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Climate change, social justice, and dislocation in the United States: Recommendations for Policy Makers

SHIFTING POPULATIONS AND CLIMATE CHANGE HAZARDS IN THE UNITED STATES

The 2022 International Panel on Climate Change (IPCC) report on climate adaptation found that climate change has caused "substantial damages" and "increasingly irreversible losses" in terrestrial, freshwater, and coastal ecosystems with adverse impacts on food and water security. Climate change is increasingly contributing to humanitarian crises where climate hazards coincide with highly vulnerable populations and has perpetuated vulnerability through displacement and involuntary migration. The IPCC estimates that between 3.3 and 3.6 billion people live in "contexts that are highly vulnerable to climate change." While the report specifically mentions regions like Africa, Southeast Asia, Central and South America, Small Island states and the Arctic, the stark reality is that human vulnerability and dislocation is also taking place in the United States, despite its established emergency institutions and national wealth. The number of Americans moving as a result of climate change is unknown, but current evidence suggests that Americans are moving towards environmental dangers, increasingly populating hazardous places such as California, the New Jersey coastline, and Florida (Curtis and Schneider, 2011).

Climate-related migration results from two main types of climate related threats: **sudden onset events** (such as hurricanes, floods, and wildfires) and **slow onset events** (such as sea level rise and extreme heat). Sudden onset events are believed to be increasing in their intensity and frequency, and in the past 40 years, there is evidence about the rising costs of their associated damage (Smith, 2021). **Slow onset events** play out over longer periods of time and are harder to measure and track in terms of their impact on migration and displacement. Sudden and slow onset events do not occur in isolation, so the literature includes a third category referred to as **compounding impact events,** in which sudden onset events create long-term impact. For example, a hurricane leads to flooding that in return creates land degradation. Another example is the extraordinary heat wave — "record-shattering triple-digit temperatures" — that hit the US Pacific Northwest in June 2021, amid the severe drought and wildfires already afflicting the Western US. This event impacted nine million people, killed hundreds, and obliterated local heat records by as much as nine degrees (Di Liberto, 2021).

This policy brief discusses the challenges of dislocation in the United States and offers policy recommendations for how the United States can become better prepared and protect its most vulnerable communities.

TYPES OF THREATS RELATED TO CLIMATE CHANGE:

Sudden onset events

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Slow onset events

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Compounding impact events

There are no reliable and systematically collected data — either globally or in the US — on the number of people either displaced by or migrating as a result of climate-related events.[1] There are rough estimates of people displaced by disasters like floods, fires, and hurricanes, but no data on the people who decide to migrate based on concerns about slow onset events. Most reports use the estimate of over 1.7 million people displaced in the United States as a result of disasters. This estimate from the Internal Displacement Monitoring Centre (IDMC, 2021) is frequently cited by national and international organizations (World Bank, United Nations Office for the Coordination of Humanitarian Affairs (OCHA)).[2] However, IDMC constructs the number based on data from the Federal Emergency Management Agency (FEMA), which does not include displacement that doesn't trigger federal response, such as smaller sudden onset events and slow onset events (Perls, 2020).

As climate conditions worsen, it is likely that disparities will emerge between those who can afford to move further away and more vulnerable communities whose economic situation prevents migration, even in the face of increasingly difficult conditions. This process is already visible in states such as Louisiana where low-income non-white communities have not migrated, risking becoming trapped and increasingly reliant on post-disaster services and government assistance. Similarly, in states like Oregon, families without insurance often left their homes only at the last minute, risking their lives and often becoming homeless after their properties were lost to wildfires (Merzbach, 2021). Those who have left did so permanently, as they were not able to recover and rebuild their homes and communities in their old neighborhoods — which were often replaced with more expensive housing complexes, a process known as "climate gentrification." In this manner, US climate-related migration could potentially lead to increased segregation (in part because of climate gentrification and in part due to the differing ability to invest in protective infrastructure). Combined with deepening inequalities, this segregation has the potential to worsen social and political disaffection and increase migration (Burke, 2020).

