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## Social vulnerability shapes the experiences of climate migrants displaced by hurricane Maria

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### Abstract

Climate change-related shocks and stresses are prompting the movement of hundreds of thousands. The purpose of this study is to understand the experiences of climate change migrants, people displaced from these crises from the initial impacts of the hazard to their recent arrivals in a new location. To do so we draw on focus group discussions with Puerto Ricans in South and Central Florida displaced by 2017 hurricane Maria. We document the factors leading up to the hurricane that shaped their preparedness, their relocation decisions, and their post-relocation experiences in the initial seven months following the hurricane. We find that for these Puerto Ricans, underlying neglect, discrimination, and other social processes transformed Maria from a hazard to a disaster with devastating economic, social, and physical and mental health effects, while also creating challenges in early recovery. However, migrants were also able to draw on their faith, community and educational institutions, and new neighbours as sources of strength and coping. We argue that since these factors are socially produced, a vulnerability perspective is critical to understanding the experiences of climate migrants. We draw on this perspective to conclude with research and policy implications.

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## Keywords

mass migration; cyclones; social vulnerability; disaster recovery; Federal Emergency Management Agency; emergency response; community resilience

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## 1. Introduction

On September 20, 2017, Hurricane Maria made landfall in Puerto Rico as a Category 4 hurricane with sustained winds of 155 miles per hour and torrential rains that ravaged the United States (US) territory. Like other hurricanes of this magnitude, huge numbers of Puerto Ricans saw their homes destroyed, and many were left without food and water, electricity, and the ability to communicate via phone or internet. For months after the storm, thousands remained without power, and many continued to struggle to obtain basic necessities for more than a year. As a result, many Puerto Ricans left the island and sought refuge on the US mainland, with large numbers relocating to South and Central Florida. In late 2017, Florida Governor Rick Scott announced that Florida had welcomed nearly 300,000 Puerto Rican arrivals and was preparing for many more, having set up relief centres in Miami and Orlando.

These migrants could arguably be classified as ‘climate change-related migrants’ or ‘climate migrants,’ people whose movement is influenced by climate change-related shocks and stresses. People move for a complex array of reasons, and direct or indirect exposure to climate change related hazards (such as hurricanes) can play a role in shaping their movement (Boas et al., 2019, Black et al., 2011). To this end, in some ways, the storm represented a “push out the door” for Puerto Ricans vulnerable to the hurricane who had been long unhappy with conditions on the island and who had been considering a move to the US mainland (Scaramutti et al., 2019).

Research on climate change-related migration is growing, but comparatively little work has focused on *what actually happens* to people displaced by climate related shocks and stresses, particularly after they are resettling or have resettled in new locations (Boas et al., 2019, Vos et al., 2021). Instead, major lines of effort have begun to examine how climate change can spur migration (Wing et al., 2022, Freeman and Ashley, 2017), estimate the numbers of climate related migrants, and identify where people have relocated or are expected to relocate in response to climate shocks and stresses (McMichael et al., 2020, Hauer, 2017) (for a critique see Kelman (2019)). Indeed, there is a small but robust body of research on how hurricane Maria has shaped outmigration from Puerto Rico to the US mainland (Hinojosa and Meléndez, 2018, DeWaard et al., 2020, Santos-Lozada et al., 2020, Acosta et al., 2020, Alexander et al., 2019, Martín et al., 2020). Other issues, such as the impacts of climate-related migration on people’s mental and physical health (Schwerdtle et al., 2018, Dannenberg et al., 2019) and the ways in which policies and institutions should respond to climate related migrations (Blake et al., 2021, Sabasteanski, 2020, Ridde et al., 2019), have less of a focus. Studying what happens upon arrival – and why – is missing from the current body of work. As Boas et al. (2019) note “research on climate mobilities needs to shift part of its focus from climate-sensitive sending areas to destination areas.”

Information on climate migrants in their new locations is necessary to support adaptive and transformative intervention and policy approaches to facilitate well-being among climate migrants and the communities where they have settled. People migrating away from the epicentre of a disaster effectively bring the disaster and its effects with them to the new location (Vos et al., 2021). However, whether climate migration is “good” or “bad” is to, a large degree, a subjective evaluation: exposure to a climate related shock or stress and migration is almost always harmful, but settlement in a new location has the potential to be either helpful or harmful, adaptive or maladaptive (Schwerdtle et al., 2018, Dannenberg et al., 2019, McMichael et al., 2012, Schütte et al., 2018). With the appropriate conditions in place (such as local institutions, financial resources, and social connections (Wisner et al., 2004)), migrants can access new resources and bring with them assets that can be integrated into the fabrics of the communities where they settle. In turn, this can facilitate well-being, or “thriving in every aspect of life and having opportunities to create meaningful futures” (Chandra et al., 2021). In the absence of conditions that facilitate well-being and integration into their new communities, migrants may not be able to access resources, and they may be unlikely to contribute to broader well-being of their host communities. Indeed, without necessary supports, migrants may suffer from the disaster itself *and* from the pain of missing their homelands.

