Report

Climate change, migration and displacement

The need for a risk-informed and coherent approach

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Cover photo: Vast tracts of land in Pakistan's Sindh province are still submerged under water, six months on from the extreme monsoon rainfall that forced more than 20 million people from their homes. © Department for International Development / Russell Watkins 2010

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Acronyms

AAAA	Addis Ababa Action Agenda
COP	Conference of the Parties
HRC	Human Rights Council
IDMC	Internal Displacement Monitoring Centre
IDPs	Internally displaced people
IFRC	International Federation of Red Cross and Red Crescent Societies
ILO	International Labour Organization
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
KNOMAD	Global Knowledge Partnership on Migration and Development
LDCs	Least developed countries
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NDC	Nationally Determined Contributions
ND-GAIN	Notre Dame Global Adaptation Index
NGO	Non-governmental organisation
OHCHR	Office of the High Commissioner for Human Rights
PDD	Platform on Disaster Displacement
PRISE	Pathways to Resilience in Semi-arid Economies
SDGs	Sustainable Development Goals
SFDRR	Sendai Framework for Disaster Risk Reduction
SIDS	Small Island Developing States
TFD	Task Force on Displacement
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees (UN Refugee Agency)

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Terminology

There is a significant lexicon associated with human mobility,[1] with definitions not always shared between actors. Human mobility captures:

- **Migration:** the process of moving within or across borders, either temporarily, seasonally or permanently. Migration is commonly associated with an element of choice, and in this paper it is considered to be *voluntary* in nature.
- **Displacement:** refers most commonly to instances where there is no choice but to move, either temporarily or permanently, within or across borders. In this paper, displacement is considered to be *forced* in nature, for example in the case of a severe flood or political unrest forcing people from their homes.
- **Planned relocation:** a form of organised movement of people typically instigated, supervised and carried out by the state. Ideally, it is undertaken transparently with the informed consent of the community concerned, and with adequate provisions for re-establishing lives and livelihoods (McAdam and Ferris, 2015; Warner et al., 2015). It is most likely to be permanent and so singular, rather than seasonal, but can also occur where people or groups of people are moved from places of temporary residence. Planned relocation is undertaken to protect people from risks and impacts related to disasters and environmental change, including the effects of climate change. However, it is not without controversy, as other non-climate factors can motivate a state to relocate people, including land use change or natural resource extraction.

While the distinction between migration and displacement in this paper is the element of choice, we acknowledge a continuum along this forced–voluntary spectrum, and that, in many instances, choice and coercion will co-mingle (Hugo, 2010; IOM, 2009). As noted in the Nansen Initiative (2015: 17), 'people, while not necessarily having the ability to decide in complete freedom, still possess the ability to choose between different realistic options'. Thus, it is important to recognise that those who migrate do not always do so completely voluntarily or in safety over the entirety of their journey.

1 See, for example, IML (2004).

Executive summary

There is a lack of clarity as to the direct influence of climate change on human mobility. We know that some areas worldwide are becoming less habitable due to increasingly extreme climate-related hazards. We know that other areas could become more habitable, allowing new economic activities such as agriculture or tourism. International processes, particularly those on migration and displacement, climate change and disaster risk reduction, increasingly refer to the links between climate change and human mobility. However, these links are not always grounded in evidence, and this increased attention has not led to the coordinated, significant policy or legislative change that is required.

This paper responds to these challenges. It presents an overview of the current evidence base on the complex relationships between climate change and human mobility to support the development of an informed global discourse across the humanitarian, peace and sustainable development agendas and as a counter to some of the sensationalist claims often propagated by the media. In so doing, the paper illustrates that to adequately address human mobility in international and national policy responses, the links between climate change, displacement and migration need to be better understood.

Climate change will alter the frequency, intensity, duration, timing and location of sudden- and slow-onset climate-related hazards. In 2016, over 24 million people were newly displaced by sudden-onset climate-related hazards, such as typhoons and floods. But there is no means of tracking how many might have moved partially in response to slow-onset hazard events, such as drought or desertification. In addition, directly attributing human mobility to climate change is extremely difficult: people move for a wide variety of reasons, and even where hazards contribute to this decision, it is the underlying socioeconomic, cultural, political and environmental processes that either enable or constrain people's ability to cope where they are or result in them moving. Analysis is hampered by this complexity and the interrelatedness of drivers of migration, while significant data challenges make estimation of migration and displacement under a changing climate problematic. Multidisciplinary, robust investigations of climate change and human mobility are limited.

And yet, while the precise relationship between hazard and mobility is not easily tracked, it is clear that climate is influencing patterns of migration and displacement. Decision-makers are therefore attempting to understand the influence of climate change on migration and displacement and what can be done about it. The distinct role of underlying **vulnerability and capacity** in driving human mobility and its impacts – including the policies and practices dictating formal and informal support – illustrate that the links between climate change and human mobility are not just for disaster risk management efforts or humanitarian assistance to address, but should be fundamentally ingrained in sustainable development processes.

National climate strategies and plans

Human mobility – both autonomous and planned – presents opportunities that may aid adaptation to climate change, and serve as an adaptation measure itself. Risk-informed development strategies and policies are paramount, and have the potential to reduce vulnerability and enhance the ability of an individual, community or country to cope with, respond to and acquire the necessary skills to deal with shocks and stressors, including those posed by climate change. Here, Nationally Determined Contributions (NDCs) and national adaptation and disaster management processes and plans can play an important role.

If carefully managed and with the necessary resources, adaptation and disaster management **processes and plans** have the potential to:

- Reduce vulnerability and ensure individuals, communities and countries have the necessary skills to cope with and respond to climate-related hazards;
- Determine the flows, conditions and impacts of human mobility; and
- Support migrant and displaced workers and communities.

This potential will be lost unless these strategies and policies are based on and account for the ways in which climate-related hazards affect people's needs, welfare, income, and subsequent decisions to move (or stay). Such plans must operate in both origin and destination communities, acknowledge the heterogeneous nature of those moving, and account for permanent, temporary and circular migration. To be able to effectively operate in this way, additional financing and technical support from the international community is required.

Global regimes

At the global level, the conceptual framework and organisational architecture around migration and displacement are embedded within an international response machinery developed over seven decades. But this machinery has not yet managed to integrate the complexity of 21st-century mobility into its politics or institutions. The links between climate change and human mobility have been recognised and are starting to be addressed to varying degrees within many global regimes. These include the United Nations Framework Convention on Climate Change (UNFCCC), the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR) and the United Nations Convention to Combat Desertification (UNCCD). The Platform on Disaster Displacement (PDD) has an important role to play in supporting national governments to mainstream approaches to human mobility into broader policies. The 2030 Agenda for Sustainable Development (2030 Agenda) includes Sustainable Development Goals (SDGs) and targets on both climate change and migration, though explicit links between the two are absent.

The Global Compacts on Migration and Refugees, to be finalised in 2018, offer scope for climate risk-informed action. For example, the former is likely to include a recognition of migration as an adaptation strategy. It remains to be seen what impact (if any) the Compacts will have on national policies. However, if the Compacts and NAPs could be better aligned, in terms of language and approaches, links could plausibly be made between global and national ambitions, alongside a means to support people who want or need to move. This could start to shift the discourse, to seeing migration as an adaptation strategy rather than a failure to adapt to climate change. It could also help shift siloed approaches to ensure human mobility is integrated into socioeconomic development plans.

Such an approach would build on growing calls to better consider the rights, needs and protections available to people falling outside the scope of the 1951 Refugee Convention. The UN Secretary-General António Guterres has called for a new international protection framework for people who have been forced to leave their own country and who may not qualify for refugee status under international law, including those displaced as a result of catastrophic environmental events (Zetter, 2017). A rights-based approach to climate change – that accounts for issues of justice, equity and accountability – is of fundamental importance to both the effectiveness of NAPs and progress towards global frameworks such as the 2030 Agenda.

Patterns of human mobility are highly likely to shift as the climate continues to change. National and global policy must act to give people choice – the choice to stay or go, and the support to do so. Ultimately, countries must honour their international commitments to climate change mitigation to ensure communities are not left with no choice at all.

1. Introduction: people on the move in a changing climate

People have moved throughout history, and for many reasons. Some are displaced – forced to move due to conflict and persecution, natural hazard events like flooding or cascading disasters such as drought-influenced famine – and others choose to migrate temporarily or permanently in pursuit of better economic conditions, for family reasons or, at times, when seasonal conditions, like failing rains, make it difficult or impossible to earn a livelihood (Shen, 2013; Lilleor and Van den Broeck, 2011; Piguet, 2010; Ibáñez and Vélez, 2008). In other cases, governments have pursued policies and programmes promoting movement and population relocation from highly hazard-exposed areas, or have forcibly displaced communities through land-grabbing and threats of violence.

Anthropogenic climate change complicates this already complex picture. A changing climate will alter the frequency, intensity, duration, timing and location of slow- and sudden-onset climate-related hazards (IPCC, 2014a; 2012). The impacts of climate change are already being felt through increasing drought and heavy rainfall contributing to flooding, sea-level rise and abnormally high temperatures (Blunden and Arndt, 2017). These shifts in climate are impacting the ecosystems upon which livelihoods and economies, cultures and societies depend for water, food, energy and waste removal, among other services (Cozzetto et al., 2013). It is important to understand that not all climate-related hazards can be attributed to climate change. Climate attribution science is much stronger at understanding the influence of climate change on hazards (Peterson et al., 2012; IPCC, 2012), but not every occurrence is caused by or unduly exacerbated by climate change. Yet, given the potential knock-on impacts to human systems and the known influence of climate-related hazards on displacement, decision-makers are asking what role(s) climate change may play in human mobility – both displacement and migration – and what should be done about it.

