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PEOPLE ON THE MOVE

STRENGTHENING ADAPTATION RESPONSES TO SUPPORT HUMAN MOVEMENT IN A CHANGING CLIMATE

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ACRONYMS

AAA  Adaptation Action Areas
ASAL  Arid and Semi-Arid Lands
BCCSAP  Bangladesh Climate Change Strategy Action Plan
CDCS  Country Development Cooperation Strategy
COP  Conference of the Parties
DRR  Disaster Risk Reduction
EPA  Environmental Protection Agency
FEMA  Federal Emergency Management Agency
FEWS NET  Famine Early Warning Systems Network
GDP  Gross Domestic Product
GHG  Greenhouse Gas
GOB  Government of Bangladesh
GOF  Government of Fiji
IDMC  Internal Displacement Monitoring Centre
IDP  Internally Displaced Persons
INDC  Intended Nationally Determined Contribution
IOM  International Organization for Migration
IPCC  Intergovernmental Panel on Climate Change
KNOMAD  Global Knowledge Partnership on Migration and Development
MECC  Migration, Environment and Climate Change Division (within IOM)
MECLEP  Migration, Environment, Climate Change: Evidence for Policy
NAP  National Adaptation Plans
NAPA  National Adaptation Programmes of Action
NDC  Nationally Determined Contribution
NOAA  National Oceanic and Atmospheric Administration (US)
NRC  Norwegian Refugee Council
OCD-DRU  Office of the High Commissioner of Human Rights
PCCSP  Pacific Climate Change Science Program
SALT  Sloping Agricultural Land Technology
SDG  Sustainable Development Goals
SIDS  Small Island Developing States
UN ESCAP  United Nations Economic and Social Commission for Asia and the Pacific
UN FAO  United Nations Food and Agricultural Organization
UNFCCC  United Nations Framework Convention on Climate Change
UNHCR  United Nations High Commission for Refugees
UN ISDR  United Nations International Strategy for Disaster Reduction
**GLOSSARY**

**Adaptation**: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects (IPCC, 2014).

**Circular migration**: Repetitive migration (whether internal or external) including temporary (stays exceeding a year) and/or seasonal (stays of less than a year) (Dayton-Johnson, 2007).

**Climate change**: A change in climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or variability of its properties, and persists for an extended period, typically decades or longer. These changes over time can be due to natural variability or as a direct or indirect result of human activity (IPCC, 2014; Rigaud et al., 2018).

**Climate variability**: Climate variability refers to variations in the mean state and other statistics (standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability) (IPCC, 2014). See “Climate change” above.

**Climate migration**: The movement of a person or groups of persons who, predominantly for reasons of sudden or progressive change in the environment due to climate change, are obliged to leave their habitual place of residence, or choose to do so, either temporarily or permanently, within a State or across an international border. (IOM, 2019b)

**Displacement**: Forced movement or removal of persons or persons obliged to leave their places of habitual residence as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights, or natural or human-made disasters (IOM, 2019b).

**Extreme weather event**: An event that is rare at a particular place and time of year. Definitions of rare vary, but an extreme weather event would normally be as rare as or rarer than the 10th or 90th percentile of a probability density function estimated from observations. By definition, the characteristics of what is called extreme weather may vary from place to place in an absolute sense. When a pattern of extreme weather persists for some time, such as a season, it may be classed as an extreme climate event, especially if it yields an average or total that is itself extreme (e.g., drought or heavy rainfall over a season) (IPCC, 2014).

**Environmental degradation**: A reduction in the capacity of the environment to meet social and ecological needs and objectives through the depletion of natural resources such as air, water and soil; the destruction or disruption of ecosystems and habitats; extinction of wildlife; and pollution caused by both natural and human influences (UNISDR, 2004).
**Hazard:** The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources (IPCC, 2014).

**Hotspot:** A geographical area characterized by high vulnerability and exposure to climate change (IPCC, 2014).

**Immobility:** Inability to move from a place of risk due to a lack of capital (social, economic, political and/or financial); or not moving away from a place of risk due to personal choice (adapted from Rigaud et al. 2018; Foresight 2011).

**Internally displaced persons:** Persons or groups of persons who have been forced or obliged to flee or leave their homes or places of habitual residence as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters who have not crossed an internationally recognized state border (Foresight, 2011).

**Internal migration:** The movement of people within a State involving the establishment of a new temporary or permanent residence (IOM, 2019b).

**Migration:** The movement of persons away from their place of usual residence, either across an international border or within a State (IOM, 2019b).

**Movement:** A generic term covering all the different forms of movements of persons, including temporary or permanent, seasonal or long-term, intra- or international, voluntary or forced, as well as planned relocation (IOM, 2019b; Rigaud et al., 2018).

**Planned relocations:** A form of organized movement of people, typically in groups or whole communities, often instigated, supervised and carried out by the state to a predefined location (Stapleton et al., 2017; Foresight 2011).

**Remittance:** Private international monetary transfers made by migrants, individually or collectively (IOM, 2019b).

**Resilience:** The ability of people, households, communities, countries and systems to mitigate, adapt to and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth (USAID, 2012).

**Stressors:** Events and trends, often not climate-related, which have an important effect on the system exposed and can increase vulnerability to climate related risk (IPCC, 2014).

**Slow-onset event:** An event that evolves gradually from incremental changes occurring over many years or from an increased frequency or intensity of recurring events, including sea level rise, increasing
temperatures, ocean acidification, glacial retreat and related impacts, salinization, land and forest degradation, loss of biodiversity and desertification (UNFCCC, 2010; IDMC, 2018a).

**Sudden-onset event:** An event that emerges quickly or unexpectedly as the result of natural processes, and takes place over a period of days, including earthquakes, volcanic eruptions, floods and cyclones (adapted from Rigaud et al., 2018).

**Vulnerability:** The propensity or predisposition to be adversely affected, encompassing a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (IPCC, 2014).
EXECUTIVE SUMMARY

The climate is changing at an unprecedented pace. Sudden-onset events such as cyclones, floods, droughts and wildfires are occurring with increased intensity and frequency, threatening assets and increasing the vulnerability of people globally. At the same time, slow-onset events—including sea level rise, higher temperatures, salinization, land and forest degradation, and desertification—are contributing to pressures on livelihoods, water quality and availability, and food security (IPCC, 2012; Oaks et al. 2019).

Risks associated with climate variability and change are increasingly recognized as drivers of both internal migration and displacement. These risks, when played out against a backdrop of limited economic opportunities and poor governance—including uneven or inequitable delivery of services, and inadequate political representation (e.g., lack of political will, insufficient government service, corruption)—have the potential to further compromise the resilience of political, economic, social and governance systems. While the casual links between climate change and movement are still being established, weather and climate events (e.g., tropical storms, droughts that stretch through multiple growing seasons, widespread flooding) are a contributing factor in movement. For example, according to the 2019 Global Report on Internal Displacement from IDMC, a total of 16.1 million people were displaced by weather-related disasters in 2018, with storms and floods accounting for the highest number of people displaced (IDMC, 2019a). In the first half of 2019 alone, Cyclone Fani triggered more than 3.4 million new displacements in India and Bangladesh, while flash floods and landslides in the Philippines led to the displacement of 405,000 people (IDMC 2019b). Thus, climate change likely acts as a risk multiplier, increasing the frequency, intensity and severity of these events, thereby affecting human behavior and movement.

The spatial and temporal variability of predicted changes in climate, coupled with similar challenges forecasting human mobility patterns creates a set of inherently complex dynamics. The motivations that compel people to move and the processes involved are highly variable, contextually diverse and situationally specific to the location and time of occurrence. Further, these motivations are part of a complex ecosystem closely intertwined with micro- (individual/household) and macro-level (community/sub-national) drivers. Climate variability and change can likely amplify these drivers by influencing the probability, scale and circumstances of the events that drive people to move. It is therefore important for governments and the development community to be prepared to respond in a way that minimizes social and economic disruptions in both receiving communities and the communities of origin – particularly in locations most at risk from climate variability and change.

This study contributes to the growing field exploring adaptation responses to climate-related human movement by: 1) examining the role of climate variability and change and climate-induced hazards as risk multipliers in the context of human movement; and 2) providing practical recommendations for adaptation strategies to support people to remain in their home communities, prepare for and respond to shocks and improve their own and their communities’ adaptive capacities when and where movement
does occur. Owing to a lack of literature, it does not delve deeply into specific strategies that receiving communities can use to mitigate the negative impacts of absorbing new populations, and only lightly touches on options for improving the situation of people during movement.

This paper is divided into the following sections: I. Introduction; II. Framing the Challenge; III. The Effects of Climate Change on Specific Populations; IV. Adaptation Options to Support Improved Resilience; and V. Lessons Learned. The paper concludes with detailed analyses (Annex A) from four case studies – Bangladesh, Fiji, Kenya and the United States – that each offer context-specific examples of climate-influenced human movement, and an analysis of the opportunities to connect relevant policy structures to support improved adaptation and resilience of people and communities. These case studies reflect the diversity of environmental risk posed by climate variability and change in different contexts and governance structures and offer important lessons to support future programming.

**LESSONS LEARNED**

Building on both the literature review and the four case studies (Annex A), the following observations are made:

- Climate variability and change can act as risk multipliers affecting individuals and communities. Local governments in both the sending and receiving communities will bear the brunt of the responsibility for planning and managing internal migration (and to a degree displacement). Therefore, migration and displacement policies should be incorporated into both urban and rural development policies to improve the resilience of systems and plan for increased population flows - both temporary and permanent.

- Regional coordination to improve the collection of data specific to migration is essential, as is national level involvement to provide financial resources and technical expertise, or to resolve disputes between local authorities, is also necessary.

- As climate-related movement takes many different forms, it will continue to require context specific policy responses rather than a one-size-fits all approach. Political context, the number of people likely to be affected (and their social, economic and geographic characteristics), the nature of the climate or natural hazard, human capacity and available resources are all key factors that will shape policy responses.

- While there is a growing consensus that internal migration and displacement will increase due to climate variability and change, gaps remain in accurately estimating the number of people who are likely to move and the extent to which measures to promote climate resilience will reduce this number. There is also consensus that most displacement and migration is and will continue to be internal (Rigaud et al., 2018) with movement primarily from rural to urban settings. It is also widely accepted that people who move in response to climatic and environmental stressors/impacts will tend to follow existing patterns of internal movement for economic reasons. The four case studies in Annex A provide examples of this phenomenon.

- Sudden-onset natural disasters are most likely to trigger temporary displacement, while longer term climate change, given its slower onset but more permanent change, is more likely to influence internal migration.
RECOMMENDATIONS AND ADAPTATION ACTIONS TO ADDRESS MOVEMENT

Development programming represents a critical opportunity to build capacity and provide key resources to address movement in adaptation planning and implementation, and support more resilient outcomes. Adaptation actions that affect movement seek to minimize the impact of weather events and a changing climate on populations that might otherwise result in displacement or internal migration. Hazard-specific adaptation actions can both limit a population’s exposure and sensitivity to climate variability and change and weather-related events, and support improved adaptive capacity.

DROUGHTS AND EXTREME TEMPERATURES
Adaptation actions aimed at addressing drought typically focus more on increasing adaptive capacity and reducing sensitivity – particularly within populations that rely on rainfed agriculture and grazing for livestock – and less on reducing exposure, which can be difficult or impractical.

Recommended adaptation actions specific to droughts and extreme temperatures include:

- Improve livestock management.
- Improve agricultural techniques.
- Improve water management.
- Promote alternate or diversify livelihoods.
- Improve information and planning.

FLOODS AND LANDSLIDES
Adaptation actions for flooding focus heavily on reducing exposure (and to a lesser extent sensitivity) by decreasing the likelihood of a flood or landslide occurring due to heavy precipitation event, and less on increasing a community’s adaptive capacity. Recommended adaptation actions for flooding and landslides include:

- Reduce deforestation.
- Encourage reforestation.
- Construct hard infrastructure and physical defenses.
- Restore natural defenses and construct green infrastructure.

TROPICAL STORMS
Adaptation actions for tropical storms frequently focus on reducing exposure and sensitivity, and seek to minimize the impacts of storms on homes and livelihoods, thus reducing displacement or the length of time a community is displaced. Recommended adaptation actions for tropical storms include:

- Improve housing construction and location.
- Increase hard and green infrastructure defenses against storm surge.
**SEA LEVEL RISE**

Adaptation actions to address sea level rise typically focus on short-term protection strategies, and long-term preparation and planning strategies. Recommended adaptation actions to address sea level rise include:

- Construction of physical barriers, both hard and green infrastructure.
- Relocate or build new infrastructure at higher elevations.

**ACTIONS TO REDUCE OVERALL VULNERABILITY**

While the adaptation actions listed above are tied to specific hazards, in reality, many adaptation actions have multiple benefits. The following adaptation actions can reduce overall household- and community-level vulnerability irrespective of the specific hazard:

- Increase access to or assist communities to access crop and livestock insurance to protect against loss or failure caused by drought, flooding and tropical storms.
- Strengthen remittance networks and infrastructure to protect against loss of livelihood caused by extreme weather events.
- Improve weather observation networks and increase public access to weather and climate information.
- Support climate-proofing of infrastructure, including hardening and protecting bridges and roadways, and hardening and/or relocating critical infrastructure to protect against flooding, more intense tropical storms, and sea level rise.
- Strengthen policies and regulations including: land use and development regulations; land reform and titling; environmental and natural resource management plans; emergency response plans; water allocation plans; and water abstraction regulations.

In addition to the above-highlighted hazard-related adaptation actions, the following country-level and targeted programmatic activities can be considered:

- Support government to include internal migration and displacement planning in climate adaptation, risk reduction and national development policies starting with developing and updating National Adaptation Plans (NAPs).
- Assist government introduction of migration procedure templates for municipal planning processes or work directly with municipalities on local development plans.
- Participate in donor-led international and host country initiatives, such as conducting large scale, longitudinal studies tracking climate impacts and related human movement, to assess links between climate variability and change and internal migration, and to justify effective responses.
- Coordinate with donor organizations to assist host countries to access climate funding (e.g., Green Climate Fund, the Global Environment Facility and other international entities) aimed at strengthening internal migration governance, including use of the capacity development mechanism included in the Global Compact on Migration, which addresses both internal and external migration.
- Promote data and research sharing between host governments and other donors to better support migration and displacement planning and responses. Invest in early warning systems that
track slow-onset and extreme climate events and migration trends to advance from reactive response to proactive resilience building actions.

- Coordinate with international governance bodies relevant to in-country migration and displacement programming. Improve coordination and programming with explicit or implicit links to movement, including resilience activities, to better understand the correlation between climactic drivers and movement.

- Align practice with policy to build resilience. In Kenya, for example, although progress is being made toward integrating climate and mobility into relevant policy, older policies still exist that work at cross purposes, such as: 1) state-driven development that privatizes or otherwise limits access to lands used by pastoralists; and 2) conservation-related land enclosures that result in displacement or remove access to resources with inadequate safeguards/compensation for those whose livelihoods are adversely impacted.

- Improve guidance to help governments consider internal migration and remittance flows in climate resilience efforts as it may mitigate the need for future large-scale relocation. However, there are some cases (Small Island Developing States (SIDS) in particular) where the nature of the hazard is so significant that future relocation seems an unavoidable conclusion. Thus, even if the risk is not imminent, local authorities in areas with documented evidence of climate vulnerability might want to begin contingency planning to ensure any future relocation is as well managed and organized as possible.

- Provide adequate and coordinated support to ensure community engagement and careful planning that mitigates against policies or actions that might contribute to existing disparities among the internal migrants or people in receiving communities. For planned relocations, resource coordination between state and non-state actors will be critical to ensure that those who have not migrated earlier receive the assistance needed to relocate. Examples of this type of engagement are highlighted in two of the case studies included in Annex A. Specifically, research on indigenous communities in Alaska demonstrates the importance of community engagement in the decision to relocate (Bronen, 2011). While in Fiji, a draft Relocation Guideline is an example of a national policy that incorporates lessons learned from development-induced displacement into a set of robust guidelines for relocation efforts in response to climate change.

- Improve data and modeling to help government policy-makers better understand: 1) what climate stressors lead to increases in human movement and the related temporal and spatial effects; 2) how circular migration fits into adaptation, risk reduction and development planning; and 3) the importance of engaging sending and receiving communities when developing and implementing such policies.

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1Fiji’s Relocation Guideline can be found here: [https://www.refworld.org/pdfid/5b72a0c14.pdf](https://www.refworld.org/pdfid/5b72a0c14.pdf)
I. INTRODUCTION

The climate is changing at an unprecedented pace. Sudden-onset events such as cyclones, floods, droughts and wildfires are occurring with increased intensity and frequency, threatening assets and increasing the vulnerability of people globally. Slow-onset events – defined by the Intergovernmental Panel on Climate Change (IPCC) to include sea level rise, higher temperatures, ocean acidification, glacial retreat and related impacts, salinization, land and forest degradation, loss of biodiversity and desertification – are contributing to pressures on livelihoods, water quality and availability, and food security (IPCC, 2012; Oaks et al., 2019).

Risks associated with climate variability and change are increasingly recognized as drivers of both internal migration and displacement. These risks, when played out against a backdrop of poor governance – limited economic opportunities, uneven or inequitable delivery of services, and inadequate political representation (e.g., lack of political will, insufficient government service, corruption) – have the potential to further compromise the resilience of political, economic, social, and governance systems. The spatial and temporal variability of predicted changes in climate, coupled with similar challenges forecasting mobility patterns creates an inherently complex set of dynamics that are becoming increasingly urgent as more people are driven to move within their countries.

Warnings of the potential for climate variability and change to force or contribute to the movement of tens of millions or even hundreds of millions of people (Meyers and Kent, 1995; Meyers, 2005) have yielded to a realization that quantifying this causal relationship is a complex process influenced by factors that do not lend themselves well to estimates generated by statistical projections and models (Stern, 2006; Baird, 2007; Brown, 2008; IOM, 2008; Norwegian Refugee Council, 2009; Warner, 2010; Foresight, 2011; Zetter, 2011; McAdam, 2011). Decisions to move often result from a combination of social, political, economic, environmental and demographic factors that cannot be isolated from one another (Black et al., 2011a; Ionesco et al., 2017 in IOM UN-OHRLLS, 2019). The challenge comes in trying to isolate environmental determinants of human mobility from other drivers (Johnson and Krishnamurthy, 2010). Climate and environmental changes at any given location, resulting from slow- or sudden-onset events, directly affect a population’s exposure to hazards and can lead to the destruction or degradation of livelihoods, driving people to move either temporarily or permanently (Figure 1) (Warner, 2010; Johnson and Krishnamurthy, 2010). Considering these complexities, there are many initiatives underway to try to quantify the number of people expected to move as a result of climate variability and change. While no consensus exists, these types of projections are an important component in driving policy change and supporting more integrated approaches to support populations that move, those that choose to remain, and those that are left behind.

This study focuses on capturing the role of climate variability and change and climate-induced hazards as a risk multiplier in the context of human movement and offers constructive ways to minimize the adverse impacts on individuals, households and communities through adaptation actions. The paper does not attempt to specify the causal link between climate variability and change and human movement.
Instead, it provides actionable recommendations for how to respond to the risks that climate variability and change present, with respect to movement.