This article offers qualitative evidence regarding what happens in the initial periods when people are displaced by climate-related disasters. Specifically, we analysed focus group discussions with Puerto Ricans displaced by Hurricane Maria and relocated to South and Central Florida. We focus on the disaster to relocation experience, e.g. mitigation and preparedness before the hurricane, their experiences of the hurricane, the decisions that drove them to relocate, and resettlement in their new locations in the initial months following the hurricane. In so doing, we provide a holistic picture of climate-related migration triggered by exposure to a sudden onset shock from the perspectives of climate migrants themselves. Such first-person accounts can provide valuable information regarding “what works” and “what does not work” in terms of disaster management, policy, and resources to welcome and support climate migrants in their settlement communities.

## 2. Materials and methods

### 2.1 Context and Setting

The focus groups described in the present study were conducted in April 2018, approximately seven months after Hurricane Maria hit Puerto Rico. This is a time period where people might still be experiencing crisis and just starting the long process of recovery while resettling in their new environments (Fothergill and Peek, 2006, Browne, 2015, Adger et al., 2018, Tierney and Oliver-Smith, 2012). The South Florida focus groups were conducted at a community centre in Wynwood, a historically Puerto Rican area of Miami. The Central Florida focus groups were conducted at a church facility south of Orlando, in Kissimmee, near where many of the Maria survivors were being housed in hotels by the US federal agency responsible for disaster management, the Federal Emergency Management Agency (FEMA). At both sites, community partners reached out to hurricane survivors whom they had helped and invited them to participate in a focus group.

Qualitative research methods were employed to engage Puerto Ricans displaced by Hurricane Maria in critical discussions exploring the storm's impact, as well as disaster preparedness, response, and barriers to perceived recovery (both in Puerto Rico and among Puerto Ricans who migrated to the U.S. mainland). The focus group script and questions were developed collaboratively by the study team and content experts to assure the appropriateness of the prompts. Questions included in the focus group script were designed to elicit information about local and family preparedness, motivations for relocation, perceptions of response and recovery efforts, barriers to recovery, and post-migration experiences in Florida. A set of prompts was used to guide the focus groups around these areas, and participants were encouraged to speak at length following each prompt.

## 2.2 Data

The present study was approved by the Institutional Review Boards from Boston University, the University of Miami, and the RAND Corporation. Four focus groups were conducted in Spanish by the research team in April 2018, with two groups held in South Florida and two in Central Florida. Focus groups were conducted by two bilingual university researcher co-authors and observed by RAND staff.

A respondent-driven sampling (RDS) approach was employed to recruit participants. Specifically, seed participants were recruited through community partner organizations, and each participant was asked to refer additional participants from their social networks (with \$30 incentives provided for successful participant referrals, up to three per participant). RDS is a commonly used approach for recruiting hard-to-reach populations and populations for which an exhaustive list cannot be identified (Johnston and Sabin, 2010). Several community centres and religious organizations working to support displaced Puerto Ricans were contacted to assist with recruitment. Groups were scheduled at times and places that were convenient for participants. In Miami, groups were held at a community centre located in the city's Wynwood area, which has traditionally been a Puerto Rican enclave. Our research team worked with the leadership of the community centre to identify and contact participants, and to invite them to attend focus groups. In the Orlando area, focus groups were held at a local church facility. Church leadership helped to recruit participants in collaboration with a recent Puerto Rican migrant who had emerged as a leader among the city's new displaced Hurricane Maria survivor population. During each group, refreshments were provided, and following the Orlando area group, a community meal was served.

At the beginning of each group, the purpose of the study was described in detail, and informed consent was obtained. Groups were capped at nine members each to allow for a flow of conversation within a two-hour time frame. At the beginning of each focus group, the facilitator explained the purpose of the group, as well as potential risks and benefits associated with participation. The facilitator also explained that participation was voluntary, informed participants of their right to leave at any time if they wished, answered participants' questions, and encouraged the group to be mindful of the importance of confidentiality. After reviewing these ground rules, the facilitator requested permission to record the discussion. Each focus group meeting was between 1½ and 2 hours. As a

recruitment device and to compensate them for their expertise, participants were provided with a \$75 gift card for taking part in the study.

### 2.3 Participant Characteristics

Table 1 ( $N=36$ ) is a breakdown of participants by group. Participants were from urban and rural areas across Puerto Rico who had migrated to Florida following hurricane Maria and its aftermath. More women (24) than men (12) participated in the focus groups, and most participants had been in Florida between 4 and 6 months, with a range of 1 week to 6 months.

### 2.4 Analytic procedures

Each session was recorded and transcribed. A systematic content analysis was performed by the authors. This analysis involved identifying, labelling, and categorizing the data by question, followed by thematic analysis aimed at developing themes inductively from the data. We used an inductive analysis approach to help ensure our results captured the views of FGD participants themselves and because of the limited existing research on the experiences of climate migrants in new locations. Transcripts were coded in Spanish to ensure that the meaning of the text remained intact throughout the coding process. The coding was then compared across coders, and a logical analysis was performed by looking for patterns of differences and similarities among the data themes and between the South and Central Florida sites.

To develop the discussion and policy recommendations, we drew on collaborations with the South Florida Puerto Rican Chamber of Commerce, the Hispanic Federation of Florida, and other partners in South and Central Florida. In particular, the academic researchers began collaborating with a member of a faith-based organization and community partner involved in supporting the Puerto Rican migrants in Florida, father José Rodríguez of the Episcopal church in Orlando, who is now a member of our team and a co-author on the article. These organizations and partners were briefed on the contents of the focus group discussions and were asked for their input in terms of recommendations for preparing for future storms and for welcoming climate migrants to mainland US communities. We chose this coproduction approach because it can often be helpful for developing useful research results in a way that is meaningful for risk reduction (Meadow et al., 2015, Mercer et al., 2008, Wall et al., 2017).