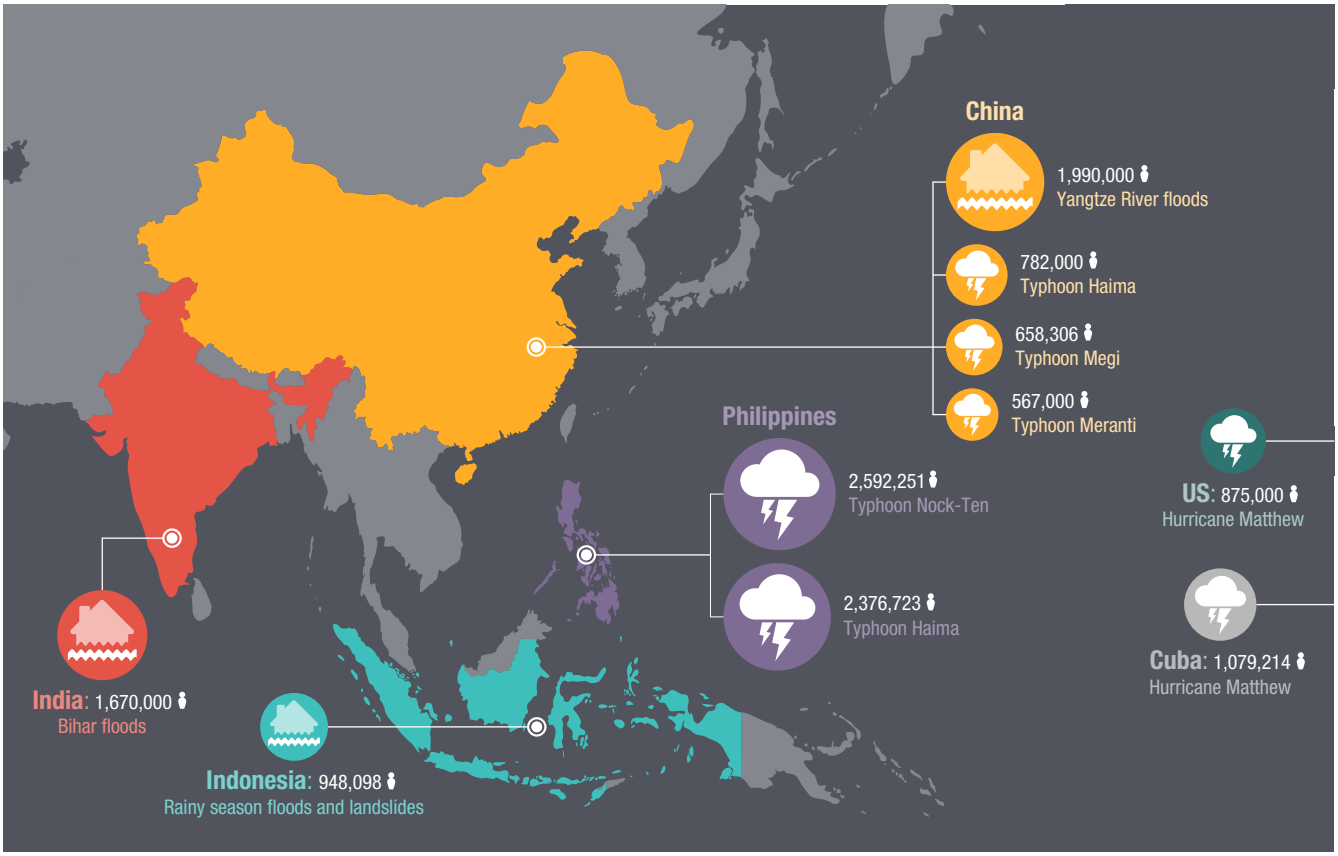
Sudden-onset climate-related hazards contribute to large numbers of displaced people on an annual basis through evacuation and moving out of harm's way (Adamo, 2009). Such hazards newly displaced over 24 million people in 2016, and overall have displaced 32 times more people than other geophysical hazards such as earthquakes, and three times as many as those fleeing conflict (IDMC, 2017). Sudden-onset hazards include storms (e.g. typhoons), extreme temperatures, and flooding. All of the ten largest disaster displacement events in 2016 were related to floods and storms (Figure 1). Between 2008 and 2016, sudden-onset events were responsible for 99% of internal displacement: an average of 21 million people annually (ibid.).[2]

Slow-onset climate-related hazards[3] include drought, desertification, salinisation, ocean acidification, glacial retreat and sea-level rise and changing trends in seasons. Although not represented in the disaster displacement data, slow-onset hazards play a role in compelling people to move when other systems, such as government responses, are inadequate to enable them to stay in place, or where there are few options for livelihood diversification (Adamo, 2003). Such hazards, which often have long warning times, can prompt people to migrate, temporarily or permanently, when livelihoods can no longer be supported or areas become uninhabitable due

2 The Internal Displacement Monitoring Centre (IDMC) database for sudden-onset climate-related hazards includes floods, storms, extreme temperature and wildfires. It excludes displacement influenced by slow-onset events. Furthermore, the IDMC uses the term 'disasters' to connote 'hazards'. Some over-counting (in high-income countries) and under-counting (in low-income countries) may occur because housing destruction and evacuations are counted as disaster-displacement proxies (see IDMC Methodology for details: IDMC, 2017).

3 In this paper, 'hazard' is distinguished from 'disaster' following convention by the Intergovernmental Panel on Climate Change (IPCC). A hazard refers to climate-related physical events or trends (IPCC, 2014b: 1,766). A disaster is 'severe alteration in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects' (ibid.: 1,763).

Figure 1. The ten largest displacement events of 2016 were climate-related



Source: IDMC database (2017)

to warmer, drier seasons or the physical loss of land and ecosystem resources (Bremner and Hunter, 2014). Slow-onset climate-related hazards generally last longer and have cascading impacts, often over months and years (Glantz, 1999).

The role of sudden-onset hazards in displacement, as well as some case studies on the influence of slow-onset hazards on migration (see, for example, Koubi et al., 2016), have given rise to warnings that climate change will lead to mass population movements. In 2006, the Stern Review suggested that, by 2050, 200 million people would be affected by climate change that could induce human mobility (Stern, 2006). The non-governmental organisation (NGO) Christian Aid has forecast that a billion people may be displaced by 2050 as a result of environmental causes, albeit not climate change alone (Christian Aid, 2007). Others have estimated the number of 'climate migrants' at between 25 million and 30 million a year (Myers, 1997; El Hinnawi, 1985). A recent report by the Environmental Justice Foundation (EJF, 2017) suggests that sea-level rise will lead to the displacement of hundreds of millions of people by 2100.

Confidence in these projections of future human mobility influenced by climate change is, however, low (IPCC, 2014a). Significant data challenges undermine estimates of human mobility under a changing climate. Groups such as the Internal Displacement Monitoring Centre (IDMC), which collect data related to internal displacement by climate-related disasters, acknowledge difficulties in tracking displacement; national and international databases related to migration do not contain climate-related attribution data, making it impossible to track the influence of climate in people's decisions to migrate internally or across borders.

Beyond problems with the data, the simplistic linkage of climate change and mass displacement and migration ignores the multiple and complex interplay of factors beyond climate-related hazards that contribute to people's decision to move or stay in place. Climate-related hazards are not the only factor inducing people to move: even where hazards contribute, it is underlying socioeconomic, cultural, political and environmental processes that either enable or constrain people's ability to cope where they are, or force them to move because support is lacking. When people can choose to move (as opposed to being compelled to do so), economics and social ties are a stronger influence on the type (permanent or cyclical, in-country or cross-border) of migration they undertake than the hazard itself.

Over-simplifying the narrative can limit the options for facilitating choice and people's capacity to move, or be resilient in place. It is extremely important to take a

step back and examine what can be said about human mobility based on existing migration and displacement data, and then explore the complex contexts behind movement, and within which climate-related hazards and change fit. This paper presents an overview of the current evidence base and latest discourse on the complex relationships between climate change and migration and displacement. In doing so, it intends to support the development of an informed global discourse across the humanitarian, peace and sustainable development agendas by enabling decision-makers from a variety of sectors to better understand how climate change can amplify the drivers and influence the patterns of human mobility. The paper illustrates the need to understand and address the complex links between climate change, displacement and migration. Such an understanding is critical if migration and displacement are to be adequately addressed in international and national responses to human mobility, climate change and wider sustainable development objectives.

2. The challenges of linking human mobility to climate change

2.1. Human mobility, vulnerability and capacity: the complex interplay

Human mobility is an age-old phenomenon driven by numerous factors: people move in search of better economic and employment opportunities, due to changing policies at home or abroad, to escape conflict and social persecution, or in combination with natural hazards and environmental degradation affecting their livelihoods (Shen, 2013; Lilleor and Van den Broeck, 2011; Piguet, 2010; Ibáñez and Vélez, 2008). It is rare that a principal cause can be disentangled; it is instead the complex interplay between social, political, economic, cultural and environmental factors that determines an individual's, family's or community's vulnerability, and their capacity to uproot or stay, that results in population movement (Figure 2).

Generally, vulnerability can be thought of as how susceptible people, and the systems upon which they depend, are to suffering harm, when a shock, hazard or stress occurs, such as a flood, conflict or economic downturn. Capacity may be thought of as an individual's, community's or country's ability to cope, respond to and acquire new skills to deal with shocks and stressors. The degree to which an individual is vulnerable is based in part on factors such as their age or disability, but also on more complex and interconnected factors related to social inequalities and marginalisation (e.g. unequal land distribution, insecure land tenure, gender or age discrimination or access to credit), absent or poor services, poor governance and unequal cultural and social power systems that combine to create chronic, underlying vulnerability (Wisner et al., 2012). Access to education, diverse livelihoods and decent infrastructure, such as roads

Figure 2. Many factors influence human mobility

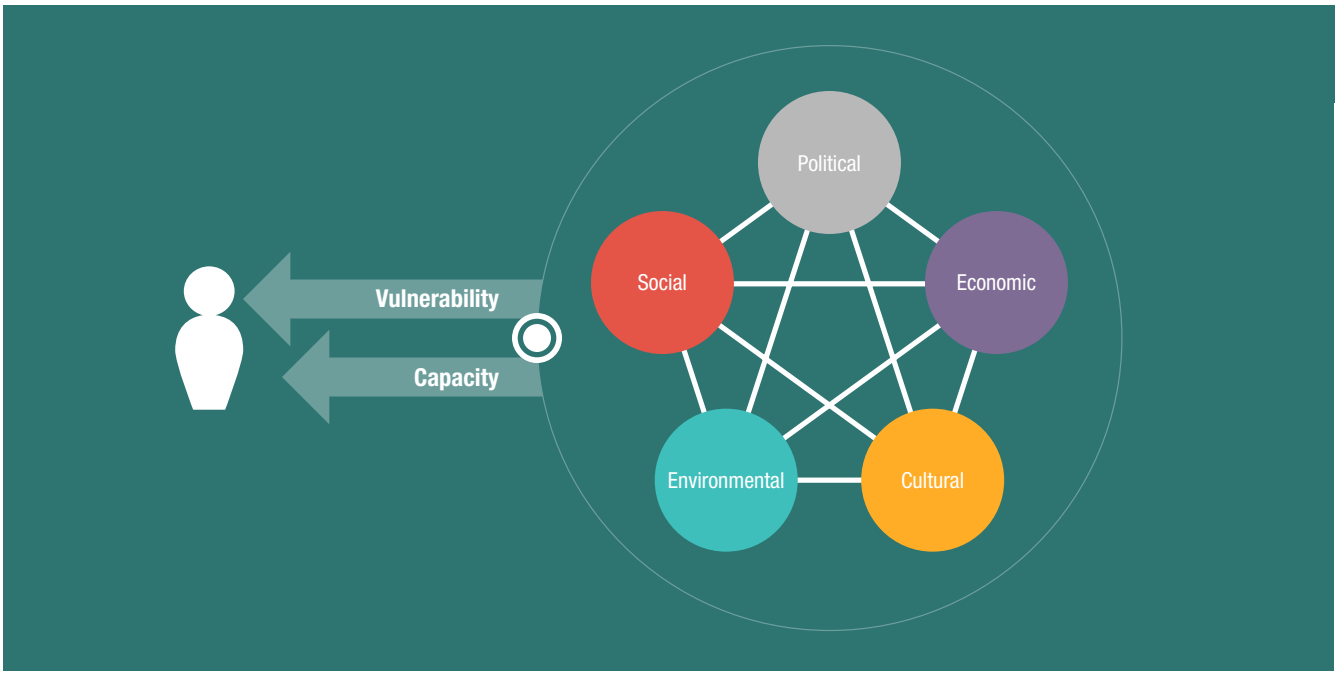


Table 1. Examples of vulnerability and capacity factors and their role in human mobility