**Figure 1. Migration and displacement interacting with sudden- and slow-onset climatic events**

![Migration and Displacement Diagram](image)


**METHODOLOGY**

This paper provides an overview of the ways in which climate variability and change are, and will continue to, influence the probability, scale and circumstances under which people move. A desk-based literature review was conducted with a focus on adaptation responses. It provides an examination of the development benefits of considering movement in conjunction with adaptation action to support improved resilience. It then provides recommendations for adaptation strategies to support people to remain, prepare for and respond to shocks, and to improve the adaptive capacity of people and communities when movement does occur. This paper also explores climate risks specific to groups with increased levels of vulnerability as a product of gender, age, livelihood or geographic location, including women, youth, pastoralists, and coastal and urban populations.

This paper does not attempt to offer a definitive position on the causation of climate-related drivers and movement, nor does it seek to provide a methodology or framework to capture the scope, scale and timing of movement in the context of climate variability and change. Rather, it focuses on capturing the role of climate variability and change and climate induced hazards as risk multipliers in the context of human mobility. It is important to underscore that motivations that compel people to move, and the processes involved, are highly variable, contextually diverse and manifest across temporal and spatial scales. Further, these motivations are part of a complex ecosystem closely intertwined with micro- (individual/household) and macro-level (community/sub-national) drivers, and climate variability and change may amplify these drivers. While this paper considers the broader set of motivating factors, it focuses on the specific influence of climate variability and change on internal movement.
This paper is divided into the following sections: I. Introduction; II. Framing the Challenge; III. The Effects of Climate Change on Specific Populations; IV. Adaptation Options to Support Improved Resilience; and V. Lessons Learned. The paper concludes with detailed analyses (Annex A) from four case studies – Bangladesh, Fiji, Kenya and the United States – that each offer context specific examples of climate-influenced human movement, and an analysis of the opportunities to bridge relevant policy structures to support improved adaptation and resilience of people and communities. These case studies reflect the diversity of environmental risk posed by climate variability and change in different contexts and governance structures and offer important lessons to support future programming.

A NOTE REGARDING TERMINOLOGY
As research, practice and discourse has evolved around human mobility in the context of climate variability and change, so too has terminology used to describe this phenomenon. This paper uses “movement” in the context of climate variability and change to encompass the different forms of mobility including migration, displacement and planned relocation.

Displacement is used here to capture forced movement of persons, or persons obliged to leave their places of habitual residence, in particular as a result of climate and weather impacts on physical, social, economic or financial assets (IOM, 2019b). Characteristics associated with displacement are that the movement is often reactive, unforeseen, involuntary, temporary and of short-duration (Adger et al., 2018). While displacement is most often framed in the context of sudden-onset events (e.g., cyclones, floods, droughts or wildfire), it is important to note it can also result from slow-onset processes. Sea level rise, salinization, or desertification manifest over decades and longer and result in a gradual loss of productive land, living space and vital ecosystem services to render a place uninhabitable or a livelihood nonviable (IDMC, 2018b; Adger et al., 2018).

Migration is used here to capture the voluntary process of movement, either temporary, seasonal or permanent, in response to economic and social factors in particular (Adger et al., 2018; Stapleton et al., 2017). Characteristics associated with migration are that the movement is, to varying degrees, voluntary, anticipated/planned and linked to multiple drivers, including, but not limited to climate (Stapleton et al., 2017; Wilkinson et al., 2016). Climate variability and change may influence internal migration patterns by altering both the economic incentive structures and vulnerability of individuals in sending and receiving communities (Adger et al., 2018).

Planned relocation is used here to capture organized movement of people, typically in groups or whole communities, often instigated, supervised and carried out by the state to a predefined location in order to mitigate extensive climate and weather-related risks (Stapleton et al 2017; Foresight 2011; Wilkinson et al., 2016). The process should be transparent, consultative, with informed consent by those affected and with adequate provisions to preserve social and cultural structures, and reestablish lives and livelihoods (Warner et al., 2015; Wilkinson et al., 2016). It is important to recognize that planned relocation is often viewed as a last resort – only to be called on when all other options have been exhausted (Nansen Initiative, 2015). Further, it is recognized that states can be motivated by non-climate factors to relocate people or groups, including economic development and natural resource extraction (Wilkinson et al., 2016).
These terms are not distinct, but part of a continuum where the characteristics distinguishing one from the other can blend and change over time in the course of the movement process. Specifically, someone who is displaced may find it too difficult to return to their habitual place of residence following a disaster due to financial, social or ecological constraints that compel them to seek alternative livelihood or support options that results in longer term migration. Inversely, someone migrating to an urban area in search of economic opportunity may end up displaced by flooding. In terms of the degree of personal agency, movement can be described along a continuum, from voluntary to motivated to compelled to forced (Warner, 2010; World Bank, 2007).

Further, as captured in a 2019 International Organization for Migration (IOM) study, being affected by climate and environmental impacts is very different from being displaced by or migrating as a consequence of those impacts. For example, the number of people impacted by drought exceeds that of other climate related phenomena, but not all people impacted will want to, be able to, or be willing to move (IOM UNCCD, 2019). This continuum and gradation of influence, combined with the temporal, spatial and contextual variability, are at the core of why this challenge is so complex. While movement can occur within and across national borders, the focus of this paper is specific to internal movement as the majority of research suggests this is the most likely type of movement in response to climate related risks.

Finally, some of the literature has used the term “environmental change”, which encompasses both changes in climate and impacts associated with environmental disruptions or degradation. While at times this report distinguishes between these factors, it is recognized that they are interrelated variables that directly and indirectly influence movement and therefore cannot always be teased apart.
II. FRAMING THE CHALLENGE

Climate scientists warn that more frequent and powerful sudden-onset events associated with climate variability and change, such as floods and landslides will displace people, while longer and more frequent droughts will likely force large numbers of people to migrate internally in search of alternative livelihoods. Furthermore, slow-onset events can make some locations less livable. For example, sea level rise is causing inundation that is leading to loss of land, coastal and riverine erosion, salinization of water and land resources and, consequently, human displacement and internal migration. Since the first IPCC report in 1990, there has been recognition that climate variability and change are likely to increase human movement (IPCC 1990, 1995, 2001, 2007, 2010).

The IPCC reports from 1995 and 2001 suggested the occurrence of large-scale climate movement, using very simple push-pull phenomenon (McLeman, 2018). As data and discourse have evolved, global policy platforms have given increased and focused attention to developing frameworks and processes devoted to migration and displacement in the context of climate variability and change, sudden-onset events and environmental degradation (Oaks et al., 2019). While work to capture the scale of this phenomenon continues, the field is expanding to include emphasizing the resilience of communities, the importance of people’s attachment to their land, their efforts to remain in place and viewing migration as a viable adaptation option to mitigate risk to individuals and communities. This section provides an overview of 1) the mechanisms through which climate variability and change, sudden-onset events and environmental degradation influence movement across contexts; 2) governance processes that could help address this challenge; and 3) remaining gaps in knowledge.

UNDERSTANDING THE INFLUENCE OF CLIMATE CHANGE, SUDDEN-ONSET EVENTS AND ENVIRONMENTAL DEGRADATION ON INTERNAL MIGRATION AND DISPLACEMENT

INTERNAL MIGRATION
To support a common foundation from which to consider the challenges presented by climate variability and change as an influencing factor on migration, the 2011 Foresight report put forward a conceptual framework (Figure 2) characterizing five drivers of migration: social, political, economic, demographic and environmental. This framework represents the integrated multi-causal dimensions of mobility, and underscores the importance and interaction of social-political-economic-cultural factors that lead people to choose to migrate or to remain in place. Social scientists underscore the importance of individual characteristics (age, level of education, economic activity) (Van der Land et al., 2018), as well as the intervening factors (e.g., legal framework, cost of moving, social networks, diasporic links, recruitment agencies and technology) identified in the Foresight (2011) study as the prevailing factors and obstacles that influence mobility.
This framework has been widely adopted as the foundational model to understand the influence of climate and environmental determinants on migration. The report includes several very important specific considerations that are worth noting. First, the presence of drivers does not guarantee migration will occur. Second, the role of personal agency in migration frameworks cannot be underestimated or discounted (Foresight, 2011). For example, in some contexts women do not have the agency to migrate. Furthermore, climate variability and change, and other environmental factors such as land degradation or loss of ecosystem services, each play a distinct but interconnected role in influencing migration dynamics. For example, migration patterns may change during an El Nino year (e.g., climate variability) owing to land degradation from reduced rainfall, but these changes may be temporary with individuals returning to their place of residence following the event. Migration in response to sea level rise, on the other hand, is more likely to be permanent, especially where it results in loss of land. As noted elsewhere, migration can be both a proactive response to climate change, as well as the result of exhausting adaptation actions or limited adaptive capacity. Further, migration can reduce vulnerability to climate risks by moving away from hazards or increase it by creating increased pressures on systems and ecosystems in receiving areas. Similarly, some populations migrating to urban areas owing to drought settle in flood prone areas, and thus the populations are trading one risk for another through their mobility.

### DISPLACEMENT

Natural disasters, both sudden- and slow-onset, are a major cause of displacement. According to the 2019 Global Report on Internal Displacement from IDMC, a total of 16.1 million people were displaced by weather related disasters in 2018, with storms and floods accounting for the highest number of people displaced (Figure 3) (IDMC, 2019). Displacement following sudden-onset disasters is likely to be...
both temporary and short-term. Sometimes it takes the form of organized evacuations carried out under the government’s national disaster response agency (IOM, 2015a) and is considered by academics as either ‘distress migration’ or as a ‘coping strategy’ – rather than adaptation. Yet research indicates that disaster displacement can be protracted (IDMC, 2015a) and even become permanent when return is not possible, either because of the level of destruction or the economic means of the displaced persons leave them unable to rebuild infrastructure or capital or reestablish their livelihoods.

Ginnetti (2015) found that disaster-related displacement risk has quadrupled since the 1970s and people are twice as likely to be displaced by disasters now than they were in the 1970s. He argues that one of the primary drivers of increased risk since the 1970s has been rapid, unplanned development in hazard-prone areas in developing countries, as rapid urbanization concentrates large numbers of vulnerable people in dangerous locations. This phenomenon points to the urgent need for improved integrated climate and urban management policies that thoroughly map environmental hazards, updates those
hazard maps regularly (including integration of climate risk mapping) and proactively works to limit settlement in areas recognized as hazardous (Ginnetti, 2015). Furthermore, it is important for both national and municipal government officials (and policies) to recognize that migration to urban areas, particularly by poor people, whether motivated by environmental or other drivers, will likely result in the formation or expansion of densely-packed settlements, often in most hazardous areas, unless policies are in place (and enforced) to minimize it.

While urbanization is one dimension of increased exposure and vulnerability, it is compounded by the increasing frequency and intensity of the climate events, and the interaction with slow-onset processes that can magnify their impact. For example, cyclones and storm surges may become more destructive as sea levels rise, which may have increasing impacts on the growing urban centers predominately located along the coasts. Slow-onset processes can also erode a community’s capacity to withstand a sudden-onset hazard (Nansen Initiative, 2015). These examples underscore the challenge in trying to respond to any one impact in isolation from other climate and environmental processes, as well as the importance of increasing and integrating disaster risk reductions (DRR) with adaptation and migration policies, such as the UN Office for Disaster Risk Reduction (UNDRR)’s Hyogo Framework for Action 2005-2015.

Successful efforts to reduce the impacts of disasters can also reduce the chance of displacement. For example, strong governance and institutional responses can mitigate the impact of sudden-onset weather-related disasters. By reducing the impact of these disasters, good governance can reduce the drivers of human movement.

A concentrated focus on DRR has been a major theme in development approaches and multilateral institutions in the first two decades of this century. However, this burgeoning field initially paid little attention to the linkages between specific disaster events and different mobility responses. For example, the only reference to population movements included in the Hyogo Framework for Action was paragraph 19.i. which called on States to “[e]ndevour to ensure, as appropriate, that programmes for displaced persons do not increase risk and vulnerability to hazards” (UNISDR 2005).

While the incentive structures, and temporal and spatial dimensions are different for displacement and migration, linkages do exist and are increasingly accounted for in policy and research. As noted, what starts out as displacement can transition into permanent migration.

**IMMOBILITY**

While the focus on human movement has predominately been on those populations likely to move, there is growing concern for both voluntarily and involuntarily immobile populations—specifically individuals or populations who are unable or unwilling to move (Figure 4). Characteristics including gender, age, and socio-economic status will affect evolving patterns of mobility, or lack thereof. In the
face of slow-onset environmental change, those with savings, social networks and alternative livelihoods are more likely to migrate, while the vulnerable poor, those with little capacity or networks, may be left behind or choose to stay behind (Warner, 2010). Therefore, the vulnerable poor often suffer from a lack of capital needed for voluntary mobility, which places them at greater risk from the climate threats for which they often have limited capacity to respond to or recover from (Foresight, 2011).

These populations require targeted support and consideration, such as improved early warning systems and evacuation plans, as well as safety nets (either state or community based) to help reestablish livelihoods to ensure the cycle does not continue to repeat (Black et al., 2011a).

GLOBAL POLICIES ADDRESSING MOVEMENT IN A CHANGING CLIMATE

While migration as an effect of climate change was captured in broad terms in early assessment reports focused on or otherwise addressing the intersection of these issues, it was not until the Fourth Assessment Report in 2007 that the term ‘environmental migration’ was made explicit. In 2010, the relationship between climate change and migration expanded considerably. This was largely in response to the United Nation’s Framework Convention on Climate Change Conference of Parties 10 (UNFCCC COP 10) decision to consider the movement of people as a form of adaptation to climate change and its call for further research and action on migration, displacement and planned relocations. The Outcome Agreement from UNFCCC COP 16 marked a turning point in international policy whereby States agreed to undertake “measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels” (IPCC, 2011).

In 2011, the Nansen Conference in Norway led to the establishment of the Nansen Initiative (now the Platform on Disaster Displacement), which sought to address the legal gap facing those who were displaced across national borders because of disasters (Platform on Disaster Development, 2018). The Internal Displacement Monitoring Centre (IDMC), focusing on internal displacement, began collecting data on disaster-induced displacement in 2012. The International Organization on Migration (IOM) was one of the first institutional actors to begin a program of research on migration related to climate and environmental impacts (IOM 2018, Environmental Migration Portal) while the World Bank’s KNOMAD established a working group on environmental change and migration in 2013. Also, in 2013, the Warsaw International Mechanism for Loss and Damage was established to focus on the countries most vulnerable to the impacts of climate change. This progression culminated in 2015 with the adoption of the Paris Agreement on Climate Change, which acknowledged the human rights of migrants in climate action, the adoption of the Sendai Framework for Disaster Risk Reduction (that highlighted disaster related displacement), and finally the 2030 Agenda for Sustainable Development, which called for climate action and safe and regular migration (Oaks et al., 2019).

In December 2018, the Global Compact for Safe, Orderly and Regular Migration was signed and represents the first-ever negotiated global framework outlining a common approach to international migration in all forms. It recognizes climate change and environmental degradation as drivers that compel people to leave their place of origin, and commits to supporting migrants and governments to mitigate negative impacts by:

- Strengthening joint analysis and data sharing to better predict, map and understand migration movements that may result from climate or environmental drivers
- Developing adaptation and resilience strategies to climate events
- Integrating displacement considerations into disaster preparedness strategies
- Harmonizing efforts across subregional and regional levels to address vulnerabilities of persons affected by climate events, and promoting outcomes that increase resilience and self-reliance
- Developing coherent approaches across international, and State-led policies and processes (UNGA, 2019)
III. THE EFFECTS OF CLIMATE CHANGE ON SPECIFIC GROUPS

Developing countries already face significant impediments to economic development. Insufficient and/or inadequate infrastructure and public services, limited productive capacity, lack of economic diversification and investment, weak governance structures and limited institutional capacity can all contribute to increased vulnerability to shocks and stresses (UN-OHRLLS, 2019). Social factors “such as poverty, the degree of support (or conversely discrimination) communities receive from the state, their access to economic opportunities, the effectiveness of decision making processes, and the extent of social cohesion within and surrounding vulnerable groups” (Barnett and Adger, 2007) can exacerbate political and economic disparities and inequities within and among different segments of society. This section examines the effects of climate variability and change and environmental hazards on the potential internal migration of specific groups already disadvantaged by social or geographical circumstances.

WOMEN AND GIRLS

There is considerable variation in motivations and consequences when examining migration through a gender lens. Political and customary structures and gender expectations play a significant role in the migration experiences of men, women, girls, boys and persons identifying as lesbian, gay, bisexual, transgendered and intersex (LGBTI) (IOM, 2019a). While there is quite a bit of literature examining the gendered impacts of climate variability and change, studies linking climate, migration and gender are much more limited (Chindarkar, 2012). One study by Abebe (2014) considers the case of East Africa where agriculture is central to rural life and is responsible for 75 percent of economic activity and over 75 percent of employment (Abebe, 2014). This study suggests that women are responsible not only for 95 percent of all domestic tasks, but also for 80 percent of crop production. And yet they own less than one percent of the land (Abebe, 2014). When agricultural production decreases, including due to climate variability and change, women’s tasks increase. For example, they must walk longer distances to collect water, leaving less time for education and other livelihood opportunities. Similarly, climate variability and change can encourage men to migrate to work in cities, leaving women behind who must work harder to make up for the labor lost. Abebe notes that migration can worsen rural poverty, increase women’s workload, and heighten the risks of expulsion from their families and becoming victims of sexual violence (Abebe, 2014). Rural women who migrate in search of work often lack skills to get jobs in the urban sector and thus gravitate to the informal sector, particularly domestic service, where they are exploited and vulnerable to sexual abuse (Abebe 2014).

However, migration outcomes vary, and migration of women and girls can also have various positive impacts. It can bring about greater economic and social autonomy, new educational and career opportunities and create new social connections that motivate women to look for different and better opportunities. Migration can also provide a crucial source of income for women and their families, which builds greater self-confidence and raises social status. Since 1960, many countries in Asia have recorded
significant increases in the number of female migrants that stem from shifting labor demands and globalization (Rigaud et al., 2018). These shifts have further implications for deviations in traditional gender roles within households and communities. Thao and Agergaard (2012) documented increases in rural-urban female migration in Vietnam where women became the primary source of income with increased influence in finance and decision-making, and saw husbands taking on traditional caretaker roles (Thao and Agergaard, 2012). Stapleton et al. (2017) cite research on circular migration in Rajasthan, India where women tend to migrate for periods of three months or less staying within their home districts while men tend to migrate farther away and for up to a year at a time.

Migration can also act as a household diversification strategy in the face of continued shocks and stresses. For example, remittances sent home from family member who have migrated may serve as insurance against shocks during natural disasters and can help families survive hunger or spend money to improve farming and livestock production as well as raise their households' ability to access important services. A secondary effect of this is that, in many cases, the migration of men away from their families means women become de facto heads of household with increased autonomy and decision-making power (Abebe, 2014; and Chant, 1998). Women can, however, become more vulnerable when men in the family leave, particularly in countries with existing gender exclusion and inequality issues (Ye et al., 2016).