## 3. Results

### 3.1 Before the hurricane: preparedness and mitigation in Puerto Rico

Participants described a culture of preparedness in Puerto Rico and how they enacted some basic level of preparedness ahead of hurricane Maria and thought that most other Puerto Ricans did as well. They highlighted how preparedness was a deeply engrained in their communities, in part because of the history of hurricanes in the region. One participant in central Florida described how “when you are living in a tropical country, we need to be ready for hurricanes.” Preparedness was thus the norm: “this is common, this is our culture. The houses get prepared, the wooden roofs get tied down with rope, tied down with chains, with whatever shows up” (Central Florida). This norm had a long history: “I remember

from my childhood with my family. I remember what we did with my grandparents” (South Florida).

Despite a culture of preparedness in Puerto Rico, not all households prepared fully for hurricanes. One factor inhibiting preparedness were costs. Stocking up on food, water, candles, gasoline, and other supplies was a financial burden that not all could afford. One respondent described how in a place like Puerto Rico where the economy is “very precarious” people often would “wait a little longer until they get a little money and then look for the tools that are most cost effective before the arrival of the hurricane” (Central Florida). Another factor were miscommunications. Hurricane warnings could be followed by storms with limited damage, so people lost faith in the warnings. “Sometimes they say a really strong storm is coming, but, when it gets here, it’s nothing. So, people mistrusted [the warnings]” said a participant in South Florida. Those with clear memories of major hurricanes tended to be more receptive to warnings – mostly older participants that had lived through Hurricanes Hugo (1989) and/or Georges (1998).

Participants thought that the Puerto Rican government was not living up to its responsibility to ensure Puerto Rico was resilient to hurricanes. Roads, power, water, and other essential critical infrastructure were poorly maintained and brittle. Hurricane specific preparedness measures were few and far between and varied across communities. Some described how rural communities could be particularly vulnerable to hurricanes. For instance, one participant described the problems with energy infrastructure in rural areas:

They [rural people] are used to not having power for a few days, or water, because, if there is no electricity, there is no water because the water pumps do not work. So, they are used to it. They see it like something normal. They already have to have a generator, or some other way to maintain hope that the power will come back as soon as possible. It could be a day or it could be a few hours, so before Irma they were used to it. With Irma it got worse, and with Maria it ended. With Maria the power poles fell because they were not maintained, because of bad infrastructure. (South Florida)

Many participants thought government failures were rooted in corruption. “Politics! Politics! Politics for everything! For the mayor of Adjuntas, if you were part of a different political party than his, you would not get water or food. And that’s it, no water or food,” said a participant in central Florida, expressing their frustration at a patronage-based political system. Corruption was viewed as an irresponsible dereliction of duties. “What happens is that they are irresponsible, let’s be sincere, they have stolen, and continue stealing. That is what happens,” stated a participant in south Florida.

### 3.2 The response to the disaster

All focus group participants believed that their own efforts to prepare were inadequate for hurricane Maria – labelled “the destroyer,” by one discussant. The hurricane was overwhelming. “Even if we did have an emergency plan, it doesn’t matter because we can have a plan for one day or two days but the rest of the days without power or water—you can’t deal,” said one participant. Other participants told similar stories. “Regardless of how much storm protection you had, how much food, how much gas, you were never going

to be as prepared as you needed to be, because this hurricane was a catastrophe,” said a participant in South Florida. “To survive what happened, I think nobody is prepared. . . .It’s something that, regardless of how much they tell you, you are not prepared,” said another. One stated simply “To prepare us for a cyclone or a Category 5, no.” Another participant offered context by describing how they had stockpiled gasoline, water, and other supplies ahead of the hurricane. She was “the daughter of a military man” and her father “always prepared us.” But after a week without power, she had run out of fuel to run her generator. She went to wait in line at the gas station, but “after 6 hours, I had to leave because there was no more gasoline.”

Participants described how corruption exacerbating problems during the response. Some were upset to see images in the media of rotting food and resources that never made it through to people in need, linking these failures to corruption. “People are trying to help you from other places. Why are there pictures on social media of the food with flies around it? Why didn’t they let the food through? Because it’s all about money. Because you have to make money from everything,” said a respondent in South Florida. Others talked of storm-related price gouging. “Nobody has enough money to spend on food, it gets really expensive. And the materials, they raise prices on those too,” said another South Florida participant, commenting on how stores would raise prices around the storms. “Everything goes up. A candle, we would buy a simple candle at \$0.75, but they would put it at \$2.50 and \$3.00 during and soon after [hurricane season],” remarked a respondent in Central Florida.