Between 2015 and 2021, sudden onset events such as hurricanes and wildfires have displaced over one million people annually. The National Centers for Environmental Information reports that between 2015 and 2021, the following billion-dollar disaster events affected the United States: six droughts, 13 flooding events, 55 severe storms, four winter storms, six wildfires, 15 tropical cyclones, and one freeze (National Oceanic and Atmospheric Administration, 2021).

In 2017, most of the 1.7 million displaced people were a result of ten hurricanes, particularly Hurricanes Harvey and Irma (Internal Displacement Monitoring Centre, 2021). The occurrence of hurricanes may increase because of continuous ocean-warming (Kossin et al., 2017) which is likely to affect US residents living in Caribbean areas such as Puerto Rico and along the East and Gulf coasts. The hurricanes of 2017 resulted in more than 3,300 deaths and produced nearly $300 billion in damage while destroying over one million homes primarily located in Puerto Rico (Hurricane Maria) and southeast Texas (Hurricane Harvey) (National Centers for Environmental Information, 2017). Model projections of climate change-related events also predict the increased frequency and intensity of severe thunderstorms during springtime in the Midwest as well as the southern Great Plains (Diffenbaugh et al., 2013). Atmospheric moisture will also likely create increased rainfall in the West Coast (Gao et al., 2015). While there is no conclusive evidence that extreme flooding will occur as a result, there is fairly strong evidence of increased frequency of floods and increased

1 It is important to distinguish between *displacement,* in which people's lives are physically threatened by the event and they are forced to leave their homes, becoming either permanently displaced or eventually returning to their homes; and migration in which people make a planned decision to move –usually permanently, and are less likely to return to their original dwellings. Displacement is usually associated with sudden onset events, and is more likely to lead to return and rebuilding for a large proportion of the affected population. Migration is a decision people make when confronted with long-term threats, like water inundation of their homes or loss of livelihoods as a result of heat waves, drought, diminishing water supply and so forth. The migration decision is affected by many factors, not just climate events.

2 For example, both World Bank (https://data.worldbank.org/indicator/VC.IDP.NWDS?locations=XU&name_desc=true) and OCHA (https://data.humdata.org/dataset/idmc-idp-data-for-united-states-of-america) use the same IDMC data.

annual peak stream flows in the central US and the Mississippi River Valley (Mallakpour and Villarini, 2015).

Similarly, wildfires have been at record high in the past five years, and they are predicted to increase in frequency due to the expansion of wildland-urban interface (WUI). WUI is where development — whether an individual home or a whole community — spreads into forestland and other natural areas. FEMA reports that "more than 46 million residences in 70,000 communities in the United States are at risk for WUI fires." (U.S. Fire Administration, 2021). In 2018, the wildfires in California contributed to the displacement of some 1.22 million people. These fires were the most expensive damage caused by sudden onset events in 2019 and 2020 (National Oceanic and Atmospheric Administration, 2021). According to the California Department of Forestry and Fire Protection, "nearly 10,000 fires had burned over 4.2 million acres, more than four percent of the state's roughly 100 million acres of land." (California Department of Forestry and Fire Protection, 2021).

Displacement and Social Justice

THE CHALLENGES OF SUDDEN ONSET CLIMATE EVENTS

In many regions of the US, the legacies of segregation and lower housing costs mean that low-income and socially vulnerable communities are more likely to live in high-risk areas. For example, during Hurricane Harvey in 2017, low-income neighborhoods were the most affected by the resulting floods (Collins et al., 2019). According to the Greater Houston Flood Mitigation Consortium Report, 26 percent of affordable, multifamily housing lie within a currently mapped floodplain and are vulnerable to future flood events (Greater Houston Flood Mitigation Consortium, 2019). Similarly, the damage caused by Hurricane Katrina in Louisiana was most concentrated in low-income, Black communities, many of whom became permanently displaced (Baranger, 2015). Who returns to their homes after a storm or flood also depends on demographic characteristics, labor force status, and income. After Hurricane Katrina, by 2008 only 54 percent of Black evacuees returned compared with 82 percent of White evacuees (Graif, 2015). Black evacuees also tended to stay closer to home by moving elsewhere in Louisiana or to states like Mississippi, Alabama, Texas, Tennessee, Georgia, Florida, and Arkansas (Groen and Polivka, 2008). The slow return and protracted displacement of Black communities is attributed to their living in high-risk flood zones which led to higher property damage and to the limited social infrastructure and assistance that allow more vulnerable residents to return (Adams et al., 2009).