Gray and Mueller (2012a) analyzed the relationship between drought and mobility in Ethiopia over a 15-year period. They found that men's labor migration doubled under severe drought conditions with land-poor households the most vulnerable, which confirmed previous research suggesting migration is a coping strategy during drought. However, women's short-distance and marriage-related mobility fell by half under moderate drought conditions, which may signal a decreased ability to pay for wedding expenses and set up new households.

YOUTH

There is considerable concern that lack of livelihood opportunities for young people in Africa will be an increasing, major driver of international migration (Summers, 2018). Although there is little direct research on the impact of climate variability and change on youth migration, there seems to be a consensus that young people experience both push and pull factors that influence their migration choices (UNDESA, 2013; UNICEF, 2014; de Brauw, 2019). There are several studies showing youth are more willing to migrate to find jobs than their older relatives (Appiah-Nyamekye, J. and Selormey, E., 2018) primarily within their own countries. While this is often framed in the context of lack of opportunity, a recent study from Mozambique indicates youth would remain or return to rural, mostly agrarian livelihoods, if overcoming challenges of access to finance, tenure security and improved application of technology were supported (Ghebru and Zavale, 2018).

As members of the larger household, young people are likely to be affected by household decisions to send a member of the family to work elsewhere in order to diversity the household income. At the same time, remittances sent back may increase educational and other opportunities for young people who remain at home. Sending one child to university can also be a diversification strategy, increasing household and community resilience. Families choosing to send one child to find work or education,
while keeping others at home can create inequities among family members, even as it makes the overall household more resilient.

PASTORALISTS

For generations, pastoralists have migrated to find fodder for their livestock. In fact, their seasonal migration patterns can be considered an adaptive response to the already harsh environment in which they live. In East Africa, pastoralists occupy over 70 percent of the region’s dry lands, varying from 95 percent in Somalia and Djibouti to about 80 percent in Kenya and around 60 percent in Uganda and Ethiopia. “Mobility or seasonal migration is a critical element of pastoral livelihoods and is flexible and adaptive in the context of a changing and uncertain environment” (Abebe, 2014).

Schrepfer and Catarina (2014) examined the impact of drought—exacerbated by climate variability and change—on pastoralists in Kenya and found that drought is just one of the factors impacting their lives. Other drivers such as cattle rustling, conflict over resources and increasing privatization of land are causing changes in pastoralists’ seasonal migration. In fact, while climate variability and change are driving migration in other contexts, in the case of pastoralists, these stressors are leading to increased settling as pastoralists are no longer able to access their typical grazing lands. In a sense, this represents a form of displacement for these communities in that they are displaced from their traditional migratory livelihoods. This internal displacement, Schrepfer and Catarina (2014) conclude, is causing impoverishment and decreasing resilience.

IN FOCUS: DROUGHT, MOBILITY AND POLICY RESPONSE IN KENYA

In Kenya, the 2008-2011 drought prompted increased national recognition of the relationship between climate and migration, particularly for pastoralists. It affected an estimated 3.7 million people and cost the country $12.1 billion primarily in losses of livestock, crops and water resources (GOK 2012). As resources became increasingly constrained, pastoralists traveled further and for longer periods in search of grazing and water resources (Schrepfer and Catarina, 2014). This adaptive migration initially met pastoralists’ needs. But when coping capacity become overstretched, the drought, combined with non-climatic factors (e.g., loss of traditional lands and migration routes to development, inter-community conflicts, weak governance), led to temporary or permanent migration, forced displacement or sedentarization that often increased poverty and marginalization (Schrepfer and Catarina 2014). The drought also increased conflict over scarce resources that resulted in conflict-induced displacement (GOK, 2012).

The government’s post-drought assessment in 2012 recognized the relationship between drought and increased migration and informed subsequent policies. Kenya’s 2016 National Adaptation Plan (NAP) calls for increasing the adaptive capacity of vulnerable groups, including displaced people and pastoralists, to reduce rural-urban migration. The country’s 2017 National Policy for the Sustainable Development of Arid and Semi-Arid Lands (ASALs) further aims to protect and promote pastoral mobility that supports traditional drought coping mechanisms and pastoral livelihoods. As an example of policy implementation, during Kenya’s 2012 drought, UN FAO worked with the National Drought Management Authority on early interventions to support pastoral livelihoods and avoid displacement (UN FAO, 2018).

While Kenya has made policy progress regarding climate-induced migration in recent years, limited coordination among government entities and inadequate capacity, political will, rule of law and information sharing are hindering policy development and implementation (IOM, 2015). The lack of comprehensive policies covering climate, migration, displacement, forest and urban planning are particularly concerning as complaints about illegal evictions and inadequate resettlement continue.
COASTAL COMMUNITIES AND SMALL ISLAND DEVELOPING STATES

It has been estimated that 23 percent of the world’s population lives both within 100 km of the coast and less than 100 m above sea level (Nicholls et al., 2007), and that population densities in coastal regions continue to rise. Migration of people to coastal regions has been a common trend in both developed and developing countries, and most of the world’s megacities are concentrated along coastlines. However, coastal populations face both increased exposure and vulnerability to climate variability and change, as risks related to increased storm magnitude, sea level rise, water inundation and salinization of freshwater resources threaten to compromise infrastructure, property and livelihoods.

Rapid urban sprawl, settlements and population growth are contributing to the degradation of natural protective coastal ecosystems such as mangroves, wetlands and beaches (Nicholls et al., 2007). Lack of urban planning means populations are settling in areas vulnerable to flooding, health outbreaks and other constraints. Owing to the complexities of coastal vulnerability in an urban context, more frequent and severe cyclones, are now causing some residents to act against the general coastal movement trend, with people migrating (or being displaced) to less vulnerable areas away from the coast. These complexities are further examined in the Bangladesh case study in the text box below and Annex A.

IN FOCUS: CLIMATE STRESSORS AND URBANIZATION CHALLENGES IN BANGLADESH

Bangladesh is highly exposed to climate change, particularly sea level rise and intensifying cyclones. The country also has a high degree of rural-urban migration resulting in burgeoning informal urban settlements with severe public service deficits (Marshall and Rahman, 2013). Migration is primarily motivated by economic incentives. However, disaster displacement is also significant and climate migration, particularly from coastal regions, and appears to be on the rise. This is in contrast to the global trend of populations migrating toward the coast.

Sea level rise of one meter, possibly by 2100, is projected to inundate 3.2 percent of the country’s total land and 14 percent of its capital city Dhaka (Rigaud et al., 2018). In recent years, a series of cyclones have led to widespread displacement followed by migration due to destruction of housing and farmland (Mehedi, et al., 2010; IDMC, 2015c; IDMC, 2017b). Modeling suggests climate stressors will increasingly drive large-scale internal mobility with up to 13.3 million people migrating away from climate-impacted areas by 2050 (Rigaud et al., 2018).

With substantial rural-urban migration increasingly associated with environmental and climate factors, there is consensus about the need for urban policies and investment that address in-migration. Policy and governance responses to the massive rural-urban migration to date have been weak, resulting in large urban slums, encroachment on protected forest and marine areas and trapped populations (Marshall and Rahman, 2013; McAdam and Saul, 2010). Moving forward, Bangladesh faces the difficult decision of many coastal countries: how to allocate resources among 1) efforts that facilitate and support migrants and those displaced to return to vulnerable coastal areas (through support for housing, livelihoods and coastal protection); and 2) efforts that address the needs of migrants in the expanding informal settlements of the country’s urban areas.

Small Island Developing States (SIDS) face unique social, economic and environmental vulnerabilities. Climate variability and change presents a particularly significant development challenge for SIDS due to their remoteness, dependence on fragile ecosystems, high exposure to natural disasters, limited ecological carrying capacity and comparatively small aggregate, but widely dispersed landmass (Cameron, 2009; McNamara and Gibson, 2009; UN-OHRLLS 2019). Further, the high ratio of shoreline to land makes their populations highly susceptible to rising sea levels, while rainfall variability and saltwater inundation threaten already limited fresh water supplies (Barnett, 2001; Betzold, 2015). Adaptive capacity is often limited both by a chronic lack of financial, technical and institutional resources, as well
as poor and/or insufficient communications and transport infrastructure and service delivery (Cameron, 2009; Barnett, 2001). Although SIDS have relatively small populations, the number of people at risk constitute a high percentage of their overall population (Foresight, 2011).

Historically, SIDS have been able to adapt to environmental change (UNFCCC, 2007). However, the current rate of change and compounded impacts (sea level rise, increased frequency and intensity of storms, rainfall variability, etc.) have brought new levels of vulnerability and risk. Continued habitability of the islands remains the primary policy concern, especially as continued sea level rise threatens to drown some of the lowest lying islands. However, there are no distinct established thresholds beyond which people can no longer remain on their islands. Traditional assessments of vulnerability often look at parts within the system, but in the context of SIDS, a holistic assessment of a whole island system is essential to understanding and establishing thresholds (Barnett, 2001).

Migration narratives in the context of SIDS often occupy both sides of the same adaptation coin – with one side viewing migration as a necessary and strong adaptation strategy, and the other as a failure of adaptation and mitigation efforts (Barnett, 2001; Cameron, 2009; Betzold, 2015). While internal migration in many SIDS is already happening, important distinctions in context merit further consideration. First, although countries may support internal migration (including migrating from one island to another within the same country), communities often have strong cultural and social ties to their island of origin. Therefore, while people may migrate within a country, the physical and social distance is generally greater than in many other contexts with increased risk of loss of place. Additionally, while internal migration within or between islands may reduce immediate risks, it does not completely mitigate long-term challenges as populations often move from one high risk area to another. Lastly, SIDS experience an inherent limit on internal migration options due to their size and limited land availability. Therefore, some SIDS have begun exploring the option of international migration, which is beyond the scope of this study.

IN FOCUS: PLANNED RELOCATION AS AN ADAPTATION RESPONSE IN FIJI

In recent decades, Fiji has experienced sea level rise at a rate twice the global average (PCCSP, 2011). The associated coastal erosion, flooding and inundation, and salinization of water and land resources are already influencing migration, displacement, and relocation (Thomas and Benjamin, 2018). For example, in 2006, after decades of increasing coastal erosion and flooding that damaged homes and infrastructure and threatened public safety, residents of Vunidogoloa asked the Fijian government for assistance to relocate (Charan et al., 2017). In 2012, the government allocated funding for the relocation and in 2014 Vunidogoloa became the country’s first village to relocate due to sea level rise.

Fiji has been a leader in incorporating climate-related relocation and Internally Displaced Person (IDP) rights into policy (IDMC, 2018c). In 2018, the government released national Planned Relocation Guidelines, which begin by recognizing that planned relocation is a complex and often traumatic process and an option of last resort in coping with climate change (GOF, 2018a). The guidelines define relocation as: “the voluntary, planned and coordinated movement of climate-displaced persons… to suitable locations, away from risk-prone areas, where they can enjoy the full spectrum of rights …” (GOF, 2018a, p. 6). The country has identified hundreds of at-risk communities and recommended a subset of these for potential relocation.

To prevent the need for relocation, Fiji has consistently increased national funding for in situ adaptation measures, including sea wall construction, improved drainage and mangrove restoration. However, while in situ adaptation is clearly preferred, at some point investments in high risk settlements will begin to consume a disproportionate amount of funding to the detriment of other populations (GOF, 2017).
IV. ADAPTATION OPTIONS TO SUPPORT IMPROVED MOVEMENT AND COMMUNITY RESILIENCE

While the casual links between climate variability and change and movement are still being explored, weather and climate variability (e.g., tropical storms, droughts that stretch through multiple growing seasons, widespread flooding) have been clearly shown to drive movement. According to the Internal Displacement Monitoring Centre (IDMC), 231.7 million people globally have been internally displaced due to weather-related disasters since 2009, averaging 21 million internal displacements per year (IDMC, 2018c). Climate variability and change likely act as threat multipliers, increasing the frequency, intensity and severity of these weather and climate events. Therefore, it is important to consider human movement when developing and implementing adaptation policies and plans.

Climate adaptation planning rarely addresses movement itself. Instead, it typically seeks to limit the impact of weather and climate events on populations that might otherwise be displaced or migrate as a result. For example, in a community that might be displaced by a flood or a tropical storm, climate adaptation efforts would typically focus on reducing the potential for flooding (e.g., building sea walls, improving natural coastal protection).

Often times, adaptation is viewed through the lens of reducing a community’s vulnerability to weather and climate hazards, where the determinants of vulnerability are:

- *Exposure*: a function of location that represents the direct and indirect risk posed by weather- and climate-related hazards and other pressures such as population growth, land use and land cover changes.
- *Sensitivity*: the propensity to be adversely affected by weather- and climate-related hazards.
- *Adaptive capacity*: a function of the tools and resources available for stakeholders to respond to and prevent impact from current stresses and prepare for future stresses.

Adaptation actions are therefore typically aimed at decreasing a community’s vulnerability to hazards by focusing on reducing sensitivity and exposure to those hazards and increasing adaptative capacity.
CURRENT PRACTICE IN NATIONAL PLANNING FOR ADAPTATION AND MOVEMENT

Most countries have some form of climate change action plan that is intended to be used to guide investment decisions. Many countries also participate in the various United Nations Framework Convention on Climate Change (UNFCCC) mechanisms for climate change planning: 184 signatory countries of the 2015 Paris Agreement have produced Nationally Determined Contributions (NDCs) that contain adaptation measures, 51 countries have produced at least one iteration of a National Adaptation Programme of Action (NAPA) and 13 countries have developed and submitted a National Adaptation Plan (NAP). Most countries also have some form of disaster management plan that typically includes a section on disaster risk reduction/mitigation, and that frequently complements or overlaps with activities outlined in the climate change action plan.

These national-level planning documents can serve as a useful starting point to determine a country’s adaptation priorities. However, very few NAPAs and NAPs explicitly refer to movement (Sward and Cocjoe, 2012; Wilkinson et al., 2016). There has been slightly greater attention to movement in the NDCs, with IOM’s Migration, Environment and Climate Change Division (MECC) finding that 33 of the 162 NDCs (or 20 percent) they examined in 2016 referred to migration (or movement more broadly). Of those NDCs that mention movement, approximately 46 percent were submitted by African countries and another 33 percent by Asia-Pacific and Oceania countries. In the NDCs that mentioned movement, the references fell into three main categories: 1) preventing adverse effects of mobility, i.e., displacement due to natural disasters and migration linked to climate change as a push factor; 2) migration as an adaptation strategy, including through resettlement; and 3) leveraging remittances from migrants to support adaptation in sending communities (IOM, 2016).

The fact that only 20 percent of NDCs referenced movement suggests that while some governments are thinking about proactive approaches to human movement associated with the effects of climate change, many are not. Research and practice in the movement space (e.g., Thomas and Benjamin 2018, the MECLEP project) suggest that the best way to address this issue is to incorporate migration and displacement into national development and/or climate change adaptation and DRR plans. National and sub-national climate adaptation planning and disaster management processes should also include comprehensive risk and vulnerability assessments of human movement.

ADAPTATION ACTIONS TO ADDRESS MOVEMENT

In order to understand the effects of climate variability and change in a particular geographic region, a climate vulnerability assessment (CVA) should be conducted. A CVA will provide further detail about a community’s or country’s exposure, sensitivity and adaptive capacity. It will also help identify specific areas or communities that are most vulnerable, and highlight which weather events pose the highest risk now and in the future. In the context of movement, a CVA can help increase understanding of which communities might be most likely to be affected by weather events and a changing climate, and thus at an increased likelihood of displacement or forced migration. Ultimately, a CVA provides an evidence base for decision-makers faced with a long list of possible adaptation options and helps them prioritize particular actions in specific geographic areas. It can also alert them to areas where further study is needed.
As stated previously, adaptation actions that affect movement often do so by seeking to minimize the impact of weather events and a changing climate on populations that might otherwise result in displacement or migration. Table 1 provides a robust (but not exhaustive) list of adaptation actions that could be considered to either limit a population’s exposure or sensitivity to weather events and climate variability and change, or increase a population’s adaptive capacity.