Factor	Capacity	Vulnerability
Political/ governance	Regional or bilateral agreements allow migrants to find legal work and provide labour protections (ADB, 2012; Atoyan et al., 2016). Good governance and strong political capacity to leverage resources may lead to faster recovery and return of displaced persons (Wisner et al., 2003) or facilitate migration and migration protections, such as through the National Determined Contributions (NDCs)[4] and National Adaptation Programmes of Action (NAPAs)/National Adaptation Plan (NAP)[5] processes.	Political instability and poor governance can contribute to poor disaster risk management, including climate risk management and assistance in response and recovery (Wisner et al., 2003). Lack of bilateral agreements leaves internally displaced people (IDPs) and migrants open to people smuggling, dangerous and exploitative working conditions and poor access to services (e.g. education or healthcare) at receiving locations (Foresti and Hagen-Zanker, 2017; Du et al., 2016). Inability to access services exacerbates displaced/ migrant vulnerability.
Economic	Sufficient income, savings, insurance or borrowing capacity enable adaptation to hazards in place, or ease adjustment in movement (Lee, 1966). Migration to diversify income base can increase capacity to cope with hazards and reduce poverty at the sending location through remittances (Warner et al., 2013).	Lack of financial resources and family/individual indebtedness can make it difficult to rebuild lives at receiving location, whether displaced or migrated (ISET and CEDSJ, 2011).
Social	Strong kinship networks can provide cash or other support to recover and rebuild post-hazard or to migrate (Lindley, 2014). Strong community-based networks have better disaster preparedness (Witvorapong et al., 2015). Networks also enable sending of remittances, allowing remaining family to recover from hazard shocks, (Yang and Choi, 2007) and strengthen access to services such as education and sanitation (Adida and Girod, 2010).	Poor community cohesion and weak networks due to lack of trust may reduce hazard warning and information dissemination and ability to provide assistance during and after hazards. Visitors, newly displaced or migrated persons without established social networks may be more vulnerable to hazards (Henly-Shepard et al., 2015). Displacement and migration can change family and community composition and weaken networks (Jones and Faas, 2016; Moser, 1996). In some instances, migration of some family members can lead to greater vulnerability for women and children left behind to manage households (Opitz-Stapleton and Liu, 2014; Battistella and Conaco, 1998).
Cultural	Good health, being male, cultural attitudes, religious belief systems and traditional knowledge can support income diversification and coping at home, or facilitate adjustment and opportunities during displacement or migration (Mercer et al., 2009; Marsella and Christopher, 2004). Increasing participation in the migrant labour force can give women greater voice in family and community affairs, and economic resources for dealing with disasters (Enarson et al., 2007).	Being sick or disabled, belonging to a marginalised or discriminated group, being female in a highly patriarchal society, age and fatalistic attitudes towards disasters can increase vulnerability when a hazard occurs, reduce options for coping in place and for recovery (Kelman and Stough, 2015; Wisner et al., 2003), and influence duration of displacement or ability to migrate.
Environmental/ built environment	Well-functioning ecosystems continue to provide water, waste filtering and buffering against hazards, such as mangroves and coastal wetlands slowing storm surge (Elliott and Pais, 2010). Hazard-resilient infrastructure (roads, water treatment, housing) sustains minimal damage during hazards and facilitates return home after displacement (ADB, 2005). Out-migration from degraded areas can reduce ecosystem pressure and contribute to restoration if accompanied by good governance and support for land tenure and environmental conservation (Nagendra et al., 2007; Repetto, 1986).	Creeping environmental stress – pollution, overuse of water resources, deforestation, grassland overgrazing, etc. – contributes to physical loss of land and reduces viability of natural resource-dependent livelihoods such as farming and pastoralism (Koubi et al., 2016; Galvin, 2009). Resulting income reduction and livelihood instability may prompt migration (Bilsborrow, 1991). Poor housing, settlements or infrastructure ill-equipped to cope with large displaced or migrant populations may lead to increased hazard exposure for these groups (UNISDR, 2015; Tacoli et al., 2015).

to bring goods to market, are key capacity components, for example, enabling choices in response to shocks and stressors, including those caused by climate-related hazards and climate change (see also Table 1 – Wisner et al., 2012; Mustafa et al., 2008). A sudden- or slow-onset hazard can trigger a disaster when it leads to 'severe alterations in the normal functioning of a community or society due to the hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects' (IPCC, 2014b: 1,763).

Climate-related hazards may increase the likelihood of security challenges when events contribute to severe impacts to livelihoods, and food and water security. Where there is poor governance, limited land management and lack of resources and social tension, disruptions to food, water and livelihood security by climate-related hazards can cause disasters that might contribute to conflict

4 NDCs are national climate plans that outline, to varying degrees, climate related targets, policies and measures that governments aims to implement as a contribution to global climate action.

5 The process for developing and implementing NAPs was established as part of the Cancun Adaptation Framework (UNFCCC, 2011). NAPAs provided a process for Least Developed Countries (LDCs) to identify priority activities that respond to their urgent and immediate needs to adapt to climate change.

eruption and displacement. In the Sahel, for example, drought in combination with socioeconomic-political factors can disrupt livelihoods and increase the risk of conflict between livelihood groups (e.g. famers and pastoralists; UNEP, 2011). However, the links between population pressure, resource scarcity and conflict are historically weak (Burrows and Kinney, 2016). Human mobility can result from conflict, or conflict can result from human mobility, which only makes it harder to extract the role of climate-related hazards within these complexities.

Conflict does, however, increase vulnerability to climate-related hazards, which will be altered by climate change, and decreases the ability to adapt to climate change. Where conflict is large-scale, violent and/or protracted, it compromises assets including infrastructure or its functioning, institutions, social networks and livelihood opportunities – and people may be displaced. An understanding of the role of climate-related hazards in human mobility *and* associated conflict and instability necessitates an understanding of non-climate factors, such as politics, land rights, production systems, national resource management, markets and trade and infrastructure (Peters and Vivekananda, 2014). Thus, where climate-related hazards may have played a role in displacement and migration, the hazards will themselves not cause conflict 'independent of other political and economic factors' (Burrows and Kinney, 2016: 7–8).

Whether people suffer negative impacts – such as crop loss or loss of land – from a sudden- or slow-onset climate hazard depends on their exposure to the hazard and their underlying vulnerability and capacity. For example, the poor and socially marginalised may often live and work in areas more exposed to particular hazards, and be ill-equipped to handle them (e.g. poorly constructed buildings or lack of sanitation to convey sewage away from flood waters (Cutter et al., 2003)).[6]

Neither vulnerability nor coping capacity is fixed, but will shift and change over time. This can be a result of changing socioeconomic circumstances, such as age or disability (Raja and Narasimhan, 2013; GPDD, 2009), but also due to external processes, such as improvements in the quality and availability of basic services or infrastructure. These shifts also influence movement patterns. The weaker these key socioeconomic, political, cultural and environmental factors, the more vulnerable people are and the lower their capacity to cope with sudden- and slow-onset hazards. As a result of this vulnerability, processes of environmental change (including climate change, land degradation or loss of ecosystem services) might influence migration and displacement by affecting people's incomes and livelihoods (Bilsborrow, 1991).

2.2. Human mobility: the climate attribution challenge

According to the United Nations (UN), as of 2015 approximately 244 million[7] people were living outside their country of birth, and another 740 million were either internally displaced or had moved within their country (UNDESA, 2016a). However, it is very difficult to untangle how much of this movement is solely or partially because of climate-related hazards, or how many of these hazards were influenced by climate change. Storms, floods and droughts have occurred for millennia, and while climate change is demonstrably altering the nature of climate-related hazards and trends, not every hazard is completely attributable to or influenced by climate change (Peterson et al., 2012).

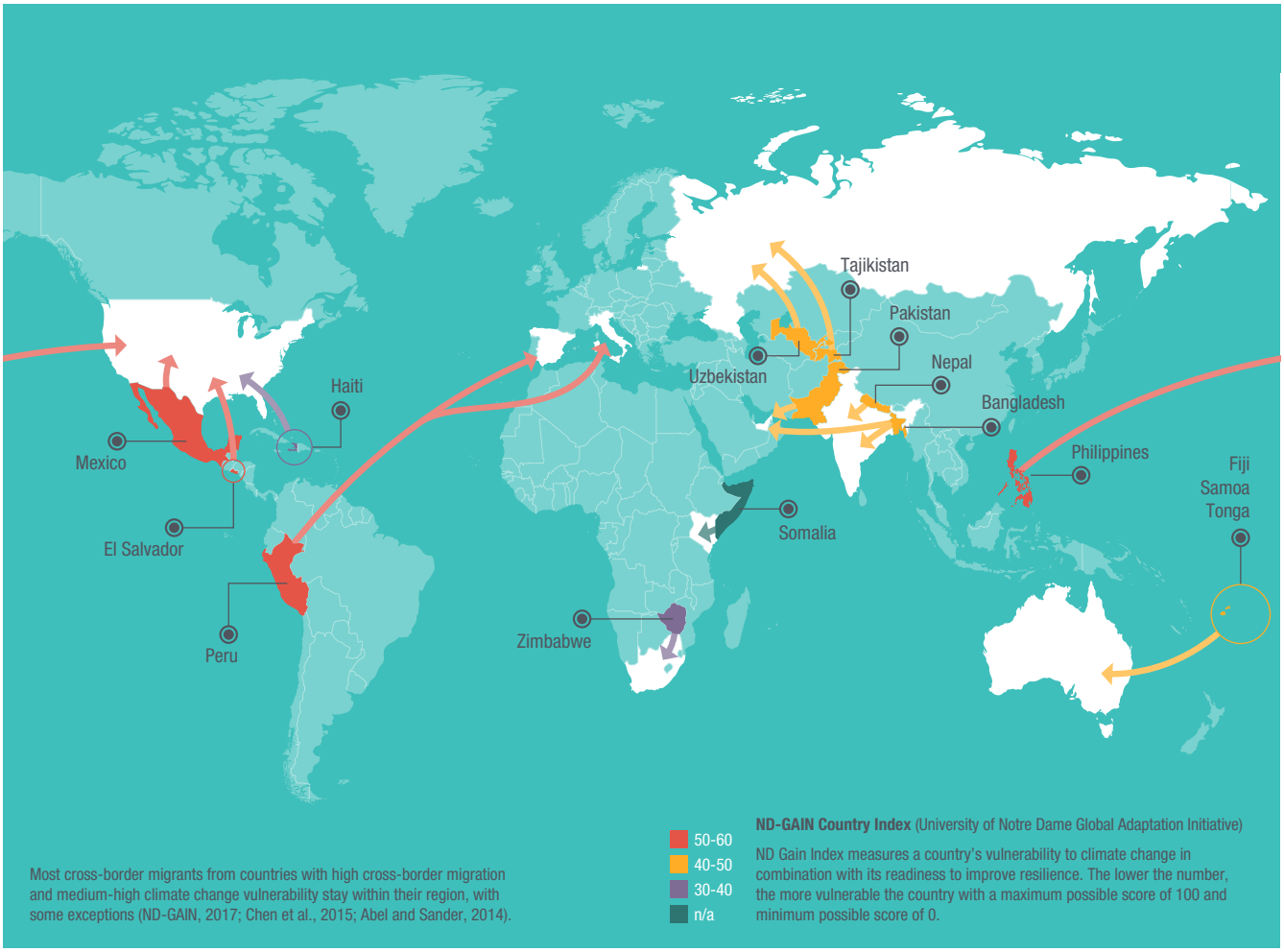
Not all countries regularly collect data on immigration or numbers of refugees and internally displaced people, and among those that do, collection and reporting methods differ significantly (Ginnetti, 2017; Lucas, 2015). Double-counting of cross-border migrants and refugees, slow asylum registration processes and cumulative counting of international migrants in some datasets also confound efforts to track movement over time (Butler, 2017). Agencies including the IDMC, the Red Cross/Red Crescent and the UN Refugee Agency (UNHCR) collect annual data, but their methods and datasets are not always comparable, either with each other or with statistics that might be kept by a particular country. Challenges with tracking internal movement are also related to whether individuals are newly displaced, were displaced in previous waves or are engaged in cyclical migration (ISET and CEDSJ, 2011). Additionally, not all climate-related hazard events become disasters, so not all climate-related hazard displacement will be recorded by datasets that track disaster displacement (see previous discussion on hazards versus disasters as part of the challenge in categorising and tracking human mobility). No datasets currently capture those displaced as a result of droughts or even slower-onset hazards, even where these events become disasters. Nor do datasets capture how environmental degradation influences human mobility and climate change's impact on environmental degradation.