Renters are particularly affected by sudden onset events such as floods as they are not informed about potential risks in the same way that homeowners are, and because rent insurance usually doesn't cover flood damage (Hersher, 2020).[3] Similar patterns of inequality in vulnerability levels exist in rural areas. When the Mississippi River flooded in 2011, Black farmers were affected the most. Poorer, rural areas were purposefully flooded to save wealthier nearby towns as the American Society of Civil Engineers and state government officials intentionally broke levees to reduce economic damage (Goldenberg, 2011). Most of the flooded areas did not receive proper compensation afterwards (Song and Michels, 2021). A similar situation occurred when the Missouri River flooded Kansas, Missouri and Nebraska in 2019, displacing many Midwestern farmers. There is no information as to whether these farmers have been able to return, or where they have gone (Simpson, 2019).

3 See also: "Case Study: Floods and Socioeconomic Inequality: University of Michigan, LSA Center for Social Solutions." https://lsa.umich.edu/social-solutions/news-events/news/insights-and-solutions/case-studies/case-study–floods-and-socioeconomic-inequality.html.; and "First Street Foundation Releases New Data Disclosing the Flood Risk of Every Home in the Contiguous U.S.,", https://assets.firststreet.org/uploads/2020/06/FSF-FF-DATA-LAUNCH-FINAL.pdf; First Street Foundation report published in June 2020 suggests that FEMA is not up to date with information leaving millions of homeowners uninformed about flooding risks. While FEMA classifies 8.7 million properties to be at risk through their flood maps, the First Street Foundation Flood Model identifies nearly 70 percent more, or 14.6 million properties with the same level of risk.

In the case of wildfires, the trend is similar in that the quality of housing and availability (or affordability) of insurance determines levels of vulnerability. The WUI in this scenario is where development — whether an individual home or a whole community — spreads into forestland and other natural areas. Research suggests that the increasing number of people living in these areas has to do with rising housing prices that push many to seek housing outside of urban centers (Peterman et al., 2019). However, some people also move to be closer to nature (Barringer, 2013). While hundreds of thousands of people have been displaced directly because of wildfires (regardless of their social and economic status), many have been pushed out of their homes due to the increased insurance premiums. High payouts led insurance companies to increase their premiums, making average rates in WUI areas higher. Residents in high-risk areas report abrupt cancelation of their policies or instant rate increases (Quinton, 2019).In some areas, insurance companies decide not to provide insurance altogether. People then have to buy insurance through state agencies such as California's Fair Access to Insurance Requirements Plan, which comes with high premiums and minimal coverage — and is paid for by taxpayers (Peterman et al., 2019). These insurance policies suggest that income influences who stays and who leaves WUI areas even before catastrophic fires occur. Those who are not able to afford insurance stay in at-risk areas without insurance or are underinsured or forced to move permanently. Wealthy and well-connected people whose property gets destroyed in the wildfires can re-build because they can afford expensive insurance or can extract promises from the state. Lack of affordable housing and inadequate recovery assistance have pushed many into homelessness in California (Mockrin et al., 2015).

THE UNIQUE CHALLENGES OF SLOW ONSET CLIMATE EVENTS

Some 23 million people in the United States live in low-elevation coastal areas, mostly in major metropolitan areas.[4] As sea levels consume coastlines, agriculture will be driven northward from the southern and coastal regions of the country (Shaw et al., 2020). Between May 2018 and April 2019, sea level rise (SLR) led to record high-tide flooding (Shaw et al., 2020). SLR also leads to the intrusion of saltwater into fresh water supplies, particularly in California and South Florida (Curtis and Schneider, 2011). This makes SLR unique among environmental stressors as it is likely to lead to a widespread migration unless costly protective infrastructure is employed (Georgeson et al., 2016).

Extreme heat waves in the US are predicted to increase particularly in the Southeast and Southwest, but also in the northern regions (Sun et al., 2015), putting farm laborers and people working outside at risk (Mera et al., 2015). High heat and drought particularly impact agricultural communities in subtropical areas such as Hawaii, Puerto Rico, the US Virgin Islands, and the US-affiliated Pacific islands (Gould and Diaz et al., 2018).

