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A Decision Framework for Environmentally Induced Migration

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ABSTRACT

Global environmental change, including climate change, is increasingly affecting ecosystems and the communities who rely on them. Reflecting on the manner in which the environment changes can help provide insights into the different mechanisms by which humans respond and adapt to deal with the environmental stress they face. When it comes to migrating as a response strategy to environmental stress, the pace of change in the environment will have a significant influence on the mode of displacement and migration-related decisions. Determining the exact extent that environmental stresses play in forcing people to move is complex for at least two reasons. First, deciphering which of several push and pull factors influence a decision to move is difficult as multiple factors (e.g., social, political and economic factors) often act simultaneously. Second, environmental degradation processes are often a consequence of the degradation of social, economic and political conditions and vice versa. Reflecting on the concept of social-ecological systems and the notion of ecosystem services is useful for understanding this complexity and can help in determining the extent to which ecosystem degradation plays a role in forcing people to migrate. An attempt is made to address the gap in conceptualising environmental change and migration by sketching a decision framework for categorising people moving due to environmental stressors. The approach examines the circumstances leading to a decision to move, including the state of the environment and coping capacities / adaptive abilities of those individuals or communities affected. This conceptualisation is not a final scheme but

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rather, a point of departure for debate and discussion. It is hoped that, following in-depth discussions and improvements of such a framework, it will become a useful tool for operational agencies that have to provide support to people who are displaced or migrate because of environmental stresses.

INTRODUCTION

The topic of environmental change, particularly climate change, and migration is increasingly debated in global policy circles. At an expert meeting[1] to discuss ways to move the research and policy agenda forward on environmental change and migration, over 30 scientists and experts highlighted that more work is needed to conceptualise and quantify migration responses to the impact of environmental change and degradation. The existing, speculative estimates about the potential scale of environmentally induced human displacement underline the fact that we know little about how changes in the environment affect migration and that we lack the data and research necessary to move beyond such estimates. Experts at the workshop underscored that we do not have a sufficient understanding of how slow-onset events, including desertification, sea-level rise and deforestation, affect migration within and between countries. Nor do we know much about how expected changes in migration patterns are likely to affect the environment. Policymakers lack the conceptual framework necessary to prepare for, prevent or respond effectively to environmental migration. Research therefore needs to address issues such as environmental triggers and drivers that affect human mobility, the construction of evidence-based scenarios to characterise the migration process for environmentally induced migrants, providing the scientific basis for institutional and legal approaches as well as governance frameworks, and determining the links between adaptation and migration (Stal and Warner, 2009).

The reason why the concept of environmental migration/displacement is often rejected or not considered as significant does not necessarily come from an underestimation of the environmental degradation processes that affect the planet. Rather, the concept is contested because of the complexity of factors contributing to migration. Critics argue that environmental degradation, if proven, is only one of several factors that affect migration. This is a valid position, as ecosystems are shaped by human activities but also set constraints to human activities by shaping economic activities and social norms. This mutuality between human

beings and the environment allows for a better understanding of how humans create their vulnerability to natural hazards and environmental degradation processes (Oliver-Smith, 2003). The mutuality between environment and humans can be illustrated further by the concepts of coupled social-ecological systems (SES) and ecosystem services. Yet the argument that migration is driven by a complexity of factors, does not justify ignoring the phenomena, as environmental stressors are predicted to grow in strength in the future and the environmental signal in migration patterns may become more pronounced (Warner et al., 2009). To ignore research on environmental stressors and migration would be to miss critical opportunities to assist affected people, and to better understand the interactions between nature and human society.

This paper attempts to address the gap in conceptualising environmental change and migration, particularly how to define groups of people who move for environmental reasons. The paper offers a decision framework to categorise people who move or have to move because of environmental factors. By revisiting definitions proposed in Renaud et al. (2007) who identified three categories of environmental migrants, namely ''environmental refugees'', ''environmentally forced migrants'', and ''environmentally motivated migrants'', this paper focuses on a process of defining the phenomenon of a person or people who ''make a decision'' to move because of environmental degradation or change at the point in time when they make their decision. This conceptual approach focuses on the necessity of migration in relation to environmental stressors. The approach examines the circumstances leading to a decision to move, including the state of the environment, and the coping capacities and adaptive abilities of those individuals or communities affected. In proposing this framework, we focus on the situation surrounding the decision and initial move and in the case of one of the proposed categories we also account for what happens to people once they have been displaced by a catastrophic event.

The overall goal of the paper is to present the conceptualisation of a decision framework which has been developed to circumvent lack of consensus about definitions of environmental migration. It is hoped that following in-depth discussions and improvements of such a framework, it will become a useful tool for operational agencies that have to provide support to people who are displaced or migrate because of environmental stresses as it would provide a list of criteria that can then be used to determine appropriate and timely interventions.