Tracking international movement provides little information on the influence of slow- or sudden-onset hazards in the statistics. Globally, cross-border movement flows – using UN data that defines an international

6 The IPCC Working Group II (IPCC, 2014a: 5) defines climate change vulnerability as the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. It further describes risk as the probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of vulnerability, exposure and hazard.

7 The UN Department of Economic and Social Affairs (UNDESA) Population Division's *Trends in International Migration Stock* tracks cumulative international migration. Once an individual moves away from their country of birth, they are forever counted as a migrant in this database even if they gain residency in the country to which they have moved. Thus, international migration numbers may involve a degree of over-counting (Nature, 2017).

Figure 3. Most cross-border migrants stay within their region, with some exceptions



migrant as anyone living outside their country of birth, including refugees and the long-term displaced, as well as voluntary migrants (UNDESA, 2016a) – have remained fairly steady between 1990 and 2010, ranging between 41.4 million (1990–95) to 41.5 million (2005–10) (Abel and Sander, 2014). Looking at cross-border migration and refugee flows over a longer period of 1965 to 2015, the total number of cross-border movements has only slightly increased in proportional relation to overall population growth, from 2.5% in 1965 to 3.3% in 2015 (Angenendt and Koch, 2017). Refugee numbers are fairly consistent at 20.6 million in 1992 and 21.3 million in 2015 (Butler, 2017). With the exception of Latin America, the vast majority of people who cross national borders remain within the region of origin (Butler, 2017; see Figure 3 also). Due to lack of data, it is not possible to draw relationships between cross-border movement and sudden- or slow-onset climate hazards, however; only internal displacement databases track those displaced by sudden-onset hazards. This creates challenges for the evidence-based policy and decision-making that is required to ensure the most vulnerable have the support they need.

Turning to human mobility within countries, the Global Knowledge Partnership on Migration and Development (KNOMAD) project estimates that internal migration (staying within the country of origin) likely exceeds 700 million people a year, but acknowledges that the true scale is not known (KNOMAD, 2017; Bell and Charles-Edwards, 2013). The IDMC (2017) puts the total number of internally displaced, inclusive of both conflict and sudden-onset hazards, at 40.3 million in 2016. The top five countries in terms of numbers of IDPs in 2016 were the Democratic Republic of Congo, Syria, Iraq, Afghanistan and Nigeria (ibid.).

Internal displacement associated with sudden-onset climate hazards is more common where vulnerability is high and capacity to cope in situ is difficult, as shown in Table 2. There are exceptions, such as China and the United States, where climate-related hazards can lead to large displacements – in part because of early warning and evacuation mechanisms (ibid.).

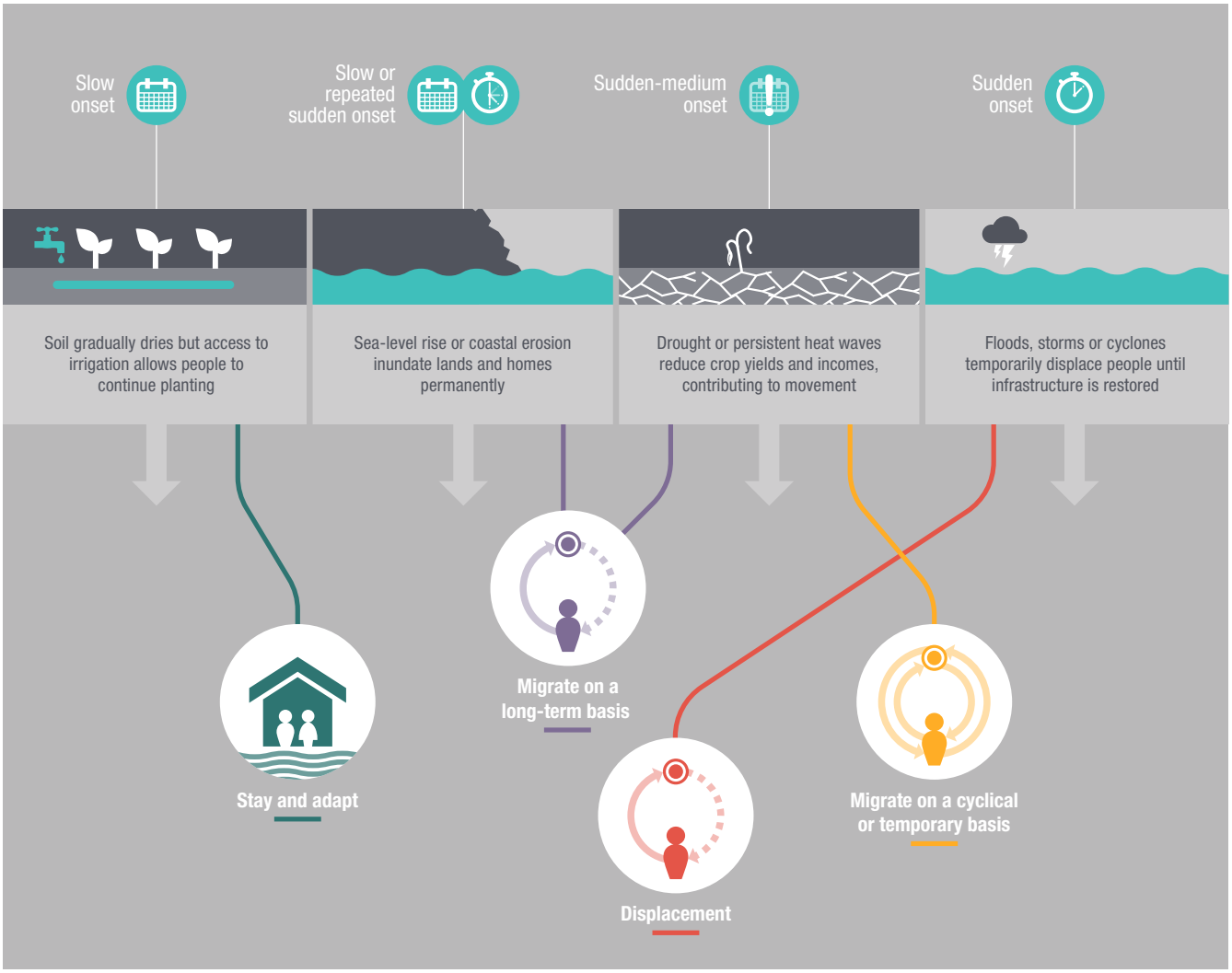
Much of what is known about internal movement and climate hazards is based on country-specific case studies. Research to date seems to indicate that human mobility influenced by climate-related hazards is largely internal, either through displacement or temporary to long-term migration (Adamo and Izazola, 2010), and differs from country to country and in relation to different types

Table 2. Countries with high internal sudden-onset disaster displacement numbers for 2016 and their climate change vulnerability and readiness score

Country	Region	Vulnerability to climate change*	2016 climate-related displacement
Philippines	South-East Asia	50.8	5,930,000
India	South Asia	46.4	2,400,000
Indonesia	South Asia	50.9	1,246,000
Myanmar	South-East Asia	37.6	509,000
Ethiopia	East Africa	40	347,000
Democratic Republic of Congo	Central Africa	32.5	130,000
Nigeria	West Africa	40.1	78,000
Yemen	Middle East	32.2	45,000
Colombia	South America	56.2	31,000
Afghanistan	Central Asia	32.4	7,400

**The ND-GAIN Index, which ranges from 0 to 100, measures a country's vulnerability to climate change in combination with its readiness to improve resilience. The lower the number, the more vulnerable the country.*
Source: Data from IDMC Database, 2017; ND-GAIN, 2017; Chen et al., 2015

Figure 4. Possible mobility responses to different climate hazards



Box 1. Migration in Pakistan due to heat stress

Pakistan is highly vulnerable to climate variability and change, including flooding and shifts in the monsoon. However, the greatest impact on migration has been found to come from heat waves. Extreme heat, particularly during the Rabi (November–April) wheat planting season, can wipe out over a third of farming income due to crop losses and yield reductions. Both women and men migrate in response to extreme heat, but men tend to move further away. Men are also 11 times more likely to migrate during heat waves than they are during heavy rainfall because heat waves have a greater negative income impact. Despite the greater impacts of heat waves, policies and relief assistance during this hazard are more limited than during flooding, and fewer resources are available to assist poor or socially marginalised groups dependent on farm-based incomes. The extreme poor, who are often landless, tend to be the first to migrate out of villages as farmers no longer employ them.

Source: Mueller et al. (2014)

of climate hazards, the impacts people experience and their capacity to cope and recover. During and after many environmental stressors, including climate-related hazards, people often attempt to stay in place in order to maintain social networks and livelihoods, and because moving is costly (Cubie, 2017; Adger et al., 2007). It is when impacts overwhelm capacities that an individual may feel compelled to or be forced to move, including through evacuation (Koubi et al., 2016; Wisner et al., 2003). Where they have sufficient capacity, they may also migrate either temporarily or cyclically, in part to avoid or better cope with some types of climate-related hazards. Slow-onset hazards may afford people more time to adapt in place or to build their social networks and financial assets in a manner that allows more choice in how and to where they migrate (Figure 4).

A case study from Vietnam suggests that sudden-onset events like floods or typhoons increase the likelihood that people will migrate internally (either temporarily or permanently), whereas people may seek to adapt to slow-onset events in situ (Koubi et al., 2016). By contrast, in Indonesia and Bangladesh people are temporarily relocating in response to extreme weather events like flooding, but migrating on a longer-term basis when confronted with creeping environmental stress and repeated slow-onset events like prolonged heat and drought during key agricultural seasons (Mueller et al., 2014; also see Box 1 on Pakistan). In situations of conflict and unstable governance, a sudden-onset climate-related hazard, or the successive occurrence of multiple climate hazards, might aggravate tensions and displace people for a longer period or contribute to decisions to migrate internally to urban areas (Moench and Dixit, 2007; Hunter, 2001). In some instances, people are being displaced for months or years post-hazard due to underlying vulnerability and/or inadequate responses (Crawford et al., 2015). Examples include the 2016 floods in Louisiana in the United States, in which some households were displaced for months due to damaged homes and assets and shortcomings in government relief systems (Domonoske, 2016), or the 2008 Kosi floods in Nepal and Bihar, India, where many of the displaced were still living on embankments up to a year after the flood due to slow relief and recovery responses (Ghimire and Chautari, 2010).

Through the increased frequency and intensity of extremes of weather and changes to seasons that interact with vulnerability and capacity contexts, climate will influence patterns of migration and displacement. But the effect of climate change on human mobility depends on much more than the hazard itself: vulnerability and capacity determine the options people have to move or stay when climate-related hazards occur, and climate-related hazards sometimes necessitate but also reduce the capacity to move. As a result, the relationship between hazard and mobility is not always clear (and may never be in some cases, even if data were available).

In the context of a changing climate, the complexity of the channels of influence means that projections of positive or negative outcomes for countries as a result of human mobility are not yet available (and, again, may never be).[8] Yet the distinct role of underlying vulnerability and capacity drivers, including the policies and practices dictating formal and informal support, illustrate that the influence of climate change on human mobility is an issue for sustainable development, not just the remit of disaster risk management or humanitarian assistance, and needs to be addressed as such.

8 With the context in which people move so important, including the way that underlying drivers of climate, economic and other risks are managed and reduced over time, it is possible that models (particularly at a global level) may always fall short of being able to predict the costs and benefits of human mobility under a changing climate.