Within the US, large-scale irrigation systems, federal subsidies and food imports decrease vulnerability to droughts. However, drought is an indirect driver of displacement, impacting farm laborers, often composed of predominantly low-income, Latinx immigrants. During the California drought in 2011-2015, many of these communities were displaced by lack of employment opportunities (Lang, 2015).

Rural people and workers impacted by drought seek employment and opportunities often in large urban centers where another climate-related threat exists: extreme heat. High temperatures can create deadly risks by increasing rates of heart attacks and heat strokes (Medina-Ramón et al., 2021). Most affected are the elderly, sick,

4 Some of the metropolitan areas at risk of floods include Portland, Maine; Boston, Massachusetts; Providence, Rhode Island; New York and the greater New York metro area, including Long Island; Wilmington, Delaware; Baltimore, Maryland; Norfolk-Hampton, Virginia; Charleston, South Carolina; Savannah, Georgia; Miami, Jacksonville, Fort Myers, St. Petersburg, and Pensacola, Florida; Mobile, Alabama; New Orleans, Louisiana; Oakland, San Francisco, and Sacramento, California; and Seattle, Washington.: Est.; for more information see Katherine J. Curtis and Annemarie Schneider, "Understanding the demographic implications of climate change: estimates of localized population predictions under future scenarios of sea-level rise." https://doi.org/10.1007/s11111-011-0136-2

homeless, low-income and non-White people living in inner-city neighborhoods that are more exposed to dense urban development, sparse vegetation and lack of open spaces — all highly correlated with higher temperatures (Harlan et al., 2006). A study of over 100 US cities found that formerly "redlined"[5] neighborhoods have higher average temperatures than non-redlined areas (Hoffman et al., 2020). Staying inside and cool during summer can be expensive. In New York, some 30 percent of residents in the poorest neighborhoods didn't have air conditioning at home (Ito et al., 2021). Inability to pay utility bills leads to power shutoffs which puts residents at risk, even if they have air conditioning units. Power shutoffs have resulted in the death of elderly people who had no way to stay cool during the hot months (Dahl et al., 2019). Extreme heat can indirectly cause displacement because increased energy costs drive people out of their homes if they are not able to pay bills and face eviction as a result.

Sea level rise also threatens renters and low-income communities in urban centers across the United States. Most programs and policies implemented to mitigate the impact of SLR, however, are aimed at restoring property rather than protecting vulnerable communities. For example, working-class communities in New Jersey live primarily in low-lying coastal areas. However, the bulk of local and federal protection efforts have been directed towards building a barrier along the corridor where wealthier ocean front neighborhoods are located (Upton, 2017). This lack of protection for vulnerable communities is particularly visible in the states bordering the Gulf of Mexico (Martinich et al., 2012). People are displaced because their property or land is destroyed, but also because of the decrease in viable housing, along with increasing housing prices and insurance costs. Some studies estimate that in Florida, upward of 9.9 million people will be at risk of direct displacement by 2030 (Curtis and Schneider, 2011). Alaskan Native communities will be disproportionally affected, because Alaska Native villages on coastal lands will not only lose land due to erosion and SLR, but will also lose their food security, and cultural and religious stability because much of their identity is tied to the land (Bronen, 2013).

Social Attitudes towards Displaced Americans

Climate-related migration is often about people moving to large urban areas (Wolsko and Marino, 2015), but more research is needed on attitudes towards "newcomers" and how they integrate into urban areas over the long term. Some evidence suggests that climate-related migration has the potential to amplify existing social, political, and economic vulnerabilities. The most well-researched case is the aftermath of Hurricane Katrina, when people moved to Baton Rouge, Dallas, Atlanta or San Antonio — but especially to Houston, where some 200,000 settled after the hurricane. They had mixed experiences (Dart, 2015). Residents of Houston initially seemed to welcome the newcomers (White, 2011). But over time, surveys of residents in 2006 and 2010 characterized the mass relocation of evacuees as "a bad thing." (Warren, 2013) The newly arrived, mostly non-Black and low-income people from New Orleans, were tagged as adding to crime (notably by the mostly White and higher-income residents). (Swartz, 2006) However, later studies showed no evidence to support such claims — crime rates were not changed due to their presence (Varano et al., 2010), with resentments based more on perceived "special treatment" as well as related to pre-existing prejudice about them.

