

BRIEFER

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Migration as a climate adaptation strategy in developed nations

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The U.S. Department of Defense’s recently-released Climate Change Adaptation Roadmap states: “As climate change affects the availability of food and water, human migration, and competition for natural resources, the Department’s unique capability to provide logistical, material, and security assistance on a massive scale or in rapid fashion may be called upon with increasing frequency.”ⁱ Within this document, “human migration” is not a throwaway line. There are real concerns across governments, including those institutions normally focused on more traditional security risks, that climate change is, and will have, a marked effect on human migration. This article posits that the developed – not just the developing – world may need to seriously consider migration as a potentially viable adaptation option to climate change.

The migration option

The literature for overt migration as a climate adaptation option is minimal to non-existent. Yet the “migration as adaptation” concept is not without precedent. According to the 2014 Quadrennial Homeland Security Review (QHSR), two of the top five threats to the United States of America are the low-levels of preparedness many systems in the U.S. have to deal with immigration and natural hazards, both of which could be exacerbated by climate change. The QHSR states: “Natural haz-

ards are becoming more costly to address, with increasingly variable consequences due in part to drivers such as climate change and interdependent and aging infrastructure.”ⁱⁱ Perhaps the most emblematic example of a modern human migration challenge in response to a climatic event is the Gulf Coast of the United States. In 2005, Hurricane Katrina slammed into Louisiana and Mississippi, permanently displacing from 100,000 to 300,000 residents, and generating around \$34 billion in damage.ⁱⁱⁱ

In this context, it is becoming increasingly difficult to avoid “migration” as one potential adaptation option for dealing with climate change disturbances.

An ancient strategy confronts modern boundaries

For thousands of years, climatic changes and human migration have been linked. There are numerous examples in history of climatic variability driving mass movements of people.^{iv,v,vi} Migration at such large scales has become much more complex in the modern context. Cultures have reached a migration plateau with the firm establishment of geopolitical borders. Rarely do large masses of people move due to climatic variability, as they had for millennia in the past. The new, modern drivers of migration are due to conflict, opportuni-

ty, and development policies. Relatively fixed political borders and steady economic development regimes are not fully prepared for a reversion to climate-related migrations. Migration as an adaptation option is, therefore, new territory for policy makers concerned with security.

Climate change in context of other drivers of migration

Of the social, economic, political, and environmental factors that dominate drivers of migration, climate change hazards are increasingly having detectable effects.

There are five dimensions of climate change that can have a potential effect on the drivers of migration: sea level rise, changes in storm frequency and intensity, changes in rainfall regimes, increases in temperatures, and changes in atmospheric chemistry.^{4,5,vii}

Using examples from developed countries, this review sheds light on some ways in which climatic hazards, especially sea level rise, storms, floods and droughts, can infringe upon human security and state stability.

Coastalization and abandonment

Littoralization in Europe and the United States has increased significantly over the 20th century, with settlements and assets becoming more and more concentrated along coastlines.^{viii} One of the prevailing policy preoccupations is dealing with mass-influxes of populations, and economic development in coastal areas, which concentrate assets, infrastructure, and economic influence, while at the same time increases exposure to climate-related hazards.

Consider, for instance, the 2014 CoreLogic Storm Surge Report.^{ix} More than 6.5 million homes along the U.S. Atlantic and Gulf Coasts are likely to be at risk from storm surges. Florida, Louisiana, and New York are within the top three states for the number of properties at risk. In these three states, an estimated \$1.5 trillion in residential homes are exposed to storms, and almost \$1 trillion of them are concentrated in just fifteen metropolitan regions.

One outcome of climate-related hazards is that the territorial and socio-economic changes that occur in the wake of such hazards can lead to the abandonment of coastal areas. An interaction of socio-economic conditions and cultural capacity to manage climatic and environmental risks are likely to determine communities' adaptive capacity, including whether or not a population decides to leave an area entirely.

Risk perception, climate change and migration in the Mediterranean

One of the crucial components of adaptive capacity is "risk perception," which has been identified as an important predictor of people's decisions to adjust to various kinds of environmental hazards.^x Linking risk perception to migration, for example, empirical studies conducted along the European coastline of the Mediterranean Sea suggest that abandoning some highly dynamic coastal areas (such as those along the Spanish and Greek coastlines), is viewed as an acceptable option for climate change adaptation, according to the majority of stakeholders. These stakeholders often stated the sentiment that "winning" against nature was impossible, and that the cost of protecting the coastal areas in a time of economic recession would be higher than abandoning those areas.^{xi,xii}

In the examples in Spain and Greece, the issue of "sea level" was pointed out repeatedly by stakeholders. This is especially important in light of future projections that estimate a rise of between 3 and 61 cm across the Mediterranean basin in the 21st century.^{xiii} Sea level rise in the Mediterranean also clashes with one of the prevailing demographic trends in the region, including on the North African coastline, which is characterized by the rapid growth of human settlements and economic activity.