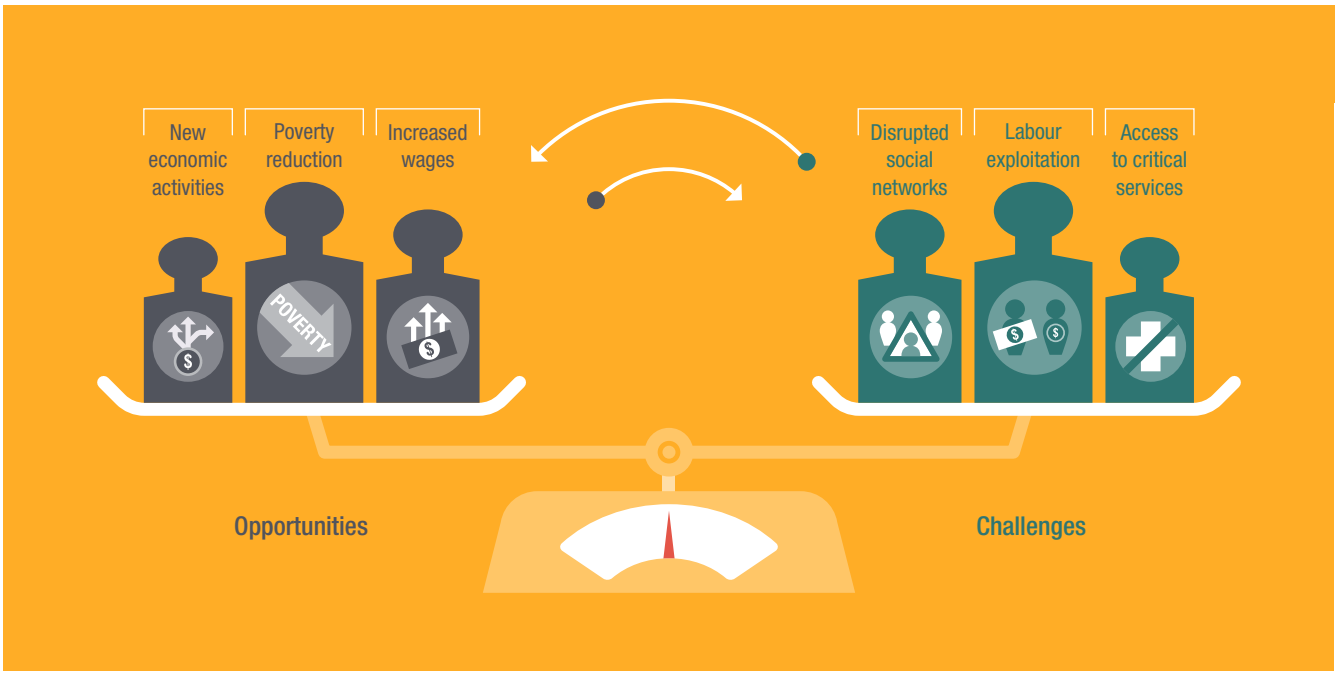
3. Human mobility and adapting to a changing climate: challenges and opportunities

Not every hazard *must* lead to disastrous impacts and potentially contribute to displacement and migration. Poor governance, lack of infrastructure and services, poor building codes, development in hazard-exposed locations and the state of public disaster response and relief mechanisms are underlying vulnerability drivers long known to contribute to human mobility, both voluntary and forced. Addressing vulnerability and building capacity to either reduce displacement or facilitate equitable and resilient migration requires the integration of sustainable development, climate resilience and disaster risk reduction, particularly in countries with low readiness. In these complex contexts, migration – both autonomous and planned – presents opportunities that may aid adaptation, and serve as an adaptation measure itself.

3.1. Migration as adaptation

Mobility holds both opportunities and challenges for those moving, for the hosting population and those who are left behind (Figure 5). In the context of climate change, these opportunities and challenges are highly context-dependent, influenced as much by the policies and cultures at the receiving location as by individual circumstances (Lenard and Straehle, 2012; Nijkamp and Poot, 2012; Conway and Potter, 2009; McKenzie and Rapoport, 2004). In the case of family and community members left behind, population movement can mean increased responsibilities, roles and, sometimes, vulnerability. However, while real challenges exist, the overall impact of human mobility at the sending and receiving ends may be more positive than is commonly portrayed (Crawford et al., 2015; Thompson, 2014).

Figure 5. Opportunities and challenges of human mobility



Box 2. Cyclical migration in Rajasthan, India

Rural-to-urban migration, both cyclical and temporary, has steadily increased in India over the past few decades. The landless poor constitute the majority of migrants, many of them from lower castes and indigenous communities, and from regions with poor economic performance. In Rajasthan, where rainfall-dependent agriculture predominates, the summer monsoon rains have become increasingly erratic since 1980. In years of late or failed rains, and when groundwater supplies are overdrawn, marginalised farmers are often pushed into economic distress, and the lack of other job opportunities has frequently left breadwinning family members with little choice other than to migrate when crops fail. Overdrawn aquifers do not support the irrigation necessary to adapt to climate hazards such as heat waves, warmer seasons and drought. Both male and female family members cyclically migrate to towns and cities such as Jaipur, the state capital, in search of urban employment and better living conditions. Women tend to migrate for periods of three months or less and stay within their home districts, while males tend to migrate further away and for up to a year at a time.

Source: ISET and CEDSJ (2011)

Migration can serve as a key poverty reduction instrument in sending locations, and as noted above the pursuit of economic opportunities is a strong driver of migration. Diversifying the income base can reduce vulnerability, including for women[9] participating in labour migration (Enarson et al., 2007). This might be through an individual family member migrating and sending back remittances (Warner et al., 2013), the movement of whole families or through cyclical or temporary migration. Migration can also lead to a reduction in child and female labour and decrease vulnerability to climate-related hazards by increasing financial capacity (Foresti and Hagen-Zanker, 2017). Remittances may allow family members to remain at home and recover more quickly after a natural hazard (Vasconcelos et al., 2016; New Climate for Peace, 2015). There is also evidence that such flows 'can play an important role in building adaptive capacity to climate change, for example by diversifying rural household income sources and leading to positive development impacts' (Sward and Codjoe, 2012).

Cyclical and long-term migration has been part of natural cycles of movement and coping with environmental variability for decades (see Box 2 on India) – though climate risk is changing those 'normal' patterns of movement, for instance in pastoralist communities (Galvin, 2009). Burkina Faso's NAPA observes that transhumance, which was once unknown in many areas of the country, is now widespread due to recurring drought (Burkina Faso NAPA, 2007: 4). However, outmigration from a particularly degraded area can reduce pressures on that area, potentially allowing it to recover (Bilsborrow, 2002; Suhrke, 1993). Furthermore, if governance and policies are put in place to promote land tenure and environmental protection, some of the population left behind may be able to adapt in place as pressures on fragile ecosystems ease and people diversify away from natural resource-dependent livelihoods (Nagendra et al., 2007; Nagendra, 2007; Hunter, 2001).

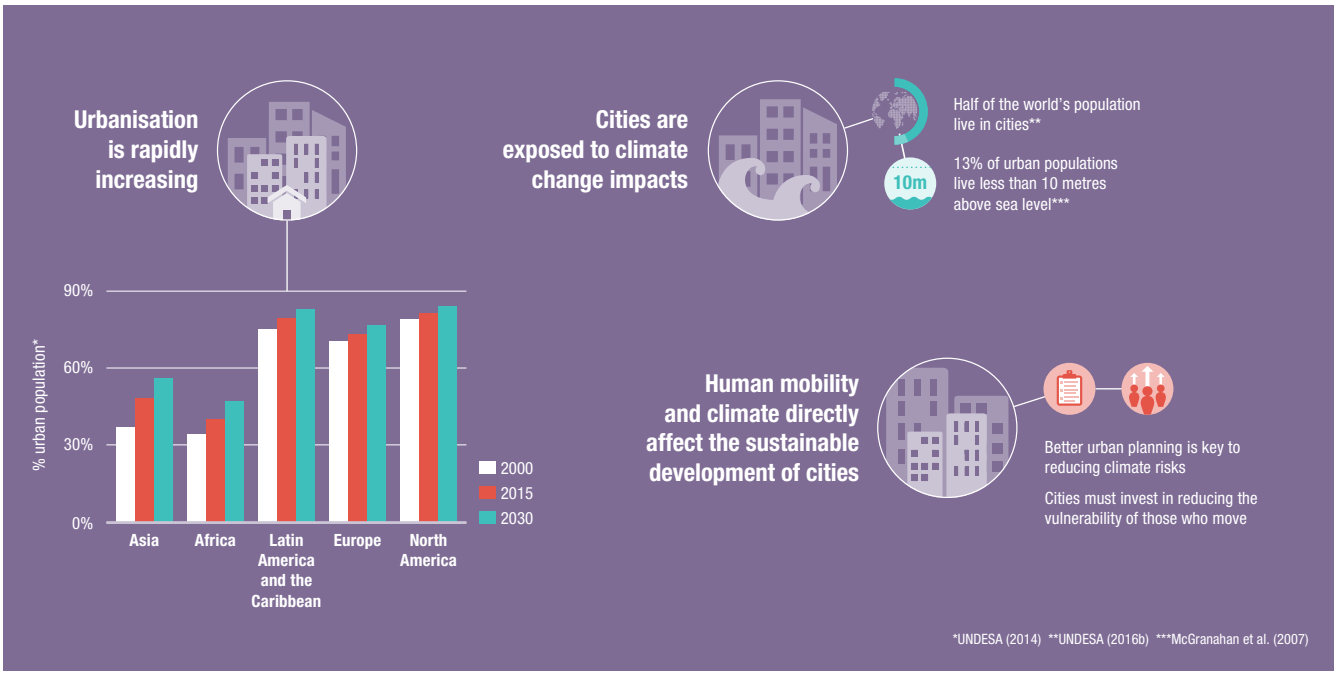
Urbanisation is a good illustration of the opportunities and challenges of human mobility under climate change (Figure 6). Many major urban areas are located in low-lying coastal zones that may face sea-level rise (McGranahan et al., 2007), or are sited next to major water bodies exposed to flooding (Barroca et al., 2006). More than half of the world's population is currently living in cities (UNDESA, 2016b); 13% of this urban population lives less than ten metres above sea level and is, therefore, exposed to submergence, coastal flooding and coastal erosion (McGranahan et al., 2007). New arrivals often live in informal, marginal settlements, where housing may fail to comply with planning and building regulations, and there may be limited or irregular access to health and education services, infrastructure and transportation. Settlements can also be prone to landslides and local flooding (UN-HABITAT, 2015).

The challenge here is ensuring that any acceleration of rural-to-urban movement does not increase the vulnerability to climate change of those who move, or host communities. There are growing opportunities to reduce vulnerability in cities, even in informal settlement areas (Mosel et al., 2016). A number of cities are participating in and driving initiatives[10] to build urban resilience to natural hazards (Webber, 2017; Broto and Bulkeley, 2013; Creutzig et al., 2016). Such initiatives support participating cities in urban planning and infrastructure development, building codes, green spaces and other activities to more equitably and sustainably receive incomers, and reduce overall hazard risks.

9 There is an increasing trend in the feminisation of labour migration, with women now accounting for approximately 44% of all labour migrants (ILO, 2015).

10 Such initiatives include 100 Resilient Cities, the C40 Cities Climate Leadership Group and the Asian Cities Climate Change Resilience Network.

Figure 6. Cities show that human mobility and climate are sustainable development issues



Finally, attention must be paid to those who lack the capacity to move even if they might wish to migrate. In a context of high vulnerability, certain types of environmental stressors and shocks, including sudden-onset climate-related hazards, may contribute to 'traps' that, for example, keep people in precarious financial situations or living in hazard-exposed locations (Milan and Ruano, 2014; Findlay, 2011). In Malawi, for example, slow-onset climate stressors like drought do not strongly impact upon choice and the ability to move as people are able to adapt in place, but sudden-onset shocks such as flooding are eroding assets and reducing the ability of rural farmers to migrate to urban areas (Suckalla et al., 2017). In other cases, severe droughts that affect large geographical areas and different livelihood systems, e.g. pastoralism, can limit the choice and ability of people to move to safer locations even if mobility is the common coping strategy (Aben et al., 2017). In Alaska, a number of indigenous communities are considering relocation so as to protect their lifestyles and culture in the face of melting Arctic permafrost and associated coastal and riverine erosion and flooding (Cozzetto et al., 2013).