CURRENT ENVIRONMENTAL TRENDS, LOSS OF ECOSYSTEM SERVICES, AND CONSEQUENCES FOR MIGRATION

Within the last few years there have been many reports which paint a bleak picture of the current and future state of our environment worldwide. They highlight that if status quo in our behaviour is maintained, accelerated deterioration of our ecosystems will be inevitable. A selection of the main conclusions of some of these major reports is briefly presented below in chronological order to highlight some of the trends which justify a concern to address environmental migration now and in the future.

The Millennium Ecosystem Assessment (MA) (2005a) concluded that 15 of 24 ecosystems reviewed were being degraded or used unsustainably, affecting in particular poor resource-dependent communities. Within the context of migration, the MA (2005b) particularly highlighted that 2 billion people living in arid, semi-arid and sub-humid regions are extremely vulnerable to the loss of ecosystem services including water supply, and specifically notes that:

- 10 to 20 per cent of drylands are already degraded.
- Pressure is increasing on dryland ecosystems to provide services such as food, water and sanitation.
- Climate change is likely to increase water scarcity in regions that are already under water stress as they accommodate close to a third of world population but harbour only 8% of global renewable freshwater resources.
- Droughts are becoming more frequent and their continuous reoccurrence can overwhelm the coping mechanisms of communities.

The fourth Global Environment Outlook (GEO) of UNEP (2007) had similar general conclusions to the Millennium Ecosystem Assessment reports. In particular, it highlighted the fact that environmental degradation observed worldwide (air pollution, land and water resources degradation, loss of biodiversity) undermines development, human well-being and the achievement of some of the Millennium Development Goals. The GEO report notes that one of the many consequences of environmental degradation is human migration even though establishing direct links is difficult because of the potentially many push factors at play. However, the link is explicitly noted for two of the seven patterns of vulnerability studied in the report: drylands and small island developing states.

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2007) notes that temporary rural to urban migration is a normal response to environmental hazards (such as droughts) and that large numbers of displaced people are a likely consequence of extreme events. The report further notes that migrant numbers could increase, and so could the likelihood of their migration becoming permanent, if such events increase in frequency. Small islands and areas impacted by increasing number or duration of droughts are particularly vulnerable. The report is however careful in noting that research so far has highlighted the complexity (multiple factors) of migration decisions.

Data compiled annually in the Emergency Events Database (EM-DAT) by the Centre for Research on the Epidemiology of Disasters (CRED, 2008) show a continuous increase in the frequency in manifestation of many hazards of natural or anthropological origins throughout the last few decades. These events, such as floods, droughts, and storm surges are affecting more and more people and are generating increased damages globally, even though reported fatalities are on the decline (CRED, 2008). The Munich Reinsurance Company's NatCatSERVICE database also indicates an increasing number of great natural disasters (i.e., disasters which have severe impacts on affected regions) in recent decades (Munich Re, 2008). Degradation of ecosystems and the increased impact of hazards of natural origin, as noted above, can be accelerated by climate change.

The processes described above affect both society and ecosystems, which can be considered as coupled social-ecological systems (SES). The notion of social-ecological systems emanates from the concept of sustainable development where societies' needs should be attained without sacrificing the state of the environment (e.g., Turner et al., 2003). An SES is defined as a system that includes societal (human) and ecological (biophysical) subsystems in mutual interaction (Gallopín, 2006). Thus, the concept reflects the idea that human action and ecological structures are closely linked and dependent on each other. Social-ecological systems are complex systems characterised by multiple, stochastic and/or nonlinear interactions between elements of the system. Within this conceptualisation, environmental degradation processes (from an anthropocentric perspective) can be natural in the sense that they are not initiated by human activity (for example environmental degradation processes resulting from volcanic eruptions, earthquakes or tsunamis). However, in many cases, these processes will be linked to human activities and therefore social, economic and/or political systems directly (e.g. land

degradation) or indirectly (e.g. climate change). The latter cases represent the bulk of degradation processes that could contribute to environmental migration and is captured in the notion of ecosystem services discussed further below.

The notion of the state of ecosystem services forms the basis for most of the categorisation of environmental migrants that is presented in the next section. Ecosystem services are "the benefits people obtain from ecosystems" (MA, 2005a, v). As noted above, the Millennium Ecosystem Assessment (MA, 2005a) described the pressures that are being put on our ecosystems and the subsequent loss of ecosystem services. It is suggested here that of particular interest with the issue of environmental migration is the loss of provisioning and regulating services. Provisioning services are defined by the MA as products obtained from ecosystems such as land, food and fibre, fuel, and fresh water. Regulating services are processes such as air quality maintenance as well as climate and water regulation (among others). In the MA conceptual framework, provisioning services contribute to human wellbeing and poverty reduction together with other types of services. When these services are threatened, migration patterns could begin to emerge as a response.