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<th>Event/Shock</th>
<th>Adaptation Action</th>
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<td><strong>Drought and Extreme Temperatures</strong></td>
<td>Introduce, support or promote agro-pastoralism as a sustainable land management practice.</td>
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<td>Introduce or promote improved livestock management techniques to reduce overgrazing and desertification, including:</td>
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<td>• Grazing management techniques such as matching stocking rate to carrying capacity, rotational grazing and/or dispersed grazing.</td>
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<td>• The use of semi-intensive production for livestock (free-range combined with intensive systems).</td>
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<td>• Improved fodder production techniques.</td>
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<td>• Use of improved breeds (such as indigenous varieties that are more resistant to diseases and drought and are high-yielding).</td>
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<td>Introduce or promote improved agricultural practices to reduce soil moisture loss and decrease crop loss or failure, including:</td>
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<td>• Provide training on changing planting patterns (such as altering crop rotations) and using intercropping to reduce soil moisture loss.</td>
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<td>• Encourage crop diversification from primary staple varieties (e.g., maize, rice) to include more drought resistant ones (e.g., cassava, sorghum, millet, cowpea, pigeon pea) and provide needed inputs.</td>
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<td>• Support and finance soil and water conservation techniques, such as mulching and planting cover crops.</td>
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<td>Introduce or promote improved water management techniques to ensure adequate water supply and decrease reliance on variable rain patterns, including:</td>
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<td>• Constructing water-harvesting structures such as water pans and shallow wells.</td>
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<td>• Piloting small-scale irrigation schemes that could safeguard crop and livestock productivity during dry periods.</td>
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<td>• Implementing small-scale dams and boreholes as alternative water sources.</td>
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<td>• Conducting stream restoration activities.</td>
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<td>• Providing support for rainwater harvesting.</td>
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<td>Introduce or promote alternative livelihoods, cash crops and financing to decrease reliance on subsistence crops, including:</td>
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<td>• Livelihood diversification programs.</td>
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<td>• Inter-household transfers and loans.</td>
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<td>• Expanding credit markets and access to credit.</td>
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<td>• Commodity trading and market linkages.</td>
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<td></td>
<td>• Crop diversification with high-yield cash crop varieties (e.g., coffee, tea, cotton, oilseeds).</td>
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<td></td>
<td>Develop or strengthen heat and drought warning systems, or encourage use of existing networks such as the Famine Early Warning Systems Network (FEWS Net).</td>
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<td></td>
<td>Introduce or strengthen a sustainable groundwater management strategy.</td>
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<td></td>
<td>Develop a drought management and response plan with water use prioritization.</td>
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<td><strong>Floods and Landslides</strong></td>
<td>Improve watershed management in areas affected by flooding, including upland/upstream reforestation activities.</td>
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<td></td>
<td>Introduce or scale up interventions to address drivers of deforestation, including:</td>
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<td></td>
<td>• Providing inputs (e.g., seedlings/saplings, soil amendments), equipment, training and extension services to support agroforestry.</td>
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<td></td>
<td>• Encouraging the use of improved cookstoves and alternative fuels.</td>
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<tr>
<td>Event/Shock</td>
<td>Adaptation Action</td>
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<td></td>
<td>Introduce interventions to address soil erosion, including:</td>
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<td></td>
<td>• Undertaking soil rehabilitation efforts or providing support to communities to</td>
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<td></td>
<td>engage in soil rehabilitation.</td>
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<td></td>
<td>• Promoting terracing along catchment slopes.</td>
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<td></td>
<td>• Providing training for extension workers on soil management techniques.</td>
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<td></td>
<td>Invest in replanting and tree-based business opportunities to promote ecosystem</td>
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<td>restoration, including:</td>
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<td></td>
<td>• Community woodlots and small-scale wood processing.</td>
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<td></td>
<td>• Nurseries and seedling production.</td>
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<td></td>
<td>• Fruit and fodder production.</td>
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<td></td>
<td>Introduce or promote agroforestry techniques such as border planting, alley</td>
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<td></td>
<td>cropping or Sloping Agricultural Land Technology (SALT) to reduce deforestation</td>
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<td></td>
<td>and erosion.</td>
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<tr>
<td>Tropical storms</td>
<td>Construct or repair drainage systems in cities and towns to reduce flooding</td>
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<td></td>
<td>caused by heavy precipitation events.</td>
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<td></td>
<td>Introduce or promote green infrastructure interventions such as green roofs,</td>
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<td>permeable pavement, urban parks and forests, and bioswales to capture stormwater</td>
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<td>runoff, reduce the strain on drainage systems and reduce flooding caused by heavy</td>
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<td>precipitation events.</td>
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<td>Encourage municipalities to introduce restrictions on development in flood risk</td>
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<td>zones.</td>
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<td>Construct dams, flood ways, dykes or other flood-control works.</td>
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<td>Preserve or rehabilitate natural wetlands, forested marshlands and retention</td>
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<td>Sea level rise</td>
<td>Construct storm-resistant housing, or rehabilitate housing damaged by a previous</td>
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<td>storm to include storm-resistant features such as an elevated structure, and use</td>
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<td>of reinforced concrete for wall, hurricane ties for the roof, and impact-resistant</td>
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<td>windows.</td>
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<td>Promote or provide support for interventions that act as a buffer against storm</td>
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<td>surge and inland flooding, including:</td>
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<td>• Planting or rehabilitating mangrove forests, particularly those near human</td>
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<td>settlements.</td>
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<td>• Constructing dykes, breakwaters, seawalls, revetments or other physical barriers.</td>
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<td></td>
<td>• Protecting or rehabilitating coral reefs.</td>
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<td>• Planting or rehabilitating a green buffer between coast and human settlements.</td>
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<td>Update building codes that specify the required resistance to wind, wind driven</td>
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<td>debris and height above defined flood risks.</td>
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<td></td>
<td>Construct dykes, breakwaters, seawalls, revetments or other physical barriers to</td>
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<td>protect human settlements from storm surge.</td>
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<td></td>
<td>Install or promote beach erosion controls, including hard engineering solutions</td>
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<td>(e.g., groins, breakwaters, dune rehabilitation, increased vegetation) and</td>
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<td>regulatory measures (e.g., buffers and setbacks).</td>
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<td>Build new infrastructure (or rebuild damaged infrastructure) further inland and at</td>
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<td>a higher elevation.</td>
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<td>Increase access or work with communities to access crop and livestock insurance</td>
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<td>to protect against loss or failure caused by drought, floods and tropical storms.</td>
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<td></td>
<td>Provide support to strengthen remittance networks and infrastructure to protect</td>
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<td>against loss of livelihood caused by an extreme weather event.</td>
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<td>Multiple shock types</td>
<td>Introduce or strengthen early warning systems for drought/heat, flood, and tropical</td>
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<td>storms.</td>
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<td>Provide support to improve weather observation networks—including</td>
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<td>hydro-meteorological data stations and streamflow gauges—and to increase access to</td>
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<td>weather and climate information.</td>
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<td>Provide support to climate-proof infrastructure, including hardening and protecting</td>
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<td>bridges and roadways, and hardening or relocating critical infrastructure.</td>
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**DROUGHTS AND EXTREME TEMPERATURES**

Drought is a complex phenomenon, and the 2014 IPCC assessment report (AR5) stressed low confidence in a global scale observed trend in drought, in part because of the difficulties in distinguishing
between long-term climate change and decadal drought variability (caused by El Niño, for example). A more recent IPCC report (2019) stated with a higher level of confidence that drought intensity and severity in certain regions have increased and will continue to increase—including the Mediterranean, west Asia, many parts of South America, much of Africa (particularly Southern Africa), and north-eastern Asia.

According to the IDMC, 1.8 million people were internally displaced due to drought in 2017. While the exact number of people who migrate internally due to drought is unknown, numerous reports and case studies (Raleigh et al., 2008; Foresight, 2011; Piguet and Laczko, 2014; Ionesco et al., 2017; Hermans and Garbe, 2019) indicate that drought—particularly drought conditions that persist through multiple crop cycles—affects movement. For example, one study found that during the 2015 drought in Ethiopia, four out of ten households in the study area engaged in some form of migration (Hermans and Garbe, 2019). Another analysis of studies from the Sahel region found that short-term rural-rural and rural-urban migration was a common coping strategy during droughts (Foresight, 2011).

Adaptation actions aimed at addressing drought typically focus on increasing adaptative capacity and reducing sensitivity—particularly within populations that rely on rainfed agriculture and grazing for livestock—with less focus on reducing exposure (which can often be difficult or impractical). As shown in Table 1, recommended adaptation actions fall into five categories: 1) improved livestock management; 2) improved agricultural techniques; 3) improved water management; 4) implementation of alternate or diversified livelihoods; and 5) improved information and planning. Collectively these actions are meant to reduce the push factors to migrate by mitigating the negative impacts of droughts on livelihoods. Further details about each category are provided below:

- **Improved livestock management.** In many parts of the developing world (particularly in Sub-Saharan Africa), livestock are raised in extensive production systems (i.e., grazing, pastoralism), and livestock practices are characterized by low inputs, low production, and low numbers of cattle per household (Robinson et al., 2011). This reliance on grazing and surface water, coupled with poor land management, leaves these areas particularly vulnerable to drought. Actions to increase the adaptive capacity of groups that rely on extensive production include: 1) improving grazing and land management to ensure there is ample forage during a drought event; or 2) introducing improved or indigenous breeds that are more resistant to drought. Adaptive capacity can also be increased by shifting away from exclusively relying on extensive production to mixed systems, agro-pastoralism or semi-intensive production using drought-resistant fodder.

- **Improved agricultural techniques.** Many places in the developing world rely on rainfed agriculture, and even in areas with irrigation, a heavy reliance on a single staple crop continues to be common. In some areas of Sub-Saharan Africa for example, up to 98 percent of agriculture is rainfed (Zermoglio et al., 2019). Drought can have a devastating effect in these areas, leading to significant crop losses or even total crop failure and famine. Actions to improved adaptive capacity focus largely on soil management to increase soil fertility and reduce soil moisture loss, including changing planting patterns to coincide with shifting seasonal rains, employing intercropping, planting cover crops during the off-season and mulching and composting. Diversifying crops from a primary staple crop (e.g., maize, rice) to include more drought resistant crops (e.g., cassava, sorghum, millet, cowpea, pigeon pea) can help increase adaptive capacity in the event a staple crop is lost to drought.
• **Improved water management.** Increasing the availability of water and decreasing reliance on seasonal rains for agriculture is another strategy to increase adaptive capacity. Adaptation actions in this category include: 1) introducing and funding small-scale irrigation systems; 2) restoring streams that have changed from perennial to seasonal due to land or streambank degradation; 3) tapping into groundwater with boreholes; and 4) increasing a farm’s ability to harvest and retain water with water pans, shallow wells or rainwater collection systems.

• **Alternate or diversified livelihoods.** Helping communities shift from an exclusive or primary focus on subsistence agriculture can increase a community’s adaptive capacity by limiting the impact of a drought. Adaptation actions often include supporting alternative livelihoods programs or introducing high-yield cash crops that can provide a source of income in the event a subsistence crop fails. Communities also benefit from improved access to credit, which can act as a buffer against a single season’s harvest failure, and access to markets, which can allow farmers to increase productivity and earn a profit during non-drought periods.

• **Improved information and planning.** At the national and regional level, information and planning can be strengthened to improve adaptive capacity at the community level. As seasonal rains change and decadal drought patterns shift, an early warning system that monitors for upcoming drought and heat events and transmits that information to farmers is crucial—particularly those who rely on rainfall. While a permanent national system would be ideal, tapping into existing early warning systems such as Famine Early Warning Systems Network (FEWS NET) can help ensure communities are adequately prepared for upcoming drought events.

**FLOODS AND LANDSLIDES**

Unlike drought, the IPCC was able to conclude with a medium level of confidence that there has been an increase in the intensity and frequency of heavy precipitation events at a global scale (IPCC, 2019) and that this trend will increase as warming increases. Communities located along rivers, coasts and in urban areas are most likely to be affected by an increase in flooding from heavy rainfall, particularly in Asia, Central and South America and Sub-Saharan Africa (excluding southern Africa) (IPCC 2014). In urban areas, informal settlements are often the most vulnerable, due in part to poor housing quality and lack of services, but also due to the tendency of informal settlements to be located in areas prone to flooding. This trend is likely to increase—by 2060, an estimated 105–180 million additional people globally may be living in the floodplains of urban areas (Foresight, 2011).

Flooding tends to be associated with displacement, and per the IDMC, 8.6 million people globally were internally displaced by floods in 2017, accounting for almost half of all disaster-related displacements (IDMC, 2018c). Although exact numbers are not known regarding the number of people who move due to flooding, as flooding becomes more frequent and severe in certain locations, the number of people forced or driven to move is likely to increase.

Adaptation actions for flooding typically address the issue by focusing heavily on reducing exposure to flooding (by decreasing the likelihood of a flood caused by a heavy precipitation event) and to a lesser extent on decreasing a community’s sensitivity to flooding. As shown in Table 1, recommended adaptation actions fall into four categories: 1) reducing deforestation; 2) encouraging reforestation; 3) constructing hard infrastructure and physical defenses; and 4) restoring natural defenses and constructing green infrastructure, which are described in detail below.
• **Reducing deforestation.** Significant deforestation can greatly increase flood and landslide risk – particularly flash flood risk – by decreasing the absorptive capacity of land and increasing erosion and sedimentation in streams and rivers. Deforestation in developing countries is frequently driven by the conversion of forests to agricultural or grazing land, illegal logging, and the use of timber for firewood and charcoal (IPCC, 2019). Adaptation actions to address these drivers can include: 1) improved watershed management; 2) support for agroforestry; 3) introduction of improved cookstoves and alternate fuels; and 4) alternative livelihood activities to help curb deforestation.

• **Encouraging reforestation.** Reforestation efforts can have a positive impact on reducing flood and landslide risk by absorbing runoff, decreasing erosion and sedimentation of streams and rivers, and improving soil quality. In addition to replanting efforts, introducing agroforestry techniques such as border planting, alley cropping or SALT, and providing support for agroforestry (e.g., inputs, equipment, training) and tree-based businesses (e.g., community woodlots, fruit tree cultivation) can help incentivize reforestation and decrease the conversation of forests to agricultural land.

• **Constructing hard infrastructure and physical defenses.** While costly, constructing hard infrastructure and physical defenses is often the most beneficial solution for protecting communities from the effects of flooding and landslides. In urban areas, heavy precipitation events are more likely to lead to flooding due to a prevalence of impermeable surfaces, lack of drainage systems or drainage systems in disrepair, and often, proximity to rivers and coasts. Informal settlements in particular are susceptible to flooding due to a lack of drainage systems and often being located on flood prone areas. Construction and maintenance (e.g., repair of collapsed sections, unblocking of clogged sections) of drainage systems can reduce flooding. Cities can also construct physical defenses to mitigate the impacts of flooding and landslides, including such common solutions as dams, dykes, diversion canals, levees, debris flow barriers and landslide barriers.

• **Restoring natural defenses and constructing green infrastructure.** As human settlements have expanded, natural defenses such as wetlands, forested marshlands, and retention areas have been converted for housing and agriculture, reducing the ability of these areas to absorb and disperse flood waters. Protecting these areas from further development, coupled with streambank rehabilitation and other ecosystem restoration measures can help mitigate the effects of flooding. In urban areas, natural measures to absorb stormwater runoff, commonly known as green infrastructure, can reduce the amount of runoff that reaches drainage systems and further minimize the effects of a heavy precipitation event. Typical measures include installing green roofs, permeable pavement and bioswales, as well as establishing urban parks and forests.

**TROPICAL STORMS**

While tropical storms and cyclones are not expected to become more frequent globally with climate variability and change, the IPCC AR5 concludes it is likely that maximum wind speed and precipitation rates will increase, meaning each individual storm is likely to be more damaging, and have a greater impact on human settlements (IPCC 2014). The impacts will be greatest in areas that already have active cyclone seasons, including the US and Caribbean Islands, East and Southeast Asia, countries that border the Bay of Bengal, Eastern Africa and the Pacific Islands.
Storms and cyclones are the largest disaster-related cause of internal displacement, with 14.4 million people displaced in 2017, accounting for 75 percent of all disaster-related displacements and nearly half of all displacements (both conflict and disaster) (IMDC, 2018). Conversely, storms are not typically considered an important driver of permanent migration; rather, studies have shown that migration rates in storm-affected areas and non-affected areas are similar, indicating that migration is not driven by storms (Raleigh et al., 2008).

Adaptation actions for tropical storms frequently focus on reducing sensitivity, and seek to minimize the impacts of storms on homes and livelihoods, reducing displacement or reducing the length of time a community is displaced. As shown in Table 1, recommended adaptation actions fall into two categories: 1) improving housing construction and location; and 2) increasing defenses against storm surge, which are described in detail below.

- **Improving housing construction and location.** Many homes in developing countries—particularly those in rural areas and informal settlements—are not capable of withstanding tropical storms. Poor construction quality is in part the result of low incomes, and in part due to a lack of building codes and zoning regulations. Municipalities can address poor building construction and location by developing and enforcing development regulations. Regulations to consider include: 1) updating building codes to specify the required resistance to wind, wind-driven debris, and height above defined flood risks; 2) introducing restrictions on development in flood risk zones; and 3) establishing setback regulations that specify the distance homes must be from rivers and coasts. Countries and municipalities can also provide subsidies or grants to construct storm-resistant housing (or rehabilitate housing damaged by a previous storm), including storm-resistant features such as an elevated structure, and the use of reinforced concrete for wall, hurricane ties for the roof, and impact-resistant windows.

- **Increasing defenses against storm surge.** Storm surge is often the greatest threat to life and property from a cyclone for coastal communities. With increased storm intensity comes the likelihood of larger and more powerful storm surges (which will be further enhanced by sea level rise). Adaptation actions to mitigate the impacts of storm surge can include restoration of natural defenses, including planting or rehabilitating mangrove forests, protecting or rehabilitating coral reefs, and establishing green or forested buffers between the coast and human settlements, as well as construction of physical barriers, including dykes, breakwaters, seawalls, and revetments.

**SEA LEVEL RISE**

While studies are all in agreement that sea levels will continue to rise, the exact magnitude of that rise is uncertain. New research estimates that 190 million and 630 million people globally will occupy land below projected high tide lines in 2100 under the low and high emissions scenario, respectively (Kulp and Strauss, 2019). While very little research has been conducted on the effect of sea level rise on movement, a small number of case studies exist to demonstrate the correlation—most notably on Kiribati (UN ESCAP, 2015). Despite the lack of research, it stands to reason that if large portions of currently inhabited land become permanently inundated, those populations will be forced to relocate and may be driven to migrate even before permanent inundation occurs.
Adaptation actions to address sea level rise typically focus on short-term protection strategies, and long-term preparation and planning strategies. As shown in Table 1, recommended adaptation actions fall into two categories: 1) construction of physical barriers; and 2) relocating or building new infrastructure at higher elevations.

- **Construction of physical barriers.** While no physical barrier is likely to permanently protect against sea level rise, barriers and erosion controls can protect communities in the short- to medium-term. Dykes, breakwaters, seawalls and revetments can be constructed to protect communities from rising sea levels and seasonal high tide events. Beach erosion controls can be installed to slow the rate at which coastal erosion is occurring and can include solutions such as groins, breakwaters, dune rehabilitation and increased vegetation, as well as regulatory measures such as buffers and set-backs that limit the impact of development on coastal erosion.

- **Relocating or building new infrastructure at higher elevations.** Low lying coastal communities should incorporate sea level rise projections into infrastructure planning and long-term development plans. Critical infrastructures such as roads, seaports and airports, hospitals, power plants and others should be assessed for their vulnerability to sea level rise. Investment plans for infrastructure that could be vulnerable to sea level rise in the future should include funds to relocate or rebuild at higher elevations at the end of the infrastructure’s service life.

**ACTIONS TO REDUCE OVERALL VULNERABILITY**

While the adaptation actions listed above are tied to specific hazards, in reality, many of those actions have multiple benefits. For example, building physical sea defenses can protect against sea level rise, and can also protect against storm surge and flooding. The adaptation actions listed below are not tied directly to a specific hazard but instead can reduce household and community level vulnerability overall, by providing mechanisms to hedge against risk, helping communities adapt to a changing climate and providing tangible means for both households and communities to cope with shocks and stresses.

- Increase access to or work with communities to access crop and livestock insurance to protect against loss or failure caused by drought, floods and tropical storms.

- Provide support to strengthen remittance networks and infrastructure to protect against loss of livelihood caused by an extreme weather event.

- Provide support to improve weather observation networks—including hydro-meteorological data stations and streamflow gauges—and to increase public access to weather and climate information. Developing or strengthening early warning systems for drought/heat, flood, and tropical storms can help communities prepare, and can reduce the loss of life and property from an event.

- Provide support to climate-proof infrastructure, including hardening and protecting bridges and roadways, and hardening or relocating critical infrastructure to protect against floods, more intense tropical storms, and sea level rise.

- Strengthen policies and regulations such as: land use and development regulations; land reform and titling; environmental and natural resource management plans; emergency response plans; water allocation plans; and water abstraction regulations.
INTERNAL MIGRATION AS AN ADAPTATION ACTION: BENEFITS AND CHALLENGES

As previously discussed, internal migration can be viewed as a successful adaptive response and/or as a failure of in situ adaptation. Further, research shows that migration can produce both positive and negative effects for the people who move and for those who stay behind. Several factors inform the nature of the outcome, including who is moving, whether the migration is planned or in response to a specific event, whether that event is slow- or sudden-onset, and whether those who migrate are protected, welcomed and supported.

BENEFITS

As a positive adaptation response, migration is a means of enhancing resilience by supplementing incomes, diversifying livelihoods, increasing the flow of remittances, and building linkages between sending and receiving areas. Migration may also reduce the pressures in the communities of origin (Barbier, 2009). The case for migration as an adaptation response – particularly when it is planned and supported – is made clearly by the UN Food and Agricultural Organization (FAO):

“Migration can be an adaptation strategy to climate change. Safe, orderly and regular migration can contribute to agricultural development, economic growth, food security and rural livelihoods… Migration can increase the resilience of vulnerable populations especially in climate-sensitive rural areas. Migrants can help create decent employment and inclusive social protection systems by transferring remittances, technology, knowledge and skills.” (UN FAO, 2017, p. 3)

Seasonal internal migration, which has been practiced in some regions for generations, is also an important livelihood option for agricultural communities during droughts or dry periods, providing a means of livelihood diversification while decreasing consumption requirements in the sending community. The UN FAO concludes that migration “can be a proactive adaptation strategy, particularly at early stages of environmental degradation” (UN FAO, 2017). However, this underscores an important point: timing and context matter. Seasonal migration might be an appropriate form of adaptation in some circumstances as a means of coping with short-term stressors but may no longer be viable after environmental degradation or climate impacts reach a point where habitability is reduced (see Fiji case study, pp. 65-71).