Similar experiences were reported after the California wildfires in 2018. After the town of Paradise was left in ashes (Gee and Anguiano, 2018), some 20,000 residents moved to the nearby city of Chico, where the sudden population increase exposed the city's pre-existing vulnerabilities. The hosts became agitated with the presence of the displaced, who were resented for perceived special treatment they received over locals in need. In general, mistrust and prejudice seem to increase when financial and health services become overwhelmed, and especially if newcomers are of different race and income level than their hosts (Swartz, 2006). When many newcomers lack economic and social connections

5 They were designated as hazardous areas for real estate investment based primarily on their racial makeup.

in the new communities, they become by necessity more reliant on government-provided assistance and this can generate resentment.

The negative reception by host communities potentially becomes intensified with increased strains on urban infrastructure (such as the electrical grid) and services (Orr, 2020; Minton, 2020). Combined with cities' ageing infrastructure, increased urban migration can lead to power outages, suggesting more preparation is needed (Energy Professionals, 2021; Making City, 2021). Lack of access to heating and cooling can worsen the effects of income inequality and economic instability. In areas that are already vulnerable, there is an increased risk of a new class of debt — climate-distressed mortgage loans (Keenan and Bradt, 2020).

Movements of people have the potential to negatively impact the financial health of insurance markets, community and agricultural banks, and other parts of the financial systems that are critical for survival, especially of small businesses and farms (Commodity Futures Trading Commission, 2020). In climate hazard-affected regions that see out-migration and de-population, American consumers could face higher financial burdens because of increases in housing prices and insurance premiums. Knock-on effects could include reduced spending power that in return has implications for manufacturing and wholesale trades. Again, marginalized populations would likely bear a relatively disproportionate share of the economic burdens (Siders, 2018). People in communities of color who are hit by climate- related disaster experience an average 31-point credit score decline, while individuals in majority White communities had a four-point decline (Ratcliffe et al., 2020). This type of inequality, together with potential tensions that might arise out of movement of people, might also push individuals to the political extremes and contribute to the stronger polarization of the US society.

FEDERAL RESPONSE TO DISPLACEMENT

The federal government's response to climate-related displacement usually comes after rapid onset events such as storms, large floods and wildfires. This response is short term, and agencies involved in providing assistance rarely refer to those who are displaced as Internally Displaced Persons (IDPs).[6] Federal disaster agencies such as the Federal Emergency Management Agency (FEMA) instead refer to disaster victims, survivors, or evacuees (Graham, 2015; Kromm, 2020), demonstrating the lack of attention given to the issue of internal displacement in the United States and the short-term assistance it offers. In order to address the issue of climate-related displacement and the risks it might pose for human and national security, the US government needs to embrace the concept of internal displacement as a domestic phenomenon.

Currently, most federal programs are based on the 1988 Stafford Act, which guides action in the form of short-term assistance. For slow onset events or long-term recovery assistance, funds usually come through different congressional appropriations with significant delays and ad hoc responses that often exclude the most vulnerable communities. The result is that when climate-related displacement occurs, the federal response tends to be disorganized and adds burdens on the displaced as well as their host communities. For example, the Californian Camp Fire in 2018 killed over 80 people and destroyed some 14,000 residences, with some 16,000 people having to move to nearby towns. The town of Chico, pop. ~100,000, received 19,000 new people almost overnight. There was little federal or state support for Chico and the strain on city services led to animosity towards the newcomers. In the aftermath of a disaster, many neighboring towns face social and political tensions along with economic and financial consequences.

6 See, for example, Roberta Cohen, Brookings-Bern Project on Internal Displacement, Statement at the Harvard Kennedy School of Government: Human Rights at Home (Nov. 1, 2006), https://perma.cc/4ZUG-LCRT. This statement highlights the fact that "internally displaced" is the language "the United States government uses at the United Nations" to apply to displaced persons in other countries, but never internally.