Migration is considered by some as an adaptation process while others consider it the end result of failed adaptation (e.g., see Boano et al., 2008, and Barnett and Webber, 2009 for a discussion of environmentally induced migration in the context of adaptation, resilience and sustainability). The Human Development Report 2009, which focused on human mobility and development, emphasising, that migration can be a vital strategy for households seeking to diversify and improve their livelihoods, discussed how migration can be an adaptation strategy adopted by communities facing continuous environmental change (UNDP, 2009). This report cited the work of Ezra and Kiros (2001) which showed that Ethiopian households affected by severe and recurrent droughts would adopt a strategy of income diversification by having some household members migrate while others stayed behind. Ellis (2000) showed how migration in general contributes to income diversification in rural areas. Barnett and Adger (2007) discuss that in the face of livelihood stress, migration may be one response adopted by those whose livelihoods are undermined by factors such as climate change. A recent Asian Development Bank report on the topic identified as a key finding that "climate change needs to be conceptualized as an additional factor among an

array of existing factors driving migration" (University of Adelaide et al., p1).

Migration could also be viewed as an outcome of an SES that has passed a threshold beyond which the system's resilience has been overcome. Migration could therefore be induced because an SES has shifted from a favourable state to an unfavourable one, thus not allowing individuals/communities to sustain their livelihoods. Alternatively, migration could be an action taken in an attempt to help sustain an SES (for example people migrating away on a seasonal basis allows time for an ecosystem to recover). Furthermore, migration itself could induce a shift in an SES by affecting the social sphere of the coupled system which in turn impacts ecosystems.

By definition, the concept of mutuality between environment and society implies that the former can not be disentangled from the latter. However, this does not imply that environmental degradation processes should not be seen as major push factors affecting the lives and livelihoods of many throughout the world, and that environmentally induced migration should not be considered as a special case of migration. Indeed, the loss of ecosystem services (i.e. the benefits people obtain from ecosystems) is probably a major factor triggering migration in some circumstances and whether or not these losses are rooted in complex, non-linear processes should not deter us from investigating their impacts on societies.

The trends and patterns highlighted above serve to emphasise the multiple types and scales of environmental changes and degradation that currently threaten people's livelihoods and will potentially increasingly do so in the future. Moreover, Antonio Guterres, the UN High Commissioner for Refugees (UNHCR) stressed that human displacement is likely to be worsened by climate change (Guterres, 2008a, 2008b). Therefore, there is an urgent need to improve our understanding of migration and displacement triggered by the variety of different environmental change and degradation situations.

DEFINITIONS LINKED TO ENVIRONMENTAL MIGRATION

A crucial step in the conceptualisation of environmental migration is the need for a definition of those on the move due to environmental factors (Dun and Gemenne, 2008). There is an abundance of definitions and

descriptions about persons displaced or migrating because of environmental stresses found in academic literature and the media. Particularly noteworthy is the term ''environmental refugee'' (see e.g., Renaud et al., 2007; Biermann and Boas, 2008; Myers, 2002, 2005; Conisbee and Simms, 2003). This term is used occasionally in academic papers, but most frequently in news articles and publications intended for a wider audience. However, implementation organisations such as UNHCR, the International Organization for Migration (IOM), the Office for the Coordination of Humanitarian Affairs (OCHA) and others have expressed concern that using the term ''refugee'' in relation to environmental stressors is problematic (e.g., see Guterres, 2008b). The 1951 Convention relating to the Status of Refugees (Refugee Convention) offers protection to individuals who are persecuted by a government or regime, societal groups, or individuals, on one of the five Convention grounds (race, nationality, religion, membership of a particular social group, or political opinion) (UNHCR, 2006). The grounds for persecution are important in the definition. The factors ''nature'' or ''the environment'' or ''the climate'' do not seem to be grounds for persecution and are not entities which can have an intent to harm, which is often considered part of the definition of persecution (Hathaway, 1991). Therefore, under the Refugee Convention, changes in the environment cannot be assigned responsibility when humans are induced to move because of environmental changes. Further, refugees are people who have crossed an international border, but in the majority of cases, it is likely that at least in the first instance, people displaced by environmental factors will be Internally Displaced Persons. Finally, governments that sign the Refugee Convention agree to offer protection and assistance to those designated as refugees. This assistance is linked with funding and resources, which some worry might be diluted if wider numbers of people (including environmentally induced migrants) were granted refugee status.

The word ''refugee'' is politically charged, yet two elements that make the term ''refugee'' a compelling word to describe the phenomena addressed here is the element of flight, and the element of needing assistance. People who have been forced to move because of environmental disasters must often flee with expediency. Such individuals need protection and assistance, often in a way that is very similar to Convention refugees. They may require a safe place to stay, food and water, health and legal assistance, and possibly resettlement. Thus, a definition or definitions are needed that do not threaten the status of those already protected as (political) refugees, but which does recognise the plight and

need for assistance of those who have been forced to move because of worsening environmental circumstances.