CHALLENGES

Poorly managed migration can increase vulnerability to climate variability and change, heighten pressure on scarce natural resources, increase poverty, and exacerbate tensions between migrants and host communities (UN FAO, 2017). Migration flows may enhance aggregate exposure to climate risks as people are as likely to migrate to places of climate vulnerability as they are to migrate away from vulnerable places (Black et.al., 2011a, Adger, 2005; Foresight, 2011)—for example, in rural-urban migration, migrants often first settle in flood prone informal settlements. Learning norms and responses to climate related hazards in a new community also takes time, and may enhance vulnerability to new risks (Foresight, 2011, p. 160).
Unplanned migration often has the greatest negative effect on the poorest segments of society in the sending and receiving communities. For example, in Pakistan, the poorest segments of the population are the first to migrate as they do not have the adaptive capacity to remain, while in Haiti, the poorest segments remain behind as they do not have the resources to move (Mueller et al., 2014). Similarly, insecure land tenure—a problem most encountered in the poorest segments of society—can prevent people from leaving high-risk areas (Hugo, 2013). The effects of poorly managed migration are also likely to vary by individual characteristics, such as gender, age, ethnicity, and social status.

IN FOCUS: SUB-NATIONAL POLICY, INSURANCE, AND CLIMATE RESILIENCE AND MOBILITY IN THE UNITED STATES

In the United States, a patchwork of state and local policies and programs, primarily in coastal areas, form the base of climate resilience initiatives. Among these efforts, there is very limited consideration of how climate impacts migration. At a national level, climate relevant policy and programming, such as the Stafford Act (federal disaster assistance) and National Flood Insurance Program, have been criticized for mandating that recovery funds be used on the original site even when this requirement traps people in increasingly uninhabitable areas and leads to further losses in subsequent disasters.

Florida has recognized its risk from sea level rise and intensifying hurricanes and has taken steps toward climate resilience. In 2015, the state legislature mandated local governments to consider the impacts of sea level rise in local comprehensive plans (Markell, 2016). Following Hurricane Irma in 2017, the state allocated $3.6 million to assist local governments in planning for sea level rise and implementing coastal resilience projects (Ritchie, 2017). The state mandate and budget allocation are significant steps; however, the planning mandate gives little guidance on how to consider sea level rise and the budget allocation was not nearly enough to make meaningful progress across the state. Climate resilience in Florida, however, continues to be organized and implemented through efforts such as the Southeast Florida Regional Climate Change Compact, the first group of local governments in the U.S. to collectively address climate risk on a regional scale (Menees and Grannis, 2017).

Meanwhile, although government entities are not directly addressing climate related migration, some coastal residents and business owners are selling their properties and moving on their own. This process is already starting to create “climate change gentrification.” For example, in Miami, wealthy, coastal residents and businesses are moving inland displacing often lower-income, minority residents while those unable to move from the coast are left in increasingly tenuous circumstances (Bolstad, 2017). The recent wildfires in California have also drawn increased attention to the role of insurance in enabling settlement and rebuilding in high risk areas (Hoffower, 2018). In the United States, it may be changes in insurance policies (flood and fire), rather than government policies, that will primarily influence habitation in or movement from areas of high environmental risk.
V. CONCLUSION

As documented throughout this report and evidenced in the literature, the motivations that drive people to move are multi-causal, and climate variability and change will likely continue to impact the probability, scale and circumstances under which people move. The complexities of this phenomenon are amplified by the spatial and temporal variability of predicted changes in climate, as well as similar challenges in forecasting mobility patterns. This section summarizes key lessons from the literature, as well as remaining gaps that need to be addressed to better understand, plan for and support movement in a changing climate.

LESSONS LEARNED

Building on both the literature review and the four case studies presented in this paper, the following observations are made:

- Climate variability and change act as risk multipliers affecting individuals and communities. Local governments in both the sending and receiving communities will bear the brunt of the responsibility for planning and managing migration (and to a degree displacement). Therefore, migration and displacement policies should be incorporated into both urban and rural development policies to improve the resilience of systems and plan for increased population flows – both temporary and permanent.

- Regional coordination to improve the collection of data specific to migration is essential, as is national level involvement to provide financial resources and technical expertise, or to resolve disputes between local authorities, is also necessary.

- As climate-related movement takes many different forms, it will continue to require context specific policy responses rather than a one-size-fits all approach. Political context, the number of people likely to be affected (and their social, economic and geographic characteristics), the nature of the climate or natural hazard, human capacity and available resources are all key factors that will shape policy responses.

- While there is a growing consensus that migration and displacement will increase due to climate variability and change, gaps remain in accurately estimating the number of people who are likely to move and the extent to which measures to promote climate resilience will reduce this number. There is also consensus that most displacement and migration is and will continue to be internal (Rigaud et al., 2018) with movement primarily from rural to urban settings. It is also widely accepted that people who move in response to climatic and environmental stressors/impacts will tend to follow existing patterns of internal movement for economic reasons. The four case studies in Annex A provide examples of this phenomenon.

- Sudden-onset natural disasters are most likely to trigger temporary displacement, while longer term climate change, given its slower onset but more permanent nature, is more likely to influence climate migration.
OPPORTUNITIES FOR IMPROVED INTEGRATION OF CLIMATE AND MOBILITY PROGRAMMING

Development programming represents a critical opportunity to build capacity and provide key resources to address movement in adaptation planning and implementation, and support more resilient outcomes. In addition to the adaptation actions outlined above to mitigate the negative impacts of specific hazards, the following interventions can be considered for both country-level strategies as well as targeted programmatic activities:

- Support government migration and displacement planning in climate adaptation, risk reduction and national development policies. The development and updating of NAPs serve as a good entry point for this assistance.

- Assist national governments with the development of migration procedure templates for municipal planning processes or work directly with municipalities on local development plans.

- Participate in donor-led international and host country initiatives, such as conducting large scale, longitudinal studies tracking climate impacts and related human movement, to assess links between climate variability and change and migration and justify effective responses. Large scale, longitudinal studies that track weather events and climate trends along with movement of specific individuals are the most comprehensive way to assess climate/movement dynamics.

- Coordinate with donor organizations to assist host countries in accessing climate funding (e.g., Green Climate Fund, the Global Environment Facility and other international entities) aimed at strengthening migration governance, including use of the capacity development mechanism included in the Global Compact on Migration.

- Promote data and research sharing between host governments and other donors to better support migration and displacement planning and responses. Invest in early warning systems that track slow-onset and extreme climate events and migration trends to advance from reactive response to proactive resilience building actions.

- Coordinate with international governance bodies relevant to internal migration and displacement programming. Improve coordination and programming with explicit or implicit links to movement, including resilience activities, to better understand the correlation between climatic drivers and movement.

- Align practice with policy to building resilience. In Kenya, for example, although progress is being made toward integrating climate and mobility into relevant policy, older policies still exist that work at cross purposes, such as: 1) state-driven development that privatizes or otherwise limits access to lands used by pastoralists; and 2) conservation-related land enclosures that result in displacement or remove access to resources with inadequate safeguards/compensation for those whose livelihoods are adversely impacted.

CONCERNING RELOCATION

Relocations are expensive and deeply unpopular with communities. Avoiding the need to relocate communities should be a powerful incentive for investing in climate resilience and processes that facilitate migration and remittance flows. Guidance should be developed to help governments consider migration and remittance flows in climate resilience efforts as it may mitigate the need for future large-scale relocation. However, there are some cases (SIDS in particular) where the nature of the hazard is so significant that future relocation seems an unavoidable conclusion. Thus, even if the risk is not
imminent, local authorities in areas with documented evidence of climate vulnerability might want to begin contingency planning to ensure any future relocation is as well managed and organized as possible.

It is important to recognize that those who have not migrated earlier, and thus may be trapped populations, may be particularly vulnerable and will most likely need governmental assistance in relocating. Evidence suggests that when relocations are necessary, as in Fiji and Isle de Jean Charles, community engagement and careful planning are key to successful outcomes and will help mitigate against policies or actions that may contribute to existing disparities among the migrants or receiving communities. Research on indigenous communities in Alaska demonstrates the importance of community engagement in the decision to relocate (Bronen, 2011). Community-driven processes for relocation need adequate and coordinated support from state and non-state actors. Fiji’s draft Relocation Guideline is an example of a national policy that incorporates lessons learned from development-induced displacement into a set of robust guidelines for relocation efforts in response to climate change.

EXPANDING THE KNOWLEDGE BASE

Literature evaluating the effectiveness of national policies on planning for internal migration caused by climate variability and change remains limited. Field-based research in countries likely to experience climate related internal migration would support improved understanding of the potential scope and scale of the problem and inform how policy responses should account for slow- versus sudden-onset events. Further, additional information on the differences between climate-motivated internal migration and other forms is needed to determine when the two groups should be treated separately or together in policy responses.

Where climate policies exist, they often lack integrated internal migration considerations and vice versa. Improved data and modeling are needed to help governments better understand what climate stressors are likely to lead to increases in internal migration, and the temporal and spatial dimensions thereof. It will be important for policy makers to consider the way that seasonal or circular migration can fit into adaptation, risk reduction and development planning. The engagement of sending and receiving communities is particularly important in developing and implementing such policies.

In addition, further analysis is recommended on the following four key areas where the literature review revealed some action is taking place, but where evidence is sparse: 1) the role of regional and international organizations in encouraging governments to adopt policies on movement caused by climate variability and change, and the type of expertise needed to support integrated policies; 2) good practices to incorporate internal migration in urban planning initiatives; 3) efforts to improve resilience in place; and 4) analysis of policy harmonization between rural and urban areas.

As most movement is expected to be internal, establishing a resource database (supported by evidence) that captures and analyzes internal movement trends could provide critical information to governments on how to incorporate internal migration and displacement into their national laws and policies. Key data points could include: 1) characteristics of migrants; 2) the type of migration (permanent, temporary, circular); 3) individual/household migration history; 4) how migration correlates to weather or climatic
event(s); and 5) individual/household motivations (to the extent they are not made explicit). Including additional information on other events driving internal migration (e.g., political unrest, economic shocks) would help in determining the relative strength of climate as a driver. This may also help to examine thresholds/tipping points wherein coping capacity is exceeded and movement is triggered. Improved comparative analysis of other compound risks could also inform data collection, modeling, and resulting policies. Examples include: 1) climate; 2) mobility and food security; 3) health and shifting disease burdens; and 4) conflict and fragility.

Since this challenge does not lend itself to a one-size-fits-all model, the resulting information and guidance would need to be adaptive to account for context specific governance structures, challenges, resources and hazards, as well as account for movement on a continuum (e.g., voluntary, forced, displaced, permanent relocation). The guidance could guide priority tasks such as: 1) collecting evidence on areas at risk; 2) examining zoning regulations in urban areas that are anticipated to receive people moving for environmental reasons; and 3) deciding which ministries should be responsible for specific activities.
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ANNEX A: CHALLENGE IN CONTEXT, CASE STUDIES ON MOVEMENT GOVERNANCE

The following case studies – Bangladesh, Fiji, Kenya and the United States – examine climate-related internal movement, both migration and displacement, with a focus on the policy and legal frameworks relevant to mobility, as well as an analysis of adaptation options across diverse contexts. These cases were chosen to reflect the diversity of climate and environmental risk and governmental response to movement in response to those risks. Bangladesh and Fiji both face significant risks from sea level rise, increased intensity of storms and inundation. While the climate risk is the same, the context and policy responses in in case vary significantly. In Bangladesh, the overall trend centers on movement away from coastal areas to cities, particularly Dhaka, the capital. In Fiji, the government has produced some of the most comprehensive policies on internal climate migration, including: 1) migration as a form of adaptation; and 2) planned relocations to mitigate against climate impacts and reduce the vulnerability of coastal populations.

On the other end of the hazard spectrum, Kenya is a country very likely to suffer the effects of prolonged drought. While it has developed strong policies on internal displacement, these may not be enough to respond to the movement of large numbers of drought-driven people. Unlike the three other case studies, the United States does not have a national policy on movement in response to climate change; rather policies are being formulated at the state and municipal level and overwhelmingly focus on increasing climate resilience so people can remain in their current locations.

BANGLADESH: CLIMATE STRESSORS AND URBANIZATION

Introduction
Bangladesh is highly vulnerable to climate variability and change with 80 percent of the country located in low-lying coastal zones and river floodplains and 40 percent of the labor force employed in climate-sensitive agriculture (World Bank, 2017a). Increasing temperatures, sea level rise, riverine flooding and cyclone intensity pose risks to the population and economy (see Figure 5). Its population of 165 million (2017) is expected to grow to 196 million by 2050 (Rigaud et al., 2018). In addition, it has one of the highest population densities in the world at 1,240 people per km² of land, with more than 36 million people living in the country’s expansive coastal zone where sea level rise and storm surges are already increasing erosion, fresh water and soil salinization, and flooding in densely populated areas of productive lands (Rigaud et al., 2018; Ahmed and Suphachalasai, 2014). Sea level rise of one meter is projected to inundate 3.2 percent of the country’s land area and 14 percent of Dhaka by 2100 (Rigaud et al., 2018; Ahmed and Suphachalasai, 2014). Sea level rise impacts are concentrated in the coastal zone but extend inland along the Brahmaputra, Meghna and Ganges rivers (Rigaud et al., 2018).
Bangladesh has a high level of past and ongoing internal mobility, with large numbers of people engaged in rural-to-urban movements (Rigaud et al., 2018). Internally, rural-urban migration and the resulting burgeoning informal urban settlements are generating severe public service deficits that have become major policy concerns and the subject of heated public debate (Marshall and Rahman, 2013). Mobility is primarily linked to economic drivers, but disaster displacement is also significant. For example, the Internal Displacement Monitoring Centre (IDMC) estimates that 4.7 million people were displaced by disasters in Bangladesh between 2008 and 2014 (IDMC, 2015c). Internal migration in response to climatic and environmental factors also appear to be on the rise.

**Overview of Internal Migration: A focus on Rural-Urban Shifts**

*Internal mobility trends*

In absolute numbers, the vast majority of the Bangladesh's internal migration is to Dhaka and to a lesser extent, Chittagong and Gazipur. Urban population growth in recent decades has occurred at 2-3 percent nationally, with higher rates in Dhaka (Marshall and Rahman, 2013). This growth is driven in large part by internal mobility towards the garment industry concentrated in Dhaka and Chittagong (Rigaud et al., 2018). A 2005 assessment found that migrants represented more than half of slum residents in Dhaka, Chittagong and Sylhet and 65-70 percent of slum residents in Khulna, Rajshani and Barisol (Islam et al., 2006). In recent years, however, there is some evidence that rapid urbanization in Dhaka is abating as rural labor markets have tightened and agricultural productivity has increased leading to greater distribution of movement to urban peripheries and secondary cities (Marshall and Rahmann, 2013).

Climate factors also appear to drive internal migration. Most of the extensively surveyed slum-dwelling migrants in Dhaka, Khulna and Barisal came from coastal areas at-risk from sea level rise and cyclones (Islam et al., 2006). Coastal cities and rural areas have experienced much lower than average population growth due to out-migration in recent years. In some cases, population numbers are even dropping (Marshall and Rahmann, 2013). Bangladesh has long established patterns of seasonal internal migration associated with annual wet and dry periods, which are particularly prominent in the subsistence
agriculture regions of the northwest and northeast (Marshall and Rahman, 2013). Social inequality, food insecurity and labor demand appear to be the key drivers of internal seasonal migration (Etzold et. al., 2014). In the past, this seasonal movement was to neighboring agricultural areas but since the early 1990s, has increasingly included migration to urban centers, and has become more permanent in nature (Marshall and Rahman, 2013). Flooding in the northeast also leads to temporary displacement as seen in the case of the August-October floods of 2014 that displaced 360,000 people (IDMC, 2015c).

In Bangladesh, river erosion, flooding and cyclones are the main sudden-onset drivers of displacement, while key slow-onset processes are sea level rise, coastal erosion, saltwater intrusion/salinization, changing rainfall, rising temperatures and drought (Rabbani et al., 2016). Saha (2017) found that the destruction by Cyclone Aila in 2009 decimated agriculture, fishing and forestry livelihoods leading households in central Bangladesh to move to the secondary city Khulna despite a reluctance to move (Saha, 2017). In 2013, Cyclone Mahasen displaced 1.1 million Bangladeshis from coastal areas, and in 2017 Cyclone Mora, followed by monsoon flooding, displaced 946,000 people (IDMC, 2015c; IDMC, 2017b). Sea level rise impacts a critical risk zone within four kilometers of the coast, with high potential for out-migration due to impacts to housing, water sources and farmland inundation (Dasgupta et al., 2014). Migration from the coast occurs mainly within the district of origin and is expected to increase with sea level rise, particularly in Chittagong and Khulna (Chen & Mueller, 2018).

For farmers, crop failure related to drought has a significant impact on long-term internal migration (World Bank, 2017a). Longitudinal research has found that in areas where the proportion of households experiencing crop failure increased by one percent, there was a corresponding 3.5 percent increase in long-term migration (Gray and Mueller, 2012a). This increased migration, however, was primarily among households that did not directly experience crop failure. Rather the effects of crop failure on individual households was to suppress migration (Gray and Mueller, 2012a). This suppressed movement is likely related to a lack of resources to support migration after failed harvests, and points to the emergence of trapped populations in areas of increasing environmental stress (Gray and Mueller, 2012a).

Influence of climate on internal migration

Modeling suggests that climate stressors (sea level rise, rainfall variability, heat stress) will increasingly drive large-scale internal migration in Bangladesh (Rigaud et al., 2018). Under a pessimistic scenario, climate impacts may become one of the dominant forces driving internal migration, leading an estimated 13.3 million people to migrate away from areas of flooding (coast and river floodplains) and declining crop productivity (mainly in the northeast) by 2050 (Rigaud et al., 2018).

In coastal areas, sea level rise and flooding are expected to dampen population growth and create out-migration hotspots in Dhaka, the river delta south of the city and the eastern coast near Chittagong (Rigaud et al., 2018). Despite this projected out-migration, the two cities are expected to experience continued population growth, as well as the highest population densities in the country (Rigaud et al., 2018). Outside the coastal zone, climate stressors on agriculture are expected to lead to further out-migration from the rice-growing areas of the northeast. Rice is the primary staple food produced and consumed in Bangladesh and production is expected to decrease by 2050 (Haque et al., 2016). These stressors include abnormally heavy pre-monsoon rainfall that can damage or destroy crops, which
occurred in May 2017 with two million tons of rice crops destroyed just before harvest (Siddique, 2017).

In-migration is expected into the irrigated and rainfed agricultural areas along the Ganges where better agricultural conditions are projected (Rigaud et al., 2018). Some have contested these projections, noting that urban centers are likely to remain a strong pull for migrants. The country’s continued high exposure to flooding is expected to increase displacement by 4.8 percent between 2015 and 2025 (IDMC, 2015c).