Implicit in these statements is an assertion that household-level efforts to prepare for hurricanes were simply not sufficient for a catastrophe of Maria’s magnitude and duration in the context of Puerto Rico’s dilapidated infrastructure, limited preparedness, and governance challenges. To address a storm of Maria’s magnitude in a territory so vulnerable to disaster more work needed to be done at higher levels beyond the household, from strengthening infrastructure to addressing corruption. Efforts should also target households, including local outreach and education related to how to prepare, where to go, and who to call in case of an emergency. “I think that [local government officials should] go door to door and talk to people,” to “create a group or dialogue within families,” offered one participant

### 3.3 The decisions to relocate

Our focus group participants described leaving Puerto Rico for an array of reasons. These included economic problems and disruptions in work, worsening physical and mental health and challenges accessing health services, disruptions to continuing education, and issues related to safety and crime. Few wanted to leave Puerto Rico before hurricane Maria hit. Despite the island’s very serious difficulties they had a good life. “Why would I leave my beautiful island?,” said one participant. Far from wanting to leave, they described being forced to relocate. “We have no other choice,” said another.

The post-disaster environment made staying in Puerto Rico extremely difficult. Waiting in lines from morning until night to access water and gas placed tolls on the body and mind, as did long wait times at hospitals and challenges access to vital medications. Stress was pervasive. It was mostly related to survival – trying to secure basic necessities such as food and water, working to access education and health services, and avoiding crime and

safety issues. It placed a toll on people's health. "After 30 years living without epilepsy, my epilepsy came back. The level of stress was so strong. I lost my job, my house, my car, everything," said one respondent in south Florida. Many described feelings of despair. Being "surrounded by death," as one respondent put it, placed a toll on the mind. Parents worried about their children's safety and wellbeing – children with disabilities no longer able to critical resources and services, school closures and disruptions to education, and potential trauma from conditions on the island.

Many participants left Puerto Rico because of these stress and health issues. One participant described how they had a heart attack after the hurricane and struggled to secure a plane ticket to the US mainland for open heart surgery. After they managed to get a ticket, "I said 'thank God' because if I would have stayed in Puerto Rico I would not have lived to tell the story." While participant left because of their physical health, others left for their mental health. "I would see my mom so frustrated and crying every single day—all she would do is cry and cry. I told myself, I can't do this. I can't do this. I need to get out to do my own things and do something to help my mom," stated one participant, who left the island for her own mental health and the health of her mother. Parents also.

All participants framed *why* they moved as driven by push factors related to the disaster, but *where* they moved as motivated by pull factors. Pull factors included family ties, educational opportunities, Florida's tropical climate, its high numbers of Puerto Ricans and Spanish speakers, and the area's Latin culture. Participants in one Central Florida group had made plans to move ahead of the hurricane; for them the storm was a catalyst for action. "The hurricane gave the final push. Gave the push for us to say, 'Okay, let's go and see what we can do in Orlando,'" said one participant in this group. Most of these participants were from rural areas, many had family members in Florida and had previously lived on the US mainland. "In Puerto Rico they didn't give me any services for him... So, I said I would leave around October. I told him [my husband], 'You go first and get settled and then I will come,'" said another member of this group.

### 3.4 After relocation: Accessing services and benefits

Participants faced obstacles after relocating to Florida. Table 2 summarizes the main ones.

The table shows the breadth of challenges that participants faced – everything from accessing education, healthcare, and other essential services to securing stable employment. Some of these challenges were specific to the infrastructure around the emergency; many described problems navigating FEMA and dealing with its bureaucracy, especially its temporary housing program which was placing survivors in hotels and in a state of flux. Others, such as accessing education and securing transportation, could occur after any move to a new location.

These challenges were also tightly interlinked, with problems in one area leading to challenges elsewhere. Many participants, for instance, described how they had a difficult time securing employment, accessing appropriate education and health services, and even faced outright discrimination because of their limited English-speaking abilities. In turn, this made it harder to access other crucial services necessary for beginning the recovery process.



Without a steady source of income, it was hard to save up for a security deposit to rent an apartment. Uncertainty related to FEMA's temporary housing program, a housing issue, also made longer-term planning difficult. Collectively, these problems could potentially leave households 'stuck' in extreme precarity and a state of emergency.

As they were navigating this new landscape, participants also tried to maintain connections with friends and family back in Puerto Rico and keep informed about the island's recovery. They reported communicating with family and friends using Facebook, WhatsApp, and other social networking sites, and watching television news to keep abreast of the ongoing recovery on the island. Although they missed their families and their island and faced many different challenges in their new location, few were actively trying to return to Puerto Rico. "I want to stay here because I like it more than over there, and I know I have more opportunities here. I got here and, a week later, I had a job... there are more opportunities here, and I see a brighter future for myself here," said a participant in South Florida. Others agreed. Despite the difficulties and the comforts of home, there were too many problems on the island to return to.

### 3.5 Coping and hope after relocation

Relocating was challenging, but respondents also cited reasons for hope and resources for coping. These are summarized in Table 3.

Just like the many challenges that they faced in their new environment, there were many reasons for coping and hope. These included religious faith and support received from religious organizations; mutual assistance that Puerto Ricans provided to each other; and a sense of optimism and overall hope for the future.

Across all focus groups, participants repeatedly identified religion and faith in God as a key supportive factor. God was a constant, counterbalancing their uncertainties. "You don't know what will happen tomorrow, if you're going to be on the street tomorrow or if you will have food," remarked one respondent on why their faith was important. "He has never failed and will never fail you," said another, in a similar statement.

