration: Remaining in the Caribbean

There is an important network of relationships between St Martin and the surrounding Caribbean islands, due to the facts that the majority of the immigrant population originated from the Caribbean region and that many inhabitants have connections to the other French and Dutch territories, such as Guadeloupe, Martinique, Curaçao and Aruba. These relationships presented an opportunity for many to find refuge from the destructions in the direct aftermath of the hurricane.

Guadeloupe was the main point of arrival for Saint Martin evacuees, regardless of whether they wanted to stay in the Caribbean or be repatriated to mainland France. By the end of September, over 6,000 people from Saint Martin had been taken charge of at the Guadeloupean airport Pointe-à-Pitre (France Info, 2017c). In order to support the arrivals from Saint Martin, several organizations and national agencies, set up an emergency reception centre in Pointe-à-Pitre, providing food, medical help and shelter, but also giving directions to people in order to access to housing and education in Guadeloupe (Fondation de France, 2017). The prefecture of Guadeloupe coordinated offers from residents who were willing to provide housing for the people from Saint Martin, and the French employment agency *Pôle Emploi* in Guadeloupe was instructed to automatically take charge of job seekers from Saint Martin (Guadeloupe 1^{ère}, 2017).

Evacuation from Sint Maarten occurred through other Caribbean islands within the Kingdom of the Netherlands, mainly Curaçao and Aruba (Ministerie van Defensie, 2017). First, Dutch military airplanes brought 1,400 people to Curaçao (Het Parool, 2017) and the US Army also evacuated a significant share (Curaçao Chronicle, 2017). From the 16th of September onwards, a Dutch airline arranged an airplane commute from Sint Maarten to Curaçao or Aruba, initially for all the tourists that wanted to leave, and later for everyone. (Het Parool, 2017). Many of the evacuees would continue their journey to the Netherlands from Curaçao (Ministerie van Defensie, 2017).

In Curaçao, a special camp was set up to receive those who had nowhere to go to and who needed time to organize their papers. The camp gave shelter to more than 200 people from Sint Maarten until mid-October “to prevent a humanitarian disaster”, said Leroy Fer, coordinator disaster management in Curaçao (Leidel-Schenk, 2017). When the camp closed, 26 residents still had to find accommodation. Since Curaçao is a separate country within the Kingdom, the people who did not have a place to

stay or the money to buy a ticket elsewhere were left on their own (Dias, 2017). “Curaçao cannot organize work and shelter for all these people. [...] We do want to help, but have to help ourselves first”, said Donna Philbert, sector director of the Ministry of social development, work and wellbeing (Leidel-Schenk, 2017).

A significant number of unaccompanied minors arrived in Pointe-à-Pitre (Fondation de France, 2017). Some parents whom remained in Saint Martin sent their children to school in Guadeloupe, as classes were suspended up until two months after the hurricane. At the end of September 2017, the prefecture of Guadeloupe announced that 284 children from Saint Martin had returned to school (Bancaud, 2017).

Similarly, some parents sent their children to Curaçao, whose government had announced that it would open its schools for children from Sint Maarten. On the 16th of September, 30 children arrived in Curaçao. 500 families had signed up to host the children and were screened by a multidisciplinary team to ensure that the children—many of whom were traumatized—had a suitable new home to go to (NOS, 2017; Antilliaans Dagblad, 2017).

The motives for leaving St Martin varied strongly, from people who had lost all their possessions and sources of livelihoods, to others who simply wanted to wait for a normalization of the situation before returning (Fondation de France, 2017). Of the 6,000 arrivals in Guadeloupe, roughly 3,500 residents of Saint Martin and Saint-Barthélémy remained on the island for at least two to three months after their evacuation (Europe 1, 2017b). Staying in the French or Dutch Caribbean was an option for natives of St Martin, who had suffered devastating losses but still hoped for a chance to return more easily to their island in the future.

Certain islanders who remained in the region were unfortunate enough to experience yet another hurricane event. While Hurricane Maria did not hit St Martin directly, it did hit other islands of the North-Eastern Caribbean Sea in full force (Pasch *et al.*, 2018). Some inhabitants of St Martin had fled to these islands after Hurricane Irma (Martinez J., personal communication, April 20, 2018; Gianni N., personal communication, March 8, 2018; Ahmed & Semple, 2017).

At this point, it is difficult to judge the temporality of migration from St Martin to neighbouring islands. According to UN (1998) definitions, displacement which lasts for longer than one year is considered long-term migration. One year after Irma, there is currently no available data on St Martin returnees. However, the fact that many St Martinois who

remained in the Caribbean lack connections to go anywhere else, gives reason to assumptions about the less-permanent nature of their migrations. According to interviewees, many migrants from the region used these connections from their country of origin to escape the chaotic circumstances temporarily, but often returned relatively quickly (Martinez J., personal communication, April 20, 2018; Gianni N., personal communication, March 8, 2018). The duration of these migration patterns will also depend on the progress of the still-ongoing reconstruction efforts.

Arriving in Europe: A Tale of Abandonment and Second-Class Citizens

The differences in status between the French and Dutch parts of the island strongly impacted the migration patterns of their respective residents. This is clearly reflected in the number of people who chose to leave St Martin for Europe without having any relatives there to host them. Only a few dozen natives of Sint Maarten left the island to go to the Netherlands (Markus, 2017b), while at least 450 people born on the island left Saint Martin for mainland France (Europe 1, 2017a), either through repatriation services provided by the French State or via their own financial means (France Horizon, 2017). People without any personal network struggled the most, whereby housing was the biggest challenge for people arriving both in the Netherlands or France.

In the Netherlands, people from Sint Maarten were not able to register at a municipality and access certain social services if they did not have a place to stay (Markus, 2017b). It was unclear how municipalities in the Netherlands were expected to host the escapees and difficult for them to arrange short-term shelter and support, as well as adequate housing in the longer term (Ollongren, 2017). The Dutch Minister of Internal Affairs and Kingdom Relations urged the municipalities not to distinguish between people from Sint Maarten and other Dutch people as they registered at the municipality. She asked them to collaborate and provide migrants with support according to the legislation. She also stressed that Dutch help was directed at Sint Maarten and that people from Sint Maarten who decided to come to the Netherlands were responsible for their own survival and housing (Ollongren, 2017). The Dutch government thus counted on the migrants to be self-reliant and to organize housing for themselves (Markus, 2017b).

The situation was quite different in France, where the French State had a clear responsibility towards the natives of Saint Martin. However,

discrepancies between the islanders originating from mainland France and those born in Saint Martin were significant. The majority of those who arrived in Paris had friends or family in mainland France to provide them with both psychological and material support. Still, 450 of the total 2,500 evacuees had no relations whatsoever and nowhere to go (Europe 1, 2017a). They were provided provisional housing at the expense of the French State in a number of hotels surrounding Orly airport. The majority of these evacuees were natives of Saint Martin and many of them were women who had left their husbands behind on the island in order to bring their children to a safe and stable environment. Among them were also some Caribbean immigrants who faced additional barriers as they lacked French language skills. Temporary accommodation solutions were found for 151 of these people in an old castle and boarding school in Coye-la-Forêt, allowing children to finally return to school, until the NGO France Horizon found them social housing in different French regions (Ministère de la Cohésion territoriale, 2017).

Integration in their new homes, the job market and the mainland French society is full of challenges for the natives of Saint Martin. Their dire financial situation caused by the losses suffered during the hurricane, the education gap between the population of Saint Martin and that of mainland France, as well as cultural differences, have created frustrations. Some voiced their discontent at the lack of support from the French government, saying: “We feel like we are foreigners, but I am French, we are all French. We are alone, without help and don’t know where to go.” (Philippon, 2017).

Especially for the natives of St Martin, the decision to move to Europe is a much bigger step away from their homes than staying in the Caribbean. Many explained that they had lost everything to the hurricane and wished to reconstruct new lives (Lasry-Segury, 2017). Therefore, migration is potentially much more permanent for those who moved to Europe, than for those who stayed in other Caribbean territories.

Generally speaking, the ability to return to the island depends on financial resources, but also on employment and education opportunities. Neyen was obliged to return to Saint Martin after three months, as she would have lost her teaching position otherwise, however leaving her son with her family in Antibes to continue attending school in mainland France (Neyen S., personal communication, April 25, 2018). The fact that schools were closed due to the damage and the lack of teachers was a motive to migrate for families with children. This was the case for Martinez’ parents, whose little sister is still in primary school: “My

parents' decision to leave to Paris was naturally influenced by my little sister. Otherwise they would maybe have stayed", she says (Martinez J., personal communication, April 20, 2018).

The Most Vulnerable Left Behind: Immobility in the Case of St Martin

The analysis has up until now focused on the people who chose to leave the island in the aftermath of the hurricane. However, it is equally relevant to consider population groups who did not move. In the case of St Martin, a study of 'immobility'—a concept that refers to groups who do not wish or have the capacity to migrate away from their place of origin in times of crisis—after Hurricane Irma gives insight into the social and ethnic inequalities present on the island.

In this context, immobility applies to a large part of St Martin's immigrant population, a group which has been mobile in the past and migrated away from their homeland for economic and possibly even disaster-related environmental reasons (i.e. Haiti). The "dynamism of mobility status" has been conceptualized by Carling (2002), showing that mobile populations can become immobile (Zickgraf, 2018). Immobility is problematic because people who became incapable of moving away from disaster locations "may become more prone to humanitarian emergencies" (Foresight, 2011).

St Martin has been an important immigration hub in the Caribbean since the population of the whole island almost tripled between 1980 and 2007, with a substantial part of this increase attributed to inter-regional immigration (Redon, 2007). As a result, shantytowns have developed on sandy beaches in the lowlands of the island (Duvat, 2008; Hillebrink, 2013). These low-lying areas are more prone to multiple natural hazards, such as strong winds and floods from rising sea levels and storm surges (Cashman & Nagdee, 2017; Bueno *et al.*, 2008). In St Martin, the immigrant population is concentrated in the most precarious neighbourhoods of the island, many of which are located on the coast (Secours Catholique Caritas France, 2018; Mesu & Stoffers, 2011).

Precise information on the fate of these undocumented migrants is largely unknown (IOM, 2017b; Gianni N., personal communication, March 8, 2018). It is clear, however, that the destruction of these neighbourhoods was exacerbated by the poor housing conditions of irregular migrants on the island, leaving many people without shelter after the hurricane (IOM,

2017b) and contrasting sharply with other areas on the island. Gianni observed that “almost all of the wealthy people’s houses stayed somewhat intact” (Gianni N., personal communication, March 8, 2018).

Many of the residents of the most precarious neighbourhoods had no choice in whether they should leave or stay, as they had nowhere to go and lacked the necessary resources to leave (La Croix, 2017). In addition, those who are not officially declared residents of Saint Martin cannot benefit from compensation and evacuation services put in place by the French State. These residents have less trust in national authorities, are less likely to follow evacuation measures and are more reluctant to approach aid organizations (IOM, 2017c).

Quartier d’Orléans, where 70% percent of the 8,000 to 10,000 inhabitants are immigrants, is a good example of the difficulties these communities faced in the aftermath of the disaster. The isolation of the neighbourhood resulted in a slower distribution of aid supplies by the authorities. When supplies arrived, they were deemed insufficient, as the high number of undeclared residents made it difficult for aid workers to calculate and adjust the quantities needed in the neighbourhood (Le Devin, 2017).

Stigmatization and a general feeling of insecurity also created problems. The pillages that took place after the disaster contributed to feelings of fear and hostility amongst aid workers. In the first days, the situation was considered too dangerous for adequate stock-taking (Koch, 2018). Scared by reports about armed robbery and other violence, aid workers would just throw canisters of water from trucks when passing Quartier d’Orléans, instead of distributing supplies directly as on the rest of the island (Le Devin, 2017).

Another factor leading to immobility, which did not only apply to the migrant population, was the desire of people to contribute to reconstruction efforts. The most isolated communities decided to take things into their own hands and organized shifts to clean up the ruins. Some residents presented this responsibility towards their community as a reason to stay in the destroyed areas. Mathieu from Quartier d’Orléans explains: “Everybody is trying to leave, but (...) there has to be people who stay and clean up the place” (Libération, 2017).

Despite these efforts, many people in these precarious neighbourhoods still practically live in the streets, months after the disaster. Inhabitants stay in the destroyed remnants, because they do not have the financial resources to rebuild their houses (Secours Catholique Caritas France, 2018; Van den Dool, 2018). Van der Veer adds: “Since the island is prone

to hurricanes, house insurances are very high. The poorer people on the island cannot afford that” (Van der Veer R., personal communication, May 3, 2018).

Conclusions and Discussion: Understanding the Patterns of Migration and their Implications

After having identified and detailed the different patterns of migration—or in some cases the absence of migration—the case study of St Martin should be situated in a larger framework with regards to assumptions about environmental migration, in comparison with the rest of the Caribbean region and concerning the concept of vulnerability.

St Martin and Assumptions on Environmental Migration

Hurricanes are defined as rapid-onset environmental disasters with a strong capacity to cause migration and displacement. In the literature surrounding environmental migration, rapid-onset phenomena are assumed to “lead overwhelmingly to short-term internal displacements rather than long-term or long-distance migration” (Piguet *et al.*, 2011). This argument is based on the lack of financial resources of individuals affected by such disasters and their wish to return to reconstruct their houses and communities. The potential of tropical cyclones to “provoke long-term and long-distance migration” is seen as limited but can occur in regions where there is a high frequency of disasters, and “if the affected society is highly dependent on the environment for livelihood and if social factors exacerbate the impact of the disaster” (Piguet *et al.*, 2011).

The people of St Martin were significantly affected by factors which are likely to induce long-distance and long-term migration, including the unexpected and unprecedented magnitude of the hurricane. The psychological shock many residents of the island suffered when confronted with hurricane Irma, combined with predictions that similar events will become more frequent in the future, have impacted the relationship people have with their home region. In parallel to the discourse on global warming and its capacity to increase frequency and intensity of Caribbean storms, long-distance and long-term migration becomes a strategy of resilience, seeking to rebuild a new life elsewhere before worse is yet to come.

Long-distance migration away from devastating destruction and re-occurring environmental hazards, is only made possible in this form for the

people of St Martin (and long not for all, as has been discussed) because of the island's attachment to the French and Dutch governments. "Other countries such as Cuba, Dominica and Antigua and Barbuda, have no such patrons, and are at the mercy of donations and the generosity of their neighbours" (Benjamin and Thomas, 2017). These populations have much less access to long-distance migration outside of the region.⁷ St Martin is not unique in this regard, as other Caribbean islands, such as Puerto Rico or the British Virgin Islands, are also attached to larger countries.

This is equally demonstrated in the different relationships of Saint Martin and Sint Maarten to the Dutch and French governments, which affected the choices inhabitants had in the aftermath of the storm. French Saint Martin represents a particular example of environmental migration, which can be characterized as very long-distance while nevertheless remaining internal. Internal migration meaning that migration takes place, without an internationally recognized State border being crossed (OHCHR, 1998). The UNHCR (n.d.) adds to this definition that internal migrants therefore remain under the protection of their government. In the case of Saint Martin, this allowed the French government to provide assistance throughout the migration process (however satisfying or not the results were evaluated by the affected people). In contrast, migration from Sint Maarten to the Netherlands cannot be characterized as internal so that the protection the migrants received from the Dutch government was minimal, limiting their options to escape from the region.

The Impact of Social Inequalities: Immobility and Aggregated Vulnerability

Deep socio-economic inequalities were already very much present on the island of St Martin before the hurricane hit. The combination of existing social and ethnic inequalities with the disaster has resulted in immobility and aggregated vulnerability to environmental hazards for parts of the population.

Piguet *et al.* (2011) recognize the social dimension of vulnerability to environmental hazards, pointing out that "people do not have access to the same resources when it comes to reacting or adapting to environmental change". The case of St Martin has shown that these resources are

⁷ However, this lack of reliable backing can also result in greater resilience within the countries themselves. In Cuba, for example, there are numerous measures taken to be well prepared for hurricanes, such as a national curriculum on disaster preparedness, prevention and response (GRID, 2018).

not only of financial but also of social and cultural nature. Comparing the adaptation of natives of St Martin and other French or Dutch nationals, who migrated to Europe, shows that absence of social connections and cultural barriers are equally problematic than the lack of financial means (which can partly be compensated for through aid from the government or civil society).

Vulnerability to the consequences of the natural disaster was most strongly experienced by St Martin's immigrant population, which had the least options to choose from in terms of adapting to the event. Through an accumulation of environmental (natural disaster, geographic location of neighbourhoods in most exposed areas), economic (low-quality housing, lack of financial resources to move elsewhere), social (mistrust for national authorities, high rate of illiteracy or lack of language skills, lack of relations in other French or Dutch territories) and political (lack of citizenship, high number of undocumented residents) factors, a situation of aggregated vulnerability was created. It resulted in immobility and further impoverishment of an already precarious group. It should be added that for many, migrating to St Martin was already an adaptation strategy to escape extreme disaster-related vulnerability. Oftentimes, their countries of origin in the Caribbean are even more destabilized by and vulnerable to environmental and economic problems, as demonstrated by the fact that some of the Caribbean immigrants who did return to their islands of origin experienced a second disaster in the form of hurricane Maria (Martinez J., personal communication, April 20, 2018; Gianni N., personal communication, March 8, 2018; Ahmed & Semple, 2017).

Examples can be given in order to illustrate the concept of aggregated vulnerability of the migrant population of St Martin. Many undocumented migrants work irregularly in the tourism industry. They are therefore often the ones who lose their jobs first and have no safety net to rely upon. An inhabitant of the Dutch Quarter in Sint Maarten, home to many undocumented migrants, fears that this can further worsen the living conditions in the area: "What if the aid stops and people do not have an income? They will steal, it will become dangerous." (Markus, 2017a).

Secondly, in terms of adaptation to the disaster and long-term reconstruction, there were also large differences in the capacity to access aid, compensation or insurance payouts. In the first weeks following the hurricane, demands for compensation payments had to be filled out, however, the level of illiteracy is so high among the first generation of immigrants that many were not capable of filling out the forms by themselves (Le Devin, 2017).

Conclusion

It has been shown that migration from St Martin in the aftermath of Hurricane Irma is a case study at the crossroads of many debates about the nexus between environmental migration, climate change and hurricanes in the Caribbean. The main points which have influenced the case of St Martin are its position in one of the most hurricane-prone regions of the world, its divided territory into two distinct political entities, high levels of inter-regional immigration, as well as a unique population composition almost equally divided into three distinct groups.

The main conclusions that can be pulled from this case study and applied to the environmental migration field are the conditions under which rapid-onset disasters can provoke long-distance migration, the seemingly contradiction of internal and long-distance migration and, finally, concrete examples of immobility and aggregated vulnerability.

Despite political and economic differences between Sint Maarten and Saint Martin, the inhabitants of both territories faced very similar challenges in their adaptation strategies to the disaster. The support received by migrants in terms of housing and integration into the job market and the Dutch or French societies was perceived as completely insufficient. In light of the expected increasing frequency of natural hazard-related disasters in the near future, the lack of cooperation between the two sides of the island represents a major drawback. If Sint Maarten and Saint Martin manage to pool resources and to coordinate a common resilience and adaptation strategy for the entire island, chances increase that inhabitants do not have to suffer such devastating damage in the future and can stay on the island.

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Hurricane Maria and the Geopolitics of Puerto Ricans' Environmental Migration

Manuel Guerrero and Valentina Guatri

The magazine *Scientific American* described Hurricane Maria as “one of the largest mass migrations events in the United States’ recent history” (Cusick & Aton, 2017). Yet, while Hurricane Maria can be said to have spearheaded a wave of environmental migration from Puerto Rico to the mainland United States, migration trends from Puerto Rico to the rest of the United States had already seen significant increases over the past decade and are projected to continue to increase over the coming years. Therefore, to understand the importance of environmental migrations prompted by Hurricane Maria, it is important to analyse this migration event within the larger context of the shared environmental and socio-political conditions that have prompted Puerto Ricans’ recent mass migration to the United States, both before and following Hurricane Maria.