The federal government often falls short when assisting populations during and after disasters, as was the case in Puerto Rico after Hurricane Maria in 2017. Administrative systems in Puerto Rico crashed when the electric grid collapsed and people had no means of communication. In some cases, federal practices can aggravate the problem. An NPR report found that between 2017 and 2020 the Department of Housing and Urban Development (HUD) sold nearly 100,000 homes that were foreclosures in the US.[7] These homes were disproportionately located in flood-prone places. HUD sold homes in flood plains at almost 75 times the rate of all homes sold nationwide, according to Zillow records.[8] HUD sells flood-prone homes in almost every state, but Louisiana, Florida and New Jersey are hot spots. There is a nationwide shortage of affordable homes, especially for low-income families, and providing safe, affordable housing is HUD's mission. Many buyers are first-time homeowners excited to find a house they can afford. But the NPR report found that HUD does not fully disclose the potential costs and dangers of living in harm's way. In many cases, buyers of HUD homes get less information about flood risk and the cost of flood insurance than if they were to purchase the house from a private seller. The NPR analysis also found that neighborhoods where HUD sold homes have lower median household income on average than areas where HUD did not sell homes. Some of these transactions have happened as local governments are buying out properties in the same areas to mitigate flood risk.

POLICY RECOMMENDATIONS

The current structure and administration of federal assistance programs such as FEMA contribute to deepening inequalities and need to be reformed. FEMA is the main source of post-disaster funding, but its coverage varies across socioeconomic statuses and geographies (Hamideh et al, 2018). FEMA focuses primarily on recovery and reconstruction of destroyed property, which favors those with wealth and high property value (Fussell and Harris, 2014). After both Hurricanes Katrina and Harvey, White residents were more likely to receive FEMA assistance than Black residents despite Blacks reporting higher property damage (Hamel et al, 2017). Federal insurance coverage in low-income Black communities resulted in inadequate payments that did not meet their needs (Fussell and Harris, 2014). Lack of proper reimbursement also contributes to permanent climate-related displacement or pushes people deeper into the risk zones and poverty.

In the past year, FEMA has announced two initiatives to advance equity across the agency: the formation of an Equity Enterprise Steering Group, and the establishment of a robust stakeholder engagement process to develop the agency's 2022 – 2026 Strategic Plan.[9]

These FEMA initiatives are steps towards reducing barriers and increasing opportunities, and reflect the agency's commitment to advancing equity. Such initiatives should be enhanced and built on.

7 See, for example, National Public Radio, "The Federal Government Sells Flood-Prone Homes To Often Unsuspecting Buyers," NPR Morning Edition, September 13, 2021 (https://www.npr.org/2021/09/13/1033993846/the-federal-government-sells-flood-prone-homes-to-often-unsuspecting-buyers-npr-). Foreclosures occur when the homeowner is unable to pay their federally insured mortgage, and the house is seized by a bank and turned over to HUD. Only a small percentage of foreclosed homes in the United States end up being sold by HUD, but the numbers add up.

8 According to the NPR investigation, "More than one-fifth of homes sold by HUD in Louisiana were in flood plains. In Florida, it was about 12% of homes sold by HUD, and in New Jersey, 7%. In comparison, Zillow's records show that 0.1% or less of all homes sold in these states are in flood zones."

9 For more information, see FEMA announcements on initiatives advancing equity: FEMA, 2021. "FEMA Announces Initial Initiatives to Advance Equity" (https://www.fema.gov/press-release/20210721/fema-announces-initial-initiatives-advance-equity)

In addition, the following recommendations will enable the US government to strengthen its response:

Invest more in research to understand mobility and immobility related challenges. There is a significant lack of statistical information and research related to the impact of internal displacement and migration on political and economic stability in the US. Existing research doesn't disaggregate data at a regional or city level to allow more detailed understanding of different types of migration and impact. We need to understand who moves as a result of climate change, who gets permanently displaced and why. We also need better understanding of the responses of both the displaced and their hosts, in order to identify and address potential risks of social or political unrest. This is especially important when considering that criminal networks and extremist movements might take advantage of the difficult situations to recruit and mobilize support.