In the academic sphere, several discussions have emerged surrounding the ''environmental refugees'' concept. There are those, such as Bates (2002) and Myers (1993), who adapted or redefined the original definition of environmental refugee proposed by El-Hinawi in a 1985 United Nations Environment Programme policy paper (see Renaud et al., 2007 for further in depth discussion). For example, Bates (2002: 648) proposed that environmental refugees are ''people who migrate from their usual residence due to changes in their ambient non-human environment'' while Myers (1993: 752) proposed that environmental refugees are ''people who can no longer gain a secure livelihood in their erstwhile homelands because of drought, soil erosion, desertification, and other environmental problems''. Other academics such as Hulme (2008), Castles (2002), Black (2001), Kibreab (1997) and McGregor (1993) stress that migration decisions are multi-causal, emphasising that environmental factors combine with socio-economic factors and the political context in influencing peoples' migration decisions and that to isolate environmental factors as is implied by terms such as ''environmental refugees'' is deceptive. Research findings from investigations into livelihood diversification strategies and how households cope with shocks provide ample support for such arguments. For example the work of Henry et al. (2004) in Burkina Faso showed that despite finding a link between changing rainfall patterns and short-distance migration, a household's socio-economic position, education level and livelihood activity also had an influence on the migration outcome (see also Kniveton, et al., 2008).

For the purposes of this paper, the working definition of environmental migrants proposed by the IOM will be used as an overarching concept. At the time of writing, this definition states that: ''Environmental migrants are persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad'' (IOM, 2007: 1)

This definition is broad and inclusive, and identifies environmental degradation as the main push factor triggering migration. It does not distinguish between temporal or permanent migration nor does it identify the end destination of migrants. This definition is useful for providing an understanding of whom and what is being addressed. However, the

concept of environmental migration also needs to consider the conditions of migration more specifically. This is needed to inform actors dealing with migration issues so that they can act or react in case of emergencies and/or assist migrants to insure that their basic rights are being respected. For this purpose, it is therefore useful to distinguish between various types of population movements induced by environmental factors instead of only referring to those on the move as ''environmental migrants'' in a broad sense.

Three categories of environmental migrants defined by Renaud et al. (2007) are considered with some modifications. The first category is ''environmental emergency migrants'' (as opposed to ''environmental refugees'' in the original publication[2]). These are individuals who flee the worst of an environmental impact on a temporary basis. Environmental Emergency Migrants are people who have to flee because of the swiftness of an environmental event and who have to take refuge to save their lives. The environment thus becomes the underlying factor for the displacement while socio-economic factors have secondary influence. Examples include people who flee the impacts of natural events such as hurricanes, tsunamis, or earthquakes. When displacement from a disaster remains within the affected country, this category of environmental migrant should be recognised under the 1998 *Guiding Principles on Internal Displacement* (UNHCHR, 1998) or, for example, the recently drafted Kampala Convention (African Union, 2009). These principles recognise that internally displaced persons (IDPs) are people who can be displaced by natural or human-made disasters. This is also inferred in the Inter-Agency Standing Committee (IASC) dealing with persons affected by natural disasters (IASC 2006). However, it is considered here that the term ''environmental emergency migrants'' should also apply to people who move across an international border but who, to the best of our knowledge, are not yet covered by any specific international convention (e.g., see Guterres 2008b). Policy efforts are therefore required for this type of cross-border migration in order to enable the adequate humanitarian agencies to provide their support within a legal framework.

The second category is ''environmentally forced migrants'', that is, people who ''have to leave'' in order to avoid the worst of environmental deterioration. The urgency for flight is less than for the previous category since the pace with which the environment is changing and/or deteriorating is slower. In this category, people may not have a choice to return to their former place of residence due to the physical loss of their land e.g. due to coastal erosion or sea-level rise or the degradation of

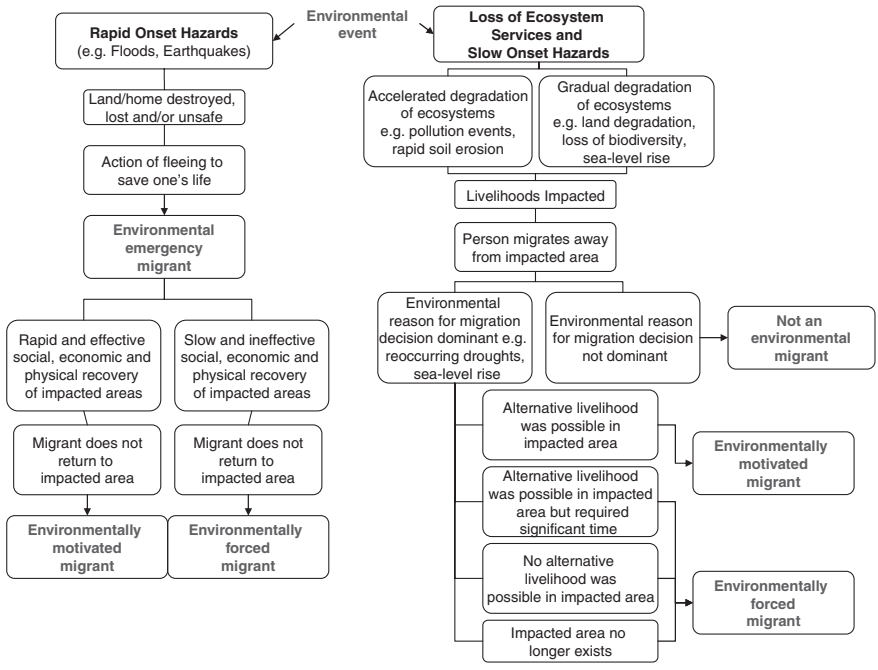
soil to such an extent that it can no longer provide any services. Here, the environment is the primary factor triggering the migration. However, in cases where the physical land is still available, people may have the opportunity to return to their original place of living particularly if they can implement alternative livelihoods. In the case of droughts, for example, Findley (1994) indicated that it is generally agreed that migration levels rise both immediately and as a long term response to the threat of recurrent events but also stressed that many migrants return to their drought affected areas. The relative importance of socio-economic and environmental factors may be more difficult to discern in the case of "environmentally forced migrants" despite a clear environmental degradation process being identified. In some cases such as droughts, the IDP guiding principles mentioned in the category above may also be applicable. However, here again, for those crossing an international border, no specific international protection mechanism is available.