Internal migration processes and outcomes
While rural-to-urban migration has been positive in the aggregate, it has contributed to unequal outcomes with areas of intense urban poverty as well as the economic “hollowing out” of some areas of origin (Marshall and Rahmann, 2013). The pace and extent of migration to urban areas in Bangladesh has led to rapid and unplanned urbanization in cities, most dramatically in Dhaka. In line with findings globally, research in Bangladesh highlights how better resourced households are more likely to undertake migration in a more planned manner, while the most vulnerable and those displaced by disasters are more likely to experience distress migration or displacement (Adri, 2014; Islam and Shamsuddoha, 2017). Adri (2014) found that economic migrants had higher incomes, savings, home

SPOTLIGHT ON CYCLONE AILA: COASTAL VULNERABILITY

On May 25, 2009, just 18 months after the damaging Cyclone Sidr, Cyclone Aila hit Bangladesh producing a storm surge that ranged from two to four meters. The cyclone led to widespread flooding, damaged crops and livelihoods, and impacted 3.9 million people causing 190 deaths (UNDP 2010). The storm surge inundated freshwater fishponds and farms with sea water, and damaged or destroyed hundreds of kilometers of embankments built to protect the coast (UNDP 2010). The cyclone led to large economic losses, prolonged suspension of livelihood activities and displacement of 300,000 people followed by considerable migration due to destruction of housing and farmland (Mehedi, et al., 2010). In the hard-hit sub-district of Koyra Upazila, 42,000 people (28 percent of the population) migrated internally after the cyclone, many to informal settlements in Khulna, the country’s third largest city (Sadik, et al., 2018).

Government and humanitarian organizations responded quickly with emergency support and humanitarian assistance (e.g., emergency shelter, cash grants, food assistance). Later, international assistance supported recovery and reconstruction in line with government disaster response. Seven years after the cyclone, however, migrants remained in Khulna and other destinations and affected communities continued to be impacted by tidal flooding due to the damaged embankments, income insecurity and a lack of freshwater (Sadik, et al., 2018).

Since the 1970s, Bangladesh has continuously improved disaster preparedness and management. Notably, the country chairs the Platform on Disaster Displacement (through June 2019), which works towards better protection for people displaced in the context of disasters and climate change and supports a multi-stakeholder forum for dialogue and implementation. Disaster-related policies, however, tend to focus on disaster early warning and the immediate aftermath rather than on addressing long-term resilience or the needs of those forced to move. Efforts to improve land use planning, road networks, coastal embankments and agricultural practices, for example, were not included in recovery planning and implementation after Cyclone Aila (Sadik, et al., 2018). Further, bureaucratic barriers inhibited recovery, such as a lack of embankment repair due to diminished government funds and legalities that prevent non-government entities from working on embankments (Sadik, et al., 2018). Moving forward, Bangladesh faces the difficult decision of many coastal countries – whether to encourage migrants and those displaced after disasters to return to vulnerable coastal areas (through support for housing, livelihoods and coastal protection embankments) and/or address the needs of migrants in the expanding informal settlements of the country’s urban areas.
ownership and asset bases than their counterparts who faced slow- or sudden-onset disasters. In contrast, climate migrants in Dhaka City reported higher unemployment, more reliance on loans, and diminished social networks, food security and health conditions in comparison to both non-environmental migrants and the conditions at their origin before the environmental stressor (cyclone, flooding or river bank erosion) (Adri, 2014). While economic migrants appear to fare better than environmental or climate migrants, non-migrant households in the studied districts appear to be better off than migrant households.

Policies and Institutional Efforts Relevant for Internal Migration

Increasing climate resilience

Bangladesh has identified climate change adaptation as a key national priority. The country is already mainstreaming adaptation into the water, health, forestry, agriculture and infrastructure sectors in line with the 2009 Bangladesh Climate Change Strategy and Action Plan (BCCSAP). BCCSAP is resourced by two funding sources: 1) government; and 2) donor. Each year since 2009, the Ministry of Finance (MOF) has allocated funds for adaptation actions identified in the BCCSAP leading to government investment of more than $500 million over the last decade (Huq, 2018). These efforts have served to mainstream climate change into much national and sectoral development planning and supported hundreds of adaptation projects at local and national levels, with many focusing on food security, livelihoods and disaster risk reduction (DRR) (Huq, 2018). The country has also made substantial progress in addressing cyclone risk through an extensive Cyclone Preparedness Program that includes an early warning system and approximately 2,000 shelters across the coastal zone, which has significantly reduced loss of life in recent cyclones (IDMC, 2015c).

Integrating climate and internal migration in policy and institutions

The government is also engaged in national and international efforts (e.g., Platform on Disaster Displacement) to address displacement and migration. At a policy level, the country’s 2015 National Strategy on the Management of Disaster and Climate-Induced Internal Displacement was developed to address disaster and climate-induced internal displacement by providing a strategic policy framework, legal mandate and dedicated institutional arrangements. Further, the National Sustainable Development Strategy recognizes that absent adaptation efforts, climate impacts (e.g., sea level rise, riverbank erosion, saline water intrusion) may displace large numbers of people by 2050 (GOB, 2013). The government has also supported relocation programs (e.g., Guchchagram) in response to landlessness and natural disasters such as those noted above. These programs establish cluster villages, typically on government land, aimed at poverty alleviation and providing land and shelter. Despite these efforts, the share of landless households has increased over the last 40 years (USAID, 2010).

The government commonly recognizes migration and/or displacement in climate, disaster and development related policies and strategies. Key documents are the BCCSAP (2009) and National Strategy on the Management of Disaster and Climate-Induced Internal Displacement (2015). In BCCSAP, the government lays out long-term action points to address internal and cross-border migration, including developing a monitoring mechanism of internal and external migration and a protocol to provide adequate resettlement and rehabilitation support to migrants. The National Strategy on the Management of Disaster and Climate-Induced Internal Displacement takes a rights-based approach to managing displacement in line with IOM’s migration management cycle and references the Guiding
Principles on Internal Displacement. It also aligns with GOB’s social development framework and national and international disaster risk reduction and adaptation frameworks. Bangladesh’s Perspective Plan for 2021-2041 is expected to offer additional direction on climate and migration (Rigaud et al., 2018). Bangladesh is currently revising BCCSAP and the new document is expected to include actions toward assisted migration (Wyns, 2017).

With increasing challenges related to internal migration mainly seen in expanding informal urban settlements, there is wide consensus about the need for a comprehensive policy and/or a central ministry dedicated to internal migration management (Marshall and Rahman, 2013). Outside of targeted disaster response and limited relocation efforts, there is little coordinated national planning or assistance for migrants or those displaced (Rabbani et al., 2016). Policy responses to the massive internal rural-urban migration to date have been weak, with little intervention to manage population flows and the resulting large urban slums, encroachment on protected forest and marine areas and trapped populations (Marshall and Rahman, 2013; McAdam and Saul, 2010). In Dhaka, for example, the population more than doubled between 1990 and 2011, from 6 to 14.5 million (World Bank, 2017a). The city is ranked as the second least livable city in the world (of 140 cities) largely due to its poor infrastructure and limited services, resulting from a lack of coordinated urban planning, policy and investment (EIU, 2018).

Lessons Learned
Bangladesh offers an example of a country making significant investment in adaptation options to support climate vulnerable areas and communities. Ongoing adaptation and rural development initiatives will continue to be important for at-risk communities. Some research suggests, for example, that in economic terms, the benefits of road improvements in coastal Bangladesh that reduce travel times and increase market access for remote villages would sufficiently counter the costs of increasing salinity (Dasgupta et al., 2014). Improved implementation of national environmental laws would also serve to protect the natural resources and ecosystems essential for adaptation (Rabbani et al., 2016). Lessons from Bangladesh’s effort to address coastal communities’ vulnerability and the detrimental lack of services and security in informal urban settlements include:

1. **Out-migration is already occurring in response to climate stressors and is projected to increase.** With recognition of the economic benefits of international migration, government and civil society already support this movement in Bangladesh in line with the country’s Overseas Employment and Migrants Act (2013), which supports international migrant workers with information, resources and skill development. This support could be extended to internal migration, which while often viewed negatively, could potentially make an even stronger contribution to economic growth and poverty reduction than international migration (Marshall and Rahman, 2013). Bryan et al.’s (2014) research on incentives, including through micro-credit, for seasonal migration demonstrates one option to support temporary internal migration that can have adaptation and poverty reduction impacts.

2. **The absence of a comprehensive migration and IDP law or framework and corresponding institutional arrangements presents a critical challenge to effectively managing migration and displacement needs.** The National Strategy on the Management of Disaster and Climate-Induced Internal Displacement is an important step in closing this gap. The strategy, however, was led by the Ministry of Disaster Management and Relief and is focused on internal displacement linked to climate hazards and excludes some forms of migration. A comprehensive framework will require
an integrated approach with active participation and coordination across ministries and
designation of responsibilities among government entities (Connell and Coelho, 2018). Key in
these responsibilities is improved urban management and secondary city development with a
focus on dynamic cities with strong linkages (infrastructure, communications, markets) to other
urban and rural areas (Marshall and Rahman, 2013).

3. Rural-urban migration is increasingly associated with environmental and climate factors, yet it is not
being sufficiently considered or integrated into urban policies, particularly in Dhaka. The city lacks
adequate policies and resources to address both in-migration, as mitigation measures to
increasing climate risks such as flooding, and water-logging impacts associated with increasingly
intense rainfall and sea level rise. As the country’s high exposure to climate trends increases
internal migration from climate-affected rural areas, cities will need to find ways to safely and
peacefully address this inflow of new people (USAID, 2018).

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FIJI: RELOCATION AS AN ADAPTATION RESPONSE

Introduction

The South Pacific is one of the world’s most climate vulnerable regions and acts as a hub of efforts to address climate change and its impacts. As a SIDS, Fiji has a long history of mobility in response to climate and environmental factors. The high numbers of settlements concentrated in the coastal zone cause Fiji to be acutely impacted by sea level rise and associated coastal erosion, flooding and inundation, and salinization of water and land resources (Figure 6). Fiji’s two main islands, and more than 300 smaller islands, have experienced a sea level rise of about 15 cm since 1993 – a rate twice the global average (PCCSP, 2011). Agriculture, which is sensitive to climate impacts, accounts for 39 percent of the country’s employment (World Bank, 2017a). Cyclones, sea level rise, coastal erosion and saltwater intrusion are already influencing internal migration, relocation and displacement (Thomas and Benjamin, 2018). In line with climate projections for increasing cyclone intensity in the region, Cyclone Winston in 2016 was the strongest and most destructive storm ever recorded in Fiji – displacing 55,000 people, killing 44 and causing more than $1 billion of damage equivalent to 20 percent of its GDP (Winterford and Gero, 2018, GOF 2017).

Figure 6. Pacific Regional Climate Risk Profile (2018)

In 2016, Fiji was the first country to ratify the Paris Agreement and in 2017, the country held the presidency of COP 23. It has consistently increased national funding for climate resilience efforts in recent years and is implementing several in situ adaptation measures including construction of sea walls, improved drainage, mangrove restoration and other climate resilience measures around the country. Fiji is also a leader in incorporating climate-related relocation and IDP rights into policy (IDMC, 2018c). As described in the country’s Nationally Determined Contribution (NDC), the government is already facilitating relocation of the most vulnerable communities away from high risk areas. With recognition of the cultural, social, financial, governance, environmental, and land rights challenges and sensitivities related to relocation, the government released Planned Relocation Guidelines in 2018.

While Fiji is a leader in addressing climate change impacts, a joint report by the government and World Bank estimates that climate change adaptation measures will cost $4.4 billion over the next 10 years.
(GOF, 2017). With recognition of the cost of climate change, Fiji is one of just a few countries where the Ministry of Economy (MOE) is responsible for climate change policy, a responsibility it shares with the Ministry of Foreign Affairs (MOFA).

Overview of internal migration: A Focus on SIDS and Relocation

Internal migration trends

Across the South Pacific, current settlement patterns are the result of thousands of years of migration related to population density, conflict, resource availability and colonialism (Corendea, 2016). After Fiji’s independence in 1970, rural-to-urban migration increased and the urban population expanded from 30 percent in 1960 to 56 percent in 2017 (World Bank, 2017a). Much rural to urban migration is driven by urban-rural household income differentials, and much of this migration is circular with strong ties to the land cited as a key reason to return to areas of origin (Coelho and Neville, 2016; GOF, 2017). In provinces with major urban centers, much rural-to-urban movement is intraprovincial, while on smaller rural islands most internal movement is to the capital, Suva (population 88,000). Communities have also long undertaken temporary and long-term movements in response to natural disasters and environmental change (Gharbaoui and Blocher, 2018). Today, natural disasters are the main driver of internal displacement and Fiji ranks among the top 10 countries in the world regarding the proportion of population displaced due to disasters (IDMC, 2017a).

Influence of climate on internal migration

Across the Pacific, the impacts of climate change on coastal communities, farmers and fishers are leading governments, communities and households to consider migration and relocation (Coelho and Neville, 2016). In Fiji, sea level rise, increasing cyclone intensity and more frequent and extreme heavy rainfall are expected to decrease arable land and the availability of fresh water while increasing flooding, coastal erosion and infrastructure damage (Nurse et al., 2014). The low-lying and densely populated Rewa river delta in eastern Viti Levu island, for example, is expected to experience increased erosion, flooding and inundation resulting in substantial damage and disruption to livelihoods and basic services (Lata and Nunn, 2012). Figures from the University of Waikato estimate that across the Pacific Islands, home to around 10 million people, 665,000 to 1.7 million people will migrate or be displaced by climate related stressors by 2050 (Ferris et al., 2011). Climate related stressors could lead to further rural-to-urban migration even when urban destinations are at no less risk than areas of origin (Farbotko et al., 2018a).

Internal migration processes and outcomes

With sea level rise increasingly impacting Fiji and communities requesting government assistance, options for relocating communities have become a government focus. Vunidogoloa is one of three Fijian villages that have been completely relocated. Additional villages are in various stages of planning for relocation, and others have been identified as particularly vulnerable with a high likelihood of relocation in the short- to medium-term. The Climate Change Unit is conducting province and village climate vulnerability and adaptation assessments around the country that have identified hundreds of at-risk communities and recommended a subset of these for potential relocation.

Policies and Institutional Efforts Relevant to Internal Migration

Increasing Climate Resilience
The government of Fiji is increasingly addressing climate risks. From 2013 to 2017, it boosted investment in climate and disaster resilience fourfold from approximately $42 million (3.74 percent of annual budget) to $170 million (9.85 percent) (GOF, 2017). Investments include: 1) expanding the social protection portfolio; 2) risk based spatial planning; 3) changing building standards for schools, bridges, and roads; 4) improving early warning systems; and 5) a focus on climate resilient infrastructure (GOF, 2017). These investments were funded in part by an Environment and Climate Adaptation Levy designed to raise funds for environmental protection, reducing GHG emissions and implementing climate resilience measures (GOF, 2018b). Government investments are in addition to increased concessional finance for climate and disaster resilience from bilateral and multilateral sources, including the Asian Development Bank, Green Climate Fund and European Investment Bank, which reached a total of $41 million between 2011 and 2014 (GOF, 2017).

**Integrating Climate and Migration in Policy and Institutions**

Fiji’s Climate Change Unit is now based in the MOE in a deliberate effort to connect climate resilience efforts vital to the country’s economy and local livelihoods with the funding they require – previously the unit was based in the MOFA. The MOE is the UNFCCC focal point and leads national planning for climate adaptation and mitigation efforts. It is responsible for administering the Environment and Climate Adaptation Levy for climate resilience efforts and the NDC Implementation Roadmap for 2017-2030 that targets climate mitigation measures.

In December 2018 at COP 23, the MOE launched Fiji’s Planned Relocation Guidelines demonstrating Fiji’s commitment to addressing current and future climate impacts to coastal communities through planned and supported relocation. The Planned Relocation Guidelines begin by noting that planned relocation is a complex and often traumatic process and an option of last resort in coping with and adapting to climate change (GOF, 2018a). The guidelines define relocation as: “the voluntary, planned and coordinated movement of climate-displaced… to suitable locations, away from risk-prone areas, where they can enjoy the full spectrum of rights, including housing, land and property rights and all other livelihood and related rights” (GOF, 2018a). While relocation is not mentioned in the country’s National Climate Change Policy (2012), Fiji’s National Development Plan, National Adaptation Plan Framework (2017), NDC (2015), Green Growth Framework (2014) and Climate Vulnerability Assessment (2017), each discuss relocation as an option for communities at high risk of displacement from climate impacts. The NDC specifically references capacity building and support for communities where relocation is identified as the most appropriate adaptation strategy (GOF, 2015).
Decades of coastal erosion, regular flooding and continuous sea level rise led residents of the village of Vunidogolo to ask the Fijian government for assistance to relocate in 2006. Situated along Natewa Bay on the country’s second largest island, Vanua Levu, the rising sea level was inundating the village’s territory. Saltwater intruded into local gardens, damaged homes and threatened public health and safety (Charan et al., 2017). Over many years of sea level rise, sea walls constructed to protect the community from flooding and inundation had become ineffective (McNamara and Des Combes, 2015).

Residents, who had suffered the impacts of sea level rise beginning as early as the 1950s, long refused to consider leaving their homes given the great cultural, emotional and spiritual attachment to land among Fijians (Charan et al., 2017). When village members first approached local government officials, some residents were still undecided about moving and years of debate and discussion among residents and the government followed (Charan et al., 2017). The decision entailed years of discussion with an emphasis on respecting the wishes of elders (Charan et al., 2017). The ultimate decision to relocate brought a “profound spiritual predicament” to people faced with leaving the land and home central to their identity (Charan et al., 2017:26).

In 2012, the government allocated funding for the relocation in the national budget and in January 2014, Vunidogoloa became the country’s first village to relocate due to sea level rise. The village’s population of 132 moved two kilometers inland to higher ground within the customary land boundaries of the community. The move to the new village, renamed by residents as Kenani (“Promised Land”), was funded by the government ($345,000) and the village residents ($100,000) (Witschge, 2018). Community members provided timber from customary lands for the construction (McNamara and Des Combes, 2015). With support from the church, the relocation also included moving the village’s cemetery out of the path of sea water inundation (Charan et al., 2017). The new site has access to a main road and is closer to a school and health center.

Working with the government, the community made the decision about where to relocate and how to design the new village. Key to the relocation was the availability of a relocation site within the community’s customary land avoiding any contested ownership or use rights in the new site. The relocation involved extensive consultation to ensure that indigenous protocols were followed (Charan et al., 2017). The government also worked to coordinate the relocation across various government ministries and with non-government support (McNamara and Des Combes, 2015). The Department of Fisheries, for example, provided fishponds to replace some of the food and livelihoods activities that were more difficult to access after moving two kilometers from the ocean. The International Labor Organization provided starts for pineapple and banana plants to support crop rehabilitation (McNamara and Des Combes, 2015).

In the new village site, sea water no longer floods homes and damages gardens. The relocation has largely been successful; however, it has been financially, psychologically and socially costly (Charan et al., 2017). Village members still discuss the pain and trauma of leaving the place they hoped would be their “home forever” (Witschge, 2018). Key informants from the Ministry of I-Taukei Affairs also report that some traditional healers lost their abilities in the new village site and returned to the original village despite the severe flooding (Coelho and Neville, 2016). Others have noted the importance of monitoring the success of new livelihood strategies (e.g., fishponds) and well-being of community members over time (McNamara and Des Combes, 2015).