This paper attempts to understand whether Hurricane Maria exacerbated already existing problems in Puerto Rico or if it brought along new challenges to the island. To do this, we will look at the different push and pull factors for migration both preceding and following this environmental disaster through an analysis of the socioeconomic conditions before and after Hurricane Maria. By studying the response to Hurricane Maria and contextualizing the Hurricane within a larger geopolitical framework, we will be able to better understand whether internal displacements caused by Hurricane Maria lead to a permanent or temporary migration to the United States’ mainland.

Hurricane Maria

Hurricane Maria made landfall in Puerto Rico on September 20, 2017 and marks the worst Atlantic Storm since 1950 with average winds speeds of up to 123 miles per hour (Hsiang & Houser, 2017). President Donald Trump immediately declared a state of emergency, but parts of the island remained without access to electricity, water, and other supplies for close to a year after Hurricane Maria made landfall. The latest reports from

Puerto Rico's electricity provider indicate that electricity was restored to all but 25 customers on August 6th, 2018 (Campisi & White, 2018). However, thousands of residents remain without access to key infrastructure services, including over 8,000 families without regular access to clean water, while electricity blackouts remain a common experience (Schmidt, 2018; Yen & Woodward, 2018). The *New York Times* reported that "no other Atlantic hurricane was a disaster as epic as Maria slamming into Puerto Rico" (Hsiang & Houser, 2017). Following Hurricane Maria, there were severe damages to homes, roads, and the island's electricity grid with 80% of Puerto Rico remaining in darkness a full month following Hurricane Maria (Maxwell & Kelly, 2017). The hurricane also left Puerto Ricans without clean drinking water forcing many to drink from contaminated wells near hazardous waste sites and leaving thousands to "struggle to find food, shelter, and medical care" (Maxwell & Kelly, 2017). The slow recovery from the Hurricane and its ongoing effects in the daily life of Puerto Ricans have spearheaded a new wave of migration from Puerto Ricans escaping the devastation in their communities.

Additional drivers behind Puerto Rico's recent migration trends, including the island's ongoing economic crisis and the US Federal Government's response to Hurricane Maria, will be explored at length below. Together, these drivers will help us argue that the movement of people from Puerto Rico was not due only to Hurricane Maria, but to a decade-long period of economic struggles. This economic stagnation, combined with a slow and inadequate response by the local and federal government agencies in Puerto Rico, have led to unprecedented levels migration to the US mainland by Puerto Ricans on the island (Sutter & Hernandez, 2018).

How to Define Puerto Rican Migrants?

While finding the appropriate term for Puerto Rican migration to the US mainland has presented problems for those reporting on Puerto Rico's post-hurricane migration trends, we argue that the most appropriate definition is that of internally displaced persons. The UNCHR's Global Protection Working Group defines internally displaced persons—or IDPs—as "part of the broader civilian population that needs protection and assistance because of conflict and human rights abuses or due to *natural disasters* [emphasis added]" (Global Protection Cluster Working Group, 2010, p. 1). Although Puerto Ricans operate under a secondary citizenship status without full political representation and voting rights in the U.S. elections while living in Puerto Rico, Puerto Ricans are still American

citizens and therefore require the protection and assistance of the U.S. government and Federal agencies, including the Federal Emergency Management Agency (FEMA), the US Army Corps of Engineers, and the U.S. Coast Guard.

As part of the legal framework for the protection of internally displaced persons, the UNHCR maintains that “States have the obligation to respect, protect and fulfil the human rights of their citizens and other persons on their territory or under their jurisdiction” (UNHCR, 2007). To this extent, it is the role of the United States’ Federal and State institutions to provide assistance to both Puerto Ricans internally displaced within and outside of Puerto Rico.

In the following sections, we will analyse how U.S. government agencies prepared for and responded to the effects of Hurricane Maria.

Before and After the Storm

On September 6, 2017 Hurricane Irma came very close to making landfall on Puerto Rico. The hurricane skirted off course on the island, but it left up to a million people without power, its flooding submerged part of the territory, and the storm left at least three people dead (Johnson, Arkin, Cumming and Karins, 2017). Alone, Hurricane Irma was not a catastrophic storm for Puerto Rico, but it set the stage for the deadlier Hurricane Maria later that month.

On September 16, 2017 the Puerto Rico Federal Affairs Administration (PRFAA) announced the arrival of Hurricane Maria, warning the citizens of Puerto Rico to take the necessary precautions before the incumbent event. One day before the hurricane made landfall, the governor of Puerto Rico, Ricardo Rosselló, announced that 500 shelters were being made available for everyone who could not find any other safe location (Puerto Rico Federal Affairs Administration, 2017).

Ingris Bagué, a student at the University of Puerto Rico’s *Rio Piedras* Campus, felt that the local Puerto Rican government was well organized in preparation for the hurricane, but did very little planning in response to Hurricane Maria making landfall, adding that:

The government did well preparing us for the hurricane [,] but when it was over, it was a complete mess. Since the communications were [completely] down and there was (apparently) no plan outlined for the aftermath, nobody

knew what to do or where to go. So, there wasn't water nor electricity service, no communications and a lot of blocked [roads] because of the trees or landslides. It took the government several days to organize themselves and help the people [...] Then the U.S military arrived but they followed our governors order[s] and since our government wasn't very organized, a lot of time and resources were lost (Bagué, I., personal communication, 22 April 2018).

Additionally, Bagué highlights the fact that the same precautions had been taken for Hurricane Irma only a few days before Hurricane Maria. The difference between the two storms was that the former never made landfall on the island while the latter did. Consequently, the situation was underestimated, due to the previous events, which had a much lesser impact on Puerto Rico.

On September 17, President Donald Trump authorized the US Department of Homeland Security's Federal Management Agency (FEMA) to provide emergency disaster relief efforts to "save lives, and to protect property and public health and safety, and to lessen or avert the threat of a catastrophe in all 78 municipalities in the Commonwealth of Puerto Rico" (FEMA, 2017). At the time of President Trump's message, many FEMA personnel were already stationed in Puerto Rico and in a position to act as a result of their work to assist with disaster relief efforts for Hurricane Irma.

The National Hurricane Center (NHC) issued an accompanying storm warning on September 18, alerting several Caribbean islands and issuing a hurricane watch for Puerto Rico and 10 neighbouring islands (National Hurricane Center, 2017a). On the same day, Hurricane Maria made landfall on Dominica, then proceeded its course towards Puerto Rico. The NHC warned of the potential effects of Hurricane Maria the following day stating:

Maria is likely to affect Puerto Rico and the U.S. and British Virgin Islands as an extremely dangerous major hurricane tonight and Wednesday. Preparations to protect life and property should be rushed to completion. A life-threatening storm surge, accompanied by large and destructive waves, is expected for the Leeward Islands, the U.S. and British Virgin Islands, and Puerto Rico (National Hurricane Center, 2017b).

Bagué was in San Juan the day Hurricane Maria made landfall on Puerto Rico. In response to Hurricane Maria, Bagué and her brother returned to

their mother's house in the centre of the island, in order to move away from the capital city of San Juan, which is located on the island's Atlantic coast. They checked every part of the house and counted the supplies necessary to face the hurricane:

I don't know if it was the government or the winds, but before Hurricane Maria was even near, there was no power in the entire island. The wind howled like if it were a huge animal outside and since noon the rain had been so heavy I didn't even know what time it was. Wednesday morning, it felt like a continuation of the night before but worse. You could literally hear the tree trunk creek and snap as the wind blew constantly on them. [...] When the winds changed direction, they became even stronger and the rain became thicker. We heard trees and things cracking outside, and water started getting inside from beneath the doors and, somehow, out of the tight locked windows. [...] Like we had heard, most of the trees, no matter the size, were down. Many houses that had zinc or metal rooftops, had lost it completely and all the electricity cables were also on the floor. It was a terrible sight (Bagué, I., personal communication, 22 April 2018).

It's important to note that, while Hurricane Maria was not the deadliest storms in recent years, the hurricane caused substantial physical damage to the island's infrastructure (Konyndyk, 2017). The ongoing effects of the island's infrastructure damages combined with the poor response by FEMA and other official government authorities resulted in a much greater loss of life in the coming weeks in months following the hurricane.

A collection of recent documents obtained by Frontline and National Public Radio shows that FEMA's response to Hurricane Maria was totally unprepared for the hurricane, emphasizing that meals, water and tarps were all in dangerously low supply as demonstrated in table 5.1. below (Einbender, 2018). This is despite the NHC's initial warnings and although FEMA personnel were already stationed in Puerto Rico. Einbender reported that "the need for tarps was especially severe. With nearly half a million homes damaged or destroyed, FEMA needed hundreds of thousands of tarps. But just 5,000 were delivered nine days after the storm hit—20 times less than what was provided after Irma" (Einbender, 2018).

FEMA tarps serve as temporary roofs for houses damaged by Hurricane Maria and provide an important protection against further natural damage

to housing structures, while also providing better shelter to people living in damaged houses. Tarps need to be set up within the first week or two after a disaster if households want to have a good chance of saving their homes (Sullivan, 2018b).

Table 5.1. Immediate Hurricane Response

Supplies Delivered 9 Days After Each Storm			
	Meals	Water (Liters)	Tarps
Hurricane Harvey (Texas, USA)	5.1 Million	4.5 Million	20,000
Hurricane Irma (Florida, USA)	10.9 Million	7 Million	98,000
Hurricane Maria (Puerto Rico, USA)	1.6 Million	2.8 Million	5,000

Table created by the author. Source: Einbender, 2018

Laura Sullivan noted that FEMA severely underreported the supplies they had on hand, with a second report in which she stated that:

FEMA never had 500 generators on the island before the storm. It had 25. Its plastic roof program was out of plastic, and the most tarps FEMA ever produced was 125,000, months after people needed them. In an interview, FEMA federal coordinating officer for Hurricane Maria, Michael Byrne, said the agency was stretched thin by multiple storms and that Puerto Rico’s island geography was a challenge after a Category 4 hurricane (Sullivan, 2018b).

Alice Thomas from Refugees International added that the government’s response in Puerto Rico was far worse than in many developing countries, including the Philippines (Thomas, qt. in. Sullivan, 2018b). FEMA’s response in Puerto Rico was also far worse than in other disaster relief efforts conducted by the United States with Frontline reporters commenting that:

While the Army Corps provided thousands of blue roofs in the immediate aftermath of storms like Irma and Katrina, in the first 30 days after Maria, it finished just 439—less than 1 percent of the total needed. Even three months after the storm, only half of the number of blue roofs needed were up in Puerto Rico (McCormick & Schwartz, 2018).

Regarding the reconstruction of the island, as of December 2017, Puerto Rico had received US\$ 870 million in federal funds from FEMA, for homeowners, debris removal, delivery of food and water, medical personnel, and engineers. The island also received US\$ 4.8 billion for Medicaid funds, US\$ 2 billion for power grid restoration, and US\$ 9 billion for housing. The Puerto Rican authorities, however, claim the amount of dollars allocated to the island is not enough to solve all the damages from Hurricane Maria (Mazzei, 2018).

Joaquín Rosado, a recent Puerto Rican migrant to Philadelphia, wrote of his experience on the ground following Hurricane Maria:

FEMA's lack of immediate action to communities was insufficient, as they could have participated extensively in the recovery. Excuses were made to not visit the West and Central towns of the island (who needed it most due to their rural setting); if distributed, low-quality materials were given; and, people that needed money to recover their ceilings were given less than necessary to cover their expenses (Rosado J., survey conducted by author, 2 May 2018).

Rosado's testimony highlights the lack of an appropriate government response in the immediate aftermath to Hurricane Maria as well as the lack of necessary supplies for Puerto Ricans affected by the storm. Rosado also elaborates on what has happened in the seven months since Hurricane Maria struck Puerto Rico, stating:

After seven months of the hurricane, the aftermath is still felt and the effects are still present. While establishments are functioning and classes have begun, Puerto Rico is not the same as it was. Power outages have become a norm, some traffic lights are not running, rural towns still do not have running water or electricity, and many other problems too long to list (Rosado J., survey conducted by author, 2 May 2018).

Commenting on the recovery of the island following Hurricane Maria, Bagué elaborates, saying:

Can we even call what is happening a recovery? I would call it a remedy. I thank the U.S for sending their military, their support, electricians, and engineers, but things look the same, or worse. Yes, we have back our power, after 4-6 months (depending on the city) without it and still there

are people who don't have it (Bagué, I., personal communication, 22 April 2018).

As Rosado and Bagué explain and many other reports confirm, as of April 2018, thousands of Puerto Ricans remained without power in Puerto Rico, making it the second-largest blackout in history and the longest in US history, with more than three times as many millions of customer hours of electricity service lost in comparison to the next largest blackout in U.S. History (Criss, 2018). In a study conducted seven months after Hurricane Maria, the Rhodium Group estimated that 100,000 to 200,000 people still did not have access to electricity as of April, 2018 (Criss, 2018).

While examining the Palo Seco Power Plant in preparation to restore power to Puerto Rico, José Sánchez, the former head of grid restoration for the U.S. Army Corps of Engineers, declared that "Puerto Rico is in dire need, not only of power plants but a reconstruction of the grid itself" (Sánchez qt. in Sullivan, 2018c). Even prior to Hurricane Maria, many Puerto Ricans were already without electricity as a result of the effects of Hurricane Irma which occurred a couple of weeks prior to Hurricane Maria. Yet, reporter Laura Sullivan adds that:

It wasn't just the power grid. Water pumping stations, bridges, levees, roads—all had been starved for investment for years. Even people's homes weren't as strong as they should have been. Before the storm, the island could afford only five building code inspectors, for a population of 3.5 million people (Sullivan, 2018c).

In short, Puerto Rico was suffering from an unsustainable situation without the necessary structural strength to withstand the devastation of Hurricane Maria.

Further exemplifying the poor response to Hurricane Maria lies in the severe underreporting of associated deaths caused by Hurricane Maria and the difficulty in obtaining accurate data. A New York Times article reported that while the official death toll was listed as 64, the actual deaths due to Hurricane Maria could be as high as 1,052 based on data of cumulative additional deaths in Puerto Rico since Hurricane Maria made land-fall compared to data from the same days in 2015 (Robles, Davis, Fink, & Almkhtar, 2017).

The underreporting of deaths caused by Hurricane Maria is critical for both current and future disaster relief. Moreover, the lack of accuracy in

these and other recovery numbers makes citizens distrustful of government assistance and jeopardizes the allocation of additional resources to Puerto Rico from both public and private sources, as explained by Alexia Fernández Campbell in response to the slowdown of assistance for Puerto Rico's water crisis following Hurricane Maria (Fernández Campbell, 2017).

Economic Troubles in Puerto Rico

In addition to the lack of necessary preparation for Hurricane Maria, the severity of Hurricane Maria on Puerto Rico was made worse by Puerto Rico's recent economic troubles, further hindering Puerto Rico's recovery. In 2016, Puerto Rico had a debt of circa US\$ 70 billion.

Puerto Rico's exorbitant debt can be partially explained by the U.S. government's phase out of official tax-breaks allotted to companies operating in Puerto Rico and the subsequent departure of companies and jobs from Puerto Rico. In 1947, the US government passed the "Industrial Incentives Act", otherwise known as "Operations Bootstrap", in order to incentivize American companies to conduct business in Puerto Rico (Buckley, Herlands, & Printz, 2017).

Part of the incentives provided by the Industrial Incentives Act included exemption from Federal taxes so as to promote local manufacturing and reinvestment into Puerto Rico. However, Buckley, *et al.* point out that the U.S. Congress did not see the tax breaks as providing substantial economic benefits to Puerto Rico or the federal government (Buckley, Herlands, & Printz, 2017).

In 1996, the U.S. Congress started to phase out the Puerto Rican tax breaks and completed the phase out in 2006. After the complete removal of the tax breaks, Dylan Matthews reports that:

The full brunt of the breaks' removal hit, and manufacturers, in particular pharmaceutical companies, began closing plants; an estimated 100,000 manufacturing jobs have been lost, with more indirect jobs going away as a result. The result was a recession, worsened by the US mainland financial crisis and recession in 2007 and 2008 (Matthews, 2017).

As shown by these reports and data, the phase out of Puerto Rico's tax exemption has proved devastating for the Puerto Rican economy and its job market. Buckley et al reiterate how the private sector grew

dependent on these tax breaks and upon their removal saw little competitive advantage to remain in Puerto Rico (Buckley, Herlands, & Printz, 2017). Following the departure of these companies and the loss of jobs and capital in the island, Laura Sullivan reports that Puerto Rico saw itself forced to take on more and more loans that made millions of dollars for Morgan Stanley, Barclays, and Santander, but left Puerto Rico's government and small-scale local investors in serious debt (Sullivan, 2018a). Puerto Rico's status as a US commonwealth precluded the island from enjoying many of the benefits of incorporated US states. Of note, Puerto Rico is not covered by the US Bankruptcy Protection Law nor by the US Recovery Act (Hurley, 2016). In her report on Puerto Rico's economic troubles, Sullivan concludes commenting on Puerto Rico's slide into bankruptcy as a result of the loans, stating:

Fifteen months later, the then-governor announced the island couldn't pay any of its debt. It was broke. The bond funds crashed, savings, retirements, pensions gone. The government started closing hospitals. There was no money to shore up bridges or electrical grids. And then [...] [a] Category 4 hurricane came barreling into Puerto Rico (Sullivan, 2018a).

When Hurricane Maria struck, it found a Puerto Rico with a stagnating and indebted economy without the necessary infrastructure to withstand a natural disaster of this magnitude.

A study by climate economist Solomon M. Hsiang found that:

Assets in the United States are far more likely to be destroyed in a cyclone than assets in a comparable event in other wealthy nations, like Japan, Hong Kong or Australia. This is, in part, because of the fragility of [the United States'] infrastructure, which looks more like poorer countries, like India or China (Hsiang & Houser, 2017).

This was especially true for Puerto Rico which, despite being a territorial part of the United States, stands under a very high contrast in terms of infrastructure, economic well-being, and higher vulnerability to the effects of climate change as an island-territory. The lack of investment in Puerto Rican infrastructure and the general absence of basic maintenance for its infrastructure can be traced to the economic crisis caused in part by the phase out of the federal tax breaks and the subsequent departure of jobs from Puerto Rico.

Puerto Rico's worsening economic conditions over the past decade are also visible through the lack of jobs in Puerto Rico. As can be seen in figure 5.1., unemployment rates in Puerto Rico, on August 2017, a few weeks before Hurricane Maria, stood at 10.4% with over 113,000 Puerto Ricans without a job (U.S. Bureau of Labor Statistics, 2018). Employment rates in Puerto Rico were also down across all employment sectors with trade, transportation and utilities experiencing the highest percentage job losses at a rate of -7.3% from December 2016 to December 2017 (U.S. Bureau of Labor Statistics, 2018). The unemployment rate in Puerto Rico was also more than twice the national unemployment rate of 4.1% as of August 2017 (U.S. Bureau of Labor Statistics, 2018).

Over the past decade, Puerto Rico has also experienced a steadily declining labour force from over 1,4 million working age population members in January 2007 to less than 1.1 million working age people in January 2018 (U.S. Bureau of Labor Statistics, 2018). Puerto Rico's high unemployment rates have been exacerbated by several factors, including the island's failure to recover from the 2008 economic recession, as well as the removal of preferential tax breaks as described earlier. Following Hurricane Maria, as of December 2017, unemployment rates in Puerto Rico had climbed to as high as 11% with over 119,000 Puerto Ricans without a job (U.S. Bureau of Labor Statistics, 2018).

Figure 5.1. Puerto Rico's Unemployment rates 2007-2017



Source: U.S. Bureau of Labor Statistics, "Local Area Unemployment Statistics: Puerto Rico", Date Extracted: April 30, 2018

The Total Number of Puerto Rican Migrants

The combination of the environmental devastation caused by Hurricane Maria along with Puerto Rico's ongoing socioeconomic troubles has created a major outward migration from Puerto Rico, combining both economic migrants prior to Hurricane Maria with a large new number of internally displaced persons who have been forced to leave Puerto Rico following Hurricane Maria.