The third category is "environmentally motivated migrants" who "may leave" a steadily deteriorating environment in order to pre-empt the worst. Here, there is no emergency nor is it a last resort action to move, but rather it is a situation in which individuals or communities who foresee a continuously deteriorating environment may decide to move in order to avoid further deterioration of their livelihoods. Socio-economic factors may play a predominant role here with the environmental degradation being foreseen somewhere in the future, but when this category of migrant is identified, it is a clear sign that more severe problems could manifest themselves in the future and that remedial actions (e.g., adaptation programmes) need to be put in place by actors involved in development issues. For example farming families who experience a steady decline in land productivity through land degradation/desertification would be exposed to increased poverty. One potential decision could be to move out of their regions of origin or at least send some of their family members to other regions or countries in order to generate new income through e.g. remittances. In this context, land degradation in some parts of Mexico have been shown to have played a part in motivating people to migrate to the United States (Schwartz and Notoni, 1994).

The migration pattern observed will vary regionally and globally for hazards having the same characteristics, particularly for the environmentally forced migrant and environmentally motivated migrant categories. The reason for this is that consequences of environmental stressors will vary depending on the vulnerability of the group of people considered.

FIGURE 1

PROPOSED DECISION FRAMEWORK FOR DETERMINING ENVIRONMENTAL MIGRANT SUB-CATEGORIES



The underlying vulnerability, which can be equated, in a simplified manner, to the ability to maintain a livelihood, then becomes an important factor in triggering the migration when people are affected by an environmental stressor. This is identified in the decision framework presented below (Figure 1).

The categories above overlap broadly with the working definitions used within the Environmental Change and Forced Migration Scenarios (EACH-FOR) project (see Dun et al., 2007) as well as with migration scenarios proposed by the IOM (International Organisation for Migration) (2007). However, unlike these other categories of definitions, we do not consider development-induced displacement e.g. such as the relocation of communities caused by dam construction. We consider such projects to be intentional and planned land-use changes which have a clearly identifiable entity responsible for the displacement and compensation, thereby resulting in ''development displacees'' rather than environmental migrants. By developing sub-categories of environmental

migrants, we are hoping to be able to initiate a classification system for those who move in cases where there is no identifiable entity responsible for the migration or displacement.

The reason for the sub-categorisation of environmental migrants is to highlight the different ways in which the environment prompts people to move and the different mode/pace of action taken by the affected person(s). In recognising this, it can help to determine what types of assistance and interventions are required, to identify who will be most in need of immediate support from either national governments or international aid agencies and to plan for resource allocation at a time of crisis or to prevent a crisis. From the above, it is supposed that ''environmental emergency migrants'' will require unique support which may need to be mobilised differently than that for ''environmentally forced migrants'', with ''environmentally motivated migrants'' likely requiring the least support from an emergency response perspective, but the most support in terms of aid for sustainable development and implementation of alternative livelihoods.

ENVIRONMENTAL SIGNATURES AND ENVIRONMENTAL MIGRANTS: DECISION FRAMEWORK

In order to help determine whether or not migration is induced fully or partly by environmental factors, a preliminary conceptualisation is proposed. This conceptualisation is based on a first proposal made by Renaud et al. (2007) and developed further here in the form of a decision framework (see Figure 1). It is not a ''final scheme'' by any means as much more discussion on the categories of migrants and environmental factors is needed with stakeholders from various disciplines, particularly those from the fields of migration studies, social sciences, natural sciences, law and the humanitarian sector. Thus, the intent here is rather to trigger further discussion on the topic.