The Vunidogoloa relocation demonstrated that the community-led relocation decision-making process (e.g., where, when and how), community contributions of resources and human capital to the relocation, and inter-agency cooperation to support the relocation and livelihood options were key to the relative success of the relocation (McNamara and Des Combes, 2015). In the case of Vunidogoloa, the ability to relocate to a village site within customary lands was also key, highlighting the importance of relocations to occur over short distances and within customary boundaries when possible to avoid land rights related tensions (Coelho and Neville, 2016). In 2018, Fiji published national Planned Relocation Guidelines to guide government and community efforts to relocate communities that are becoming uninhabitable due to sea level rise.
Regional Policy on Climate Displacement
Pacific regional organizations have worked extensively on climate change, including consideration of displacement and relocation. In 2015, the Pacific Islands Development Forum leaders approved the Suva Declaration on Climate Change, which states: “climate change is already resulting in forced displacement of island populations and the loss of land and territorial integrity” (Pacific Island Development Forum Secretariat, 2015, p. 1). The Pacific Community’s Framework for Resilient Development: An Integrated Approach to Address Climate Change and Disaster Risk Management 2017-2030, for example, advises Pacific nations to anticipate and prepare for future displacement by integrating human mobility issues with disaster preparedness, response and recovery programs (Pacific Community, 2016). South Pacific Regional Environment Program’s Pacific Climate Change Portal houses extensive resources on climate policy and activities in the region including related to mobility. With physical retreat from the most at-risk coastal area assumed to be inevitable, Pacific Island countries are currently considering an unprecedented regional initiative to adopt a framework on climate-related relocation and displacement (Farbotko, 2018b). Pacific regional organizations also stand out from other regions in their efforts to merge disaster risk reduction and climate change adaptation.

VANUATU’S NATIONAL POLICY ON CLIMATE CHANGE AND DISASTER-INDUCED DISPLACEMENT
Vanuatu’s recent National Policy on Climate Change and Disaster-Induced Displacement provides a model for proactively addressing internal displacement. Based on Vanuatu’s legal system, international standards (such as the Guiding Principles on Internal Displacement) and Pacific regional strategies, the policy lays out a road map for preventing, responding to and resolving displacement caused by climate change and disasters. The policy situates itself “in the broader mobility context of Vanuatu, including traditional and customary land arrangements, development pressures and rural-to-urban migration, recognizing that displacement is triggered not only by natural hazards, but also from other crises” (Government of Vanuatu, 2018, p. vii). Based on wide-ranging consultations with communities affected by displacement, government and non-government agencies, and with the technical support of IOM, the policy proposes “twelve strategic priority areas for action to ensure displacement and human mobility considerations are mainstreamed into Vanuatu’s planning at national, provincial and local levels, building on existing national policy initiatives. Strategic areas are grouped into systems-level interventions and sectoral-level interventions and include areas such as institutions and governance, safeguards and protections, health and wellbeing, and access to justice and public participation. The policy identifies specific objectives, actions to be taken, and the relevant ministries and agencies charged with implementation and follow-up.”

At a national level, in addition to Fiji, countries including Tuvalu, Kiribati, Vanuatu, Solomon Islands and Papua New Guinea have begun processes for planned relocation (Coelho and Neville, 2016). In 2018, Vanuatu released its National Policy on Climate Change and Disaster-Induced Displacement proposing strategic priority areas to ensure displacement and mobility are mainstreamed into the country’s planning process (see text box). While there is increasing attention to displacement and relocation policies in the Pacific, climate policies also reflect the cultural significance of land and the desire of many to remain in place. There is clear acknowledgement that relocation is a last resort and policies in Fiji, Kiribati, Vanuatu and Tuvalu prioritize in situ adaptation over relocation (Farbotko et al., 2018a).

Lessons Learned
While Fiji is a leader in work on climate related relocation and IDP rights, the government is likely to face ever more difficult decisions in the allocation of limited resources for climate resilience. While in
situ adaptation is clearly preferred for Fijians, at some point in situ adaptation investments in high risk settlements begin to consume a disproportionate amount of funding, to the detriment of other settlements (GOF, 2017). In the case of formal settlements, Fiji’s Planned Relocation Guidelines note that relocation is a complex and often traumatic process and that communities should be “equipped and empowered to remain in their original homes” where safe and practical. In the case of informal urban settlements, however, Fiji has considered disincentivizing settlement in the highest risk areas by providing only minimal “lifeline services to protect public health” (GOF, 2017). Discussion of this approach in the national Climate Vulnerability Assessment notes that this strategy needs to be accompanied by clear communication with residents about the risks, reasons for limiting public investment and relocation options (GOF, 2017). In navigating these difficult decisions, the government should strengthen aligning of its initiatives with the Nansen Initiative Protection Agenda (2015) and the Guiding Principles on Internal Displacement.

Around the world, it is well-documented that relocation and resettlement efforts can often negatively impact lives, livelihoods and well-being if they are not transparent, inclusive and equitable. Across the Pacific, climate related relocation often also means the loss of traditional lands that are embedded in cultural and spiritual identity. In addition to employing relevant safeguards, lessons learned about minimizing the negative impacts of relocation in Fiji include:

1. **Use a community-led approach to relocation.** As demonstrated in the successful Vunidogoloa case, community members requested the move, identified and designed the new village site, contributed resources to the relocation and worked with government entities to plan and implement the relocation (Charan et al., 2017). Community-led relocation utilizing customary leadership and governance structures can help overcome the challenges associated with loss of land and cultural heritage (Gharbaoui and Blocher, 2018). For example, McAdam and Ferris (2015) find that in two historical cases of relocations in Fiji (1940s) differences in the integration and well-being of resettled communities was largely explained by the extent to which those relocated felt they were part of the decision-making process.

2. **Implement short distance relocation within a community’s customary lands when possible.** In Fiji, where about 90 percent of land is customary land, when a community does not have its own customary land available for a new village site, explore clan and kinship networks and past local experiences with inter-community support after natural disasters to help find suitable land (Thomas and Benjamin, 2018). Traditional channels, government support and impartial land experts should each be central in land negotiation processes (Gharbaoui and Blocker, 2018).

3. **Respect and utilize customary frameworks and structures to engage affected populations.** Ensure that receiving and/or affected communities, including traditional leaders, are involved in relocation decision making processes and have access to reliable information to inform their participation (Gharbaoui and Blocher, 2018).

4. **Work with communities to identify ways to preserve societal well-being, sense of place and cultural identity throughout relocation process and in the new village site** (Gharbaoui and Blocker, 2018).

5. **Recognize the important roles that faith-based institutions and civil society have to play in advocating for communities in relocation and adaptation processes.** They also help ensure that traditional values are integral during and after the relocation process. In Fiji, church assemblies are critical gathering places for communities to find cultural and emotional support as well as discuss and organize relocations. Further, churches have supported relocation efforts such as arranging for burial sites to be moved (Charan et al., 2017).
6. Consider “long-term, gradual and diversified” relocation options in cases where high risk communities choose not to relocate. These include options such as building “new housing in safer areas while subsistence agriculture, community meeting areas, burial grounds and other culturally important landmarks remain in their original sites” as is being discussed in several villages in Fiji (Farbotko, 2018b p. 5). Government monitoring and awareness raising of vulnerability in at-risk communities can support residents to actively explore adaptation and relocation options rather than remain uniformed until substantial climate-related events impact them (Charan et al., 2017).

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KENYA: ENVIRONMENTAL DISPLACEMENT AND GOVERNANCE CHALLENGES

Introduction
Kenya’s population of 49.7 million has a long history of population mobility related to, inter alia, traditional pastoral mobility, economic opportunity, past colonial relocation efforts and development-, conservation-, and conflict-induced displacement. Today, internal rural-to-urban migration is increasing at a rapid rate, contributing to an urban population growth of four percent annually (World Bank, 2017a). Environmental drivers of mobility appear to be increasing among the predominantly rural population (74 percent rural) (World Bank, 2017a).

Climate variability and change pose significant threats to Kenya’s economy (Figure 7). Agriculture is the primary livelihood for 60 percent of Kenyans and small-scale farms account for 75 percent of national agricultural production (GOK, 2015-SNC). Kenyan agriculture is 98 percent rainfed and highly sensitive to changes in temperature and rainfall. Increasing interseasonal variability and declining rainfall in the main rainy season have impacted cereal production in recent years. Periodic droughts and floods in Kenya have significant social, environmental and economic impacts, including food insecurity and population displacement.

With the expected increase in natural disasters that threaten climate-sensitive lands and livelihoods along the coast and in arid and semi-arid lands, increased migration and displacement are likely (Rigaud et al., 2018). In recent years, Kenya has actively engaged in climate change adaptation policy and programming and has begun to address issues of mobility, although it has struggled to implement its IDP Act. Election-related violence and subsequent displacement in 2007, and drought related migration and displacement during 2008-2011, spurred the government to address migration and displacement, including within climate policies.

Figure 7. Country Level Climate Risk Profile for Kenya (2018)

Source: USAID Climate Risk Profiles 2018
SPOTLIGHT ON PASTORALISM: 2008-2011 DROUGHT

Consecutive droughts in Kenya from 2008 to 2011 affected an estimated 3.7 million people and cost the country about $12.1 billion primarily in losses of livestock, crops and water resources (GOK, 2016-NAP; GOK, 2012). Pastoralist communities reliant on extensive grazing practices in the country’s rangelands were heavily impacted. Modernization has led to changes in pastoral movements and to increasing integration into settlements, but pastoralists still rely heavily on strategic movement between dry and wet season grazing areas to access forage and water resources (Schrepfer and Caterina, 2014). Additionally, drought impacts are exacerbated by the loss of traditional land, water resources and migration routes to expanding settlements and development, as well as inter-community conflicts.

Pastoralists in the Arid and Semi-Arid Lands (ASALs) of Kenya engage in cyclical migration patterns, rooted in traditional nomadism that occur within and across national borders, particularly in the north. Mobile pastoralism is a mode of production and a way of life that is intrinsically linked to the diverse cultures, languages, identities and levels of mobility of Kenyan pastoralists (Schrepfer and Caterina, 2014). As pasture and water resources became increasingly constrained during the 2008-2011 drought, pastoralists traveled farther and for longer periods in search of grazing and water (Schrepfer and Caterina, 2014). This adaptive migration initially met pastoralists’ needs but when resources and coping capacity become overstretched, one or more family members often migrated temporarily or permanently to seek an alternative livelihood elsewhere (Schrepfer and Caterina, 2014). For some families, drought stressors combined with non-climatic factors led to forced displacement or sedentarization, often increasing poverty and marginalization (Schrepfer and Caterina, 2014).

The 2008-2011 drought prompted increased national recognition of the relationship between climate factors and migration and displacement. In 2012, the government conducted a post-disaster needs assessment to examine the socio-economic impact of the drought and make recommendations for immediate recovery and long-term resilience-building (GOK, 2012). The assessment determined that the drought led to increased migration and displacement, including rural-urban migration, expanded migration among pastoralists in search of grazing and water resources, and increased resource-based conflicts that resulted in conflict-induced displacement.

The post-disaster needs assessment, including recognition of the relationship between drought and migration and displacement, informed Kenya’s National Adaptation Plan (NAP) and National Policy for the Sustainable Development of Northern Kenya and other Arid Lands (2012). Today, Kenya’s climate policy generally recognizes the linkages among climate change, migration and displacement. The NAP reflects the assessment’s recommendations in its calls for: a) mainstreaming adaptation into land reforms to reduce risk of internal migration; and b) increasing adaptive capacity of vulnerable groups (e.g., displaced people, pastoralists) to reduce rural-urban migration. The NAP also includes plans for mainstreaming adaptation throughout national planning, including strengthening early warning systems, climate proofing infrastructure and investments. The country’s draft National Policy for the Sustainable Development of Arid and Semi-Arid Lands further aims to protect and promote mobility for pastoralists that will support traditional drought coping mechanisms and pastoral livelihoods (GOK, 2017). As an example of policy implementation, UN FAO worked with Kenya’s National Drought Management Authority to use improved risk analysis to trigger early interventions to support pastoral livelihoods and prevent drought-induced displacement in response to Kenya’s 2017 drought (UN FAO, 2018).

Overview of internal migration

Internal migration trends

Internal migration and displacement patterns in Kenya are diverse and related to poverty, economic and educational opportunities, political and resource conflicts, disasters, environmental degradation, and conservation and development related evictions (Nyaro et al., 2016; RMMS, 2013). Inter-communal conflict over land and water resources, as well as cattle raids also contribute to displacement (Caterina and Giorgi, 2015). The drivers of internal migration and displacement are complex, often not readily attributed to a single cause and compounded by poor governance and weak rule of law (RMMS, 2013). Present displacement and migration trends follow a long history of land dispossession, relocation and resettlement. During British rule (1895-1963), the “Native Trust Land Areas” for major tribes led to
displacement of people from about 5 million hectares of land (Schade, 2017). After independence, resettlement schemes were designed to return land to those displaced and their descendants. However, resettlement was poorly implemented and left the most fertile lands with a few ethnic groups and families, thus setting the stage for future conflict (Schade, 2017).

Political, development and conservation related displacement are key drivers of movement in Kenya. Politically motivated clashes associated with elections have been the cause of repeated displacements over the years and are often rooted in land or ethnic disputes. Kenya’s largest internal displacement event in recent decades occurred in the aftermath of the 2007 disputed presidential election when nearly 664,000 Kenyans fled their homes because of violence (Caterina and Giorgi, 2015). Public and private development projects and conservation efforts have also displaced people. Efforts to conserve and restore Kenya’s forests and water catchments (e.g., Mau, Emborout, Mt Elgon forests), including for the purpose of climate mitigation efforts, have resulted in numerous forced, and often mishandled, evictions and resettlement (Metcalf et al., 2011). This demonstrates how climate change mitigation efforts can at times result in displacement or the need for migration.

Kenya’s climate variability and weather extremes make disaster-induced displacement and environmental migration common. Monitoring estimates over eight years (2008-2015) found that disasters displaced more than 550,000 people internally (Melde et al., 2016). Research has also demonstrated that environmental and climate factors are a common reason for migration. In a 2014 random survey of respondents from around the country, 15.5 percent reported they had moved temporarily or permanently due to drought or water shortages in the last 10 years (Linke et al., 2018).

Influence of climate on internal migration
In the context of increasing climate stressors, coastal Kenya is expected to become a hotspot for out-migration, while Nairobi, located in the temperate highlands, is projected to be hotspot for in-migration (Rigaud et al., 2018). Any increase in drought occurrence or intensity would increase rural-urban migration, particularly among pastoralists (Ginnetti and Frank, 2014). Rural-urban migration has been common since the colonial era and continues to be the main migration trend in Kenya. Nairobi receives the highest number of internal migrants, followed by the Rift Valley (former province) where the capital Nakuru is Kenya’s fourth largest city (IOM 2015b). Nairobi, however, also sends the highest number of internal migrants. This urban-rural migration is mainly interpreted as return migration but is still not well understood (IOM, 2015). There is also rural-rural migration as farmers pursue employment in sugar, flower and tea plantations (IOM, 2011).

Internal migration processes and outcomes
Migrants and IDPs in Kenya face difficult circumstances, including the absence of livelihood opportunities, shelter, healthcare and basic security, and often receive little assistance from government or non-government entities (RMMS, 2013; Odipo et al., 2017). Migrants are likely to settle in informal settlements that already have low access to basic services yet typically have even lower rates of access to services than neighboring non-migrant households, including for water, education, health, employment and security (Odipo et al., 2017). Additionally, rural-urban migrants often live on marginal flood-prone lands and are at risk of flood impacts, including displacement (Odipo et al., 2017). Kenyans who have relocated are also about three and a half times more likely to be victims of violence compared
to the general population (Linke et al., 2018). In Nairobi, migrants and IDPs face criminal and political violence, insecurity and further displacement due to political violence and forced evictions by the state for public infrastructure development or slum upgrading (Metcalfe et al., 2011).

The impact of internal migration on sending communities is complex and diverse. Migration can lead to loss of labor, socioeconomic stratification and changes in gender and culture dynamics (Greiner and Sakdapolrak, 2013). On the other hand, migration can also lead to increased income through remittances. In sending communities, remaining households can benefit from remittances that are often used for food, transport, education and housing. Remittances in rural Kenya have also been used to facilitate the uptake of adaptive measures, particularly more costly actions, including changes in livestock type and the introduction of new varieties of cereal crops and fast maturing seed varieties (Karanja Ng’ang’a et al., 2016). In contrast, the loss of labor associated with migration has also led to lower adoption of soil and water conservation practices and decreased agricultural investment, particularly in poor households that are more likely to use remittances for immediate basic needs (Greiner and Sakdapolrak, 2013).

**Policies and institutional efforts relevant to internal migration**

*Increasing climate resilience*

Kenya has developed climate change policy and programming to increase resilience in recent years. Its National Adaptation Plan (NAP) was completed in 2016, the same year the country passed a Climate Change Act. The NAP focuses on: 1) addressing exposure to droughts, precipitation variability and sea level rise; 2) threats to agricultural productivity and food security; 3) managing water resources; and 4) addressing climate impacts on health and ecosystems. Kenya and its international partners have made a series of investments in adaptation, including a $183 million World Bank project on water security and climate resilience and a $10 million Adaptation Fund grant to build climate resilience among vulnerable communities. And in response to Kenya’s most recent drought in 2017, UN FAO worked with Kenya’s National Drought Management Authority to use improved risk analysis to trigger early interventions to support pastoral livelihoods and prevent drought-induced displacement (UN FAO, 2018).

*Integrating climate and migration in policy and institutions*

Mainstreaming of migration, displacement and related climate and environmental drivers is evident in numerous national policies (e.g., IDP Act, NAP, National Climate Change Response Strategy, Vision 2030). Two key events in Kenya’s recent history further prompted an evolution of the migration and displacement policy environment, including within climate policies: 1) the 2007 election-related violence led to the displacement of more than 660,000 people around the country; and 2) the 2008-2011 drought affected millions of people leading to widespread internal migration and displacement. The extensive displacement after the disputed 2007 presidential election, and challenges in the government’s response, catalyzed an effort that ultimately resulted in Kenya’s IDP Act in 2012. The IDP Act is a comprehensive national framework and addresses displacement related to conflict, natural disasters, and conservation and development initiatives. The inter-agency Protection Working Group on Internal Displacement drafted Kenya’s IDP Act setting out a rights-based and participatory approach and incorporated principles from the Guiding Principles on Internal Displacement and the Great Lakes Protocols into national legislation (Caterina and Giorgi, 2015). The Act further obliges the government to provide IDPs
with durable solutions for return, local integration or resettlement elsewhere within Kenya, although it lacks specificity on compensation and other procedural issues (Schade, 2017).