The number of Puerto Ricans that will leave the island is hard to calculate, but the Center for Puerto Rican Studies estimates that Puerto Rico will lose 14% of its total population (Meléndez and Hinojosa, 2017). Yet, even prior to Hurricane Maria, Puerto Rico's population had already been decreasing in the last decade, due to the economic crisis.

Table 5.2. Puerto Rican Population Between 2000-2016

	Puerto Rican Population				Numeric Change		Percentage Change	
	Census		ACS 1-year		Census	ACS 1-year	Census	ACS 1-year
	2000	2010	2010	2016	2000-10	2010-16	2000-10	2010-16
United States	3,406,178	4,623,716	4,691,890	5,450,472	1,217,538	758,582	35,7	16,2
Puerto Rico	3,623,392	3,554,642	3,560,838	3,263,755	-68,750	-297,083	-1,9	-8,3
New York	1,050,293	1,070,558	1,085,307	1,081,110	20,265	-4,197	1,9	-0,4
Florida	482,027	847,550	864,577	1,067,747	365,523	203,170	75,8	23,5
New Jersey	366,788	434,092	430,863	470,143	67,304	39,280	18,3	9,1
Pennsylvania	228,557	366,082	378,312	444,263	137,525	65,951	60,2	17,4
Massachusetts	199,207	266,125	262,804	319,042	66,918	56,238	33,6	21,4

Table created by the authors. Source: Bureau of Economic and Business Research

In 2000, the number of Puerto Ricans in Puerto Rico was greater than the number of Puerto Ricans in the US. By 2010, the number of Puerto Ricans living in the US exceeded the number of Puerto Ricans living in Puerto Rico as shown in table 5.2. above. In 2016, Puerto Rico's decrease in population continued, with 5,450,472 Puerto Ricans living in the US and 3,263,755 Puerto Ricans living in Puerto Rico. Most Puerto Ricans migrated from Puerto Rico to Florida, Texas, New York, Pennsylvania, Maine, and New Jersey (Wang & Rayer, 2018).

In a report published by the Center for Puerto Rican Studies at the City University of New York Hunter, Professors Edwin Meléndez and Jennifer Hinojosa predict that outward migration from Puerto Rico will only continue to grow and project that between 114,000 to 213,000 Puerto Ricans will migrate to the U.S. annually following Hurricane Maria, estimating that, from 2017 to 2019, over 470,000 Puerto Rico residents will leave Puerto Rico (Meléndez & Hinojosa, 2017).

Meléndez and Hinojosa made these predictions based on a statistical simulation from data obtained from the American Community Survey which measures migration from Puerto Rico to the mainland United States, and also take into account Puerto Rico's unemployment rates, comparable studies on the impacts of Hurricane-based migrations, historical migration rates and the island's economic projections following Hurricane Maria (Meléndez & Hinojosa, 2017).

Meléndez and Hinojosa report that the mass migration of Puerto Ricans following Hurricane Maria will further slow down the economic recovery of Puerto Rico's economic crisis beginning in 2006 and its accompanying accelerated migration trends (Meléndez & Hinojosa, 2017, p. 3). The loss of Puerto Rican students to mainland universities, in particular, could make it harder for Puerto Rico's economy to recover if these students choose not to return to Puerto Rico. Following Hurricane Maria, Meléndez & Hinojosa reported that 10,324 Puerto Rican students are now continuing their education in Florida, signalling an 'exodus' from Puerto Rico into the US (Meléndez, Hinojosa and Roman, 2017). They also add that population sectors least likely to migrate may also be forced to leave the island, commenting that the lack of access to health services, electricity and clean water may encourage senior citizens to make the move to the US mainland (Meléndez & Hinojosa, 2017).

CNN analysed data from two national US data sets, including FEMA assistance applications (10,600 total applications for disaster assistance received through November 11, 2017), as well as US Postal Service change-of-address requests from Puerto Rico and the US Virgin Islands (6,590 requests between October 1st and December 31st) to estimate how many migrations have already occurred, but they mention that further data is needed to arrive at an accurate number and that these numbers may "substantially undercount the true number of people who fled Puerto Rico after Hurricane Maria" (Sutter & Hernandez, 2018). However, in conjunction with the data from Meléndez and Hinojosa, CNN found that Florida had received the greatest number of Puerto Rican migrants. This number was also supported by the Florida Division

of Emergency Management who reported that “since October 3rd, 269,000 people arrived to Florida alone” (Liautaud, 2017). A data analyst at the American Action Forum said that preliminary data “suggest that Puerto Rico’s outmigration rate is on pace to reach levels seen in New Orleans and parts of Mississippi after Hurricane Katrina” which saw a 53.4% decrease in population from 2005 to 2006 (Fernandez, 2018). The study emphasizes that the majority of migration from these areas “did not occur immediately after the hurricane” and that Puerto Rico is likely to follow a similar trend (Fernandez, 2018).

In another survey collected by Dr. Alexis R. Santos-Lozada following Hurricane María to see which migrants would seek to permanently stay in the US mainland or to return to Puerto Rico, it was found that more than half of the 6,000 eligible respondents to this “Puerto Rican Diaspora Study” survey were undecided about returning to the island and were waiting to see if conditions in Puerto Rico would improve. Meanwhile, 18.39% of surveyed responders intended to stay permanently in the United States mainland (Santos-Lozada, 2017).

A study conducted by Paraj Mahajan and Dean Yang (2017) identifies “hurricane-induced migration” as a major driver of migration to the U.S. and explains that these migration numbers are higher for those migrants with large origin-country populations already living in the U.S. (Mahajan and Yang, 2017). They attribute these higher migration numbers to other members of their national community who are able to provide familial or community support to new arrivals, as well as sponsor their relatives for legal immigration (Mahajan and Yang, 2017). Mahajan and Yang also emphasize the role that climate change will play in a future increase in hurricane-induced migrations, explaining that migrations following hurricanes can be seen as a way for disaster victims to “cope with negative shocks” (Mahajan and Yang, 2017, p. 22).

The environmental and social devastation caused by Hurricane Maria, including the lack of access to clean water, the destruction of local homes, and the loss of electricity for several months after Hurricane Maria struck, are all seen as factors that are pushing Puerto Ricans out of Puerto Rico. Professor Elizabeth Fussell adds that “the longer it takes to restore essential services, like electricity, water, sanitation, and fuel distribution, the longer [and] harder it will be for the most vulnerable members of society to stay in Puerto Rico” (Fussell, qt. in Matthews, 2017). The continued lack of access to electricity and clean water in parts of Puerto Rico would increase the likeliness of continued internal displacement due to Hurricane Maria.

However, environmental factors are not the only reason behind the increased migration numbers following Hurricane Maria. These are also being driven by a mixture of economic necessity, cultural pull from friends and relatives living in the US mainland, as well as new employment and educational opportunities.

In economic terms, Puerto Ricans who migrate to the mainland United States experience substantial financial benefits than their neighbours who remain in Puerto Rico. As part of a survey conducted by the Pew Research Center, they found that on average, Puerto Ricans who were born in Puerto Rico but had migrated to the United States earned more than US\$ 14,000 USD more than Puerto Ricans who were born and still lived in Puerto Rico (Pew Research Center, 2017). The household income discrepancy was even greater for Puerto Ricans born in the US, who earned US\$ 28,374 more than Puerto Ricans who were born and still lived in Puerto Rico.

Puerto Ricans also hold a significant advantage when entering the U.S. job market over other migrant communities in the U.S. as explained by Dylan Matthews:

Puerto Ricans are US citizens, part of the US labour market, and can take jobs and move wherever they want. And due largely to Puerto Rico's economic crisis and persistently high unemployment, its residents have been leaving in large numbers in recent years (Matthews, 2017).

By 2015, net migration from Puerto Rico had reached -64,238 (Matthews, 2017). Their potential for higher earnings, along with their easier entry into the U.S. job market help explain the growing migration figures from Puerto Rico since 2004.

Commenting on the Pew Research Center findings, Dylan Matthews highlights that between 2004 and 2016, Puerto Rico lost 446,000 in outward migration, accounting for nearly 12 percent of its population (Matthews, 2017). As early as 2003, the population of Puerto Ricans in the mainland U.S. equalled that of Puerto Rico's population (about 3.8 million) (Matthews, 2017). By 2016, these numbers had expanded to 5.4 million Puerto Ricans in the U.S. in comparison to less than 3.3 million in Puerto Rico meaning that "more than 60 percent of Puerto Ricans live outside the territory" (Matthews, 2017).

The cultural pull of the US community may also be seen as providing an important incentive for migration. The Puerto Rican diaspora has

established large populations in New York City, Chicago, and now Florida and Pennsylvania, amongst other places in the United States. Educational and employment resources are also generally seen as being easier to obtain and of higher quality in the mainland United States. Commenting on the report published by the Center for Puerto Rican Studies, Dylan Matthews says that the arrival of Puerto Ricans into Florida will exceed the number of Cubans who arrived as part of the Mariel Boatlift and “is likely to change social life and politics everywhere from Florida to New York City and its suburbs to Pennsylvania” (Matthews, 2017).

Educational attainment and education resources also play an important role in the decision to migrate. The availability of new education opportunities coupled with the partial destruction of the University of Puerto Rico was listed as one of the primary drivers for one Puerto Rican student’s decision to migrate to Pennsylvania, who explained that he decided to leave Puerto Rico following the hurricane in order to pursue [his] studies, as well as new creative jobs and opportunities available to him in Philadelphia (Rosado J., survey conducted by author, 2 May 2018). When asked whether he planned to relocate permanently to Philadelphia, he responded that he planned to return to Puerto Rico, but was unsure when (Rosado J., survey conducted by author, 2 May 2018).

Rosado’s decision to leave Puerto Rico and relocate in Pennsylvania along with his uncertainty of when to return to Puerto Rico combines several drivers ranging from the environmental destruction experienced by his community to the new professional opportunities available for him in his new home in Pennsylvania. However, while education, economic, and environmental drivers may all be seen as disconnected, additional studies continue to emphasize their correlation.

Unlike Rosado, Bagué, another Puerto Rican student, decided to stay in Puerto Rico following Hurricane Maria, but she explains that the thought of leaving frequently crosses her mind and goes on to describe her understanding of the different reasons that led other Puerto Ricans to leave the island:

For what I know, almost everybody moved on voluntary reasons, nobody pushed them. On the island there was even a campaign with the slogan of “#yonomequito” (#Idon’tquit) that in way criticized those who were leaving the island and didn’t help bring it back up. This caused a lot of misunderstandings and fights among people (Bagué, I., personal communication, 22 April 2018).

Before Hurricane Maria, Puerto Ricans already had an economic incentive to leave the island, and following the hurricane, this incentive has become stronger. Several people see Hurricane Maria as an opportunity to create a better life for themselves, by moving to the U.S. and finding better jobs (De Llano, 2017). Moreover, the profile of the people migrating to the U.S. is not primarily restricted by jobseekers anymore. It is not just people that are looking for a job, but also people seeking medical treatment, students, and entire families. The people that are looking for better work opportunities continue to migrate to the US, but they are now being joined by people from a variety of socioeconomic backgrounds both affected by Hurricane Maria and its aftereffects (Pérez, 2017).

Based on a previous study of the economic consequences of cyclones, typhoons and hurricanes, Dr. Hsiang and Mr. Houser project that the larger costs of Hurricane Maria, including growing migration and displacements trends, are still on the horizon explaining that:

Hurricanes can have a strong effect on economic growth over the following decades. Historically, a 1-in-10 cyclone event slows per capita income growth in the affected country to the point that it is 7 percent poorer two decades after the storm. This is on par with losses from an average financial or banking crisis (Hsiang & Houser, 2017).

Estimating the real costs of Maria's impact, they conclude that Hurricane Maria:

Could lower Puerto Rican incomes by 21 percent over the next 15 years—a cumulative US\$ 180 billion in lost economic output. [...] It could now take 26 years for the next generation to get back to where we are today, assuming that per capita growth rate would have continued (Hsiang & Houser, 2017).

If this prediction holds true, Puerto Rico could suffer one of the greatest economic losses in recent history (see table 5.3.).

Finally, Hsiang and Houser warn that: Research has shown that people tend to leave storm-battered areas if there's not prompt outside support to rebuild and reinvest. If there is that support, people are more likely to remain" (Hsiang & Houser, 2017). To the extent that Puerto Rico has thus far not received the appropriate local, federal, and private sector support, the internal displacement occurring following Hurricane Maria

could extend well into the next decade and further increase the uncertainty of Puerto Ricans who have already left Puerto Rico from returning to the island.

Table 5.3. Disaster-Related Economic Losses in GDP Per Capita

Economic Disaster	Years	Losses in Per Capita GDP
Asian Financial Crisis: Thailand	1997-1999	-25%
Great Recession: Nevada, USA	2007-2009	-22%
Hurricane Maria: Puerto Rico, USA	2017	-21%
Asian Financial Crisis: Indonesia	1997-1999	-21%
Great Recession: Arizona, USA	2007-2009	-18%
Great Recession: Michigan, USA	2007-2009	-13%
Average International Financial Crisis		-9%
Great Recession: USA	2007-2009	-8%
U.S. Recessions	1980-1982	-8%
Mexico Peso Crisis	1945-1995	-8%
Average International Banking Crisis		-8%
1-in-10 Cyclone Event		-7%
U.S. Recession	1990-1991	-7%
Average Cyclone Event		-4%
U.S. Recession	2001	-3%

Table created by the authors: Source: Hsiang & Houser, 2017

Conclusion

The mass migration of Puerto Ricans to the mainland United States following Hurricane Maria can be explained by the complex interaction of several environmental and socioeconomic drivers. As a form of environmental migration, Puerto Ricans migrated from the island due to the loss of their homes, the disruption of public services, such as a lack of access to electricity and clean water, the destruction of natural resources and their increased vulnerability to ongoing and future climate related events, including flooding and subsequent projected hurricanes. However, although migration and internal displacement was significantly exacerbated by Hurricane Maria, environmental factors can only be understood in conjunction with accompanying socioeconomic drivers affecting Puerto Ricans' decision to migrate from Puerto Rico, including

the high levels of unemployment in the island, the increased austerity measures in Puerto Rico, the loss of jobs across all sectors of the economy, and the lower wages paid in Puerto Rico in comparison to the mainland United States. Moreover, both environmental and socioeconomic factors came together to contribute to the devastating and ongoing effects of Hurricane Maria.

The local Puerto Rican government's response as well as the federal government's response to Hurricane Maria both point to a crisis in the governance of Puerto Rico that has served as an incentive for the citizens of Puerto Rico to migrate to the US mainland. The continued lack of electricity in certain parts of Puerto Rico leading to the nation's largest blackout can be attributed to a troubling lack of infrastructural investment in the island and point to the failure by local and federal officials to properly prepare for the full effects of Hurricane Maria. The lack of clear data and conflicting information regarding the total number of deaths occasioned by Hurricane Maria also serve to inspire continued distrust in government officials and their response to future environmental disasters and climactic events in Puerto Rico.

Cultural pull factors also help explain the desire to migrate to the mainland United States as today more Puerto Ricans live outside of Puerto Rico than within the island. As American citizens, Puerto Ricans are also able to enter the US mainland freely. From an economic standpoint, Puerto Ricans are likely to obtain higher wages in the mainland United States than in Puerto Rico. Finally, from a political standpoint, Puerto Ricans living in Puerto Rico inhabit a second-class citizenship status as they are not able to vote in national elections, unless residing within one of the 50 U.S. States. Migration to the United States by Puerto Ricans thus brings access to greater environmental security as well as significant socioeconomic advantages over residing in Puerto Rico, where Puerto Ricans have been suffering economically for several decades and politically for several generations.

The decision to migrate from Puerto Rico to the U.S. following Hurricane Maria involves a complex and multifaceted decision-making process that involves issues of environmental security, economic incentives, questions of transnational and transcultural identities, and issues of political agency and citizenship rights, amongst several other intersecting drivers. Yet, as described in this analysis, the combination of environmental and socioeconomic drivers all add weight to the projections provided by the Center for Puerto Rican Studies, which expect outward migration from Puerto Rico to reach over 470,000 people between 2017 and 2019 (Meléndez & Hinojosa, 2017).

The question of whether Puerto Ricans will ever return back home when the situation in Puerto Rico returns to 'normal' remains to be seen. However, the resettlement of Puerto Ricans that has already occurred in Florida, Pennsylvania, New York and Massachusetts, including the submission of changed addresses, the enrolment of students into new schools, and the absorption of recent arrivals into the Puerto Rican diasporic community in the mainland United States all point to the growing unlikelihood of Puerto Ricans who have been internally displaced to the mainland United States from returning to the island of Puerto Rico any time soon.

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Disaster-Induced Migration in Small Islands

Lessons learnt from Hurricanes Irma and Maria

Juraj Staron and Paula Puskarova

The current migration debate evolves around the diversity of disaster-induced displacement pathways. One strand of literature documents that evacuation is routed traditionally to the nearest safe locations (Ambrosetti and Petrillo, 2018; Sastry and Gregory, 2014). At the individual level, a disaggregate destination choice model for hurricane evacuation was developed (Cheng *et al.*, 2008) following the earlier work showing that individuals evacuate to close safe places as much as possible once beyond the at-risk area (Southworth, 1991), in an attempt to easily return to their homes and recover their assets. At the aggregate level, public evacuations are governed by the new public management principles linked to doctrines of economic rationalism and allocative efficiency (Hirschman, 1982; Hood 1995; Pollitt 1993). Since transportation costs are directly proportional to distance, the transport to the nearest safe locations represents the most efficient market solution. However, most of these studies rest on the assumption that nearby safe locations are indeed available. In contrast to continental nations, small islands experience disproportionate challenges for disaster-induced adaptation strategies related to their geography, small size, and physical isolation. They also face elevated risks for disaster incidence and severity of consequences particularly in the realms of climate change, sea level rise, natural disasters (tropical cyclones, earthquakes, tsunamis, volcanoes), and marine hazardous materials spills. As a result, they bear substantial economic losses (Shultz *et al.*, 2016).

Disaster-induced population movement is governed by the local legal framework that stipulates the rights of internally displaced people (Ferris, 2008). In case a disaster strikes a small island, local authorities face the challenge of limited land to shelter and/or resettle people. As a result, island people are trapped within the disaster-affected area (Liven, 2014; Zickgraf, 2018). However, some islands in the world maintain preferential regimes with mainland territories. U.S. Virgin Islands, for example, forms part of the U.S. Commonwealth territory. As such, they are entitled to claim federal financial assistance as well as evacuation assistance.

Evacuation assistance is meant to relocate according to the nearest safe location principle and with only one constraint—it shall be within the U.S. territory. However, as our study further argues, displacement within the U.S. island territories runs relatively smoothly, while evacuation to the U.S. mainland is trickier. It appears that wealth of people and connections to the mainland makes the difference in finding evacuation destination sites. The poorest populations find themselves in need of public evacuation that usually involves finding evacuees shelter in the neighbourhood little resilient to recurring disasters. Some studies point to wealth and race discrimination in evacuation (Elliott and Pais, 2006).

Our study examines the disaster-led displacement strategies after the two Category 5 hurricanes Irma and Maria in September 2017 in the U.S. Virgin Islands. Our study first looks at the magnitude and scale of the hurricanes, their specificities compared to other natural disasters in the region and explores the data on displaced people within the U.S. territory. Subsequently, it attempts to gauge the effects of the hurricanes in the U.S. Virgin Islands on the economy in general and labour market in particular. In this regard, we employ a natural experimental approach. Our natural experiment, however, bears many features salient to counterfactual analysis because we take the case of U.S. Virgin Islands and compare it with a control case of Cayman Islands. The selection of the control observation was made with respect to the geography, economy and communication similarities between the islands. The major contribution of the study lies within the evidence lending support to the following two hypotheses:

1. Disaster-induced displacement strategies from a small island are led by a discriminatory principle leaving population without assets trapped within the disaster-affected areas;
2. Disaster-induced displacements lead to redistribution of wealth between the afflicted and non-afflicted communities, and between harmed and intact neighbourhoods.

Data and Methods

Data used in this study comes primarily from the statistical bureau databanks of the U.S. Virgin Islands, Cayman Islands, as well as federal U.S. government agencies such as FEMA. We employ in-depth analysis of various media reports, press releases and expert studies of local as well as U.S. scholars and respondents that conducted fieldwork in the area in order to identify the linkages between the disaster, population displacement and the economic effects of the disaster and the displacement.