Where slow-onset events stress already marginalised communities, and where underlying governance, services and economies do not support coping with or adapting to hazardous conditions in situ, population movement due to slow-onset events could extend from weeks or months to years (Bremner and Hunter, 2014).

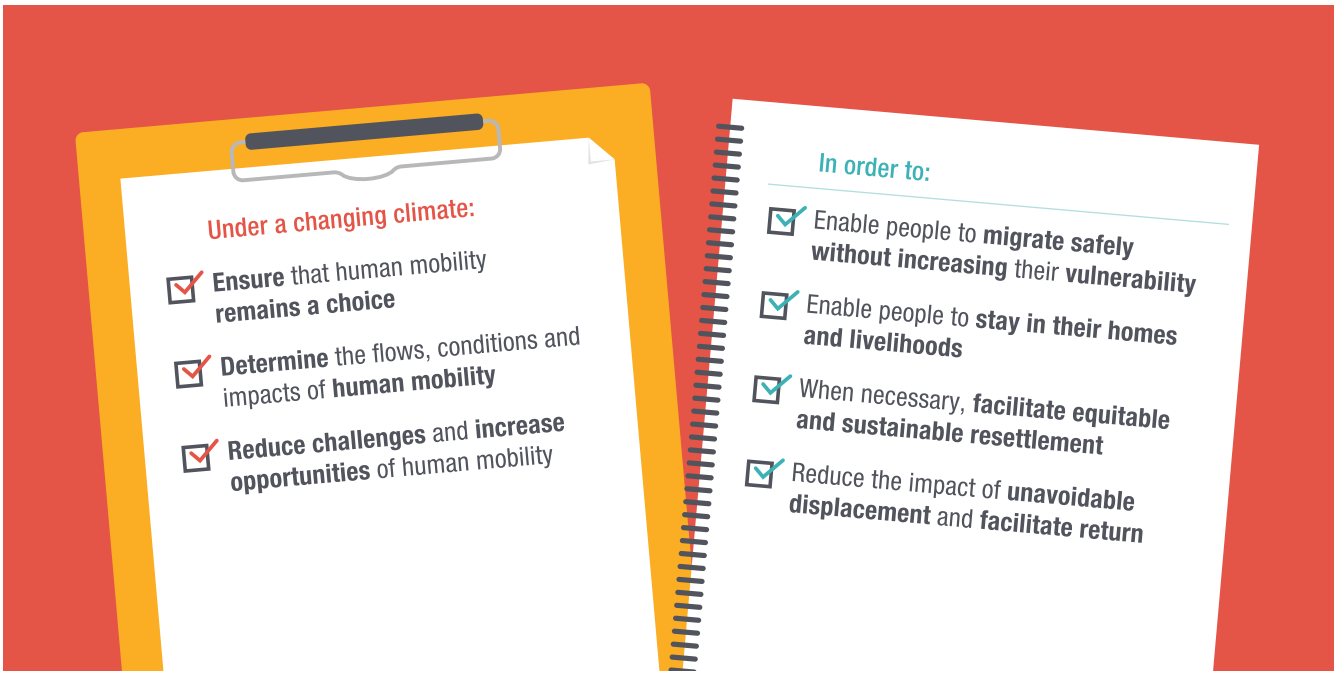
3.2. Risk-informed planning for human mobility

Movement and the ability to adapt and cope with shocks and stressors, including those posed by climate change, are elements of both vulnerability and capacity that require risk-informed strategies and policies. As such, socioeconomic development plans and processes that are risk-informed (see Box 3) have the potential to play a significant role in reducing vulnerability and enhancing the ability of an individual, community or country to cope with, respond to and acquire new skills to deal with shocks and stressors.

Box 3. Interconnectedness of risk

Risk is understood as the potential for consequences where something of value is at stake (recognising that such values can be diverse), and where the outcome is uncertain. Risk is often represented as the probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of vulnerability, exposure and hazard. It is the complex interplay of socioeconomic, political-institutional, cultural and environmental processes that shape vulnerability and capacity (Wisner et al., 2003). To develop meaningful policies and allocate resources, it is essential that decision-makers understand the inherent uncertainties and address the underlying processes, interconnectedness and interdependence that shape the complex vulnerability of people and systems. Risk-informed development approaches that enable countries to identify and manage existing risk, as well as avoiding the creation of new risk, are essential.

Figure 7. Three potential roles of National Adaptation Plans



For many countries, this is where NDCs, NAPA/NAP processes, as well as National Disaster Management Plans can play an important role (Figure 7).[11] To do so, it is critical that these policy approaches, institutional arrangements and funding mechanisms are designed and implemented to support both migrant and displaced communities as well as receiving locations, thus enabling choices in response to risks, including those caused by climate-related hazards and climate change.

If carefully managed, integrated for example into national poverty reduction and labour migration strategies and adequately resourced, national adaptation and disaster management processes and plans have the potential to play a significant role in determining the flows, conditions and impacts of international, regional and internal migration. National and sub-national climate adaptation planning and disaster management processes should include comprehensive risk and vulnerability assessments of human mobility (including human rights assessments). Taking a risk-informed approach can 'provide an opportunity to ensure that migration, displacement and planned relocation are fully addressed, as both potential challenges and potential opportunities for change' (Warner et al., 2015: 8). Where possible, migration must remain a *choice*, rather than a necessity.

3.2.1. Human mobility within national climate adaptation processes and plans

Countries have long cited environmental degradation and the need for natural resource management as factors in developing large-scale, permanent planned relocation programmes, such as those instituted on a wide scale in China for dam construction or conservation of sensitive ecosystems, such as eroded grassland areas in Inner Mongolia (Duan and McDonald, 2004; Tan, 2011), and degraded land in Ningxia. As part of the 12th Five Year Plan and the subsequent National Adaptation Plan from 2010 to 2015, around 350,000 rural residents were relocated from the mountainous areas of southern Ningxia during the five years to 2015 (Wu, 2011; see Box 4 also).

11 Bangladesh's National Strategy on the Management of Disaster and Climate Induced Internal Displacement (Bangladesh, 2015) is one example of a move in this direction.

Box 4. Planned relocation: a case study from Dasha to Hongsi Pu, Ningxia Autonomous Region, China

China's National Adaptation Strategy mandates the Ningxia Autonomous Region as a 'pilot and demonstration adaptation project for ecological migration with a focus on ecological migration to reduce population pressure, introducing new livelihood approaches and practices in ecologically vulnerable areas in adaptation to climate change' (People's Republic of China, 2013).

Interview with Imam Ma-Hui, Muslim community leader of Dasha village, Ningxia Autonomous Region (Nadin et al., 2014)

The harvests of the 1980s stand out in Imam Ma's memory not because they were so great but because the others have been so bad. *'Food output was good [in the 1980s]. But for most of the past four decades the weather has been bad. Only one or two years were good,'* he says.

Ma and his family, including his bedridden 70-year-old mother, live in Dasha village in the mountains of southern Ningxia, growing potatoes and feed for their livestock on increasingly marginal land. Water is their biggest problem. Their main source is rain, which they collect and store themselves. But when there is no runoff, they must buy it from suppliers and cart it in along a mountain road.

'With no water, we can grow nothing to feed mouths,' he says. *'When the rain comes we can grow potatoes on our land. When the rain comes after autumn, we plant grass and use the grass to feed livestock. We try to raise them healthily and make a return … That is the way it works for most people living here.'*

Sometimes they can't grow anything – nine of the last ten years have been drought. Other times it is barely worth it. *'Last year, the market value of potatoes was 0.4 yuan a kilogram … After deducting the tax and cost of transport, our profit margin is next to zero,'* he says. Life in Dasha has not always been such a struggle. Ma's mother, who moved to the village more than 60 years ago, told him conditions were better then.

Ma and his family are waiting to move to Hong Sipu, a new settlement built by the local authorities to house more than 9,000 migrants from the hinterland. There, a steady stream of water is pumped in from the Yellow River. *'Many people have already migrated there. Last year, people sold their livestock and moved … Conditions are better and there's enough water,'* he says. *'The rest of us want to move as well. We don't want to stay in this backwater place any longer.'*

Permanent resettlement programmes are not without controversy, however, and pose significant challenges for affected communities. This is because resettlement can have both positive and negative impacts on sending and receiving locations, and for migrants and the families they leave behind. In some cases, migrants may have little say as to where they are relocated, and may have to deal with inadequate compensation and services and changes in livelihoods, in addition to disruption to socio-cultural structures, and the loss of cultural ties and identity and connection to the land (IOM, 2017). Climate change adds another dimension of risk, since without robust adaptation planning, which includes comprehensive risk and vulnerability assessments (including human rights impact assessments), migrants can end up in locations that are also hazard-prone. For example, case studies in the Dominican Republic, Papua New Guinea and Vietnam show that planned relocation can both reduce harm and bring benefits, but also lead to new vulnerabilities, including exposing people to unfamiliar environmental risks and a lack of decent work (ibid.).

In contrast, planned relocation that takes into account and respects rights, cultural values and traditions, and is carried out in consultation with and with the participation of affected people, including host communities, can help manage future climate change risks and, where adequately supported and managed (i.e. well in advance of the need becoming critical, resulting in forced displacement), can save lives and livelihoods and even lead to better employment opportunities. Adaptation plans must include informing migrants of any new risks in receiving locations, and build up migrants' capacity to adapt and integrate in new locations.

Through the NDC and NAPA/NAP processes, countries are articulating a range of concerns around managing migration and displacement within the context of climate change, including the need to manage the effects of climate change on human security, in-situ adaptation and planned permanent relocation/resettlement (within and outside of national borders). Sward and Codjoe (2012: 15) identify Chad, Mauritania, Togo, Eritrea, Sudan and Burkina Faso as 'being predominantly concerned with internal migration as a coping strategy in relation to drought', with most states seeing spontaneous migration as a negative outcome and something to be urgently managed. Chad's NAPA sees migration as stimulating competition for the best land (potentially leading to conflict), putting pressure on urban services and potentially leading to public health problems (République du Tchad, 2010: 13, 27). Unsurprisingly, in this case adaptation planning is geared more to in-situ programmes to discourage people from leaving home, rather than facilitating their movement (Warner et al., 2015).

In Pacific islands such as Kiribati, slow-onset climate hazards like saline intrusion[12] are important factors influencing responses to migration and displacement (Oakes et al., 2016). For example, some Small Island Developing States (SIDS) have developed labour migration strategies that build on bilateral agreements with Australia and New Zealand for temporary seasonal work in horticulture (ILO, 2014). Others, such as Vanuatu, view planned relocation as part of their future adaptation approach (Sward and Codjoe, 2012). The Vanuatu NAPA details an example of a successful internal relocation of an at-risk community in the northern part of the country, following an adaptation assessment and a public awareness campaign (Republic of Vanuatu, 2007: 20). Kiribati's NAPA also references past community resettlement, although it also notes that this process led to 'conflicting claims over resettled land' (Republic of Kiribati, 2007: 11). Both NAPAs view planned resettlement as forming part of their future adaptation (Republic of Vanuatu, 2007: 23–28; Republic of Kiribati, 2007: 59; Sward and Codjoe, 2012). Some SIDS, such as the Solomon Islands and São Tomé and Principe, are seeking planned relocation solutions for their citizens abroad as a strategy of last resort (UNHCR, 2014).