Many also expressed profound gratitude for the support they received from religious groups, community organizations, and schools, and from individuals – Puerto Ricans who had moved after the hurricane and more established members of the diaspora community, and non-Puerto Ricans. These individuals and institutions provided valuable material supports ("book bags, clothes, and shoes"), similar to other institutions like FEMA, but did so in a way centred on comfort and care. These sentiments are reflected in statements on the significance of mutual aid ("The important thing is helping each other") and assessments of relations ("[w]e are family" and "she was like a grandma").

Participants felt hopeful about the future, partly because of the support provided by these individuals and institutions. Areas for hope included the wellbeing of their families, their ability to find meaningful work with adequate compensation, and a future with stable, affordable, housing. Some also expressed hope for Puerto Rico. "I think my hopes are also for the Puerto Rican people, that they have strength, that they get better, that they open their

eyes and get out of the monotony that they have [been in] for many years,” said a participant in south Florida. While many offered their hopes for the future, they also noted pain in the present. A statement from a respondent in South Florida illustrates this sentiment: “I have hope for my family... my grandparents, and even though I was taking care of them, I have the hope that they will be okay and I know they will be okay. It hurts. It hurts a lot not being around family, but I have the hope they will be okay.” Maria and its aftermath was also a potential opportunity for change for the better while also continuing to impose incredible hardships.

#### 4. Discussion

This article complements existing demographic research on how climate change-related shocks and stresses shape patterns of migration (e.g. (Hinojosa and Meléndez, 2018, DeWaard et al., 2020, Santos-Lozada et al., 2020, Acosta et al., 2020, Alexander et al., 2019, Martín et al., 2020) by offering evidence on what actually happens to climate migrants in the immediate period after migration following disaster. The Puerto Ricans in South and Central Florida displaced by 2017 Hurricane Maria that we spoke to described many factors shaping their experiences of the hurricane, influencing their decisions to migrate, and impacting their resettlement in Florida. These included problems with preparedness and to the island’s economy, infrastructure, and social service systems; disaster-related traumas; and navigating new environments and their available resources to re-establish semblances of ‘home.’

Focus group participants understood their experiences as not just an outcome of the storm itself, but a product of broader social issues in Florida and on the island – decaying infrastructure, widespread corruption, views of Puerto Ricans as second-class citizens, etc. Their views are consistent with disaster scholarship showing that it is human decisions that create the conditions that turn mere *hazards* into a major *disasters* (Wisner et al., 2004, Oliver-Smith et al., 2017, Kelman, 2020), including ongoing research on how Hurricane Maria evolved into an “(un)natural disaster” (Garcia-Lopez, 2018) through processes grounded in colonialism, exploitation, and other acts of marginalization (Moulton and Machado, 2019, Rodríguez-Díaz, 2018, Cortés, 2018, Robinson et al., 2022, Sou, 2022).

The social factors shaping the experiences of the Puerto Ricans we talked with have a long tail: underinvestment in Puerto Rico’s infrastructure and social services has been going on for decades as has the discrimination against the island and its people. Thus, the disaster should be conceptualized as a gradual *process* of vulnerability creation, not an acute *event* of hazard realization. This aligns with other vulnerability-centred understandings of disaster as process, such as the Oliver-Smith (2012) accounting of the “500 year earthquake” that struck Haiti in 2011, Horowitz (2020) expansive 100 year history of the events leading up to 2005 Hurricane Katrina, and research linking Hurricane Maria to Puerto Rico’s (still ongoing) colonial history (Cortés, 2018, Garcia-Lopez, 2018, Rivera, 2022). For our focus group participants, the disaster of Hurricane Maria began well before the storm hit Puerto Rico and continues to unfold in Florida, where Puerto Ricans continue to live in emergency, facing challenges accessing stable housing, employment, healthcare, and other basic essentials.

Thus, social vulnerability is central to the experiences displaced by Hurricane Maria. Although a changing climate is exacerbating the frequency and intensity of hurricanes, social processes – not climate change – should be blamed for this disaster (Raju et al., 2022). As such, discourses that focus on climate change as the mechanism for migration and for the suffering that it causes should be questioned and expanded (Kelman, 2019, Boas et al., 2019, Farbotko and Lazrus, 2012). If framings of climate migration are to be used, they should be advanced in the context of vulnerability with aim towards justice and rights for those displaced and at risk.

The participants that we spoke with also emphasized that their needs not just physical, and included (typically overlooked in practice (Sou et al., 2021, Wilkinson, 2018)) issues related to social wellbeing, and mental health, and community connectedness. In her study on Hurricane Maria survivors in Puerto Rico Sou et al. (2021) identifies “homeliness, comfort and daily household activities” as just as critical as rebuilding roads, buildings, and other physical infrastructure. In our study, Puerto Ricans in Florida expressed similar views, describing how they longed for the comfort of their “beautiful island” and greatly valued the emotional support and comfort provided by individuals and organizations in Florida. Their feelings of loss of place and need for community connectedness is not anomalous, but is instead common for migrants displaced by crisis (Adger et al., 2018, Agyeman et al., 2009, Fresque-Baxter and Armitage, 2012, Burley et al., 2007, Bornstein, 2017, Vos et al., 2021, Parks, 2022, Chamlee-Wright and Storr, 2009). These findings suggest that for climate migrants to recover, emphasis must be placed on (immaterial) social and community dimensions of recovery, not just (material) dimensions of housing, livelihoods, and essential services – potentially provided in their new location or by providing the conditions necessary for returning home.