In order to gauge the economic effects on the U.S. Virgin Islands, we decided to frame the analysis into a natural experiment setting that compares the disaster-affected territory of the U.S. Virgin Islands with the control territory—the Cayman Islands. This kind of setting is close to the counterfactual analysis setting with only exception—we relaxed on the hypothetical control case and instead we employed the observational study of the Cayman Islands. The Cayman Islands were selected as a suitable counterpart since they share the relevant geographical, economic and social characteristics of the U.S. Virgin Islands.

Table 6.1. below highlights the similarities between the two island territories. The two territories are indeed comparable in terms of population density, gross domestic product (GDP), as well as in terms of tourist visits, access to public electricity, number of airports, HDI and even unemployment rates. Thus, we consider them suitable units for our natural experiment analysis.

**Table 6.1. U.S. Virgin Islands versus Cayman Islands:
Comparing Pre-Disaster Development**

	U.S. Virgin Islands	Cayman Islands
Number of islands	4	3
Surface area (km ²)	1,910	264
Population density	307.2	253.2
Economy, 2016		
GDP	3.77 bn USD	3,48 bn USD
Tourist visits	2,748,629	2,097,300
Export	2.62 bn USD	4.2 bn USD
HDI	0.894	0.983
Unemployment	10.4%	7.1%
Energy and telecommunications, 2016		
No subscription to public electricity	9.6% population	9.8% population
Population using the internet	59.6%	79%
Transport, 2017		
Airports	2	3
Docks	4	2

Authors' elaboration. Data Source: www.cia.gov, United Nations and World Bank databanks, U.S. Virgin Islands Bureau of Economic Research, Cayman Islands Economics and Statistics Office

A natural experiment is an empirical study in which individuals (or clusters of individuals) exposed to the experimental and control conditions are determined by nature or by other factors outside the control of the investigators, but the process governing the exposures arguably resembles random assignment. Thus, natural experiments are observational studies and are not controlled in the traditional sense of a randomized experiment. Natural experiments are most useful when there has been a clearly defined exposure involving a well-defined subpopulation (and the absence of exposure in a similar subpopulation) such that changes in outcomes may be plausibly attributed to the exposure (Dunning, 2012). The main difference between natural experiments and counterfactual analysis rests upon the fact that the 'counterfactual' denotes a hypothetical case regarding what would have happened to beneficiaries in the absence of the intervention, and that impact is estimated by comparing counterfactual outcomes to those observed under the intervention.

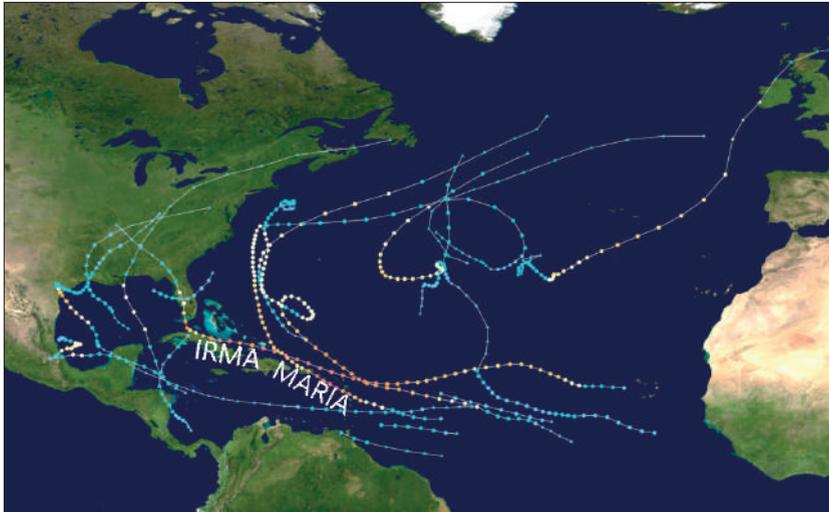
Hurricanes Irma and Maria

Hurricane Irma hit the Atlantic Ocean islands between August 30 through September 11, 2017. It stretched over 800 km from east to west and hit at least nine Caribbean states. Reportedly, the hurricane brought wind of 295kmph, which qualified it as a Category Five hurricane. The hurricane started west of Cape Verde islands and while moving further towards the Caribbean, hot water, humidity and vertical winds cumulated prompting the hurricane to reach its full-blown power. Figure 6.1. visualizes its path while comparing it with paths of all other tropical storms formed over Caribbean in 2017. The colouring represents storm category dependent on the wind strength.

Figure 6.2. documents the trajectory over the islands in the Caribbean where Hurricane Irma gained full power, namely Antigua and Barbuda, Saint Martin, Saint Barts, Anguilla, U.S. Virgin Islands, British Virgin Islands, Puerto Rico, Dominican Republic, Turks and Caicos, Cuba and up to Florida.

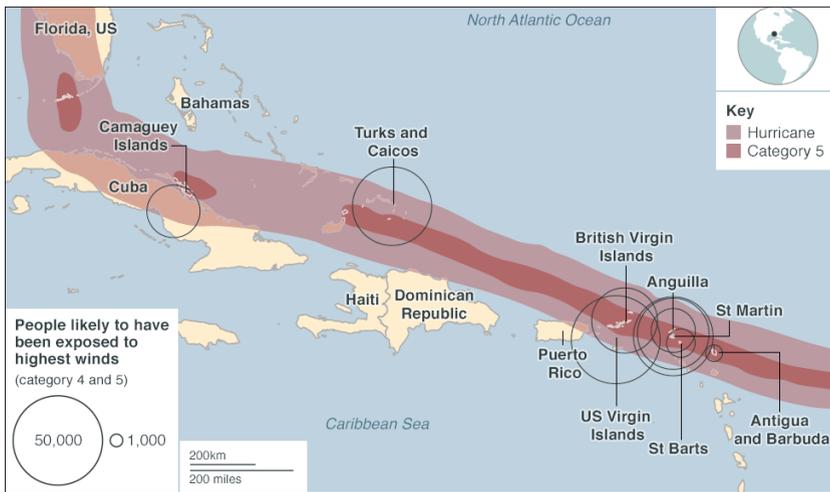
The total death toll of Irma rose to 102 people, out of which 72 were in Florida. The U.S. Virgin Islands reported only 4 casualties. The total affected population was estimated at 1.2 million people. For the first time in 300 years, the island of Barbuda, where Irma destroyed more than 90% of all buildings, was completely abandoned, without a single person left on the island. The hurricane led to the evacuation of at least 7 million

Figure 6.1. Storm Category of Hurricane Irma Moving East to West



Authors' editing. Image source: Wikicommons

Figure 6.2. Trajectory of the Category 5 Track of Hurricane Irma in September 2017



Reprint courtesy of UNITAR/UNOSAT, Image source: National Hurricane Centre, retrieved from <https://www.bbc.co.uk/news/world-latin-america-41172545>

people, out of which 6.5 million were in Florida (WSJ, 2017). The estimations done by the re-insurance company Swiss Re (2017) accounted for 100 billion USD in immediate economic costs and 300 billion USD in total. These estimates however did not encompass the value of real estate in Miami-Dade, Broward and Palm Beach where the real estate prices may total even more than 660 billion USD. Figure 6.3. visualizes the extent of the damages in the Cruz Bay on Saint John island.

Figure 6.3. Saint John Main Port. Before and After the Disaster



Authors' editing. Images source: maps.google.com

Hurricane Maria (*cf.* figure 6.4.) is considered the most severe natural disaster ever to hit the Dominican Republic and Puerto Rico. Winds exceeded 281 kmph and although it lasted only five days and hit only few islands—Puerto Rico, Dominican Republic, Haiti, Saint Croix and Turks and Caicos—the damages were far greater than anticipated because it hit land that had still not recovered from Irma. Puerto Rico reported 64 casualties (approximately the half of the total death toll) and at least 1,000 internally

displaced to other islands. The total economic losses were estimated at 94 billion USD.

Figure 6.4. Trajectory of Hurricane Maria



Authors' editing. Image source: Wikicommons

Measures Taken by the Authorities After Hurricanes Irma and Maria

President Donald Trump issued one disaster declaration (DR-4335-VI) for Irma on September 7, and one (DR-4340-VI) for Maria on September 20 encompassing the entire territory. The declarations authorised federal assistance to affected communities and certain non-profit organisations in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (42 U.S.S. 5172), as amended. The Declaration also authorised direct federal assistance. The FEMA (Federal Emergency Management Agency), as the specialised agency of the U.S. Department of the Interior, activated the distribution of more than 917 million USD for public assistance and more than 41 million USD for 11,331 individual assistance cases (FEMA, 2018).

Measures Taken Regarding Population Displacement

Considering the gravity of the impacts, Irma and Maria represent a suitable case study of displacement paths after recurring disasters. The first, Hurricane Irma struck the islands of Saint Thomas and Saint John on September 6, 2017. The U.S. population residing on those islands were

offered free flights and cruise transport to the U.S. mainland. Those who stayed had a choice to relocate to other U.S. non-afflicted territories in the neighbourhood. The U.S. Virgin Islands' governor Kenneth Mapp (2017) explained, in this regard: "I had three islands—Saint John, Saint Thomas and Water Island—devastated by Hurricane Irma, and Saint Croix was our base for restoration and recovery." The British Virgin Islands for example led the displacement of people to Puerto Rico (Bacz, 2017; The Guardian, 2017).

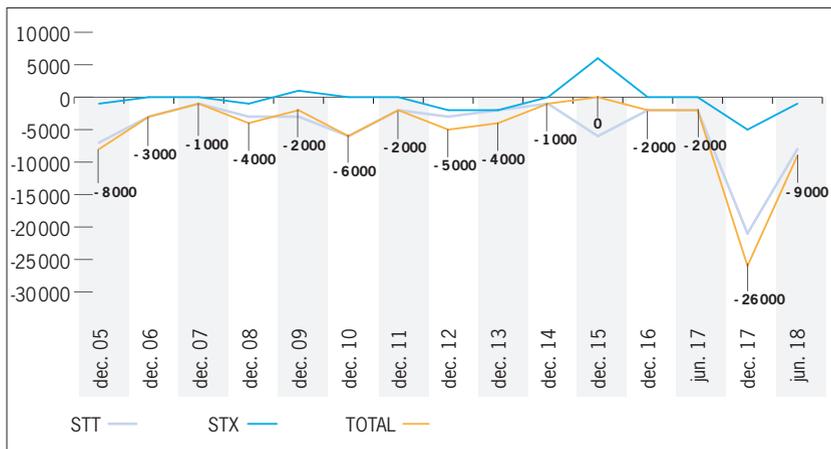
The arrival of Hurricane Maria two weeks later caught people off guard. It hit the western end of the island Saint Croix and continued towards Puerto Rico, another U.S. Commonwealth territory. The already displaced people suffered through worse conditions than those they had left behind. The assistance provided to them after Irma was ruined and the provisional sheltering was blown away. As all the U.S. territories were now declared a disaster land, there was nowhere to go but to the U.S. mainland. The provision of the free flights however was limited. The flights were granted to visitors and expats residing in the U.S. mainland territory. Some air seats were granted to those in urgent need of medical treatment. Reportedly, the number of those totalled 781 (FEMA, 2018). Wealthy U.S. Virgin Islands residents covered the costs of their private flights to the mainland. Other residents of the U.S. Virgin Islands were evacuated within the U.S. territories such as Puerto Rico and Saint Croix. Many however were left behind, forced to live among the ruins of their homes and waiting for the resolution of their insurance claims (Craig, 2018).

Figure 6.5. documents the numbers of displaced population from the U.S. Virgin Islands. During the autumn of 2017, the number of outbound passengers reached approximately 14,000 people. That represents the biggest outflow since 1989 and accounts for approximately one eighth of the total U.S. Virgin Islands population. It is expected that many will never return back to the islands (Bram, 2018) and as a result, the islands are at risk of slow recovery and protracted job loss.

The evacuation to the U.S. mainland was marked by selectivity. Locals either had a U.S. passport or money to buy the trip, register for U.S. residency in the mainland and start a new life from scratch. They needed to bear in mind that once in the U.S. mainland, they would not be entitled to any assistance whatsoever unless they were recognized as refugees. However, the formal recognition of the status of "climate refugees" is far from being achieved, even though the term has been widely used in public discourse (Shepherd, 2017).

The root cause lies with the lack of recognition of climate change as a threat to human beings within the *1951 Convention Relating to the Status of Refugees* (Refugee Convention) that forces signatory states to recognise and offer protection for those fleeing conflict, war or persecution. The protection regime under the Refugee Convention is therefore not applicable to those fleeing from the impacts of climate change, resulting in those fleeing across international borders being denied access to the territory of the State where they are fleeing to. Addressing of the gap has been advised several times (Poon, 2017), but it hits a strong lobby of opponents (McAdam, 2017).

Figure 6.5. Net Domestic Passengers to the U.S. Virgin Islands, 12-month rolling sum



Note: Airports are Cyril E. King Airport in Saint Thomas (STT) and Henry E. Rohlsen Airport in Saint Croix (STX)

Authors' calculations. Data source: U.S. Bureau of Transportation Statistics

The debate around the formal recognition of the climate refugee status goes hand-in-hand with the lack of scientific proof that climate change in itself does directly displace people. Rather, climate change may produce environmental effects which make it difficult for people to survive where they are (Ferris, 2008). While there are considerable differences of opinion about the impact of climate change on displacement, there does seem to be a consensus around two particular aspects of climate change which presumably result in displacement. First, the number and severity of sudden onset natural disasters is increasing, which, in turn, displaces people. As Margareta Wahlström (2007) pointed out, “over the past 30 years, disasters—storms, floods and droughts—have increased three-fold according to the UN International Strategy for Disaster Reduction”. A

second trend which is generally accepted is that global warming leads to sea level rise, which, in turn, forces displacement as well. According to the latest report of Friedlander (2018), sea levels rising a single meter would displace 2 billion people by 2100. A third area where climate change is expected to result in increased displacement is the area of slow onset events, in which climate change has specific long-term environmental effects over time such as desertification, rainfall shortages and other changes in weather patterns, which means that people's livelihoods are no longer sustainable and that they are forced to migrate to other places. However, isolating the specific role of environmental change in population movements remains a challenge (Laczko and Aghazarm, 2009) and, as a result, the status of environmental refugees is made harder to claim.

Onset Assistance and Financial Support

For those entrapped in the disaster-affected areas, the FEMA was assigned to secure water, food and shelter. In many cases, the assistance was rather slowly moving. Two months after Hurricane Maria hit the islands, the assistance had not reach more than 33,000 people—one third of the islands' population. Relief efforts were slowed down by severely damaged infrastructure and accommodation facilities that forced volunteers and humanitarian workers to live and provide the assistance from two cruise ships docked near Saint Thomas and Saint John. Besides, the complete loss of wiring, telecommunication and internet connection made it more difficult for humanitarian workers to reach out to those in need (Craig, 2018).

The U.S. Army Corps of Engineers (USACE) launched immediate assistance in the form of temporary roofing. The operation was called Blue Roof and encompassed the scoping, procurement and installation of temporary roofing repairs. The operation was followed by the FEMA program Emergency Home Repair. The aim of the program was to provide assistance particularly to the eligible households and to avoid frauds.

The current cost of official public assistance approved by the U.S. government and to be distributed by FEMA reached almost 1 billion USD, according to an update posted on FEMA's Facebook account and reflecting the latest figures as of June 8, 2018. FEMA claims to have redistributed 606.3 million USD to survivors' pockets out of which 511.9 million USD were approved as small business loans, 78 million USD as housing and other disaster, and 16.4 million USD as advance payments and claim settlements from the National Flood Insurance. Table 6.2. summarizes the assistance per island.

Table 6.2. FEMA Assistance to U.S. Virgin Islands as of June 8, 2018

	Saint Thomas	Saint John	Saint Croix
Registrations approved	18,833	17,504	2,976
Rental & Direct Housing Assistance	5,790	4,889	1,120
Housing and other disaster approved	35.7 mil. USD	31.1 mil. USD	11.2 mil. USD
Small business admin loans approved	254.2 mil. USD	200.1 mil. USD	57.6 mil. USD

Authors' elaborations. Data source: FEMA

The recovery of the U.S. Virgin Islands was marked by heavy private fundraising. The former basketball star Tim Duncan of the team San Antonio Spurs grew up on Saint Croix and after the hurricane he helped to raise 2.7 million USD and to distribute 400,000 kilos of food to the islands. The islands—and Saint John in particular—feature million-dollar celebrity mansions. Many public figures thus got involved to recover their property and necessary infrastructure. For example, the former Mayor of the city of New York, Michael Bloomberg, offered his help in Saint John, where his friend and co-founder of the philanthropic organisation Bloomberg L.P., Tom Secunda, owns a villa. The organisation sent to the area mainly doctors and nurses from Johns Hopkins hospital in Baltimore to provide medical assistance to the survivors.

The Community Foundation of the Virgin Islands (CFVI) which is a non-governmental organisation residing in the islands awarded 5.5 million USD in grants to non-profits, community groups, religious institutions and educational initiatives. They administer a webpage (www.usvirecovery.org), which is open for donations from all over the world. Another fund ("*HelpUSVINow!*") of 5 million USD in relief funds to assist with the islands' recovery was pledged by the Stephenson family under the leadership of long-time Saint Thomas resident Richard J. Stephenson, the founder and chairman of International Capital & Management Company, an Economic Development Company on Saint Thomas, International Private Bank on Saint Croix and Cancer Treatment Centers of America. The immediate pledge was two million dollars, with an additional 3 million USD pledged as a matching fund to encourage other donations to the CFVI. In just three months, the volume of other donations reached 1.2 million USD.

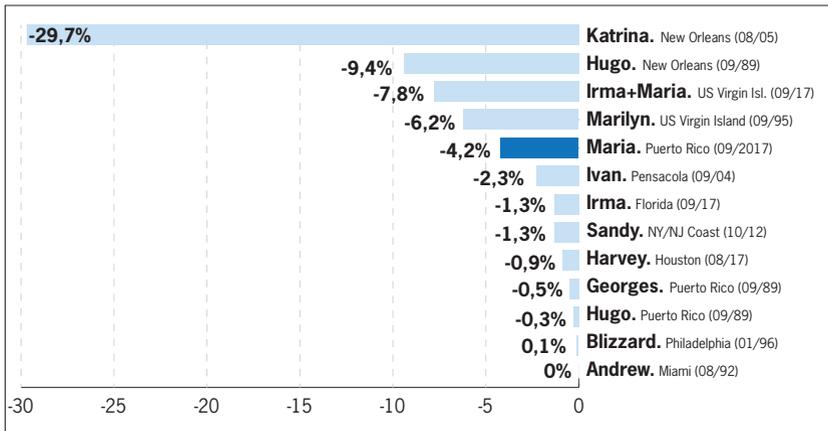
Analysis of the Economic Impacts of the Disaster and Disaster-Induced Displacement of Irma and Maria Survivors to the U.S. Mainland

It is important to note that the economic conditions of the USVI were dire even before Irma and Maria. The economy has been depressed largely due to the Great Recession after 2008, and the closure of the major Hovensa oil refinery in 2012. According to the U.S. Bureau of Labour Statistics, USVI Bureau of Economic Research, World Bank, and Moody's Economy statistics, employment in 2016 was down 15% and real GDP 27% compared to the 2006 levels. However, there was not much outmigration—in 2016, the population drop was down only 4% compared to the 2006 level. USVI were also under fiscal pressures: while they have not defaulted on debt payments, public debt in 2016 was roughly 72% of GDP what limited their market access (Bram, 2018).

Displacement-Induced Job Losses

Figure 6.6. documents that in terms of job losses, Irma and Maria had the most devastating power over the U.S. Virgin Islands in 30 years. The last comparable case was Hurricane Hugo in 1989 with a 9.4% job loss rate. The only worse effects recorded on job loss was Hurricane Katrina in New Orleans in 2005.