As the discussion is about environmental migration, the starting point of the decision framework is an environmental event. The framework then focuses on what happens with respect to human movement once such an event has taken place. In Figure 1, the environmental process also has an impact on livelihoods which trigger the migration. A distinction is made between the occurrence of rapid onset hazards of environmental origin (left hand side of Figure 1) and the gradual loss of ecosystem services which also comprises ''creeping'' processes such as

land degradation and sea-level rise (right hand side of Figure 1). The distinction is necessary because individuals affected by rapid onset hazards and those affected by the progressive erosion of ecosystem services or by creeping processes will move or be displaced differently and will require differing support, coping and adaptation strategies. For example, people affected by a tsunami have to rapidly flee the exposed area and might not be able to return to their former residence for a while because of the damages caused by the event. They will thus have to be provided shelter and assistance away from their original place of living. If we consider progressive erosion of ecosystem services, people who face land degradation processes for example, may not necessarily all move out of their original place of living. Those that do move will probably need assistance in the form of information about how to access crucial services (e.g. health, education) and employment opportunities as well support to avoid exploitation by others. Those staying behind might need support in terms of adapted land management techniques or training to adapt/change their main livelihoods. In the latter cases, it is also important to consider impacts on gender and children as empirical evidence has shown that progressive changes in the environment can have differential migration outcomes for males and females. For example, in a survey of migration related to the 1983 to 1985 drought in Mali, Findley (1994) found that while the overall level of migration did not rise, there was a dramatic increase in migration by women and children. In contrast, Henry et al. (2004) in a study of rainfall variability and migration in Burkina Faso found that the probability of long-term female migration to other rural areas decreased during years of poor rainfall, while the opposite was true for males. These two contradictory findings highlight the relevance of considering the local context in planning support and adaption strategies rather than applying blanket international solutions.

Rapid onset hazards are floods, landslides, tsunamis, coastal storm surges, hurricanes, earthquakes, volcanic eruptions and so forth. These are not necessarily of natural origin, as their trigger (or increased magnitude and frequency) can be caused by social or economic factors such as land use change or environmental degradation. The severity of their impacts is often linked to increased exposure of affected populations because of natural population growth in critical areas. Nevertheless, it is considered here that it is the event itself that has an impact on the population, regardless of the underlying factors that have triggered it. A rapid onset hazard is likely to immediately displace people or communities who have to flee in order to save their lives. For example, this was the case with the 2004 Indian Ocean Tsunami where up to 2 million people were

displaced (e.g., University of Adelaide et al., 2009) and where people were displaced for long periods (Naik et al., 2007); with Hurricane Katrina with up to 1.5 million temporarily displaced people (Groen and Polivka, 2009); and 2 million people affected and some of them displaced in the aftermath of Hurricane Mitch (Oliver-Smith, 2009; Naik et al, 2007). These individuals are therefore considered here as ''environmental emergency migrants'' (EEM) immediately after the manifestation of the event.

Following a rapid onset hazard, return to the original living place will then be determined, again, by multiple factors such as casualties/trauma suffered, institutional and financial support, strength of various economic sectors, extent of damage, post-impact state of the environment and social/demographic factors such as composition of the remaining and returning populations. Following the emergency phase, it is considered that if social, economic, physical and ecosystem recovery can be effective and swift, individuals who do not return to their original place of living or who migrate out of the affected area are ''environmentally motivated migrants'' (EMM). They are considered EMMs because the environmental factor indeed remains the cause of the original migration but recovery in the affected area has allowed people to re-establish their livelihoods, so the act of migration (or not returning) is not compelling or linked to urgency anymore (i.e. the environmental event is the motivation for the move). This case can be illustrated by using the example of Hurricane Katrina which showed that not all evacuees (''environmental emergency migrants'' following our categorisation) returned to their place of former residence following the hurricane event. A study by Groen and Polivka (2009) showed that 13 months after the event, 63 per cent of the population had returned to their previous county with age, homeownership and severity of damage in their previous county of origin being important determinants in the decision to return. Those who did not return had an opportunity to restart their lives but in some cases faced unfamiliar labour market conditions and lack of important social networks and support structures (Groen and Polivka, 2009). Such people who decided not to return could be considered Environmentally Motivated Migrants according to the categorisation presented here. Little information is available concerning the impact of the 2004 Indian Ocean Tsunami on long-term out-migration patterns from affected areas. Naik et al (2007) highlighted that many families expressed interest in migrating after the event but no mass movements were recorded.