Forward-looking adaptation planning and policies are required that factor in the needs, access and impacts of migrants (such as on infrastructure, labour markets and services). For example, if we are to provide policy frameworks which support people that want to or need to move, then supporting migration as an adaptation measure requires a better understanding of the channels through which climate-related hazards affect welfare, income and subsequent decisions to move. This could include national assessments on migration, labour markets and the economy in relation to the environment and climate change; assessments of existing data and needs; research, policy and legislation relating to migration and environmental change; and support to gather new data and build capacity to incorporate human mobility into national adaptation and development plans.

It remains a key role of the state to support and protect those who wish to stay and those who wish to move, inclusive of those lacking the resources to do so. Successful climate adaptation planning is an iterative process, in which uncertainty is accepted as inherent, and where adaptation takes place in the context of changing physical, socioeconomic and political conditions. This is not a comfortable space for policy-makers, especially with the additional complexity of managing questions of human mobility in the context of climate change. National adaptation processes and plans must be based on a full and nuanced account of why people move in response to different climate-related hazards, but which also includes those left behind. Adaptation planning processes and polices must operate in both origin and destination communities, acknowledge that those moving are not always a homogenous group and account for both permanent migration and temporary and circular migration. Policy must act to give people choice – choice to stay, choice to go and support in doing so.

Developing, implementing and evaluating effective incremental and/or transformational adaptation policies and actions is a complex and resource-intensive process.[13] We need to generate better knowledge and understanding around climate change and human mobility in order to support policy-making. There remains a significant lack of data around forced migration related to slow-onset changes, for example, and human mobility is insufficiently addressed when measuring and managing climate risks. Given the inherent complexities associated with adaptation planning, it is essential that policy-makers receive clear 'guidance on how to link human mobility to climate change adaptation', and most critically have access to data and resources to assess 'which climate change will affect (and be affected by) mobility' (Warner et al., 2015: 9).

Migration should not be seen only as a failure to adapt to climate change (IOM, 2009), but also as part of a range of adaptation measures to resource vulnerability and risk.[14] These can include rural development policies, land titling and rights, urban land-use planning and development, social protection, disaster risk management, risk transfer mechanisms and climate change adaptation policies. The reality is that these policy processes are often siloed within ministries. A more integrated and risk-informed approach will be required.

12 Situations of slow-onset, creeping environmental problems exacerbated by climate variability and change, including those associated with desertification, sea-level rise and salinisation, may present particular problems that mean people cannot return. The ability to return is also dependent on underlying political, institutional and socioeconomic support systems.

13 Climate adaptation generally falls into three broad categories (IPCC, 2014b): *autonomous*, without planning explicitly or consciously focused on addressing climate change (also referred to as spontaneous adaptation); *incremental*, where the central aim is to maintain the essence and integrity of a system or process at a given scale; and *transformational*, which refers to adaptation that changes the fundamental attributes of a system in response to climate and its effects.

14 As migration is proactively concerned with strategies to minimise impact and loss, reducing the exposure of an individual or household to climate change impacts through migration *is* an adaptation response (IPCC, 2014c; Foresight, 2011; Piguet et al., 2011).

4. Addressing climate change and human mobility at the global level

This section maps some of the key global environmental, climate, disaster, migration and refugee regimes in order to track the evolution and progress of international policy on climate change and human mobility (Figure 8). In doing so, it draws attention to some of the ongoing challenges relating to legal scope/protection gaps and current commitments, as well as identifying entry-points across agendas for partnership and engagement.

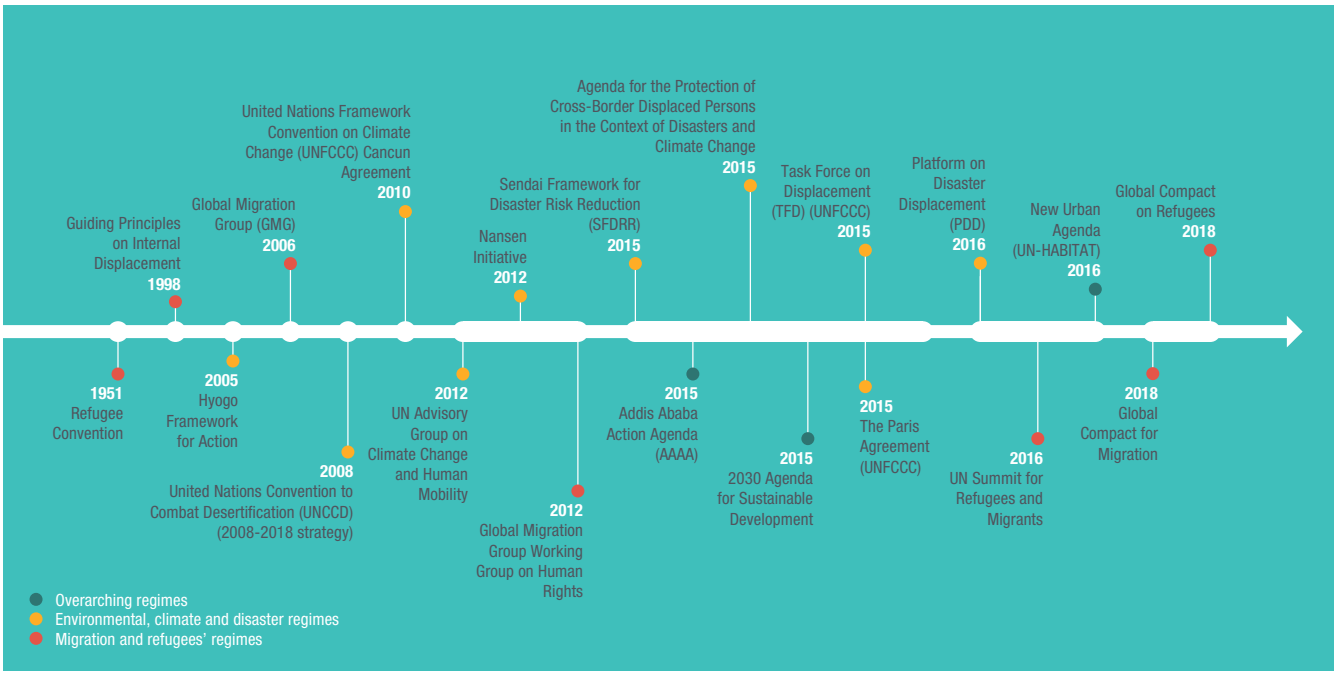
4.1. Overarching regimes

4.1.1. The 2030 Agenda for Sustainable Development (2030 Agenda)

Both migration and climate change are addressed in the Sustainable Development Goals (SDGs) within the 2030 Agenda for Sustainable Development. However, within the SDGs there are very few connections between migration and a range of development areas, including climate change. SDG 13 exclusively focuses on climate change and requires governments to take urgent action to combat its impacts. It focuses heavily on adaptation and emphasises mainstreaming climate change in policies and plans. It does not mention migration or displacement, or recommend its inclusion in climate policies. Other SDGs, notably 8, 10 and 17, point to the need for facilitated, planned and well-managed migration policies, but do not make the connection with climate change. As such, the climate–migration intersection is not adequately addressed within the 2030 Agenda, or in its implementation mechanisms, despite migration being key to meeting SDG 13.

The cross-sectoral nature of the 2030 Agenda for Sustainable Development does though present a significant opportunity to harness political buy-in for and the development of national polices to address both the potential challenges and opportunities of migration,

Figure 8. Timeline of global policies and processes



displacement and planned relocation within the context of climate change. It is imperative that the 2030 Agenda is linked to the implementation of various climate change and migration and refugee frameworks, to ensure policy coherence and reduce protection gaps.

The Addis Ababa Action Agenda (AAAA) is the 2015 outcome document of the Financing for Development Conference. Some had hoped that this conference would provide a roadmap to financing the SDGs, though arguably it instead provided a list of desirables for finance, with specific attention to domestic resource mobilisation, along with financing of social protection systems, a global infrastructure finance platform and an increase in the share of development assistance to the LDCs. The AAAA makes reference throughout to addressing climate change and building resilience to disasters and, in particular, how these link to the achievement and maintenance of sustainable development (UN, 2015: para 62). It also recognises the positive economic contributions that migrants can make to sustainable development, both at sending and receiving locations. It makes commitments to, for example, ensuring that financial services are available to migrants and reducing the transaction costs of remittances to less than 3% of the amount transferred by 2030 (para 40). It also notes that international development cooperation is required to ensure that migrant and refugee children have rights and access to education (para 78). In recognising that human mobility is a systemic issue (para 111), it reinforces the need for national and regional planning and formal and informal support at these levels, as well as at international level.

The AAAA does not make an explicit link between climate change and human mobility. It will be necessary to ensure that other overarching frameworks that do so recognise and make use of the Financing for Development ambitions to 'implement effective social communication strategies on the contribution of migrants to sustainable development in all its dimensions, in particular in countries of destination, in order to combat xenophobia, facilitate social integration, and protect migrants' human rights through national frameworks' and to 'reaffirm the need to promote and protect effectively the human rights and fundamental freedoms of all migrants, especially those of women and children, regardless of their migration status' (para 111). It will also be necessary to ensure that ambitions to 'increase cooperation on access to and portability of earned benefits, enhance the recognition of foreign qualifications, education and skills, lower the costs of recruitment for migrants, and combat unscrupulous recruiters, in accordance with national circumstances and legislation' are met (ibid.).

4.1.2. The New Urban Agenda

The role of cities in human mobility in a changing climate is critical. The New Urban Agenda (UN-HABITAT, 2015: para 28), which aims to be a new global standard for sustainable urban development, commits to '[f]ully respect the rights of refugees, migrants and internally displaced persons regardless of their migration status', but does not address climate change and migration in urban areas. This is perhaps a missed opportunity given the role urban adaptation planning could play in better supporting migrants and their families.

4.2. Environmental, climate and disaster regimes

4.2.1. The United Nations Framework Convention on Climate Change (UNFCCC)

The Paris Agreement includes two references to migration and displacement: in the preamble, which refers to the vulnerability of migrants (but not their capacities), and calls on states to 'respect, promote and consider their respective obligations on human rights' when taking action to address climate change (UNFCCC, 2015: 1); and in the text on Loss and Damage, which calls for a task force to 'develop recommendations for integrated approaches to avert, minimize and address displacement related to the adverse impacts of climate change' (ibid: para 50, 7-8).

At COP 21, the Parties to the Convention (UNFCCC) asked the Executive Committee to establish a Task Force on Displacement (TFD). The establishment of the TFD in December 2015 (UNFCCC, 2016a) is a significant step forward – and a significant task given the array of institutions working on migration and the complexity associated with understanding the role of climate change and how it interacts with the many other drivers of migration and displacement. The TFD includes representatives from UNHCR, UNDP, the International Organization for Migration (IOM), the International Labour Organization (ILO), the International Federation of Red Cross and Red Crescent Societies (IFRC), the Platform on Disaster Displacement and the UN Advisory Group on Climate Change and Human Mobility,[15] as well as members of the Adaptation Committee, the Least Developed Country Expert Group (LEG) and the Executive Committee. A five-year rolling workplan beginning in 2018 includes a work stream on migration, displacement and human mobility (Box 5).

15 The Advisory Group on Climate Change and Human Mobility was created in 2012. It included representatives of a range of institutions working on issues of human mobility in the context of climate change, including UNHCR, IOM, the Norwegian Refugee Council (NRC), IDMC, the United Nations University (UNU), the Hugo Observatory, Refugees International and the Arab Network for Environment and Development (RAED).

Box 5. Morocco: focusing on policy discussions towards comprehensive risk management approaches

In July 2016, the Executive Committee of the Warsaw International Mechanism hosted a technical meeting on migration, displacement and human mobility organised by IOM. The meeting was held in Casablanca in Morocco, a country with its own challenges related to displacement, migration and human mobility. Morocco is a transit country on the migratory route between West Africa and Europe and a host country for an increasing number of migrants from sub-Saharan Africa. Internal migration is also on the rise, including rural-to-urban migration. Many parts of the country are suffering from drought and water scarcity, which is a factor in increasing both rural-to-urban migration and the mobility of pastoralists (IOM, 2016). Many of these migrants are moving to coastal cities already grappling with climate change impacts including sea-level rise.