Participants described government agencies as by and large inattentive to these immaterial needs. Instead of offering comfort and hope, the Puerto Rican government was viewed as inept at best and corrupt at worst, while FEMA was source of anxiety, creating uncertainties in a period of instability. Their experiences align with other studies on FEMA, a source of stress for other disaster survivors (Reinke and Eldridge, 2020, Clark-Ginsberg et al., 2021, Browne, 2015), research on the federal response to Hurricane Maria, critiqued as inadequate (Sou, 2022, Cortés, 2018, Garcia-Lopez, 2018, Brown et al., 2018), and governance failures on the island itself, partly related to the island’s status as a colonial territory (Straub, 2021, Robinson et al., 2022, Rivera, 2022). While offering certain resources and supports, these institutions disaster risk creators (Lewis and Kelman, 2012, Wisner and Lavell, 2017, Peters, 2021), exacerbating hazards and propagating vulnerability social wellbeing and mental health.

In contrast, the emergent and spontaneous responses from individuals and community groups, as well as more pastoralist institutions (schools) were praised for both the material resources and the emotional comforts that they provided. Two of the most important resource providers for Hurricane Maria survivors in South and Central Florida, respectively, were the South Florida Puerto Rican Chamber of Commerce and the Episcopal Diocese of Central Florida. This extends well-established research on the centrality of emergent responses during disaster (Twigg and Mosel, 2017, Drabek and McEntire, 2003) beyond the

geographic origin of the hazard to the population in need – emergent responses occur where the people are, not where the hazard hits – and to the immaterial – for emergent response, what matters is providing the support that is needed, regardless of the nature the needed support. This speaks to the importance of support that local agencies and institutions that can provide this sense of hope and wellbeing, and finding ways of identifying and working with ones that might be outside of the geographic epicentre of the disaster.

Although the Puerto Rican hurricane survivors in our study described many elements of hardship, they also expressed feelings of hope. Part of that hope lies in the many resources that Puerto Ricans we talked to were able to access to survive and transform in their new locations, from individual elements related to faith, to interpersonal connections with others, to friendly and supportive community and educational institutions. Hope has been found to be a powerful inoculator against negative coping and the emergence of post-traumatic stress disorder following Hurricane Maria (Ai et al., 2022) and also speaks to the idea that Puerto Ricans were not mere victims of the storm, but survivors with agency, working to strategically leverage their resources in recovery.

Not all emergent responses, however, were positive. Puerto Ricans relocating in Florida experienced discrimination and tensions with non-Puerto Ricans and members of the Puerto Rican diaspora community alike. These tensions have been found following other mass migration events (Aukot, 2002, Kumssa and Jones, 2014), including disaster-related events, such as 2005 Hurricane Katrina where race-tinged tensions emerged in Houston following influx of Katrina survivors to the city (Palinkas, 2020, Warren, 2012). When situated with positive emergent responses that Puerto Ricans also experienced, our study provides an illustration of the complexity of communities and their institutions and points to the need to avoid both romanticizing communities as silver bullet solutions for climate migration and avoiding dismissing them as insignificant (Faas and Marino, 2020).

In sum, the complex and socially produced nature of the disaster and the recovery process that our focus group participants described is somewhat unsurprising when examined from a perspective of vulnerability theory and the social production of risk. Over many decades (Wisner et al., 1977, Wisner et al., 2004), disaster scholars have developed a substantial body of work showing that vulnerability is a context specific outcome of daily activities that are embedded within deeper and longer-term institutional processes driven by multi-levelled political and economic ideologies that limit some groups' access to power, structure, and resources (Wisner et al., 2004). Ultimately, human decisions create vulnerability, exposure to hazard, and the capacity to deal with crisis and recover adequately.

Given the alignment of our study's findings to established scholarship on the social production of risk, populations marginalized in ways similar to our study's participants might experience similar mobility outcomes when exposed to climate change-related shocks and stresses. Many communities across the Caribbean basin remain without adequate early warning systems and preparedness capabilities in the context of underinvestment infrastructure and corruption. Beyond the Caribbean social vulnerability remains frustratingly high, and risk creation continues to outpace risk reduction (UNDRR, 2022, GNDR, 2022). However, how vulnerability interacts with hazards to shape disaster is highly place specific

and studies on climate migrants remain limited. Future work should continue to examine what happens to people displaced by climate change in different cases and contexts, utilizing social vulnerability a key variable for consideration.

The present findings have implications for researchers and policymakers. Researchers working to understand climate-related migration can benefit from adopting a broader perspective on impacts that go beyond economics and built structures to focus on psychological, social, and community-based dimensions of well-being. Rather than reinventing the wheel (Mercer, 2010), efforts to understand the underlying reasons for multiple dimensions of well-being (or lack thereof) among climate change migrants can draw on existing research within disaster studies on the social construction of risk. They can do so by moving away from disaster-as-event to disaster-as-process framings focused on understanding how vulnerability is produced, how it manifests as crisis for climate migrants, and how it can be mitigated. Tools such as Forensic Investigations of Disasters can be employed to potentially unpack this disaster creation process and identify risk reduction solutions (Oliver-Smith et al., 2016) while frameworks such as the Pressure and Release Model (Wisner et al., 2004) can ground localized expressions of vulnerability to global processes. Policymakers can similarly draw on this work to inform interventions – focusing on the broad needs required for recovery provided by both formal and informal structures, while aiming to address the underlying causes of vulnerability across the scales that they manifest.