Create a central authority that can manage climate and internal migration related projects. Communication and planning issues are understudied and largely unaddressed by the US government agencies outside of immediate disaster relief assistance. Existing federal responses are too slow and lack coordination in their logistical and humanitarian response. To our knowledge, no centralized agency is monitoring internal migration. Therefore, it might be useful to establish a new civilian agency focused on internal climate-related migration. Existing agencies like FEMA, United States Army Corps of Engineers (USACE), and the US Department of Housing and Urban Development (HUD) could interact with this new agency, which would have the primary coordination role.

The new agency could be tasked with creating a centralized system that tracks climate-related movement of people in the US to promote equitable protection and assistance and provide support to host communities. There are currently many task forces that work on different projects related to climate change, but they lack authority and the budget to implement programs. A single agency would be better positioned to coordinate efforts and ensure that all aspects of human and national security are taken into consideration when tailoring government responses and policies.

Create more detailed vulnerability maps and improve land-use decisions. City-level vulnerability maps and updated federal flood maps will assist government agencies in preparing for and preventing displacement before disasters occur. Updated city maps allow homeowners and developers to understand the risks of building or buying a property in at-risk areas (First Street Foundation, 2020).[10] Agencies such as the Department of Homeland Security can improve land-use decisions by providing incentives or withdrawing federal investments in areas vulnerable to climate related impacts. In an executive order issued earlier this year, President Biden required federally-funded infrastructure to measure flood risk during construction. The Securities and Exchange Commission is preparing a rule to require climate risk disclosures from all public companies, which should help Americans to make better decisions about where they live or move (Bain, 2021). More policies and regulations such as these would allow citizens to protect themselves and in return mitigate economic and security risks that might arise due to climate-related migration.

Reduce energy burdens and improve service delivery systems in urban areas. Improved systems for delivery of services such as housing or public health services are the key factors in protecting cities from negative impact of climate-related events, reducing displacement, and preventing security and economic risks in receiving cities. Examples from Texas and California show that in cases where receiving towns are overburdened, security risks arise for the hosts and the newcomers. Additionally, lack of financial resources often means displaced

10 First Street Foundation report published in 2020 suggests that FEMA is not up to date with information leaving millions of homeowners uninformed about flooding risks. While FEMA classifies 8.7 million properties to be at risk through their flood maps, the First Street Foundation Flood Model identifies nearly 70% more, or 14.6 million properties with the same level of risk. For more information, please see the National Risk Assessment from the First Street Foundation here: https://assets.firststreet.org/uploads/2020/06/first_street_foundation__first_national_flood_risk_assessment.pdf

people are at risk of becoming victims of criminal and smuggling networks. Displacement can put people at risk of underground or black-market activities in the form of predation from illegal networks such as human trafficking, drug smuggling, etc. Strengthening service delivery systems can potentially reduce these risks.

Prepare for the risks of injuries, illnesses, and deaths from climate-related migration. In a scenario where large numbers of people are moving or being evacuated, increased morbidity and mortality can lead to unrest and pose a series of security risks. Learning from the example of the COVID-19 pandemic, the government should collect all research related to potential future outbreaks of disease and develop plans for mitigating and managing risks.

Build models that predict which host cities are likely to receive high numbers of internal migrants, and then prepare them for it. Such models could draw on migration models combined with models that predict climate-related risks for different regions and historical data. A combined migration-climate hazard model could predict the cities that might be destinations for climate-related migration. Preparation of host cities requires investments in infrastructure and services as well as education about climate change and displacement to decrease potential tensions and conflict.

Consider pilot migration programs to reduce risks of disorganized displacement. In July 2020, the US Government Accountability Office (GAO) released a report suggesting that a climate migration pilot program "could enhance the nation's resilience and reduce federal fiscal exposure." (U.S. GAO, 2020) The report identified a few communities that have used climate migration as a resilience strategy, and two — Newtok, Alaska, and Isle de Jean Charles, Louisiana — advanced to relocation stage. But many more communities will need to adopt this strategy in the coming decades. While organized relocation of entire communities is a last resort, as the GAO suggests, it is likely to become necessary as more habitats are destroyed. Managed relocation would allow at-risk populations to escape danger in time, especially the most vulnerable populations that do not have the means to modify their homes. Coordinated transition would allow the government to better mitigate social and political as well as economic risks that might arise out of large numbers of people relocating at the same time. •

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