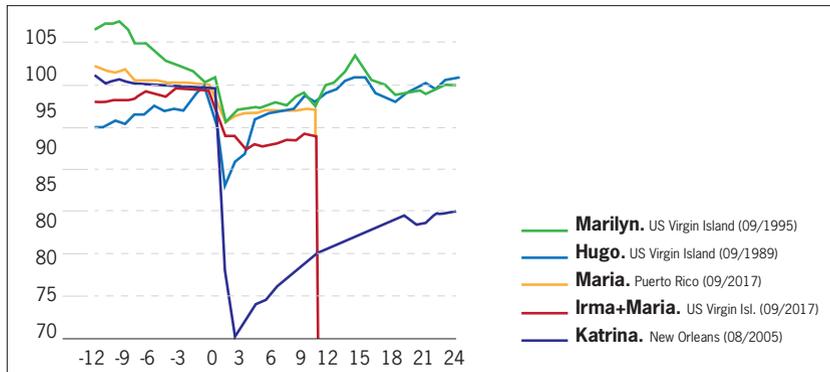
Figure 6.6. Local Job Loss Following Natural Disasters, From Onset to Trough



Authors' elaborations. Data source: U.S. Bureau of Labour Statistics, Haver Analytics, and Moody's Economy.com

Considering the death toll of Irma and Maria, data further implies that the majority of job losses can be attributed to population displacements.

Figure 6.7. Employment Paths Post-Hurricanes, index (month before hurricane = 100)



Authors' calculations. Data source: U.S. Bureau of Labour Statistics

The rather alarming fact might seem that job losses are recovering at slower pace than they did after any other major hurricane before. As reported in figure 6.7., most of the adverse effects on employment are visible immediately in the month following the storm. Only Katrina survivors witnessed deepening of the employment crisis for two months in a row. The employment in the U.S. Virgin Islands after the Irma and Maria however dropped even three months after the storms and has been struggling to jump start since then. Figure 6.7. further demonstrates that even though recovery of employment is rather a protracted battle as shown in New Orleans post Katrina the earlier storms were accompanied by more of a swing in employment when the sharp drop veered shortly upwards. However, in terms of the effects of the both hurricanes Irma and Maria on the U.S. Virgin Islands from September 2017, the adverse effects on employment appear to aggravate.

Displacement-Induced Tourism and GDP Losses

The GDP of the U.S. Virgin Islands depends heavily on tourism revenues. Hurricanes Irma and Maria resulted in a shutdown of the hotels in Saint Thomas and Saint John for two months straight. Many hotels are expected to stay closed throughout the whole season of 2018. The first hotel in Saint Croix in 30 years—the Fred hotel in Frederiksted was to be opened on December 1, 2017. Maria severely damaged the premises and postponed any investments. The total fall in tourism revenues measured through the number of visitors are documented in table 6.3.

Table 6.3. Cruise ship visitors to the U.S. Virgin Islands, annual change 2016-2017

Month	Year	2016	2017	Change in %
January		227,156	202,508	-10.90%
February		206,594	159,110	-23%
March		214,778	196,265	-8.60%
April		187,660	147,517	-21.40%
May		111,383	95,768	-14%
June		90,638	71,985	-20.60%
July		99,058	80,645	-18.60%
August		88,877	100,916	22.80%
September		84,957	6818	-92%
October		95,215	N/A	N/A
November		166,503	69,923	-58%
December		203,916	164,604	-19.30%
<i>Other visits*</i>		<i>971,893</i>	<i>350,628</i>	<i>-63.92%</i>
Total		2,748,629	1,646,687	-40.09%

*Note: other visits account only for flights operating between September and December 2017
 Authors' elaborations. Data source: U.S. Virgin Islands Bureau of Economic Research

In an attempt to gauge the impacts of the hurricanes on the U.S. Virgin Islands' economy, we compare now table 6.3 with the number of tourist visits to the Cayman Islands in table 6.4. We may note that the number of tourist visits to the Cayman Islands during 2016 and 2017 has been growing ever since hurricanes Irma and Maria hit the islands—in the months of September, October and November. The yearly growth of October visits stood increased by more than 40% and remained over 33% in the consecutive month. That leads us to tentative conclusion that disasters may prompt positive sector externalities for neighbouring locations. The effect might not seem large given the closing 2017 number of visits to both U.S. Virgin Islands and Cayman Islands. However, comparing the monthly sales, the Cayman Islands always fell short, and only after the hurricanes the sales boomed and, despite low season, they made up for a dire 2017.

Table 6.4. Cruise Ship Visitors to the Cayman Islands, Annual Change 2016-2017

Month	Year	2016	2017	Change in %
January		196,208	181,765	-7.36%
February		176,539	189,704	7.46%
March		237,339	199,844	-15.80%
April		144,805	125,284	-13.48%
May		96,430	94,523	-1.98%
June		121,984	90,809	-25.56%
July		108,447	101,513	-6.39%
August		108,211	96,309	-11.00%
September		90,273	103,287	14.42%
October		81,311	115,077	41.53%
November		156,790	208,695	33.10%
December		193,512	221,634	14.53%
<i>Other visits*</i>		<i>385,451</i>	<i>418,406</i>	<i>8.55%</i>
Total		2,097,300	2,146,850	2.36%

*Note: other visits account only for flights operating between September and December 2017
 Authors' elaborations. Data source: Cayman Islands Economics and Statistics Office

To sum up, the Cayman Islands hosted 30.37% more visitors over 2017 than the U.S. Virgin Islands; most of this effect is strictly attributable to seized tourism business in the Caribbean after Irma and Maria. Up until September 1, 2017, they hosted only 2.37% more (1,079,751 in Cayman Islands compared to the 1,054,714 in U.S. Virgin Islands), while from September towards the end of 2017, Cayman Islands hosted more than 80% more than the U.S. Virgin Islands. According to the Cayman Islands Economics and Statistics Bureau, the positive effects of hurricanes Irma and Maria on Cayman Islands continued also in 2018. The number of tourists stood up by 29.44% with the number of visitors totalling 257,614. Thus, we assume that the total costs of the hurricanes to the U.S. Virgin Islands' tourism is far from being definite.

Table 6.5. Estimation of Irma and Maria Impacts on the U.S. Virgin Islands Economy Compared to the Cayman Islands

	GDP generated in tourism, 2016	Job creation in tourism, 2016	Export revenues in tourism, 2016	GDP generated in tourism, 2016/17	Job creation in tourism, 2016/17	Export revenues in tourism, 2016/17
USVI	1.4 mld USD	120,000	1.5	1.2%	1%	4%
CI	1 mld USD	108,000	0.5	5.5%	4.8%	7.8%

Note: USVI stands for U.S. Virgin Islands, CI stands for Cayman Islands
 Authors' elaborations. Data source: U.S. Virgin Islands Bureau of Economic Research, Cayman Islands Economics and Statistics Office

The left half of table 6.5. demonstrates our rationale to pick Cayman Islands for our natural experimental analysis. In terms of GDP and job creation, tourism appears to play a similar role for both economies. They might only differ in export revenues since Cayman Islands export more financial services than the U.S. Virgin Islands. The second half of table 6.5. shows that the Cayman Islands outpaced the U.S. Virgin Islands by 3.3% in GDP growth in tourism. The job creation growth difference accounts for 3.8%. Matching now these numbers with the total number of tourist visits over the year 2017, we see that most of the redistribution effect of the disaster on the islands' economies can be attributed to the months following the disaster. The cumulative number of tourist visits up till September 1, 2017 equalled 1,079,751 in Cayman Islands compared to 1,054,714 in U.S. Virgin Islands. The cumulative change in the number of visits up till September 1, 2017 in U.S. Virgin Islands stood at 86% (from 1,226,144 in 2016) and at 90.7% in Cayman Islands (from 1,189,963 in 2016). Thus, our analysis suggests that the hurricanes led to economic gains for Cayman Islands at the expense of the afflicted U.S. Virgin Islands. These spillover effects were accrued in the sector the two islands compete in.

Conclusion

This paper attempts to contribute to the discussion around disaster-induced displacement in small islands. The conventional strategies to relocate to the nearest safe location are challenged under the recurring disasters. The case study of U.S. Virgin Islands stricken by hurricanes Irma and Maria offers a unique laboratory in which to study the adverse

effects of recurring disasters and the resilience of local communities. Our results point to the fact that the disaster revealed significant disruptions in the early warning systems of the islands. The recurrence of disasters thus led to waste of resources and additional asset loss as well as to growing number of people trapped in the afflicted area. The evacuation led people to neighbouring islands which got stricken later by Maria. We also notice that the evacuation was led by discriminatory principles when wealth and citizenship mattered the most for evacuation from the afflicted area. That adheres to the findings of Elliott and Pais (2006). The failure of the evacuation strategy in the U.S. Virgin Islands thus places a new precedence for adaptation strategies within the USA.

Our study further attempted to gauge some of the impacts of disaster-induced displacements on the local economy. The workforce loss coincides with job loss and adverse effects on the labour-intensive tourism sector, which had been the backbone of the U.S. Virgin Islands' economy. The alarming finding is that even after ten months passed, the effects on job loss appear yet to protract. We could also find positive, yet temporary, externalities emanating from the disaster-induced supply shortages in the sector which the neighbouring non-afflicted regions compete in. The data lead to tentative estimates of the total loss in the U.S. Virgin Islands tourism sales growth at 3.3% and the loss in the tourism job creation growth at 3.8%.

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Asia

Relocation as a Response to Periodic Floods and Poverty

Case of the Yellow River Floodplain Relocation Project in Henan Province, China

Jiayin Li

Research on “eco-migration”, as it is termed by the Chinese government,¹ emerged in the late 1980s in China. It has been developed along with national poverty alleviation and development projects: the government planned and organized eco-migration, with the dual purpose of protecting fragile ecological environments and of improving the living situation of local residents. It began in 1983 with the San-Xi Areas (Hixi, Dingxi area in Gansu Province and Xihaigu in Ningxia Province) and the San-Xi resettlement projects (Shu, 2016). Since the mid-1990s, following Gansu and Ningxia, 23 provinces including Henan successively carried out resettlement projects (Liu, 2007). By the end of 2015, a total number of 12 million people had been relocated. During the 13th Five-Year Plan period from 2016 to 2020, China vowed to relocate more than 9.81 million people from impoverished regions in 22 provinces to geographically less disadvantaged areas. An estimated 950 billion yuan will be needed for the execution of the plan (National Development and Reform Commission, 2016). Impoverished regions include those known to be geological disaster hotspots, such as mountainous or hilly landmass and floodplains.

Henan is one of the 22 provinces identified by the government where people will be relocated (inter- or intra- county according to local land planning). As part of this mass national strategy on disaster preparedness and poverty alleviation, a plan to relocate residents of low-lying beach areas was officially carried out in Henan Province in 2017. As a region frequently battered by rain and floods, it is on the frontlines of the

¹ The migration of people that stems from ecological causes—for instance, when a growing population exerts too much pressure over the ecological carrying ability—is termed as “ecological migration” in China. The term “ecological migrants” was used for the first time by the State Council in the 11th Five Year Plan of the Resettlement Program for Impoverished Populations. From the government’s perspective, migration can mitigate human’s damage to ecologically fragile ecosystems, provide recovery and restoration opportunities to these ecosystems, and eradicate poverty.

government's campaign to eliminate poverty by relocation. Resettlement is a complex social process; at its best it should support and nourish the coping and adaptation processes that enable a population to regain the functionality and coherence of a viable community, resilient enough to deal with social and environmental stressors (Oliver-Smith *et al.*, 2014).

Using the Henan Province's relocation project as a case study, this paper provides an analysis of relocation as a response to natural disasters and disaster-induced poverty. It will also look at the effectiveness of the relocation plan in dealing with post-resettlement issues. This paper begins with an overview of the region and its long disaster-stricken history. It then follows a detail reading of the 2017 relocation plan. It will then look into the project's implications for poverty alleviation and local human-environment systems. Through insights provided by local residents, concerned scholars and journalists, the paper criticises the current relocation project.

Region Overview

Figure 7.1. Henan Province Map



Map created by author

Henan province is located in central China. The name “Henan” literally means “south of the River”, as it is in the valley located south of the Yellow River, the second largest river system in China. The lower reach of the Yellow River runs through two provinces, Henan (upstream) and Shandong (coastal area) before flowing into the Bohai Sea. The Yellow River has earned the name “China’s sorrow” for its tendency to flood with devastating consequences over the centuries (South China Morning Post, 2017). Uneven temporal and spatial distribution of rainfall adds to the complications and changes in climate conditions. Generally, over half of the yearly precipitation occurs during the flood season between June and September. The concentration of rainfall in time and space has led to disastrous floods that affect peoples’ living and production (ADB, 2009). In the past 70 years, more than 30 floods have occurred and the most severe one was in 1996, which affected nearly 1.2 million people, among which 360,000 were evacuated. It resulted in a monetary loss of 220.8 billion yuan and a decrease in GDP by 4% (State Council, 2017; ADB, 2009). Thanks to increased investment in flood management by the central government in the early 2000s, the number of massive floods recorded has reduced significantly, but the sediment deposits in the Yellow River brought mainly by human activities and land use in upper catchments continues to induce instability and reduce flood conveyance capacity in the lower reach (Kobayashi *et al.*, 2012). The year 2017 witnessed heavy rain accompanied by floods, strong wind and hails in the province in July, which destroyed over 500 houses and 2.8 thousand hectares of arable land. Some 30 thousand residents were struck by the disaster and about 200 people were evacuated (Ministry of Civil Affairs, 2017). The disaster has resulted in a direct economic cost of over 19 million yuan (about 2.5 million euros) through damage to levees, roads, bridges, utilities, factories, homes, buildings, farmlands and other physical assets (Ministry of Civil Affairs, 2017).

The Nexus between Poverty and Flood Risk

The use of the Yellow River for sustenance, irrigation, navigation, and public and commercial enterprises developed a binding link between water and the people (Kobayashi, 2012). This dependence on water made flood risk inevitable, and flooding in the region has created widespread hardship for its residents. Periodic floods have been a significant constraint to economic growth. Aside from direct, tangible financial losses, floods inflict major social costs and a general disruption to education, livelihood, as well as family and social life (State Council, 2013). Characterized by

fragile ecological systems, water deficiency and an abundance of sediments, the flood-prone region lacks sufficient infrastructure and lags in the development of education, medicine and culture. No factories nor companies are allowed near the bank, and the only residents are farmers who make a living growing maize and corn (State Council, 2017). As a result of the negative shocks that flood bring, those who are not resilient or adaptive may fall into poverty (Fuji, 2016), but the capacity to cope with floods in itself is highly dependent on the level of economic development. The harsh natural environment causes a 'catch-22' between poverty and natural disasters. According to the State Council (2017), the average disposable income per rural resident in 2016 in the region was 7743 yuan (around 1000 euro), which represents 66.2% of the provincial average and 62.6% of the national average. The region has become a weak point in the fight against poverty in Henan, and to address poverty, it is necessary to improve flooding management (State Council, 2017).

Traditional Flood Management in the Region

The devastating floods of 1996 and 1998 sharpened the Chinese government's commitment to flood management (ADB, 2009). Since then, the government has increased its investments towards its flood management plan for the Yellow River. Past measures to contain floods mainly emphasized on structural approaches, including raising the village platform above flood levels and constructing roads for evacuation, but these measures have proven to be insufficient and temporary, as the Yellow River is complex in hydrology, hydraulics, ecology, and human intervention (ADB, 2009). Population growth and rapid socioeconomic development dramatically increased the value of assets and the number of people at risk in floodplains, so that the costs of providing higher standards of protection increased exponentially, making absolute security unaffordable and unattainable. Plus, the boom of flood control infrastructure leaves the government with enormous ageing infrastructure requiring huge recurrent maintenance and rehabilitation costs. Engineering constructions could not solve the flooding problems once and for all. The need for a paradigm shift from structural measures to a combination of non-structural and structural measures in flood management is apparent (Kobayashi *et al.* 2012). Therefore, in the long run, the Chinese government incorporates disaster reduction in its sustainable development strategies at the national and local levels. As poverty alleviation tops the sustainable development agenda, the Chinese government sees relocation as a fundamental way out of both flooding and poverty for residents' well-being (NDRC, 2017).

From Pilot to Full Rollout: The 2017 Relocation Project

Relocation Timeline

The timeline of the relocation plan began in May 2014 when President Xi Jinping visited the Henan Province. During his trip, President Xi stressed the importance of lifting rural residents out of poverty (Xinhua, 2014). Starting at the end of 2014, the provincial Henan government launched pilot projects to relocate villagers from floodplains to new settlements within their county. The first pilot cases involved 14 villages and the second pilot cases involved 26 villages, targeting the extremely poor and the extremely vulnerable. The pilot projects have successfully relocated in total 56.8 thousand people inter-township or inter-county (NDRC, 2017). To encourage the transformation of agricultural employment and help relocated villagers integrate into their new community, the local government had at the same time enacted plans to encourage industrial development, to loosen land transfer rules, to spur larger and more efficient farms and to open vacancies in the community public service sector. The pilot project has proven to be a success due to several factors; Firstly, through the significant importance central government attached to relocation as a fundamental solution to poverty alleviation. Secondly, as Henan province entered a period of rapid industrialization and urbanization, local finance could sustain a large-scale relocation project. Thirdly, the eagerness of villagers to get out of poverty has encouraged positive sentiments towards relocation (NDRC, 2017).

During his visit to the province in May 2017, Premier Li Keqiang examined the pilot relocation project and again stressed the importance of relocating Yellow River floodplain residents (Xinhua, 2017). Given the success of the pilot project, the full rollout of the allocation project in the province was officially approved by China's National Development and Reform Commission (NDRC) in August 2017. The relocation project follows an "entire migration" model² where new migration villages will be built between 2017-2019, and the relocation project will finish in 2020.

² According to Liu (2007), there are four basic resettlement models in China, including the "Entire Migration" model, the "Insert Migration" model, the "Resettlement in State-owned Farms or Forestry Farms" model, and the "Farm + Base + Migrants" model. The "Entire Migration" model refers to a resettlement scheme where a new migration village is built with integrated services to enable all migrants to settle in.

Figure 7.2. Major Cities along the Yellow River

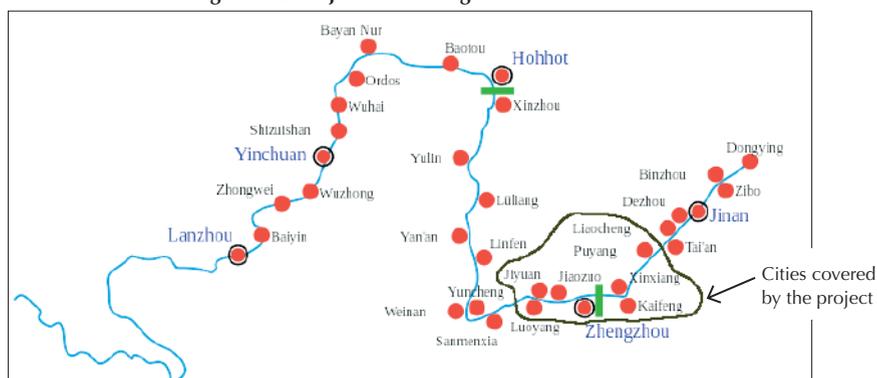


Figure edited by author Source: GreatHan

The 2017 Yellow River Floodplain Relocation Project falls under the responsibility of the Henan provincial government, though much of the detailed work is performed at the three lowest tiers of the administrative system: the county resettlement office, the township government, and the village committee. The project area covers the low-lying beach areas along the lower reach of Yellow River, ranging from Baihe Town, Mengjin County, Luoyang to Zhangzhuang Village, Taiqian County, Puyang. It covers a total area of 2116 km², within which lies 2.28 million *mu*³ of farmland. The flood-prone region is home to 1.254 million residents in 6 cities,⁴ 17 counties/districts (3 of which are identified as national poor counties and 2 of which are provincial poor counties), 59 towns and 1172 villages.