Given the centrality of social processes shaping disaster and recovery processes for climate migrants, researchers and policymakers might also benefit from approaching their work from a ‘community-centred’ perspective. For practitioners, forms of community-based disaster risk reduction and management (Shaw, 2016, Maskrey, 2011) and climate change adaptation (Ayers and Forsyth, 2009) might be particularly important. From this perspective, efforts could focus on revising critical municipal and national disaster response and recovery policies to account for climate change related migration in ways that include critical community voices and institutions (Wilkinson et al., 2016, Blake et al., 2021, Sabastianski, 2020). Researchers can similarly engage in ‘co-production,’ working with policymakers and affected communities to identify relevant research questions, carry out research, and produce meaningful results (Meadow et al., 2015, Mercer et al., 2008). Such approaches have been applied in Puerto Rico to help understand recovery needs (Saum-Manning, 2021). Essentially, the primary task is for researchers, practitioners, and community partners to work together to create environments and support systems where climate migrants can adjust and thrive in their new contexts.

## 5. Conclusion

The present study is one of the few studies to examine how communities displaced by climate change related hazards experience disaster and recover in their new locations. Drawing on focus group discussions with Puerto Rican migrants, we find a complex set of factors creating the conditions for disaster and displacement, as well as shaping recovery trajectories. We use this information to argue that the impacts of climate change related migration are broadly the products of vulnerability, and that these impacts can be understood

perspectives developed in disaster studies on the social construction of risk and disaster as process. Researchers and policymakers can operationalize these ideas of disaster as process and social vulnerability through community-centred approaches that treat climate change migrants and organizations that serve them as equal and valuable partners in research and practice.

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**Table 1.**

South and Central Florida Focus Group Discussion Participant Characteristics

<b>Group Number</b>	<b>Location</b>	<b>Number of Participants</b>	<b>Female</b>	<b>Male</b>
1	Central Florida	9	5	4
2	South Florida	9	7	2
3	South Florida	9	6	3
4	Central Florida	9	6	3

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**Table 2.**

Challenges for migrants in South and Central Florida

Theme	Illustrative Quotations
(1) Housing Costs and Access	<p style="text-align: center;"><b>Housing Costs</b></p> <p><i>I think that, if in Puerto Rico, they got the news of how Florida really is, then maybe so many people would not have come because they would know the cost of the apartments, and all the problems we're facing, and the many Puerto Ricans who are out on the street, and how all of this is going. (Central Florida)</i>  <i>[Housing] is too expensive. I live in a 1 bedroom. It costs \$1100 [per month] ... we only get social security. (South Florida)</i>  <i>[To secure an apartment] they charged us the rent, two month's deposit, and 1-month security. So, if the apartment was \$1200 or \$1300 it was \$4000 [total]. (South Florida)</i></p>
	<p style="text-align: center;"><b>Access / Section 8</b></p> <p><i>Florida has helped Puerto Rico the least. Boston gave Section 8 [housing] to everyone that came from Puerto Rico. This state is the only one that denied Puerto Ricans [the right] to look for housing like American citizens because this is the position we have. (Central Florida)</i>  <i>The thing is, here in Kissimmee there are a lot of Puerto Ricans [for a small city]... if you go to Miami or Tampa, you don't see so many Puerto Ricans like in Kissimmee. In Orlando they give Section 8, in Tampa they give Section 8, in Miami they give Section 8. It's just in Kissimmee [where] the population is so big that they can't give Puerto Ricans Section 8. (Central Florida)</i></p>
(2) Employment / English Language Limitations	<p><i>We all understand that we are in another country, but the language and the requirements in the work realm ... you have to be fully bilingual, fully, fully, fully, and that is the barrier. (Central Florida)</i>  <i>For me, it's English, that has been a barrier. I am working in home care, but over there I worked in a hospital and all my certifications are advanced... even though I am licensed here in the state of Florida, I don't have what's most important in order to work in a hospital [English]. (South Florida)</i></p>
(3) Education	<p><i>Here they are giving her a teacher only in English, and the teachers aren't allowed to speak in Spanish to the students, so when she comes home and I have her do her homework, we look online to find out what it means and I prepare her. But then, when she takes a test, she fails because the test is in English. This creates children who are insecure... I think that's a failure of the system. (South Florida)</i></p>
(4) Transportation	<p style="text-align: center;"><b>Transportation Challenges</b></p> <p><i>With public transportation here, it can take you two hours to get where you want to go. (Central Florida)</i>  <i>If you don't have a way to get around, or you don't know how to get around, you're not going to get very far here. (Central Florida)</i>  <i>I want to look for a job, but the jobs I found are 15 minutes away [in a car] and paying for an Uber will cost me \$16. (South Florida)</i></p>
	<p style="text-align: center;"><b>Registration and Insurance</b></p> <p><i>Another thing also is, when you do have a car, the first time you register a car in Florida and insure it, it's too expensive... I lost a job because of transportation (Central Florida)</i>  <i>Since I was 16, I have had a license, but not in Florida...it doesn't count [So, the insurance goes up because you don't have experience in Florida]. (Central Florida)</i></p>
(5) Discrimination	<p><i>If you know a little [English], you can defend yourself. At least I went to interviews and I characterized myself maybe as bilingual because I speak it [English], I understand, I speak it... [however] I've been denied in the interview because ... of [my] accent. (Central Florida)</i></p>
(6) Perceived Lack of Empathy and Impersonal Responses from FEMA	<p><i>How can FEMA [throw us out of housing] now after 6 months? Maybe extend [the voucher program] until June for people with children in school. (Central Florida)</i>  <i>Two days before, they [FEMA] took away the voucher, two days before March 20<sup>th</sup>.... when I checked with the hotel, they said that FEMA took away my voucher. I called FEMA, and they said my house is now habitable, and I asked them, "But how? There is no electricity or water." (Central Florida)</i>  <i>I have to pay attention to [my son] 24/7 because he has mental retardation and needs to be supervised... [FEMA doesn't] understand. They tell me, "Why can't you work?" And it's not that I don't want to, it's who will watch my son? These are situations where, if I had some family here, then it would be a little easier and I could work in peace. But I don't have anyone (crying). (Central Florida)</i></p>
(7) FEMA-Related Uncertainty	<p><i>FEMA informs you that you have a deadline ... for us ... they are paying for our hotel. Well, they tell you, "Okay you are extended, but you have this amount of time." [So] you live day after day, you can call to see if they extend you or not, you understand?... That is an uncertainty... and you live that way, day to day. (Central Florida)</i>  <i>[FEMA has] not followed through with us who were real victims from a devastating situation where we were left without homes, without food, without jobs, without health. (Central Florida)</i>  <i>The pressure [of not having stable housing] makes us ... I know of a suicide case. I know of another one where he wanted to commit suicide... beginning again and having a life like we are thinking of, a near future with new hopes, let's [make a plan], but that is not now. That does not exist in a group of people living in hotels. (Central Florida)</i></p>