On the other hand, if recovery is slow or ineffective, or if, for example, legislation blocks individuals from returning to their original place of

living, then migrants should be considered as "environmentally forced migrants" (EFM). For example, after the 2004 Indian Ocean tsunami, many people in Sri Lanka were not allowed to rebuild within a certain distance of the coastline when the Government created buffer zones. In many cases, alternative housing was offered to households away from the coastline but many wished to rebuild in their original localities. Legislation thus kept people away from their original place of living. It could be argued that this has nothing to do with an environmental factor, but because this situation was brought about by an environmental event, then people who were not allowed to return to their original place of residence should be considered as EFMs. Of course, the act of staying or moving after an impact is also linked to the ability of the communities or individuals to cope with the impact of the event. Coping comprises social, economic, political and environmental factors. Some communities have strong social networks, solidarity and local organisations (self-help communities); some need to rely on external help at the national level (e.g. India and Thailand after the 2004 tsunami); some have to rely on international help (e.g., Sri Lanka and Indonesia after the 2004 tsunami), and some communities receive no or inadequate help whatever the severity of the impact (e.g., as in Myanmar after Typhoon Nargis in 2008 and North Korea when affected by hurricanes and/or floods). Needing and receiving support can be a proxy indicator of coping capacity of affected communities or individuals and can be a criteria when discussing livelihood rebuilding in affected areas, but it is difficult to determine ex ante.

The second main branch of environmental events in the decision framework consists of the progressive loss of ecosystem services and slow onset hazards or creeping processes. There are many environmental degradation processes that can fall under this category such as land and soil degradation, desertification, water resources degradation, pest infestations, droughts, sea level rise and so forth. Many, if not all, these degradation processes, with the exception of events linked to climate change (which is an indirect relationship) are directly linked to human activities, and these are influenced by social, economic, political and environmental factors. These are the direct and indirect drivers of change identified by the Millennium Ecosystem Assessment. The argument could thus be made that people who need to migrate because of the environmental degradation processes do so because social and/or economic factors have created the problem and thus should not be considered as environmental migrants per se. This is of course linked to the concept of mutuality discussed above but we maintain that when the dominant reason

forcing people or communities out are environmental factors then migrants should be considered to be environmental migrants.

The degradation process involved in losing ecosystem services can be either rapid (but not a rapid onset hazard) or much slower in manifesting itself. Examples of the former include land clearing for agricultural activities or overgrazing of pastureland which can rapidly lead to soil/land degradation, directly impacting the potential of the soils/land to support livelihoods of communities, particularly in developing countries. An example for the latter include sea level rise which can contribute to the slow degradation of the resource base communities rely on. Regardless of the swiftness of manifestation, the degradation processes will affect livelihoods of exposed populations and can thus trigger migration.

The category of environmental migration identified when a person who faces loss of ecosystem services/slow onset hazards moves, will depend on how strongly the environmental signature emerges in the decision to move. As has been discussed above, the act of migration can have many root causes. Environmental factors can be the dominant push factor, in which case migrants should be considered environmental migrants. However, in many cases, the environmental factors might not be significantly separated from other factors (e.g., social, economic, cultural or political), in which case migrants should not be considered environmental migrants. This latter case can, for example, be illustrated by the research of Doevenspeck (2008) who found that internal migration in Benin is mainly linked to socio-cultural factors and not so much environmental factors despite the presence of environmental problems in the affected communities of Benin. In this situation, indentifying the root cause for migration will be difficult and can only be achieved through a process of interviews with the migrants and cross checking with people living in or knowledgeable about the place of origin of the migrants. Afifi (2010) considered various environmental degradation processes in Niger and argued that although environmental degradation does have considerable impacts on migration patterns in Niger, it is more the economic impacts of the degradation processes which push individuals to migrate thus coining the terms "environmentally induced economic migration" which we parallel here with "environmentally motivated migrants".

When environmental signatures can be clearly identified, such as recurrent droughts, sea level rise or coastal erosion, people who migrate away of affected areas could be considered environmental migrants. From the

decision framework illustrated in Figure 1, migrants can be classified either as ''environmentally motivated immigrants'' or as ''environmentally forced migrants''. The first category would apply to individuals who decide to move or not to return to their original place of living despite alternative livelihoods being possible and implemented swiftly in the impacted areas through, for example, self-help or external interventions. In other cases, alternative livelihoods might not be possible or might take significant time[3] to implement. Degraded ecosystems, for example, can take a relatively long time to recover from disruption and if ecosystem services cannot be compensated through alternative means, then individuals migrating because of the consequences of loss of ecosystem services, should be considered as ''environmentally forced migrants''.

A specific case within this branch of the decision framework is when an impacted area no longer exists because of the environmental event. For example, the impacted area is entirely destroyed through permanent inundation because of sea level rise or coastal/riverbank erosion. These two phenomena imply the physical disappearance of land, meaning that no alternative livelihoods are possible at the place of origin. In these cases, there is no other option but for people to move, and these individuals or communities should be considered as ''environmentally forced migrants''. Sea level rise is, however, a slow process. Several small island states such as Tuvalu or the Maldives are threatened by sea level rise and large portions of their land could be submerged in the long run (Guterres, 2008a; Warner et al., 2009).[4] Many inhabitants of these islands will have no choice but to move if the worst case scenario takes place. However the move is likely to take place a long time before the islands are submerged as sea level rise and human activities will combine to degrade the environment (e.g. through salinisation of freshwater and land). Ecosystems will be drastically affected by the gradual sea level rise such that life on these islands is likely to become very difficult for some segments of the population long before parts of them are actually submerged. Repeated, strong storm surges may also motivate inhabitants to move. Adaptation measures are possible in order to prevent the worst and a study by Mortreux and Barnett (2009) showed that many inhabitants from Funafuti in Tuvalu do not wish to leave their island for a variety of reasons. However, Gemenne and Shen (2009) showed that Tuvaluans who have already migrated to New Zealand, cited climate change, sea level rise and other environmental processes as one influencing factor in their decision to migrate. Depending on the severity of the degradation processes in the case of exposed island states, migrants should be considered either as ''environmentally forced migrants'' as