Risk perception, climate change and migration in the United States and Australia

Coastal areas in the United States are experiencing a similar confluence of stresses, which has brought the "migration" option to the fore. A study conducted in the Florida Keys shows that abandonment of the area due to sea level rise is perceived as a potentially acceptable option to experts and decision-makers.^{xiv} Consistent with this view,

some scholars^{xv} argue that it is unrealistic to believe that coastlines can be conserved from impending sea level rise, and the attendant coastal erosion. They suggest retreat and selective conservation of parts of the coast that are important to communities, and the use of technological solutions, where possible, to stop beach retreat. The same study showed that in the case of more severe hurricane events in places like New Orleans (USA), “retreat” is likely to be a primary consideration for decision-makers. Research carried out in Alaska (Inupiat community) documented that abandonment and relocation are likely to be the only sustainable option in terms of changing climate.^{xvi}

In Australia, researchers found that the majority of the respondents in eight cities around the country indicated that they would abandon their settlements because of the unavailability of water due to the changing climate.^{xvii} Hence, it can be assumed that more chronic, longer-term stresses, such as drought and water scarcity which affect ecosystems services and livelihoods, could also be a significant factor in reducing a community’s adaptive capacity, potentially leading to migratory responses over coming decades even in developed countries.

When migration is not an option

Despite the existence of communities for whom migration is perceived as a viable adaptation option, there are many communities, for social, political, economic and cultural reasons, that may be unwilling or unable to leave. In these communities, demands on the remaining institutional resources for support and services will likely grow, further complicating already difficult situations.^{9,xviii,xix} Key social and cultural characteristics that influence decisions to move are likely to be age, sex, educational level, wealth, marital status, place attachment and attitudes and preferences (such as degree of risk aversion). It is often argued that these characteristics are independent of environmental conditions – with the possible significant exception of the extent to which attachment to place is influenced by local environmental characteristics. These findings are generally consistent with prior studies carried out in Mediterranean basin, where a strong majority of respondents in

the Ebro Delta and Nile Delta, respectively, were not willing to abandon their areas.^{xx,xxi}

Some scholars have pointed out that in the context of the Spanish Ebro Delta, personal attachment to “place” is heightened in cultures where property is highly valued, such as in Spain.^{xxii} Similarly, others have suggested that stakeholders are unwilling to allow areas of high-value real estate to be abandoned to the sea, unless political forces make any other options untenable. For instance, in Somerset (UK), public bodies in the late 1990s removed seawall defenses, leading to the flooding of low-lying areas beyond the beach. Flooding resulted in the loss of valuable grazing farmland, but also in the creation of a wetland, which has provided a new recreational resource (e.g. bird watching), and has become an asset for the local tourism industry.^{xxiii}

It has also been documented that the abandonment of urban areas is generally not a viable option, as the cost of infrastructure abandonment is often perceived as too high.^{xxiv} In the case of Japanese tsunami of 2011, studies demonstrated that even in the face of exposure to such an extreme environmental event, a large proportion of the population preferred to stay and rebuild the affected area.^{xxv}

These social, political, economic and cultural pressures to “stay” are likely to remain as a countervailing force to the “migration” option in many places, but as climate hazards increase in their frequency and intensity, the cost-benefit assessments populations make may change.

Integrating migration into climate adaptation strategies

This review suggests that though it has long been recognized that climate change factors have an impact on migration, the issue has received comparatively little attention within mainstream debates on human migration in developed countries. Moreover, few case studies in this review highlight the role of risk perception and awareness in decision making processes. It is important to understand the facilitating and motivating factors for migration, as well as present and future climatic risks, in order to develop more successful adaptation and vulnerability reduction strategies. It is also imperative to more fully understand the political

and socio-economic conditions that mitigate, or exacerbate, climate vulnerability, in order to craft tailored responses to climate change risks and hazards.

The challenge remains to address migration in developed and developing countries as a possibly viable adaptation option. This may open the door

ⁱ The 2014 Department of Defense Climate Change Adaptation Roadmap, <http://www.acq.osd.mil/ie/download/CCARprint.pdf>

ⁱⁱ The 2014 Quadrennial Homeland Security Review, <http://www.dhs.gov/sites/default/files/publications/qhsr/2014-QHSR.pdf>

ⁱⁱⁱ Couch, C., Leontidou, L., Petschel-Held, G., 2007. Urban sprawl in Europe: landscapes, land-use change and policy. Blackwell, Oxford.