According to the flood control standard and flood control measures mapped out in the Comprehensive Plan for the Yellow River Basin (2012-2030) (State Council, 2013), there are still 1,037 million people living in areas with weak flood management capacity. The river along which they live cannot withstand a 20-year flood. Among the 1.037 million exposed population, 833 thousand are living in areas at high risk of flooding (State Council, 2017). 56.8 thousand of them have been relocated through the previous pilot projects, which left 776.2 thousand people at risk. The 2017 projects targeted the most vulnerable 243.2 thousand people living in 4 cities (Zhengzhou, Kaifeng, Xinxian and Puyang) and eight counties/districts (Changyuan, Zhongmou, Xiangfu, Fengqiu, Yuanyang, Puyang, Fan and Taiqian), aiming at relocating them by 2020. Local governments

³ *Mu* is a unit of land area used in China, 1 *mu* ≈ 0.0667 hectare.

⁴ These 6 cities are: Zhengzhou, Kaifeng, Luoyang, Jiaozuo, Xinxian, and Puyang.

at all levels, including village, township, county and city, are in charge of carrying out the 2017-2020 project. After the realization of the project in 2020, the government would then take care of the remaining 535 thousand people living at high risk of flooding.

About 14.407 billion yuan (about 1.88 billion euros) have been invested in the whole project. Financing sources include central government finance, local government finance, relevant project funds in departments, government land sale and residents' self-finance.

Run-up to the Project

Elevation vs Relocation

Elevation of the floodplains and relocation out of the floodplain are two options considered during the project's design. To compare these two approaches, the government has conducted control experiment on sample populations of 10,000, 5,000 and 2,000 residents. From a cost perspective, relocation appeared as the most financially viable approach. Besides, relocation could address recurrent floods in a comprehensive manner as it would significantly improve people's living conditions and facilitate the urbanization process. Compared to elevation, the downside of relocation is that it would potentially increase the costs of agricultural production for residents who are dependent on farming, but this could be solved by agricultural land transfer (State Council, 2017). In brief, relocation was deemed the more feasible and rational choice.

Analysis of Environmental Capacity

The investigation is conducted by the unit of township according to relevant regulation and data on township population and farmland. The baseline is set such that the area of convertible arable land should correspond to about 15% of existing arable land in each township, or in the township where arable land resources are scarce, the average area of arable land per resident should exceed 0.5 mu after the relocation population settled in. Surveys and statistics show that the 33 townships involved in the relocation projects have a total number of 1.875 million mu of arable land, and the area of convertible arable land is 280 thousand mu. Given that the allocation plan would require a resettlement area of 29 thousand mu, the involved townships can meet the land demand (State Council, 2017).

As most villagers depend on farming as their primary source of income, it is unrealistic for all of them to abandon their farmland and move to cities to seek new employment. Plus, farmland is a precious resource in China; it is nearly impossible to find new farmlands to satisfy all relocated individuals. Thus, the project adopts a “single relocation” measure: villagers are relocated without abandoning their entitlements to their farmland. After the flood, they could either return and continue working on their original farmland or transfer their farmlands to other individuals or enterprises.⁵ The original land available for housing will be restored to farmland. These newly restored farmlands will be owned collectively by the rural community.

Figure 7.3. Major relocation process and key players

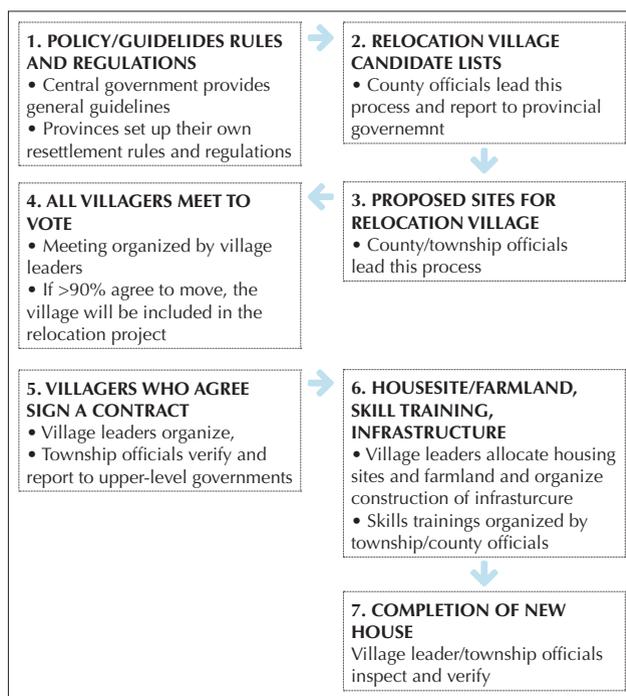


Figure created by author. Data source: Message Board for Local Leader (2017), Xue et al. (2013)

⁵ Since the country adopted the household responsibility system in the early 1980s, property rights associated with rural land have been divided into two layers: the ownership right, referring to its collective ownership by a rural community (normally a village), and the use right that is held by an individual household that contracts a piece of land from the village. Farmers could not sell or buy lands, but they could transfer their lands. Many rural migrant workers have leased out their land to those who stay in the countryside or commercial entities.

Resettlement Community and Government Subsidy

Assisted relocation entails financial compensation and incentive mechanisms that allow households impinged on by floods to leave the floodplains and choose their destination (de Sherbinin *et al.* 2011). The project plan proposes two approaches to relocation: centralized relocation and dispersed (or individual) relocation). Villagers choosing the former could move into the resettlement community built by the government. Individual resettlers, namely individuals deciding to move to cities/towns and buy their own house, after going through the process of voluntary registration and the local county/township government's review and approval,⁶ could get the same amount of relocation compensation as those moved to the government-built community. Each villager could receive a housing subsidy of 28.4 thousand yuan (about 3,700 euros): in other words, for a household of 4 people, the household as a whole could receive a total housing subsidy of 113.6 thousand yuan (about 14,800 euros).

The planned housing area for the 243.2 thousand relocated individuals covers about 7.3 million square meters. The baseline housing area per person is of 30 m². Rather than simple restitution, all resettlement communities are equipped with supporting facilities. Amongst others, the government is building a 4.8931 million m² road, 890-kilometre-long power lines, a 722.35-kilometre drainpipe, 5.7942 million m² of green zones, 86 waste transfer stations, 248.1 thousand m² of agricultural machinery storage, 100.2 thousand m² of community service centres (cultural activity centres, clinics, police stations etc.), 30 primary schools and 42 kindergartens. Relocated villages enjoyed a discount when paying for their new house in these communities. For communities located in the county, the average price of a 17-floor building is 2100 yuan (about 280 euros) per square meter, and the price of a 24-floor building is 2,050 yuan (about 270 euros) per square meter. For communities located in the township, the price of a 6-floor building is 1580 yuan (about 205 euros) per square meter (Local Leader Message Board, 2018). Taking only into account housing price and housing subsidy without consideration of other fees (water, electricity, furniture, etc.), in a standard scenario (30m² in a 17-floor building in the county), a villager should pay an extra fee of around 34,600 yuan (about 4,550 euros) by himself to move into his new house, which might be a burden for the extreme poor. To help them raise funds, the county/township government can act on the villagers' behalf and borrow money collectively from the provincial government. To get

⁶ No details have yet been provided by the government regarding the approval process.

the loan, villagers need to go through the following phases: voluntary registration, public notice, popular appraisal, and approval from local county/township government. However, no details have been published so far regarding the approval criteria. For the extreme poor who meet specific criteria (again no details have been released yet) the government could arrange for them to live in a nursing home based on their willingness (State Council, 2017).

Additional Measures

More than just spatial relocation combined with material transfers, resettlement is a complicated process. Cernea (1996) identifies eight basic risks emerging as a direct result of the resettlement process: loss of land, employment, shelter, and access to common resources; economic marginalization; increased morbidity and mortality; food insecurity; and negative cultural and psychological impacts. Thus, resettlement strategies must include economically feasible reconstruction of productive activities, with sufficient income generation, restoration of livelihoods, and adequate cultural integration with hosts (De Sherbinin, 2011).

To reconstruct sustainable livelihoods and to address the possible risks that may result from relocation, the 2017 project also mapped out relevant policies on regional industrial development. Firstly, taking advantage of the resources and unique location of the floodplains, local agricultural production is set to diversify and shifts towards high-quality and high-efficiency agricultural products such as flowers, cattle, and aquaculture products. Secondly, the relocation project tasks the local government to promote the development of leisure agriculture and rural tourism along the Yellow River. Thirdly, to absorb local labour force, the local government will continue to undertake an industrial transfer, developing labour-intensive industries such as deep processing of agricultural and sideline products (State Council, 2017).

To help the relocated farmers seek new employment in different sectors, the government also rolled out vocational training programs targeting different population groups to enhance their skills and self-development. These programs include, among others, skills training for the young and middle-aged labour force, practical technical training for agricultural production labour force, and school-enterprise cooperation. The government also supports relocated populations to start their own business, which aligns with the national guideline for the promotion of innovation and entrepreneurship approved by the State Council in 2017 (State Council, 2017).

A Solution Once and for All?

Impacts on Local Environment

The final implementation of the relocation project aims to restore and protect the Yellow River region's ecological system. However, according to the ecological risk assessment performed in the relocation plan (NDRC, 2017), during the construction of the resettlement area, the large number of personnel and machinery entering the region had a negative influence on the local environment. The mixing of concrete, the by-product of wastewater as well as living sewage will have an impact on local water quality and might potentially pollute shallow groundwater. Dust generated during construction and vehicle emissions will influence air quality in the region. If not disposed of properly, solid waste produced during the construction will also pose threats to the environment.

Hidden Danger in Hasty Relocation

The reputation of the Chinese construction industry has always not been good. Qiu Baoxing, the ex-vice-minister of the Ministry of Housing and Urban-Rural Development, commented on the Sixth International Conference on Green and Energy-Efficient Building that the average amount of time that Chinese structures remain liveable is 25 to 30 years, compared to a century or more in developed countries such as the UK. Hasty construction of resettlement communities often goes hand in hand with insufficient and shoddy facilities (People's Daily, 2010).

An interview was conducted by the Financial Times on the struggles of villagers in their new urban apartments. "Local officials reported they successfully resettled a certain number of households, but no one came to check if they returned to their home village", said an expert on China's resettlement policies in the interview. Ms. Zou, 53 years old, has been relocated in another poverty alleviation project in the landlock Guizhou Province. She returned back to her ancestral hamlet two months after the relocation because "There's no water there, no jobs there, nothing has been sorted out. There wasn't even water for flushing the toilet." Villagers also mentioned that official corruption has directly and adversely affected resettlement. Well-connected residents of better-off villages often monopolize prime street-level housing with shop fronts, so that they could start businesses, leaving poorer villagers with little opportunities to access new

jobs. The Guardian also published an article on the after stories of resettlers. Ms. Li is one of 345,000 people who is being relocated due to the South-North water diversion. She observed that her new concrete home wobbles when she walks three days after moving in. Her neighbour's floor has completely collapsed. Another's bedroom is tilting. There are cracks on many of the walls (*The Guardian*, 2016).

Mixed Reaction towards Relocation

According to the World Bank (2004), to claim that a resettlement program is voluntary, it should satisfy at least two conditions: informed consent (meaning that resettlers are fully knowledgeable about the project and its implications and freely agree to participate in the project); and power of choice (meaning the resettlers have the option to agree or disagree with the land acquisition and compensation package, without adverse consequences being imposed formally or informally by the state). In general, voluntary migration encounters various constraints in China. Firstly, as most farmers lack non-farming skills, information and funds, it is difficult for them to move elsewhere at a large scale. Secondly, even if they wished to continue farming, there is a lack of new arable land as a result of population expansion, urbanization and industrialization. It would be difficult for farmers to restore their productive capacity. Thirdly, internal migration is restricted by the residence regulation, the "hukou" system,⁷ which would limit migrants' production and living resources should they fail to obtain resident permits (Liu, 2007).

Not all people are willing to move out as they feel an attachment to their hometown and fear future uncertainties. Ms. Liang, a villager aged 46 years old, mentioned her concerns over the long distance between their new community and their old farmland (personal communication, 15 April 2018). Relocated to a new community at the back side of the dike, her new home is 3.5 km away from their old farmland at the other side of the dike. To get to their old farmland, she has to cross the dike. Her husband, like other working-aged men from the countryside, is migrant worker living in the city, leaving her as the sole breadwinner in the family and having to support three children. As she does not know how to drive, even if she could work on the old farmland, gathering crops would be very difficult. Although there are government-provided

⁷ The Hukou system is a family registration programme that serves as a domestic passport in China. It regulates population distribution and rural-to-urban migration. It is a tool for administrative control that denies farmers the same rights and benefits enjoyed by urban residents.

vocational training, with little experience outside farming, it would be extremely difficult for her to find new employment at her age.

Traditionally, the selection of participants in a relocation project is based on the principle of government organisation and people voluntarism. It is carried out through procedures of application and registration, village nomination, township examination and approval of relevant government department (Liu, 2007). In recent years, Beijing has released several new guidelines directing local officials to ensure that resettled populations are in fact willing to move (Xue *et al.* 2011). In the 2017 case, the government plan states that the project is based on the voluntarism of villagers, and urges local officials to visit each household to verify their conditions, listen to their demands, and get their consent and signatures on the relocation contract, but the plan does not mention how to deal with those unwilling to move⁸ and is unclear about whether people in areas identified as being at-risk are given enough choice about moving. According to the interviews Xue *et al.* conducted (2013), in previous resettlement projects, some elderly residents refused to move believing that they were too old, and some young and middle-aged residents refused to move because they had recently built new houses. Although they were not forced to move out, government services to the village were cut off as the village gradually emptied out, and their life became extremely difficult (Xue *et al.* 2013).

Examining the action guideline issued by county government (Taiqian government, 2017), propaganda accounts for a large part of relocations. According to the township governments, local officials are required to vigorously publicize the relocation project by radios and TV broadcasting. Other propaganda measures to smooth the relocation process include the distribution of policy flyers, public slogans and banners.

Although many villagers say that they are tired of the constant renovation of their houses every 5 or 6 years due to floods and look forward to the relocation, others have expressed the feeling that unspoken pressure is put on them through “inflammatory” slogans urging them, to “be mindful of the overall interest and support relocation by action” or spreading the message that “floodplain relocation will benefit future generations” (personal communication, 25 April 2018). “All is being pushed through quickly”, commented one villager (personal communication, 25 April, 2018). The compensation is not enough to buy a new home, but they

⁸ It does mention that in case of refusal to move, the local officials should do their best to convince the inhabitants about the benefits of the project, mobilise and guide them to participate in the project.

have no choice. One villager mentioned that the government would grant them an extra 3000-yuan bonus per household if they signed the relocation agreement in a given period. The government also encourage the formation of teams consisting of 10 households: if ten households as a team relocate in a given period, another 3000-yuan bonus will be granted to each household; if one household delays their action, then no one will be rewarded. This “collective punishment in disguise” also implicitly “forces” villagers to consent to the relocation project. This kind of “voluntarism” is more like the kind of “induced voluntarism” Gebre (2002) proposed. According to Gebre, induced voluntarism occurs when people leave places to resettle elsewhere due to deliberate acts of inducement by outside agencies, in this case financial incentives and government propaganda.

Conclusion

This paper provides a case study of the 2017 relocation project carried out in the floodplains along the Yellow River in the Henan province of China. The region is both blessed and cursed: the mighty river produces great agricultural bounty but also causes devastating floods, which increases the vulnerability of farmers living in the floodplains. The track record of resettlement associated with large infrastructure and development projects in China has been poor, but the 2017 project differs from the previous ones in the sense that it carries a dual purpose: to respond to recurrent floods as well as to lift residents out of poverty. It is part of broader efforts towards “moderate prosperity” which the Chinese government vowed to create during the 13th Five-Year Period. Still, challenges related to restoring sustainable livelihood might emerge after the resettlement phase due to an absence of more institutionalized labour market and full-fledged social security programs, as can be witnessed in past relocation programs. A range of social security programs and long-term welfare should be factored into relocation schemes so as not to repeat history (Qian, 2018). A successful relocation is one where a majority of resettlers raise their living standards as a result of project planning and implementation (Scudder, 2012). As the Yellow River relocation program is still ongoing, long-term success can only be determined by follow-up studies with the second and subsequent post-resettlement generations.

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Relocation as a Response to Periodic Floods and Poverty: Case of the Yellow River
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Europe

Moving Villages for Coal

A German case study

Adriana Willms

November 2nd, 2017. A group of climate activists walk through the empty streets of Manheim-Kerpen, Germany, passing only shuttered windows. The next day, COP23, the UN climate change conference, will start in Bonn, just 50km away. The same day, thousands of activists from across Europe will gather for Ende Gelaende, a protest and occupation of the Garzweiler II mine, the largest open-pit coal mine in Europe. In 2012, the village of Manheim counted about 1,700 inhabitants (Hadj-Hamdi, 2017). Most of them have now sold their houses to Rheinisch-Westfälisches Elektrizitätswerk (RWE, Rheinisch-Westfalian power company) and have moved away to resettle in Manheim-neu (New Manheim), a new village built to replace the old one, six kilometres away. According to RWE's plan, the remaining inhabitants will have resettled, and the village will be demolished by 2022 to make way for the expansion of the mine (Mayers-Beecks and Rheinart, 2016).

In November 2017, global leaders convened in Bonn to follow up on the 2015 Paris Accords. At the same time, the resettlement of Manheim's inhabitants became a powerful symbol and communication tool in the climate movement against fossil fuels, shining a spotlight on Germany's achievements and on its limitations (Hockenos, 2017). While the global community takes important steps in the direction of peaking global emissions in 2022, the German coal mines continue to expand (Hadj-Hamdi, 2017). Germany's energy transition seems quite contradictory. On the one hand, it is a world leader in the use of renewable energy sources, and on the other hand, it is failing to reduce the share of coal, the most polluting fossil fuel, in its energy mix (Hockenos, 2017).

The resettlement of entire communities has been a frequent occurrence in Germany since the aftermath of WWII. Between 1952 and 2000, over 50 towns and villages were moved, and 30,000 people displaced by mining development (Cioc, 2002: 101). As of 2016, RWE had resettled 35,000 people and created 24 new townships to make way for 30,000 hectares of mines (Mayers-Beecks and Rheinart, 2016). The strong influence of the Green Party in Germany has generated significantly

more public criticism and controversy over mine expansion and destruction of villages, compared to Poland and the Czech Republic, but the projects are still moving forward (Terminski, 2015).

The resettlement of Manheim's population only began to receive international media attention in 2015, when the city of Kerpen decided to settle refugees in Manheim's recently vacated houses (Hamann, 2015). The resettlement occurring in the region therefore received attention only when the empty villages started receiving refugees. Yet, despite recent attention to environmental issues in the region, the resettlement of entire villages remains largely invisible in international media. Arte's documentary *Regards: Insoutenable Lignite* interviewed affected persons who reported that even people in nearby villages were unaware that thousands were being resettled (Arte, 2017). Some climate activists cite the resettlement of villagers in the region to denounce social injustice caused by development projects globally (350.org, 2018), and local news websites have shared testimonies of affected people and updates about the evolution of resettlement and demolition (Hadj-Hamdi, 2017; Meisen, 2016; Pluwatsch, 2014). Literature on Development-Induced Displacement and Resettlement (DIDR) and Mining-Induced Displacement and Resettlement (MIDR) consistently cites Germany and its open-pit lignite coal mines and mentions significant controversy over the resettlement of villages these mines cause (Cioc, 2002; Terminski, 2012 and 2015). But to our knowledge, no academic literature has conducted an in-depth analysis of the dynamics of resettlement in the area, or its consequences for the local population.

This paper aims to provide preliminary research on the dynamics and social impacts of displacement and resettlement of communities living around the Garzweiler coal mines, focusing on the villages of Manheim and Keyenberg. It explores reasons for both pre-emptive departure and prolonged delay of displacement. This paper is largely based on two personal, semi-structured interviews conducted in Manheim and Kerpen with an elected city council member, and a former Manheim local, and on e-mail exchanges with a spokesperson of RWE, and a Keyenberg local affected by resettlement plans. It also draws on secondary literature sources on DIDR, press articles, and the author's observations of the area around the mines. First, we (1) frame DIDR with reference to existing literature on the issue, and (2) briefly place this issue in the context of the energy supply and coal industry in Germany. We then (3) present the resettlement plan and process, its actors, conflicting interpretations, and some of its consequences. Finally, we (4) discuss the diverging interests at

play surrounding the Garzweiler mines in an attempt to shed some light on how displacement is taking place and how it is impacting Manheim's population.