they will have no alternative but to move or as ''environmentally motivated migrants'' if they are anticipating the worst effects, the latter being a clear sign that local adaptation measures need to be implemented rapidly to improve the livelihoods of the communities at their place of origin to avoid more dramatic migration patterns in the future.

University of Adelaide et al (2009: 26) make the point that more long-term, incremental environmental impacts have ''relatively less immediacy so there is the danger that action on them will be deferred by policy makers''. Linking this back to the categorisation provided in the decisions framework, policies relating to those affected by incremental environmental changes would be likely to influence those categorised as ''environmentally forced migrants'' or ''environmentally motivated migrants''. Perhaps categorising migrants may help policymakers to expedite action on creeping processes as identifying an individual affected or potentially affected can aid in targeting the types of interventions needed to assist that individual as well as generating a mode for channelling the assistance.

CONCLUSION

Reflecting on the nature and manner in which the environment degrades or changes can help provide insights into the different mechanisms by which humans respond and adapt to deal with the environmental stress they face. When it comes to moving as a response strategy in the face of environmental stress, the pace of change in the environment will have a significant influence on the mode of migration. Whether or not a person decides to return to a place impacted by an environmental change or event, will also depend on several factors, especially the recovery process for the affected area and whether the affected area still exists.

This paper has sketched a decision framework for understanding the impacts of environmental stressors on migrants. One of the significant aspects of this conceptual framework is that it provides a point of departure for more in-depth and refined discussions of how the environment interacts with migration trends. The framework recognises there is a need to not only examine the impact response to an environmental event but also the ability to cope and recover. As such, concepts of vulnerability, adaptation and resilience need to be brought together, and this is what has been attempted here through the concept of livelihoods.

Another key feature of the conceptual approach is that policymakers need a framework to understand the characteristics and needs of migrants made to move because of changing environmental conditions. Within the climate change negotiations, countries are now trying to define a framework for managing climate change and facilitating adaptation for the post-2012 period when the Kyoto Protocol runs out. Only recently (Bierman, 2007; Brown, 2008; Warner et al., 2008) has the topic of migration in relation to climate change been mentioned in the context of the climate change negotiations. Policy papers to the negotiations, such as the joint submission by members of the IASC working group on climate change and human mobility (IOM et al., 2009), agree that there is a need to understand how different types of environmental stressors affect migration processes, in line with the kind of approach suggested here. Negotiators need more information, but particularly more direction about how and where to fit the topic of migration into the rapidly developing adaptation landscape i.e. in terms of planning how people should adjust to the impacts of climate change. The discussion about which people are migrating, where, for what environmental reasons, and in need of what kind of assistance must be driven forward at an accelerated pace.

NOTES

1. The United Nations University Institute for Environment and Human Security (UNU-EHS) and the International Organization for Migration (IOM), together with Munich Re Foundation (MRF) and the UN Environment Programme (UNEP) with support of the Rockefeller Foundation brought together 35 experts in the fields of migration and the environment from 16 to 18 April 2008 in Munich at the ''Research Workshop on Migration and the Environment: Developing a global research agenda.''
2. The authors have reconsidered their use of the term ''environmental refugee'' and will no longer use it. The term ''environmental refugee'' was used in Renaud et al., 2007 to raise awareness of the potential level of hardship faced by people affected by certain environmental events and the potential urgency of circumstances under which they must move (elements which are no better conjured up in people's mind than by using the single word ''refugee''). The authors now refrain from further use of the term refugee due to a recognition that refugee has a very specific meaning within international law where it is defined in the 1951 Convention Relating to the Status of Refugees (Refugee Convention) which does not provide scope for considering environmental factors as a cause of refugee flight (see main text).

3. Suggesting a time period for recovery and the option for return opens up a whole new debate which can not be tackled in this paper. However, in general, a standard would need to be established as to what can be considered ''significant time''. The authors suggest that recovery or the option of an alternative livelihood in the impacted area should be made possible within a two year period.
4. In November 2008 the President-elect of the Maldives, Mohammed Nasheed, announced the islanders' wish to buy a new homeland elsewhere as sea level rise threatens to drown the archipelago (see. ''Maldives plans to buy 'new homeland'''. *The Times of India*, 11 Nov 2008. http://timesofindia.indiatimes.com/World/Maldives_plans_to_buy_new_homeland/articleshow/3696018.cms).

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