The IDP Act offers a credible response framework for internal displacement (related to conflict and natural disasters), however, its implementation faces challenges. Kenya has a poor record of implementing legislation and the IDP Act is particularly challenging as it involves coordination across actors and policies (Metcalf et al., 2011). Additionally, urban, disaster and land management policies have not been harmonized with the Act and could pre-empt some of its guarantees, as appears to be happening in the ongoing urban and forest evictions. Additionally, the follow-up draft IDP policy clarifying government actions and IDP rights has not yet been adopted, thus hindering the Act’s effectiveness (Caterina and Giorgi, 2015). And finally, Kenya has yet to sign the African Union Convention for the Protection and Assistance of Internally Displaced Persons in Africa (Kampala Convention), which establishes a legal framework and government obligations for preventing internal displacement and protecting and assisting IDPs.

While Kenya’s governance has improved in recent years, there remains relatively high corruption, poor governance and weak rule of law, all of which challenge institutional effectiveness. There have been calls for improved government planning and preparedness in order to ensure adequate response to displacement events and clear resettlement plans ahead of evictions (OHCHR, 2012). Meanwhile, complaints about illegal forced evictions from forest and urban land continue (Mutambo and Kimutai, 2018).

Lessons Learned
Kenya’s ability to carry out constructive policy responses to the 2007 elections displacement and 2008-2011 drought is indicative of a government responsive to the factors shaping internal migration and displacement. While Kenya has made policy progress in recent years, as climate stressors increase the country’s ability to develop, finalize and implement its internal migration, displacement and climate policies, these frameworks will be tested. The country now has a strong IDP Act and a draft migration policy that, while not yet released, appears to follow international guidance (e.g., Sustainable Development Goals, Global Compact for Migration, African Union Migration Framework). Further, the country’s climate policy generally recognizes the linkages among climate change, internal migration and displacement and, to some extent, the need for limiting and facilitating migration processes.
KENYA CONTINUES TO STRUGGLE, HOWEVER, TO MANAGE INTERNAL MIGRATION AND DISPLACEMENT NATIONAL AND IN NAIROBI (IOM, 2015). MIGRANTS AND IDPS ARE OFTEN LEFT UNDOCUMENTED, WITHOUT ASSISTANCE AND AT INCREASED RISK OF IMPOVERISHMENT AND ADDITIONAL DISPLACEMENT (IDMC, 2017A; KNCHR, 2014). LESSONS LEARNED FROM KENYA’S EXPERIENCE INCLUDE THE NEED TO ADDRESS THE KEY GAPS IN THE COUNTRY’S MIGRATION AND DISPLACEMENT POLICY FRAMEWORKS AND INSTITUTIONS IN ORDER TO FULFILL THE INTENT OF CLIMATE AND INTERNAL MOBILITY POLICIES. SPECIFIC LESSONS INCLUDE:

1. LImited coordination among government entities and inadequate capacity, political will, rule of law and information sharing is hindering policy development and implementation and leading to arbitrary displacements (IOM, 2015). The disconnects between migration, displacement, forest and urban planning policies are particularly concerning as complaints about illegal urban and
forest evictions that are not in compliance with the IDP Act 2012 continue. In the case of
displacement, the government drives displacement (e.g., forest or development evictions,
stoking political violence) at the same time it attempts to address it. A need remains for
mainstreaming migration and resettlement in line with national and international standards
across government plans and policies at the national, sub-national and urban levels (e.g., Forest

2. Policy development is only the first step in building support for internal migration and building
climate resilience. Kenya has undertaken important policy development. However, finalizing,
launching and implementing the country’s relevant laws and policies would support climate
resilience and address human mobility. Specifically, the government should:

   — Release the migration policy
   — Adopt the draft national IDP policy
   — Fully implement the IDP Act with a focus on ensuring that the established National
     Consultative Coordination Committee operates effectively and in coordination with
     national and local government and non-state actors
   — Ratify the African Union Convention for the Protection and Assistance of Internally
     Displaced Persons (Kampala Convention)

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Introduction
There have been many studies assessing climate risk in the United States, most recently the November 2018 National Assessment of Climate Risk (USGCRP, 2018), which concludes that: “Climate change creates new risks and exacerbates existing vulnerabilities in communities across the United States, presenting growing challenges to human health and safety, quality of life and the rate of economic growth.” The report, based on the work of 300 scientists and 13 federal agencies, surveys the impact of climate change in 11 areas, from the economy to coastal communities, highlighting the risks to Americans living in diverse communities to the effects of climate change. The report seeks to synthesize the science and provide warning of the dire consequences of climate change, particularly to coastal communities, but also to emphasize the importance of internal mitigation and adaptation. For example, “more than half of the damages to coastal property are estimated to be avoidable through well-timed adaptation measures” (USGCRP, 2018). Figure 8 (below) represents a summary of climate risks and impacts to key sectors across the United States as presented in the report (USGCRP, 2018).

This case study looks at two examples of climate-change-induced mobility in the United States: 1) Isle Jean-Charles, a small Louisiana coastal community, which is in the process of relocating due to the increasing loss of its territory, and 2) the state of Florida, which has embarked on several initiatives to respond to the effects of climate and environmental change.

Overview: Influence of climate on internal migration
The US has a long history of internal mobility – from westward expansion to increasing rural-urban migration over the last century. Movement in response to environmental factors – particularly natural disasters – is an important dimension in this history. Notably, it was a slow-onset disaster – drought, coupled with settlement patterns – that led to the greatest displacement in US history: 2.5 million people were displaced in the Dust Bowl of the 1930s. Similarly, the great Mississippi flood of 1927, the most devastating in US history, displaced 500,000 people and contributed to the ‘Great Migration’ of
African Americans to the northern United States (Encyclopedia Britannica, 2018). More recently, Hurricane Katrina in 2005, displaced over one million people (CNN, 2015). Even in the context of a highly developed country like the United States, there are challenges to monitoring human mobility patterns. For example, there are no monitoring mechanisms to determine what happens to those who are evacuated or displaced following a disaster. In the case of Puerto Rico’s Hurricane Maria in 2017, there is no reliable data on the number of people who fled. Nor, despite massive media coverage, is there good data on what happened to Katrina’s IDPs.

The United States has had diverse experiences with internal movement as a form of adaptation to climate change. In some areas – notably Isle de Jean Charles in Louisiana – a planned relocation of a community at risk is well underway. In Alaska, several indigenous communities are considering relocation in response to climate change and other environmental factors. Governmental buy-out programs have been used in some cases to encourage people to move away from areas of environmental risk, notably following major weather-related disasters. Unlike planned relocations, buy-out initiatives such as New Jersey’s Blue Acres program, seek to protect individuals from repeated flooding and displacement, and to use the vacated land to create a buffer from the effects of climate change (e.g., storms, sea level rise), thus potentially enabling others to remain in their communities. Unlike cases in other countries, policies with respect to climate change-induced movement is primarily made at the state and local levels.

Policies and institutional efforts relevant to internal migration
The bedrock of US policies to respond to the effects of climate change has been the Stafford Act which came into force in 1988. The Act was intended to provide federal assistance to states and localities to prepare for, respond to and recover from disasters. Under the Stafford Act, a presidential determination of a national disaster in effect unlocks federal funding and triggers FEMA to provide a coordination role of governmental entities involved in relief activities. The Stafford Act defines a major disaster as “any natural catastrophe, fire, flood or explosion, determined by the president to warrant the additional resources of the federal government to alleviate damages or suffering they cause” (US Government, Stafford Act 1988, Title I). The Stafford Act has been criticized, among other things, for mandating that recovery funds can only be used to rebuild on the original site – even if the level of destruction makes continued habitation in that locale unlikely or impossible. In 2015, FEMA began requiring states to incorporate the potential effects of climate change in their hazard mitigation plans (US Government 2018, ch. 28, Reducing Risks Though Adaptation Actions).
The November 2018 National Assessment is typical of most US studies of climate risk in that internal migration is mentioned only in passing, if at all. No publicly-available national-level studies on climate change-induced movement exist – although there are a growing number of studies of specific local or state-level cases. Similarly, there are no national-level policies on displacement, planned relocations or internal migration. Rather there are policies – notably the Stafford Act – and a host of good practices for disaster management that include prescriptions for managing evacuations. When it comes to movement associated with climate risks, the overwhelming interest has been in devoting resources to increasing climate resilience and preventing the need for people to move.

US Government (2013) Executive Order 13653, entitled “Preparing the United States for the Impacts of Climate Change”, requires US agencies to take a series of steps to make it easier for American communities to strengthen their resilience to climate change, including through: (1) engaged and strong partnerships and information sharing at all levels of government; (2) risk-informed decision-making and the tools to facilitate it; (3) adaptive learning, in which experiences serve as opportunities to inform and adjust future actions; and (4) preparedness planning. The Executive Order also created the Council on Climate Preparedness and Resilience (replacing the previous Interagency Climate Change Adaptation Task Force).

Notably, none of these provisions refer to the movement of people either through internal migration, displacement or planned relocations.

In September 2015, President Obama became the first US president to travel north of the Arctic Circle. During this trip, the desire of small indigenous communities to relocate their entire communities because of the effects of climate change were made known. In response, President Obama pledged $2 million to support relocation efforts in Alaska – but given that the cost of moving just one community is over $100 million, this was seen as a drop in the bucket.

Other US governmental policies have a clear intention of preventing the movement of people in response to disasters. For example, in 1968, the National Flood Insurance Program was created and viewed as “an exemplar of moral hazard that allowed homeowners to rebuild over and over in risky areas while keeping their premiums artificially low. Fifty years later that program has accumulated $36.5 billion of debt while effectively trapping people who might prefer to escape to higher ground” (Schwarz, 2018). The recent wildfires in California have drawn attention to the role of insurance in enabling settlement in areas of high fire risk (Hoffower, 2018). In fact, it may be changes in insurance policies, both flood and fire insurance, that will do more to influence continued habitation in areas of high environmental risk than governmental policies.

Focus on state-level efforts to increase climate resilience: Florida

**Overview**

Florida is one of the States most vulnerable to the effects of climate change, and within the state Southeast Florida faces particular risk. Southeast Florida, home to six million people (a third of the state’s population) and producing 30 percent of the state’s Gross Domestic Product (GDP), is surrounded by water and vulnerable to sea level rise, saltwater intrusion, drought and more intense hurricanes. The state anticipates 3-7 inches of sea level rise by 2030 and 9-24 inches by 2060. Almost 2.5
millon people in the region live less than four feet above sea level. The region’s porous limestone bedrock makes the development of coastal protection, like sea walls, infeasible (Grannis, 2011).

Grannis (2011, p. 5-6) notes that historically, when threatened by sea level rise or storms, US landowners have built protective structures, such as physical barriers. Following Hurricane Dennis, for example, 26 miles of sea walls were built in Florida. But sea walls have been found to increase flood risk, by eroding beaches and flood marshes that serve as natural storm barriers. Many state and local governments, particularly of coastal states, have developed plans to adapt to the effects of climate change. For example, the Florida Governor’s Action Team on Energy and Climate Change recommends that local governments incorporate plans for dealing with climate change and sea level rise.

Addressing climate impacts at the state, regional, and local level

Until recently, very minimal efforts had been made by the state to address climate change. Although in 2011, state law (FLA. STAT. § 163.3177(6)(g)10) was amended to include a new feature in the coastal management element of their comprehensive plans: the designation of “adaptation action areas” (AAAs). These areas include low-lying coastal zones experiencing flooding and vulnerable to the impacts of rising sea levels. The designation of AAAs was intended to allow local governments to create policies and prioritize funding to improve resilience. Although this creates more space for action, it is a completely voluntary mechanism that leaves planning and implementation to local governments. Only eight local governments (out of 195 total governments with a coastal element requirement) mentioned AAAs in their comprehensive plans as of December 2015. Only two of these: Satellite Beach and the Village of Pinecrest, have a specific area designated, (Markell, 2016).

In 2015, the state legislature passed SB 1094 (2015), imposing a mandate on local governments to consider sea level rise and other factors that increase flood risk as part of the “redevelopment component” of the coastal management element of their comprehensive plans (Markell, 2016). This includes the development of strategies and solutions to reduce flood risk, identifying techniques and best practices to reduce flooding losses, complying with flood-resistant construction requirements in state building codes, etc. However, local governments are only required to reconsider comprehensive plans every seven years and it is not clear how strictly this will be enforced. Requiring governments to “consider” climate change does not require them to act on it or outline what steps should be taken.

Following Hurricane Irma in the fall of 2017, Governor Rick Scott requested $3.6 million in the 2018-19 state budget request for the Department of Environmental Protection to “assist local governments in planning for sea level rise and implementing coastal resilience projects” (Ritchie, 2017). Another $50 million was requested to repair beach erosion caused by hurricanes. This is a monumental step from the state government in recognizing and taking steps toward defending the state against climate change. However, in the grand scheme of things, this is a very small step: $3.6 million is minimal in the total $87.4 billion budget request and not nearly enough to make meaningful progress across the state.

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Despite these small steps from the state, climate action in Florida continues to be organized and implemented on regional and local levels. Local governments have faced additional obstacles in their efforts to act, particularly inadequate funding and pressures to push for continued development growth. Small and medium-sized towns do not have the financial resources to implement these projects on their own. More significantly, it will be impossible to adequately protect the coast without statewide coordination. Without coordinated efforts, resilience projects in some communities may make climate damage worse for others. For example, if one city builds a sea wall but the neighboring town does not, or if one city’s wall is higher than the others, it can displace more water into the next town and worsen their effects.

Some coastal residents and business owners have started selling their properties and moving on their own, particularly in southern Florida, but this is not a viable option for everyone. Worth noting, this process is already creating “climate change gentrification” in which wealthy, coastal residents and businesses move inland and displace the lower-income, often minority residents living inland (Bolstad, 2017). This is most evident in Miami where the gradual inland migration has started displacing residents of lower-income neighborhoods like Wynwood and Little Haiti. These individual movements are also shrinking the tax bases of coastal cities, which reduces the funding available for coastal adaptation and resilience projects. But there are no consolidated data on how many people are moving, their reasons for doing so or where they are going.

*Integrating climate and movement in policy and institutions: Southeast Florida Regional Climate Change Compact*

One significant positive development is the establishment of the Southeast Florida Regional Climate Change Compact – the first case of US local governments voluntarily coming together to address climate change on a regional scale (Markell, 2016; Menees and Grannis, 2017). In 2010, four southeast Florida counties created a compact to promote regional coordination of climate adaptation: Broward, Miami-Dade, Monroe and Palm Beach. They realized the need for coordination in 2009 when the four counties were attempting to get funding from Congress, but each presented different numbers and scenarios. Because of the variations, Congressional staff were “unconvinced” and did not award funding. The four counties decided to host a regional climate summit, which led to the agreement to establish the Compact. Many other agencies and organizations are involved with the compact, including the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration (NOAA), The Nature Conservancy, the South Florida Regional Planning Council, the Institute for Sustainable Communities, and others. So far, the Compact has produced several coordinated documents: The Unified Sea-Level Risk Projections, Analysis of the Vulnerability of Southeast Florida to Sea Level Rise, and Regional Climate Action Plan (with an accompanying implementation guide that includes 110 recommendations for policies and projects for resilience and adaptation). The Compact is administered by a Steering Committee made up of representatives from the four counties and municipalities, as well as regional entities like the South Florida Regional Planning Council, civil society organizations, academics and federal agencies. The Compact successfully advocated with the state to pass the 2011 law allowing local governments to establish adaptation action areas. Since 2012, the Compact has also engaged municipalities, through the Mayor’s Climate Action Pledge, to support climate adaptation programs.
There are other local initiatives in support of adaptation and climate resilience. For example, Miami is raising 105 miles of roads and constructing a major, integrated pumping system (although these construction efforts seem to have slowed under the new mayor). Throughout southeast Florida, new buildings are being constructed on higher ground, tidal valves, flood gates and pump stations have been installed, and sand has been replenished along beaches. Delray Beach has added valves to keep sea water out of the drainage system. Palm Beach County added hybrid vehicles to their public vehicle fleet, adjusted traffic signal timing to reduce emissions and created “living shorelines” of plants. All these efforts come with a great financial question: Who pays for this? In Fort Lauderdale, the city proposed that residents should be forced to raise their seawalls to a certain height by 2035, but the public opposed it and the bill failed because of the cost of seawalls of $600-2,000 per property (Ruggeri, 2017). Instead, property owners are required to keep seawalls in state of good repair with penalties imposed if their seawall is breached by the tide.

Focus on local-level efforts to develop climate resilience: Isle de Jean Charles

Isle de Jean Charles, a small historically Native American community in coastal Louisiana, began contemplating relocation fifteen years ago. More than 98 percent of the island’s land mass has been lost since 1955 and repeated flooding has led many of the community’s inhabitants to migrate elsewhere, reducing the island’s population from over 400 to fewer than 100 in 2016. As might be expected, many of the younger economically productive residents migrated in search of better opportunities, leaving behind an older, less mobile population which needs assistance to relocate.

Since 2002, there have been other efforts to relocate the community, but they were not successful due to logistical and political complications. But in 2016, the state of Louisiana received a $48.3 million grant from the US Department of Housing and Urban Development to support the relocation of this community. Administered by the state’s Office of Community Development, Disaster Recovery Unit (OCD-DRU), planning for the relocation is well underway and is based on the principle that resettlement is a last resort in the context of an overall framework recognizing that Louisiana has always been a working coast and that adaptation measures are needed to maintain working zones. A relocation site has been identified purchased, and plans have been formulated to support the economic and cultural viability of the community and to ensure inclusive and participatory community engagement. A major challenge is to resettle the community to a site that is both safe and sustainable while maintaining proximity and access to the original community for economic, cultural and historical reasons (Davenport and Robinson, 2016). As noted throughout this paper, relocation is an expensive endeavor. Although $48 million was allocated to resettle the approximately 100 people, purchase of the site alone cost $19.1 million. Planning provides for the construction of an environmental model town, complete with solar panels to supply energy and an income-generation program to create jobs. The hope is that the relocated community will be able to attract some of those who have previously left to return (Stein, 2018).

Relocation of communities is generally considered to be a last resort. It is costly, requires: 1) planning and coordinated efforts by several government agencies; and 2) long-term follow-up. Most states and localities that are concerned with the effects of climate change are focusing efforts on implementing climate resilience programs so that people will not be forced to leave their homes. For example, when the City Council of Del Mar, California considered discussing how to adapt to future sea level rise by
discussing protection, accommodation and retreat, the popular reaction against retreat was so strong that the city council passed a resolution banning further city council discussions of retreat (Rott, 2018).

Lessons Learned
The United States offers an interesting case where despite considerable scientific work done to assess climate risk in different regions of the country, there exists only a patchwork of state and local programs and policies to support climate resilience. All the efforts thus far to consider movement as a form of adaptation have been developed in post-disaster scenarios (except perhaps for Alaska where the long-term effects of climate change seem to be driving discussions around relocations of indigenous communities).

At both the local and state levels:
- Analyze the risk of displacement caused or exacerbated by climate change for communities of origin and potential receiving communities
- Based on the results of the risk assessment, develop contingency plans for responding to that displacement

At the state level:
- Encourage the development of regional processes within the state to share information, conduct joint risk assessments, and plan effective measures to promote climate resilience

At the national level, the US government should be encouraged to:
- Collect statistics on displacement caused by sudden-onset disasters and develop mechanisms to follow-up with those displaced
- Systematically collect good practices of effective policies to enable communities to remain in place

REFERENCES