Framing Development-Induced Displacement and Resettlement

Forced internal displacement is often framed as a developing country phenomenon, while migration within and from developed countries is pictured as a planned, deliberate enterprise. Environmental migration accounts also largely focus on developing countries, especially those affected by climate change (IOM, n.d). A few exceptions include chapters in previous editions of the State of Environmental Migration (Le Goff, 2010; Crimella and Dagnan, 2011; Delavelle, 2013; Brown, 2014; Anquetin, 2016; Bhagwandass, 2016; Sim, 2016),¹ and a chapter by Bogumil Terminski (2015), which gives a detailed account of DIDR occurrences in Europe since the 1920s.²

In his recent book on DIDR, Terminski (2015) defines *displacement* as “primarily a socio-economic issue associated with loss or significant reduction of access to basic resources, on which communities depend” (2015: 33). These resources may be tangible (house, water, land) and intangible (social ties, means of livelihood). He then describes *resettlement* as the “spontaneous or unspontaneous [*sic*] process by which people leave their original settlement to resettle to new areas where they can begin new trends of life by adapting to the new environment” (Terminski, 2015: 34), while others see resettlement as displacement associated with a degree of planning and control (Chambers, 1969). In this case study, our use of the term “resettlement” encompasses both Terminski and Chamber’s definitions:³ while the process is not spontaneous for most, affected persons have the freedom to choose where to move and are given many years to decide when to do so. However, most inhabitants relocate to the new settlement built by the mining company, through a carefully planned and controlled process (Bargen N., personal communication, 24 April 2018), through a carefully planned and controlled process.

¹ Selected chapters cover examples of recent forced environmental displacement in high income countries such as the US, Canada, the UK and France.

² Examples include DIDR occurrences in Poland, Czechoslovakia, Hungary, France, the UK, Spain, and Germany.

³ In this paper, the term “resettlement” does not refer to the UNHCR’s mandate to “transfer [...] refugees from an asylum country to another State that has agreed to admit them and ultimately grant them permanent settlement” (UNHCR, 2018, n.p.).

Development projects are mostly irreversible and the resulting displacement is usually permanent (Vanclay, 2017). However, DIDR seems to offer an opportunity for much more control and planning than displacement resulting from conflict or rapid-onset natural disasters, since development projects are more predictable and take place over a number of years or even decades. Nevertheless, poor implementation of resettlement plans, without adequate compensation for lost assets and mechanisms of social support, lead to long-term or even irreversible deterioration in the conditions of large communities (Terminski, 2015: 42).

Owen and Kemp (2016) explore whether a more responsible form of planning can apply to resettlement from mining projects and argue that “where displaced people have minimal control over the circumstances that result in their displacement, the potential for negative impacts, including trauma, is high” (Owen and Kemp, 2016: 1227). The premise of international safeguarding mechanisms is based on the assumption that with planning and sufficient information about the timing and intensity of displacement, developers will take appropriate steps to consult with affected people, negotiate resettlement, and compensate them for livelihood essentials (Owen and Kemp, 2016: 1228). The authors question these assumptions, as “the global mining industry exists in the context of high stakes uncertainty where total land use requirements for life-of-mine cannot always be known in advance” (Owen and Kemp, 2016: 1229).

Contrary to popular knowledge, MIDR is a global phenomenon, but is the only major category of DIDR occurring in contemporary Europe (Terminski, 2015). Because of “high standards of rights protection institutions and the responsiveness to public opinion, [...] homelessness, unemployment, social marginalization and health problems are not ordinarily the result of resettlement in the developed world” (Terminski, 2015: 7-8). There is little doubt that MIDR in developed countries such as Germany is conducted with substantially more consideration of the displaced communities’ interests than in other parts of the world. However, in cases where international standards appear to have been respected, the literature has given too little attention to the actual experiences of people displaced by mining, to the legitimacy surrounding their displacement, and to the political component of MIDR. For instance, while mining companies in Germany do apply the standard of community involvement in the resettlement stage of a project, there is no community consultation in its prior phases.

The coercive aspect of DIDR is not obvious. While wars, civil conflicts, and rapid-onset natural disasters such as floods and hurricanes clearly

force populations to migrate to safer areas,⁴ the forced component of DIDR is linked to policy and planning by the state and private companies, and its causes contain a larger degree of control. This control, however, is limited in populations to be resettled: once the decision has been made to implement a development project such as a dam, road, or open-cast mine, populations directly affected by the project have no adaptation strategies available to them apart from resettlement. Resettlers are deliberately moved by their government but are still willing to avail themselves of its protection (unlike refugees), and the government therefore retains its responsibility towards them (Turton, 2006: 26-27). In this sense, while the state uses its legitimacy and the “*eminent domain*” law to expropriate land in the name of the “*greater good*,” it also retains its responsibility towards the populations displaced by a development project (Turton, 2006).

This issue of legitimacy of the cause of displacement is crucial to understanding the context of this case study. Indeed, since the 1970s, RWE and the state have used the concept of “*common good*” in order to justify the extraction of coal and resulting population displacement. The legal background for eviction and compensation is based on the Basic Law for the Federal Republic of Germany, which states that “*an expropriation is only allowed for the public good*,” and just compensation must be made (Terminski, 2015: 210), and on the Federal Mining Act, inherited from World War II martial law, which has retained its moral backing as purveyor of the “*greater good*” (Brock and Dunlap, 2017: 36). Article 79 prescribes the compulsory relinquishment of private property to mining companies by eminent domain whenever public welfare is served, especially for providing the market with raw materials, securing employment in the mining industry, stabilizing regional economies, or promoting sensible and orderly mining procedures (Michel, 2005: 42). However, as Germany debates the terms of its inevitable coal phase-out (Bergmans and Sartor, 2018), the legitimacy of moving villages for coal is being called into question as a matter of common interest. The following section explains the grounding for dissenting voices such as the “*Grüne*” (Green party) and other environmentalist civil society groups such as Ende Gelände and 350.org.

⁴ Even then, not everyone is necessarily able to move: see literature on immobility (Black *et al.*, 2013; Zickgraf, 2018).

Coal Mining, Energy Supply and Environmental Degradation in Germany

Germany has been considered an ecological role model world-wide since it dramatically increased electricity production from renewable energy sources in only fifteen years (Hockenos, 2017), reaching 33,1% in 2017 (Morris, 2018). However, these successes have recently lost international approval, since the Environment Ministry announced in the fall of 2017 that Germany was falling short of its 2020 emission reduction targets (Reuters, 2016). Coal—the most polluting of fossil fuels—still represents 37% of Germany's power production (Reuters, 2016). Most of the coal extracted in Germany is lignite. It is easy and cheap to extract, but is among the most polluting fossil fuels (Hockenos, 2017).

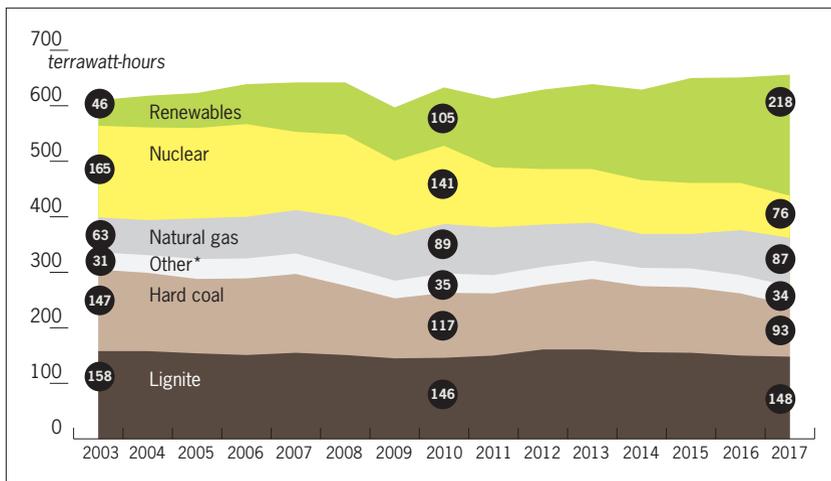
Lignite power production is exempt from taxes levied on greenhouse-gas-generating plants, and mining is not subject to fees for groundwater depletion, while its extraction requires such extensive groundwater draining that it has transformed some areas in Germany into steppe landscapes (Michel, 2005). According to a study released by the German Environment Ministry in October 2004, the contribution of all such indirect subsidies approaches one billion Euros per year (Michel, 2005). The financial burdens of environmental and health detriments are estimated at a minimum of 3,5 billion Euros annually (Michel, 2005), which greatly offset the low direct extraction costs.

To this day, Germany is the largest extractor of lignite in the world. Unlike hard coal production, lignite production is still a profitable business, and power companies such as RWE in North-Rhine Westphalia (NRW) are still expanding open-pit mines (Appunn, 2017). RWE is the single largest European emitter of CO₂, responsible for twelve percent of CO₂ emissions in Germany (IWR, 2012), and produces fourteen percent of all electricity in Germany (RWE Power AG, n.d). The state government of NRW decided in March 2014 to cut future lignite production by 1,3 billion tonnes, but overall production has, in fact, increased from 169,8 million tonnes in 2009 to 171,5 million tonnes in 2016, and its contribution to gross power generation has remained stable at around 24% (Appunn, 2017).

The reason for maintaining coal as Germany's primary power source is largely due to a strong, popular anti-nuclear sentiment that began in the 1970s and 1980s, and peaked in the 1990s (Staudenmaier, 2017). In 2002, the Social Democrats and the Green Party passed a law to phase out

nuclear energy entirely. Though Chancellor Angela Merkel announced a reversal of the law in 2010, the nuclear disaster in Fukushima, Japan, the next year caused large popular protests, led to the shutdown of several nuclear reactors and to the announcement of complete nuclear phase-out by 2022 (Staudenmaier, 2017). To meet increasing energy demand, however, coal is still perceived as a cost-effective option, even though it is contrary to the changes in energy production necessary for the implementation of the 2015 Paris Accord and Germany’s Intended Nationally Determined Contributions (INDCs).

Figure 8.1. Electricity Generation in Germany, 2003-2017



Graph created by the author. Source: AG Energiebilanzen (February 2018) *other: oil, waste, etc.

In an extensively researched report on lignite mining in Germany, Jeffrey H. Michel describes the environmental degradation caused by the Gerzweiler II (also known as “Hambach”) mine, the cause of the displacement of Mannheim’s inhabitants:

The gargantuan dimensions of German surface mining are epitomized by the Hambach quarry in the Rhineland, operated by RWE as “the biggest (manmade) hole in the world”. [...] Excavation requires the devastation of 85 square kilometres of landscape, including the Hambach Forest with many rare plant and animal species. [...] Mining involves draining 45 billion cubic meters of groundwater and resettling 5,200 local inhabitants (Michel, 2005, 16).

Image 8.1. Garzweiler II



© Adriana Willms (22/04/2018)

Images 8.2 and 8.3. Garzweiler I and II mines, and resettlement of surrounding villages



Image 2 (left): Garzweiler I and Keyenberg. Image 3 (right): Garzweiler II and Mannheim
Source: Google Maps

The Resettlement Process and Mitigation Measures

The excavation of the Garzweiler mines started in the 1970s and is scheduled to end around 2045 (Mayers-Beecks and Rheinart, 2016).⁵ RWE Power, the company operating the mining project, is also responsible for the resettlement of inhabitants living in villages located in areas destined for excavation. The company's resettlement plan for the area surrounding the Garzweiler II mine started in 2012 and is scheduled to end in 2022.

⁵ They will then become artificial lakes and recreational areas.

In 2016, twenty long-established families had not yet initiated negotiations with RWE (Meisen, 2016). The Chairman of the Communal Council, Willi Lambertz, did not know the families' motives for not leaving, but encouraged them to find new homes soon (Meisen, 2016). Demolition began at the end of 2016 in Manheim: 47 houses were to be demolished by June 2017 (Meisen, 2016). In December 2017, halfway through the resettlement plan, 374 people were still registered as living in Manheim (Kolpingstadt Kerpen, 2018), of which about one hundred were asylum seekers and refugees, housed temporarily while awaiting either a decision on their status or a longer-term housing solution (Meisen, 2016). The others are mostly new tenants, taking advantage of the cheaper rent as a temporary transit housing option (Pluwatsch, 2014).

Manheim's inhabitants and those of other villages to be demolished have known since the end of the 1970s that they would eventually have to sell their houses and leave their village. According to RWE, this allows people to "incorporate this into their lifetime planning and take the resettlement also as opportunity, for example, to move to more centrally located, old-age-ready accommodation, or to leave the area, because they have a job elsewhere" (Bargen N., personal communication, 24 April 2018). There has been uncertainty, however, about the exact timing of resettlement. We conducted interviews with people from the region, such as Martin Sagel, a Kerpen local, born and raised in Manheim.⁶ He says he always knew that he would eventually have to leave the village, but the deadline was repeatedly pushed back twenty years, which made it feel very distant and abstract (Sagel M., personal communication, 22 April 2018). This is likely due to the fact that, unlike other industries, mining companies face high levels of uncertainty around the amount of land which will be required in a mine's life-cycle, and resettlement can happen during any project phase (Owen and Kemp, 2015). The resulting incrementalism of land acquirement is linked to improvements in geological knowledge, fluctuations in commodity prices, and the availability of new technologies (Kemp, 2015: 481). According to Owen and Kemp, planning for resettlement must account for the unpredictability of the mining industry in order to truly safeguard against resettlement risks (Kemp, 2015). Our interviews suggest that continuous deadline postponement has not only confused personal resettlement plans but has also normalized the acceptability of the mine and resulting displacement (Kemp, 2015).

⁶ We met Sagel while doing research in the Kerpen area. He is an acquaintance of M. Carrasco Molina, mentioned later.

RWE's "joint resettlement" is a five-stage process which requires active participation from all self-use owners and landlords, who are allowed to rank their top three criteria within the specific requirements of the township (square footage and measurement requirements). The choice of placement in the new village then follows several steps, including options for people to keep the same neighbours (Mayers-Beecks and Rheinart, 2016). RWE explains the resettlement plan to the local population on the RWE website, under the heading "Meine Umsiedlung" ("my resettlement") and through in-person village meetings. Brown Coal Plans (BKPs), based on the state and regional development plans, set spatial planning objectives for "orderly lignite planning" (RWE, n.d.-b). BKPs are set up by a "Lignite Committee" which identifies villages to be resettled, the resettlement area and resettlement period, and carries out environmental and social impact assessments. These assessments document the existing social structure of a locality and potential material impacts of resettlement through extensive surveys, so that recommendations can be made on ways to avoid or reduce the adverse effects for the community (RWE, n.d.-a).

RWE insists that though its resettlement process is a "serious interference", it can be implemented in a "socially compatible manner" (Mayers-Beecks and Rheinart, 2016). The process rests on four pillars: efficiency; involvement of the people; special offers and information; and fair compensation. The whole process is supposed to take fifteen years, with five to six years of preparation, during which the "lignite commission" finds a resettlement site, and the local government approves the development plan in cooperation with RWE. Then comes nine to ten years of implementation, starting with the development of the new site and the beginning of the "joint resettlement" process. According to RWE, the affected population's involvement is crucial: they are invited to participate in determining the types of houses, town-scape and general township design (Mayers-Beecks and Rheinart, 2016).

RWE and the city of Köln (Cologne) provide several documents detailing procedures and the evaluation structure of compensation, which is monetary and based on market value, with additional compensation depending on the profile of the resettled person: owners, tenants, companies, farmers, seniors and clubs are compensated differently (Mayers-Beecks and Rheinart, 2016). The company describes the property purchase process as follows: an architect and a real-estate expert, commissioned by the land owner and paid by RWE, conduct a survey and determine the market price of the property. The owner may request a house inspection, after which RWE makes an offer, and finally both parties (RWE and

Image 8.4. A Street in Manheim-neu



Source: www.radioerft.de

Image 8.5. Manheim-neu Planning



Source: www.rwe.com

the land-owner) sign a contract. According to regulations, RWE cannot buy land and property before the beginning of the joint resettlement plan, which is meant to ensure that the village community is maintained as long as possible (Mayers-Beecks and Rheinart, 2016).

There exist very few testimonies of “Manheimers” about their resettlement. Manuel Carrasco Molina⁷ is a Kerpen local with Belgian and Spanish roots, and a Green Party member of the Kerpen city council since 2014. He says issues related to the mine come up in every city council meeting, and the destruction of villages was often debated between the Greens and the SPD (socialist party) during the former provincial government coalition from 2012 to 2017.⁸ But Carrasco Molina says those willing to testify are hard to find. There is reluctance on the part of soon-to-be displaced people to speak publicly about it, because they fear that what they say might be used against them. A rare published personal account of resettlement is that of the Franke/Liegl family, one of the first families to leave Manheim to resettle in Manheim-neu. The process was trying for the extended family of ten people, who suffered from conflict and pressure but eventually managed to negotiate an acceptable price for their home, and started seeing the resettlement as an opportunity to build a new life on their own terms (Pluwatsch, 2014). Some inhabitants of villages are even favourable to the mine, as it has provided jobs for their family for years. They consider that the benefits outweigh the costs, and that the company takes appropriate measures to solve problems that arise from the excavation (Arte, 2017).

For other families, however, the process is more desperate. The Winzen family lives in Keyenberg, a village whose resettlement plan started in 2016 to make way for Garzweiler I, and they have no desire to move or to build a new house. They live on an old heritage farm and found out about resettlement 35 years ago through rumours and press articles (Winzen N., personal communication, 27 April 2018).⁹ Since December 2016, they have been categorised by the local government as “displaced persons [*sic*]”, meaning they will eventually have to resettle (Arte, 2017). Actual negotiations with RWE started two years ago, with an initial offer of 1,000 m² in the new village, equivalent to 1/8th of their current property

⁷ We contacted Manuel Carrasco Molina through the “Initiative Buirer für Buir”, a local citizens’ collective created to “counterbalance the one-sided information about the Hambach mine provided by RWE” (buirerfuerbuir.de, 2018).

⁸ These negotiations resulted in a reduction of the area planned for excavation and resettlement.

⁹ We contacted Winzen through social media, after seeing him interviewed in the 2017 Arte documentary.

(Winzen N., personal communication, 27 April 2018). After two years of negotiations, RWE have offered 4,000 m², but no longer in the new village. Norbert Winzen describes the resettlement process as “total annihilation of [the family’s] means of subsistence” (Arte, 2017). The family has assumed the cost of expert evaluations of the property and hopes that RWE will reimburse them for it. Winzen says that even if the community is involved, he feels powerless because everyone feels that in the end, RWE will get what it wants (Winzen N., personal communication, 27 April 2018).

Compensation

The issue of compensation is quite controversial and is subject to much speculation in the area. Article 84 of the Federal Mining Act regulates issues of monetary compensation, equivalent to the current market value of properties intended for excavation. According to Michel (2005), RWE does not provide adequate compensation for the loss of equity due to a devaluation of property in areas close to mines, and does not provide adequate programmes to alleviate the burden of high unemployment. De Wet (2006) explains that “to calculate compensation, resources are evaluated in terms of assumed uses, productive value, and apparent patterns of access” (5). This process requires oversimplification of a complex, ambiguous and dynamic reality, which often leads to confusion, anger and resistance (De Wet, 2006).

On their website, RWE presents the compensation mechanism as an essential part of the “social compatibility” of resettlement (RWE, n.d.-a). Compensation must be transparent and appropriate, and is based on a 2010 district-wide regulation agreement between RWE and the state of NRW for resettlement in the Rhenish lignite mining area. However, when asked about compensation, Carrasco Molina speaks of an opaque process in which the negotiation of compensation is on a case-by-case basis and says that the final amount may depend on property owners’ bargaining skills. He says it is very difficult to know the truth because revealing compensation amounts could lower one’s own compensation. He adds that the first people who sold their house received a higher compensation than those who waited until the last moment, which he sees as a way for RWE to discourage delayed departure (Carrasco Molina M., personal communication, 21-22 April 2018).