The aim of the meeting was to bring together Executive Committee members and stakeholders to discuss how climate change impacts are influencing patterns of migration, displacement and human mobility. The meeting focused on comprehensive risk management approaches to address loss and damage associated with the adverse effects of climate change, including slow-onset impacts, and enhancing action and support, including finance, technology and capacity-building (UNFCCC, 2016b).

4.2.2. The Protection Agenda

The Nansen Initiative builds on the UNFCCC Cancun Agreement of 2010 and other 2030 Agenda policies. Originating as a state-led, multi-stakeholder consultative process, the Initiative has led to the endorsement of the subsequent Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change (the Protection Agenda), which aims to fill the protection gap for cross-border disaster displacement in the context of disasters, climate extremes and extensive risks associated with climate change (Nansen Initiative, 2015). The Protection Agenda, which was endorsed in 2015 by 109 countries, aims to:

- Conceptualise a 'comprehensive approach to disaster displacement that primarily focuses on protecting cross-border disaster-displaced persons. At the same time, it presents measures to manage disaster displacement risks in the country of origin.'
- Compile a 'broad set of effective practices that could be used by States and other actors to ensure more effective future responses to cross-border disaster-displacement'.
- Highlight the need to 'bring together and link multiple policies and action areas to address crossborder disaster-displacement and its root causes that to date have been fragmented rather than coordinated, and calls for the increased collaboration of actors in these fields'.
- Identify 'three priority areas for enhanced action by States, (sub-)regional organizations, the international community as well as civil society, local communities, and affected populations to address existing gaps' (Nansen Initiative, 2015: 7).

The Platform on Disaster Displacement (PDD) has since been set up to support the implementation of the recommendations of the Protection Agenda. The platform aims to promote international cooperation, and to build regional and national engagement and strong multi-stakeholder partnerships to help create a coherent approach to cross-border disaster displacement (Platform on Disaster Displacement, 2017). As such, with enhanced buy-in and support from participating stakeholders, the PDD has an important role to play in helping national governments mainstream approaches to human mobility into broader policies.

4.2.3. The Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR)

The Hyogo Framework for Action recognised displacement as a potential driver of vulnerability (UNISDR, 2005), while its successor, the Sendai Framework (SFDRR), focuses on displacement in response to extreme events (UNISDR, 2015). SFDRR highlights migrants' contribution to resilience at their destination, but gives little consideration to people moving due to or in anticipation of slow-onset or creeping environmental change (Wilkinson et al., 2016).

4.2.4. The United Nations Convention to Combat Desertification (UNCCD)

The United Nations Convention to Combat Desertification (UNCCD) advocates for '[n]ew enabling environments to promote successful solutions to combat desertification' and that 'the status of environmental or ecological migrants must be upgraded and they must be extended the same rights of protection as refugees who may have been forced to flee lands for reasons other than the environment' (UNCCD, n.d.: 2). The UNCCD's ten-year strategy between 2008 and 2018 includes a pillar specifically related to desertification and migration, including the 'social, environmental, political and cultural interactions of populations affected by land degradation' (ibid.); the promotion of partnerships and investment from developed countries; risk management; traditional sustainable technologies; and the links between desertification and human rights. The UNCCD is the sole legally binding international agreement linking environment and development to sustainable land management, and as such represents an opportunity to address mobility, climate change adaptation, land rights and security and sustainable development.

4.3. Migration and refugee regimes

4.3.1. The 1951 Refugee Convention and the Global Compacts

People moving internally within their countries – whether in response to environmental degradation or any other cause or complex of causes – are entitled to legal rights and protection by virtue of their status as citizens. For people crossing international boundaries, the specific protections afforded under the 1951 Refugee Convention (UNHCR, 1951) are limited to refugees fleeing persecution, and as such the terms of the Convention exclude any of the other myriad factors, including climate change and environmental degradation, that might plausibly be motivating flight. While the Guiding Principles on Internal Displacement of 1998 (UN Economic and Social Council, 1998), the first set of international standards focused solely on IDPs, apply relevant parts of international human rights law, humanitarian law and refugee law to the specific situation of internal displacement, this deliberately does not constitute a binding legal norm; in practice, few countries have incorporated these principles into their national legislation or constitutions, and those that have done so rarely implement these principles systematically or with conviction (Zetter, 2017).

In September 2016, UN Member States met at the UN General Assembly in New York for the United Nations Summit for Refugees and Migrants. Binding commitments were absent, and the summit resulted in an outcome document, the New York Declaration, which in most respects reaffirmed the status quo. The Declaration did, however, include a pledge by states to work towards two Global Compacts, one on migration, the other on refugees. The Declaration recognised the multi-causal drivers of migration, which may include the 'adverse effects of climate change' and other natural hazard-related disasters (UN, 2016: 1). During the formulation phase of the Global Compact for Migration, one of the informal thematic sessions focused on natural hazard-related disasters, including those influenced by climate change, as drivers of migration. The session pointed to the importance of 'aligning the Global Compact for Migration with the existing international frameworks on climate change, as well as existing guidelines on migration related to environmental factors'. The Migration Compact is currently in the final drafting stages, and is likely to promote some action on vulnerable migrants, and a recognition of migration as an adaptation strategy. However, the Compact is not binding and does not as yet include a framework for implementation. It remains to be seen what impact it will have on individual state policies.

While the form and content are still being developed, as currently framed the Refugee Compact, led by UNHCR, focuses on the financial implications of displacement, enhanced international cooperation in responding to it, and a wider role for the development community. The Compact is pointedly not tasked with opening up debate on the scope of the 1951 Convention or the mandate of UNHCR. Moreover, the decision to establish two separate compacts on refugees and migrants risks perpetuating a conceptual and organisational distinction between 'forced' and 'voluntary' flight that fails to reflect the fluid and complex reality of contemporary population movements, both within countries and across borders, incorporating 'voluntary migrants, putative refugees, former IDPs, other forcibly displaced people and trafficked and smuggled persons', often using the same routes and heading for the same destinations (Zetter, 2017: 23-28).

On a positive note, the two Compacts could take advantage of the language and commitments already made in legally and non-legally binding human rights instruments, international labour standards, climate and disaster regimes and in the SDGs. If the Global Compacts could be better aligned to support national adaptation and development plans or vice versa this would enable countries to better take into account the needs of people who want to or need to move, as well as moving the discourse away from migration as a failure to adapt to climate change.

The conceptual framework and organisational architecture around migration and displacement are embedded within an international response machinery developed over seven decades, and any efforts to produce an approach more reflective of the complexity of contemporary displacement will face probably intractable political and institutional opposition. The subjective and restrictive privileging of refugees – and the wider tendency towards category thinking more broadly – is deeply entrenched in the policies and discourses of displacement and migration, and will be very hard to dislodge. There are, though, calls for change based on a wider perspective on the rights, needs and different forms of protection of people falling outside the scope of the 1951 Convention.

Former UN High Commissioner for Refugees and now UN Secretary-General António Guterres has called for a new international protection framework for people who have been forced to leave their own country and who may not qualify for refugee status under international law, including people displaced as a result of catastrophic environmental events (Zetter, 2017). The Global Migration Group Working Group on Human Rights has drawn together a set of principles and guidelines on the human rights protection of migrants in vulnerable situations, and the Human Rights Council (HRC) and OHCHR have both sought a rights-based approach to climate change. This is of critical importance to national adaptation planning processes, as issues of justice, equity and accountability are fundamental if climate-resilient development goals are to be achieved. OHCHR is currently engaged in a project to examine the human rights implications (including in terms

of legal protection) of human mobility in the context of slow-onset events. For its part, UNHCR has produced a 'Tool Box: Planning Relocations to Protect People from Disasters and Environmental Change' covering legal frameworks; the impacts of planned relocation on affected populations, land issues, monitoring and evaluation and accountability (UNHCR, 2017). UNHCR also has a key role to play in developing policy coherence and mainstreaming the protection dimensions of climate change and disaster-related displacement in relevant policy processes, including the Habitat III New Urban Agenda, the SDGs and the Paris Agreement.

5. Conclusion

Multidisciplinary, robust investigations on the links between climate change, migration and displacement are limited. Analysis is constrained by the complexity and interrelatedness of the drivers of human mobility, which simultaneously serve as drivers of vulnerability to climate hazards and change. Estimates of migration as a result of climate change must disentangle not only social, political, cultural and economic factors, but also other environmental factors, such as mismanagement of natural resources. Disagreements as to how to link climate change as an environmental stressor with other factors of migration persist (Gómez, 2013; Black, 2001). There are multiple challenges with international and internal migration and displacement data, uncertainty about future climate shifts and 'low confidence in quantitative projections of changes in mobility' (IPCC, 2014a: 20) in response to climate change – precisely because of the complex, multi-causal reasons behind human mobility (Butler, 2017; Lucas, 2015; IPCC, 2014a). As such, caution must be exercised, and data gaps and challenges identified, in order to devise policy measures and international agreements that respond to the needs of people who are displaced or migrate – where climate change might have played some role.

There is strong agreement, however, that displacement is likely to increase from low-income developing countries whose people are exposed to increasing climate variability and change, and where resources for more planned migration are lacking (IPCC, 2014a). In the context of a changing climate, migration and displacement is increasingly becoming part of National Adaptation Planning processes incorporating references to both permanent and temporary relocation, both inter- and intra-state. While in-situ adaptation measures can allow people to stay, for example through new crop varieties, increasing non-agricultural activities and smoothing consumption through access to credit, insurance and social safety nets (Waldinger and Fankhauser, 2015), migration can be an adaptive measure where it allows for the diversification of a family's income base, for instance through remittances sent by the migrant (Warner et al., 2015). Migration as an adaptation measure can also take place before the need to move is critical and people are displaced. Human mobility, and the ability to adapt and cope with such shocks and stressors, including those posed by climate change, are issues of vulnerability and capacity, making appropriate risk-informed development strategies and policies essential. One cannot unpick climate and human mobility issues from the underlying development context of countries and communities. Yet, if adequately resourced and integrated into broader socioeconomic plans, national and sub-national adaptation processes and plans have the potential to play a significant role in this regard.

Migration as an adaptation strategy can be organised at individual or state level. While migrants tend to stay within state borders, a number of SIDS whose existence might be threatened by sea-level rise are seeking planned relocation solutions for their citizens abroad (UNHCR, 2014). Any such planned relocation strategies must work to build the positive and reduce the negative impacts for those moving, the areas left behind and for the areas to which people move. Where not appropriately managed or facilitated, migration could increase vulnerability, for instance though the disruption of social networks, a lack of jobs at arriving locations or marginal accommodation in areas of high risk (Tulloch et al., 2016; Olsen, 2009). Efforts are also required to facilitate migration for those who lack the capacity to do so but may want to migrate, in part to manage climate change risks.

Human mobility in the form of migration and displacement is a theme of global relevance. The UN Secretary-General's reform agenda brings together sustainable development, peace and security and human rights. It also bridges the linked ambitions of Agenda 2030 and the Global Compacts on Migration and Refugees, together with action on climate change – a timely agenda that has never been more pertinent. Supporting countries to develop meaningful, risk-informed policies and allocating appropriate resources is essential to tackling the issues human mobility raises, and realising the opportunities associated with migration in the context of climate change, while also minimising the costs of mobility and the vulnerabilities of migrants. This is critical if governments are serious about their commitments to the Sustainable Development Goals, the Paris Agreement and the Sendai Framework for Disaster Risk Reduction.

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