^{iv} Smith, P.J., 2007. Climate Change, mass Migration and the Military Response. *Orbis* 51(4), 617–633.

^v Walsham, M. 2010. Assessing the Evidence: Environment, Climate Change and Migration in Bangladesh. IOM, Regional Office for South Asia, Dhaka.

^{vi} Warner, K., 2010. Global environmental change and migration: Governance challenges. *Global environmental change* 20, 402–413.

^{vii} Tacoli, C., 2009. Crisis or adaptation? Migration and climate change in a context of high mobility. *Environment and Urbanization* 21(2), 513–525.

^{viii} Couch, C., Leontidou, L., Petschel-Held, G., 2007. Urban sprawl in Europe: landscapes, land-use change and policy. Blackwell, Oxford.

^{ix} 2014 CoreLogic Storm Surge Report, <http://www.corelogic.com/about-us/researchtrends/storm-surge-report.aspx#.VHPWrMI1XVE>

^x Terpstra, T., Lindell, M.K., Gutteling, J.M., 2009. Does Communicating (Flood) Risk Affect (Flood) Risk Perceptions? Results of a Quasi-Experimental Study. *Risk Analysis* 29(8), 1141–1155.

for exploring a broader range of opportunities to reduce the impacts of climate change, build resilience, and enhance local, national and regional security.

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^{xi} Fatorić, S., Morén-Alegret, R., 2013. Integrating local knowledge and perception for assessing vulnerability to climate change in economically dynamic coastal areas: The case of natural protected area Aiguamolls de l'Empordà, Spain. *Ocean and Coastal Management* 85(A), 90–102.

^{xii} Fatorić, S., Morén-Alegret, R., Kasimis, C., 2014. Exploring climate change effects in Euro-Mediterranean protected coastal wetlands: the cases of Aiguamolls de l'Empordà, Spain and Kotychi-Strofylia, Greece. *International Journal of Sustainable Development & World Ecology* 21(4), 346–360.

^{xiii} Marcos, M., Tsimplis, M.N., 2008. Comparison of results of AOGCMs in the Mediterranean Sea during the 21st century. *Journal of Geophysical Research: Oceans* 113(C12), DOI: 10.1029/2008JC004820.

^{xiv} Mozumder, P., Flugman, E., Randhir, T., 2011. Adaptation behavior in the face of global climate change: Survey responses from experts and decision makers serving the Florida Keys. *Ocean and Coastal Management* 54(1), 37–44.

^{xv} Granja, H.M., Carvalho, G.S., 2000. Inland beach migration (beach erosion) and the coastal zone management (the experience of the northwest coastal zone of Portugal). *Responsible Coastal Zone Management. Periodicum Biologorum* 102(1), 413–424.

^{xvi} Marino E. 2012. The long history of environmental migration: Assessing vulnerability construction and obstacles to successful relocation in Shishmaref, Alaska. *Global Environmental Change*. 22: 374–381.

^{xvii} Hurlimann, A., Dolnicar, S. 2011. Voluntary relocation – an exploration of Australian attitudes in the context of drought, recycled and desalinated water. *Global Environmental Change* 21, 1084–1094.

^{xviii} McLeman, R.A., 2011. Settlement abandonment in the context of global environmental change. *Global Environmental Change* 21S, S108–S120.

^{xix} Collins, A.E., 2013. Applications of the disaster risk reduction approach to migration influenced by environmental change. *Environmental Science and Policy* 27S, S112–S125.

^{xx} Fatorić, S., Chelleri, L. 2012. Vulnerability to the effects of climate change and adaptation: The case of Spanish Ebro Delta. *Ocean and Coastal Management* 60, 1–10.

^{xxi} El Raey, M., Dewidar, K., El Hattabm, M., 1999. Adaptation to the impacts of sea level rise in Egypt. *Climate Research* 12, 117–128.

^{xxii} Roca, E., Villares, M., 2012. Public perceptions of managed realignment strategies: The case study of the Ebro Delta in the Mediterranean basin. *Ocean and Coastal Management* 60, 38–47.

^{xxiii} Phillips, M.R., Jones, A.L., 2006. Erosion and tourism infrastructure in the coastal zone: Problems, consequences and management. *Tourism Management* 27, 517–524.

^{xxiv} Walsh, K.J.E., Betts, H., Church, J., Pittock, A.B., McInnes, K.L., Jackett, D.R., McDougall, T.J., 2004. Using Sea Level Rise Projections for Urban Planning in Australia. *Journal of Coastal Research* 202, 586–598.

^{xxv} Phillips, M.R., Jones, A.L., 2006. Erosion and tourism infrastructure in the coastal zone: Problems, consequences and management. *Tourism Management* 27, 517–524.