Martin Sagel is a real-estate agent who has sold a few houses in Mannheim. He tells a different story: “On average, RWE pays property owners double the market price of their property” (Sagel M., personal communication,

22 April 2018). In fact, one of his family members bought a house for 165,000 Euros and received 400,000 Euros when he sold it to RWE, even though the market had stagnated from the time of purchase (Sagel M., personal communication, 22 April 2018). According to him, RWE does this to ensure that no one will resist resettlement or criticize its mining projects. He dismisses the fact that RWE pays a higher price to owners who resettle sooner, and says it is a rumour meant to discourage people from staying until the last moment, since according to him, the company always compensates owners well above market price to avoid resistance. Sagel also says that, as a consequence, people from the surrounding area have bought houses in Manheim knowing that they will be able to sell them after a few years to RWE for a higher price.

The large disparities between the interviewees' interpretations of compensation mechanisms seem to indicate that these are not as transparent as RWE contends. RWE is currently conducting a formal evaluation of the resettlement process for the first time (Bargen N., personal communication, 24 April 2018). According to RWE, "there was not really a need for a formal evaluation process, since [RWE] have been and will always be here in the region, always knew that [their] business of lignite mining and power generation could not move elsewhere and that [they] would have to 'live with the consequences'". No external assessment has been done to-date. According to Sagel, while some families find themselves financially better off after resettlement, others struggle to afford a similar situation elsewhere, or even to replace their livelihood. Local authorities and RWE put considerable effort into encouraging people to resettle in the new village, through local consultation meetings and the joint resettlement mechanisms mentioned earlier. According to RWE, an average of 70% of the population resettles in the new dedicated settlements (Bargen N., personal communication, 24 April 2018). While acknowledging the complexity of socioeconomic systems, RWE states that "participation rates of 50% to more than 80% are sufficient to essentially preserve the old village community at the new location and to make it functional in its social structure or provide a good basis for the further development of the village community" (RWE, n.d.-a). Sagel argues that despite generous compensation, many people cannot afford to build a house in the new settlement, which is the only way to resettle in Manheim-neu. Others feel too old to start the process of planning and building a new home and prefer to stay in their house in the old village until they die. There are only large, detached houses in Manheim-neu. There is no social housing and there are very few apartment buildings. Moreover, the village was designed with suburban-style planning, with no space allocated for

farming. In sum, the reality of opportunity and range of choice is very unequal among the relocated population. Those who may be able but who do not wish to resettle there have different reasons for their choices. For example, Sagel decided not to resettle in Manheim-neu because he did not want to live in a village where RWE is omnipresent, both in the construction of public infrastructure, and in village activities (Sagel M., personal communication, 22 April 2018).

The Consequences of Resettlement

The most visible consequence of resettlement is the gradual transformation of the villages into ghost-towns: from active community spaces to quiet, empty streets. A few years ago, Manheim had many shops, services, a school, and a discotheque, but most have had to close because of a declining customer base (Sagel M., personal communication, 22 April 2018). One of the first buildings to be demolished in Keyenberg was the hospital, where most people in the region were born (Arte, 2017). As shops and public service buildings close, and the population drops, many services become less accessible to the few remaining inhabitants, and the village becomes less liveable even though demolition is still a decade away. RWE not only buys private property, but also funds the construction of public infrastructure in the new settlements (Carrasco Molina M., personal communication, 21-22 April 2018). According to Sagel, despite sufficient funding, the Kerpen city council is constructing substandard infrastructure for Manheim-neu. This affects daily life and reinforces negative comparisons with the old village (Sagel M., personal communication, 22 April 2018).

Less visible is the psychological trauma, caused by instability and insecurity. Many of the resettled inhabitants miss the community they had in their village and its historical heritage. Both Carrasco Molina and Sagel criticize RWE for pretending to replace the old with brand new: ancient trees in the Hambach forest with young seedlings from a nursery, heritage churches and old houses with brand new modern buildings. All three people interviewed regret the loss of historical and family heritage caused by the destruction of villages, some of which are over a thousand years old. The psychological impact of resettlement is especially severe on the elderly, who suffer from the loss of community, a social safety net, and familiar surroundings. Ferraro's (1983) work on the effects of relocation on the elderly has shown that moving "adversely affects the health and daily functioning of older people in the community" (n.p.), whether the

move is voluntary or not. As mentioned earlier, a common problem in MIDR-affected communities is the long waiting period between the initial information and the actual displacement, which creates significant socio-economic instability for the future resettlers (Terminski, 2015: 526). Interviewees from Manheim and Keyenberg all experienced trauma associated with the decision to move and when to move. They report that the move is often followed by depression and sometimes even suicide, although no official statistics exist on the issue.

Another consideration is the fact that extended families are common in rural Germany. The Sagel extended family lived in four houses in Manheim, but now, after resettlement, all live in different villages. Winzen speaks of the looming difficulties of relocating with a family of nine people (and farm animals) from a village where his mother's family has lived for 250 years. Extended families are common in the region. For them, community fragmentation is compounded by family fragmentation, adding further stress.

Most research about the effects of DIDR has focused on developing countries. Writing about the health consequences of resettlement due to China's Three Gorges Dam project (1994-2003), Xi *et al.*'s (2013) research showed that displaced persons of all age groups experienced similar levels of increased depression due to resettlement. Although it was usually much easier for young adults to relocate in comparison to older adults, they found that a forced resettlement was such a great source of stress that its effects overrode other forces that normally shape life experiences at different stages. These findings may be dependent on context and local healthcare systems. Back in Germany, however, despite a very different context, Sagel and Winzen's testimonies support such findings. For the Winzen family, resettlement planning has become a constant theme in daily life. Negotiating an acceptable compensation for their property causes stress. Sagel also mentions the frequent passing of the elderly shortly after resettlement. Most studies on the psychological impact of DIDR have focused on India (Goessling, 2010) and China (Xi *et al.*, 2013), where the scope and rapidity of displacement have been the most striking. More research on the effects of lengthy and incremental resettlement programs would be useful to understand better the impact of resettlement on populations around the Garzweiler mines.

Extended, long-established families are not the only ones affected by resettlement. Refugees living in Manheim as temporary tenants also have to relocate as the 2022 deadline approaches. RWE's leases of apartments in Manheim to the town of Kerpen ended on August 1st, 2018. The city is

actively looking for replacement homes, but it is proving to be difficult. Tenants themselves are also looking for places to move. Carrasco Molina offers moral support and help with administrative issues to several refugees in the area. He says that uncertainty about life after Mannheim is yet another source of stress for them, not long after leaving their home country in often traumatic circumstances (Carrasco Molina M., personal communication, 21-22 April 2018).

These negative impacts of displacement on locals are not a result of insufficient planning, however. RWE respects many of the guidelines and recommendations found in the literature on MIDR: as mentioned earlier, resettlement to Mannheim-neu involves careful planning and information sessions, and allows for negotiation of the terms of resettlement by the affected population. One of the recommendations RWE applies is that the company provide employment to the people it resettles. According to Michael Cernea, “the key policy objective in forced resettlement is restoring the income-generating capacity of resettlers” (1996: 314). For Niklaus Bargen, a spokesperson for RWE, providing jobs is evidence of RWE’s commitment to corporate social responsibility, and its understanding that resettlement is a complex process, bringing not only challenges, but also job opportunities (Bargen N., personal communication, 24 April 2018). This is wishful thinking. Increasing automation of the mining process has created above average unemployment levels in mining regions (Michel, 2005: 42). The number of mining jobs in the Ruhr region, for example, fell from 600 000 to 190 000 between 1957 and 1977 (Berghmans and Sartor, 2018). Our interviews suggest that RWE hires locals specifically from resettled villages in order to exercise control over the resettled population. Employees are less likely to criticize the development project if it is a source of income for them and their extended family. For this reason, some of the guidelines for socially responsible displacement, based on Michael Cernea’s “planning” approach,¹⁰ seem ill-adapted to DIDR issues in the context of resettlement around the Garzweiler mines. While RWE respects German regulations and standards on paper, the following accounts of intimidation and asymmetries of power call into question the checks and balances put on the company’s actions.

¹⁰ Michael Cernea argues that detrimental social impacts of development projects can be avoided through good planning.

Power Asymmetry, Resistance to Displacement, and Questioning Development

Power Asymmetry and Conflicts of Interest

“Relocation is almost always a tragedy of larger or lesser proportions, because it rests on a huge asymmetry of power” (Aberle, 1993: 191). “Even in the world’s most developed countries [...] the impact of the affected individuals and resettled communities on the decision-making process are not comparable with the political power of the state or the financial tools of the private sector” (Terminski, 2015: 521). In the case of DIDR, governments are usually responsible for resettling populations, and the state is held accountable for the process. In the case of villages around the Garzweiler mines, the entity responsible for resettlement is a private company. While it works in connection with local authorities, RWE is not subject to the same accountability mechanisms as elected representatives.

Brock and Dunlap use the Garzweiler mine case study to illustrate what they call “corporate social technologies”, which RWE uses to “maintain operational legitimacy in the face of ecological crises” (Brock and Dunlap, 2018: 34). One of these strategies is corporate counter-insurgency, which they define as the “diversity of indirect corporate strategies to secure acceptance of, and pacify resistance against the mine, including sustained ‘greening’ activities, public relations campaigns and corporate social responsibility measures that RWE has engaged in for decades” (Brock and Dunlap, 2018: 34).

According to the authors, RWE has used both soft and hard methods to “engineer consent” and “dissuade dissent” in the local population. Hard methods have included physical violence by private security hired by RWE and by police during evictions of Hambach Forest occupiers (WDR, 2015). On the soft side, RWE’s deep involvement in German politics has been extensively documented in the last fifteen years: as of 2017, “32 municipalities, 20 cities, seven associations and firms—large banks, insurances [sic] and the NRW Chamber of Agriculture—are RWE shareholders” (Brock and Dunlap, 2018: 34). Gerald Neubauer (2013) has mapped the relationship between German politicians and the coal industry, exposing 17 high-level politicians spanning the political spectrum (including environmental ministries) with close ties to RWE, as board chairs or board members. At the local level, representatives are also closely linked to

RWE: for example, Manheim's Dorfvorstehe (village representative), Lonie Lambertz, is married to RWE's former CEO, Johannes Lambertz.

Other soft-power, consent-engineering techniques include:

- Eco-tourism, used as a corporate technique to pacify opposition to resource extraction projects;
- Funding school trips for children in exchange for mentions in school publications, and a say in the design of curriculum pertaining to energy efficiency, branding RWE as a "good corporate citizen" (Brock and Dunlap, 2018: 33, 39);
- The purchase of churches by RWE in order to encourage people to move earlier (Winzen N., personal communication, 27 April 2018).

The Resistance to Resettlement Around the Garzweiler Mines: Immobility as Resistance?

Our interviews and several press articles mention the absence of resistance against resettlement from the local population (Pluwatsch, 2014). The concept of resistance deserves some attention however, since resistance does not necessarily take the form of street demonstrations or occupations. First, there actually were large protests in 1987, when over 5,000 people from the region marched at night, protesting against resettlement and the destruction of villages (Arte, 2017). The first lawsuit against the mine was also filed that year. In the 1990 Federal Election campaign, Green Party member Bärber Höhn promised that if elected, she would not allow villages to be destroyed. Most people in the villages threatened with displacement voted for her, but she did not keep her promise. A former neighbour of the Winzen family remembers when people had great hope that popular mobilization would succeed, but recalls that the 1990 disappointment was followed by disillusion and discouragement (Arte, 2017).

Since resistance around the Garzweiler mines happens in the context of RWE's deep involvement in most aspects of people's lives (energy provision, employment, politics, education, and recreation), many locals perceive RWE as a threat when considering explicit resistance and protest against the company. Tellingly, when one interviewee switched energy providers to one producing electricity from renewable energy sources because he no longer wanted his electricity to come from RWE, he suggested to his parents that they do the same. His parents still lived in Manheim at the time, and rejected his suggestion, as they were worried it would have an impact on the compensation they would receive for their houses (Sagel M., personal communication, 22 April 2018). Some farmers also reportedly

avoid antagonizing RWE out of fear that they will be given a bad deal when they are compensated for their land (Brock and Dunlap, 2018).

Whether these fears are well-founded may be debated, but it is not the issue here. If resettlers fear repercussions from outspoken criticism of the mine and resettlement, it affects the level of resistance they are willing to demonstrate. The decades-long process of displacement and demolition results in less noticeable change. Harald Welzer (2012) writes about the “cultural amnesia” of society and its tendency to adapt very quickly to realities which were once unacceptable. For example, the new status quo in Manheim is to sell one’s house and move elsewhere, even if one disagrees. In this sense, not moving is an act of resistance against the normality of displacement, which was introduced in the 1970s, and began being implemented in 2012. In Manheim and Keyenberg, a few long-time residents are resisting displacement by waiting until the last moment to move, not as an active choice, but due to a perceived lack of alternative resistance. At the entrance of the village, a wooden yellow cross sits against a wall, as a symbol of the village’s resistance to displacement. An identical yellow cross can be found against a tree in the Hambach forest adjacent to Manheim (see image 8.6.).

Another kind of immobility as resistance exists around the Garzweiler II mine. The Hambach forest, 90% of which has been lost to the excavators, has been continuously occupied by activists since 2012 (Brändlin, 2016). Some activists have moved to the forest and live in an informal settlement made of tents and tree houses year-round to keep RWE from felling trees to make way for the mine. RWE technically owns the forest, but it is illegal in Germany for an owner of forested land to prevent the public from entering (Carrasco Molina M., personal communication, 21-22 April 2018). To date, attempts to evict protesters by force have been unsuccessful (Brändlin, 2016). In a way, resistance to displacement in the area around the Garzweiler mines seems to be the privilege of a few who do not—or no longer—fear the repercussions of overt dissent. When actual or perceived stakes are too high, and the power asymmetry is too great, the cost of overt dissent outweighs its benefits, and resistance takes more subtle forms.

For Carrasco Molina, the “Grüne” municipal council member from Kerpen, the Hambach forest and November 2017 Ende Gelaende occupation are symbolic of a shift in consciousness. He believes the new generation understands the interconnectedness of coal development projects, climate change, and forced displacement worldwide. He believes this generation is also more radical and more ready to challenge the status

Image 8.6. A Symbol of Residents' Resistance to Displacement



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Image 8.7. A Street in Manheim



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quo (Carrasco Molina M., personal communication, 21-22 April 2018). Pro-mining groups argue that resistance to the mine is illegitimate because it is comprised primarily of Germans from other regions and foreigners who do not care about local jobs (Arte, 2017). According to Janna Aljets, spokesperson of Ende Gelaende, young activists are conscious that their high-energy-consumption lifestyle has a negative impact on others locally and internationally, and choose to address the issue through direct action (Arte, 2017).

As Anthony Oliver-Smith (2006) argues, resistance to DIDR often goes hand in hand with a critique of the liberal development paradigm, and the narrative according to which displacement is a necessary and unavoidable cost of modernization. Most locals who protest against the mine do so to preserve their heritage, community and means of livelihood. They are not fighting against climate change. However, if their resistance is addressed in national debates, it can attract international attention from NGOs and become integrated into a larger global dialogue (Oliver-Smith, 2006). According to Oliver-Smith:

Resistance to displacement is helping to reframe the entire contemporary debate on development, the environment and human rights—a debate that shows considerable signs of expanding and gaining increasing relevance to both national development and human rights policy, as well as to international standards (Oliver-Smith, 2006: 173).

Conclusion

This paper has described and analysed the process, dynamics, and socio-economic consequences of the Garzweiler mine development project and resettlement. RWE follows many of the guidelines and best practices found in the literature on DIDR and MIDR, but this process only works for certain types of people and certain family units, and many inhabitants are left economically and/or socially worse off, after an emotionally exhausting period before resettlement. Despite claims of transparency, rumours and fears surrounding the resettlement process suggest that some of the company's methods for discouraging dissent are questionable. While communities are consulted in the resettlement phase, there was no consultation regarding approval for the mining project itself. In places where the company is present in all aspects of local community life, as well as in local and national politics, the legitimacy granted to resource extraction on the basis of the "greater good" may to some extent be the result of

lobbying and nepotistic practices. With this in mind, we have argued that in some cases, delaying resettlement to the last minute can be considered an act of resistance. Since to this day, no one has waited long enough to face eviction, more in-depth research is needed to confirm this hypothesis.

The views expressed in this paper may suffer from a selection bias, since those individuals who agreed to talk are likely to be those who oppose the mine and resettlement the most. However, we have highlighted a few areas of concern regarding the adverse effects of displacement on the local region and population, especially in a global context where coal extraction and combustion is incompatible with Germany's commitment to the Paris Agreement. More qualitative research is needed to better understand the nature and extent of the consequences of displacement on different segments of the population, and the ways in which those affected cope with and adapt to displacement. This would result in more visibility of MIDR in Germany, and perhaps a greater impact of these voices on national debates and policy-making.

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List of Images

Image 1.1. A Madagascan Traditional Farmer with Vanilla	14
Image 1.2. A Traditional Madagascan House Built from <i>ravinala</i>	25
Image 1.3. A Madagascan House Built from Metal Sheets	25
Image 2.1. Aerial Photograph of Isle de Jean Charles, Taken in 1963	40
Image 2.2. Aerial Photograph of Isle de Jean Charles, Taken in 2016	40
Image 4.1. Marigot, Capital of Saint Martin, Before and After Irma	71
Image 4.2. Destroyed Buildings Along the Coast of Sint Maarten	76
Image 4.3. Looted Shoes and Clothing Shop	78
Image 4.4. Airplane for Evacuations from Saint Martin to Guadeloupe	79
Image 8.1. Garzweiler II	170
Images 8.2 and 8.3. Garzweiler I and II mines, and resettlement of surrounding villages	170
Image 8.4. A Street in Manheim-neu	173
Image 8.5. Manheim-neu Planning	173
Image 8.6. A Symbol of Residents' Resistance to Displacement	183
Image 8.7. A Street in Manheim	183

List of Figures

Figure 1.1. Regions Affected by Enawo	15
Figure 2.1. Land Loss and Land Recovery Over the Next 50 years	36
Figure 2.2. Isle de Jean Charles Desire to Resettle (by Household and by Resident)	46
Figure 2.3. Sites Suggested by Community Members During Engagement Sessions	47
Figure 2.4. Community voices from the 2017 Master Plan	49
Figure 4.1. The Map of St Martin	74
Figure 5.1. Puerto Rico's Unemployment rates 2007-2017	107
Figure 6.1. Storm Category of Hurricane Irma Moving East to West	125
Figure 6.2. Trajectory of the Category 5 Track of Hurricane Irma in September 2017	125
Figure 6.3. Saint John Main Port. Before and After the Disaster	126
Figure 6.4. Trajectory of Hurricane Maria	127
Figure 6.5. Net Domestic Passengers to the U.S. Virgin Islands, 12-month rolling sum	129
Figure 6.6. Local Job Loss Following Natural Disasters, From Onset to Trough	132
Figure 6.7. Employment Paths Post-Hurricanes, index (month before hurricane = 100)	133
Figure 7.1. Henan Province Map	144
Figure 7.2. Major Cities along the Yellow River	148
Figure 7.3. Major relocation process and key players	150
Figure 8.1. Electricity Generation in Germany, 2003-2017	169

List of Tables

Table 1.1. Multisectorial Rapid Assessment of Damages	16
Table 1.2. Impacted Regions and Human Toll (Floods and Wind)	17
Table 5.1. Immediate Hurricane Response	102
Table 5.2. Puerto Rican Population Between 2000-2016	108
Table 5.3. Disaster-Related Economic Losses in GDP Per Capita	114
Table 6.1. U.S. Virgin Islands versus Cayman Islands: Comparing Pre-Disaster Development	123
Table 6.2. FEMA Assistance to U.S. Virgin Islands as of June 8, 2018	131
Table 6.3. Cruise ship visitors to the U.S. Virgin Islands, annual change 2016-2017	134
Table 6.4. Cruise Ship Visitors to the Cayman Islands, Annual Change 2016-2017	135
Table 6.5. Estimation of Irma and Maria Impacts on the U.S. Virgin Islands Economy Compared to the Cayman Islands	136