Theme	Illustrative Quotations
(8) Balancing Change & Expenses	<i>Coming here, in the area we are in, it is expensive, especially because we have to keep paying the house in Puerto Rico. Maria took everything but the debt. My husband has to work really hard to pay for both sides, and it's too expensive. (South Florida)</i> <i>Once you move into your own place, your way of thinking changes. You have to start thinking about stretching your dollar. I now have two jobs, a full-time job in an ambulance and a part time job as a paramedic somewhere else ... sometimes I come out of a 24-hour shift, go home, sleep 2 hours, and go back to work again. (South Florida)</i>

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Table 3.

## Sources of support for migrants in South and Central Florida

Theme	Illustrative Quote
(1) Religious faith	<i>[I] pray a lot to God for strength and resilience and patience to listen and to deal with every day because you need faith... That is [our] priority, faith, because you don't know what will happen tomorrow, if you're going to be on the street tomorrow or if you will have food. (Central Florida)</i> <i>We have to pray for our community and for humanity. Like my [friend] here says, I have to be grateful to God ... God has wed me, has dressed me, he has never failed, and will never fail you (crying). (South Florida)</i>
(2) Community and educational institutions	<i>I am not missing any food, because everywhere you go there is a church giving you food, clothes. ... Look, go to a church, they give you new clothes, sneakers. In the school, thank God, they gave them everything, clothes, underwear, everything when they got there. (Central Florida)</i> <i>The thing is they [schools] have given [children] book bags, clothes, shoes. What we had in Puerto Rico, we have now because so many places, churches that help with food and things. (Central Florida)</i> <i>[At his school], my son is seeing a psychologist because he went through the hurricane and he was awake. At least the school has been a blessing because he has a social worker and a therapist. (Central Florida)</i>
(3) Non-Puerto Ricans	<i>I am 19, so when my friend and I got here, we met a woman at the hospital in Fort Lauderdale, they were helping Puerto Ricans so we went...she was like a grandma...she helped us a lot, she drove us back to school, bought us food, a few days later she picked us up and took us to have breakfast, took us to Dollar Tree to buy things, bought me Kotex, things I needed, medicine. (South Florida)</i> <i>I get to Miami [and] I meet a woman named Marisol in October. Back then I had nothing... Marisol lent me clothes... They had to buy me basketball shoes, some person I don't even know... The thing is, I came with nothing and, thank God, here everything has been given to me. People I don't even know have helped me. (South Florida)</i>
(4) Puerto Ricans	<i>Vanessa and I met here after the hurricane, and we have become like sisters. In fact, she is my roommate, and between all of the Puerto Ricans we have helped each other so much. If I don't have something but she does, and if she does not need it, she gives it to me. Between all of us, we are trying to help and trying to move ahead. (South Florida)</i> <i>I went to my friend's house the other day and I asked her what she was doing, and she said, "I'm working on this thing—come look." So, I went to look and we figured it out together. We all learn a little of everything. The important thing is helping each other. (Central Florida)</i> <i>The Puerto Rican community in this area helps each other because we are family. In the neighbourhood there are people from Dominican Republic, Cuba, and they help orient me. (Central Florida)</i> <i>[On] Facebook there are a lot of Puerto Rican groups... I am in a few so I can orient myself. They post jobs, help, apartments—that's where you get information and give it. (Central Florida)</i>