

ADDRESSING THE LAND DEGRADATION – MIGRATION NEXUS: THE ROLE OF THE UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION



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Cover photo: Small caravan of donkeys carrying water in the sand storm, following a major drought in 2017 in Mauritania. © IOM 2018/Sibylle DESJARDINS

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Drought hit Savanne Désolée Haiti, which was considered to be the largest desert area of the country.
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EXECUTIVE SUMMARY

Land is the central component upon which the livelihoods of humanity rely. Our food, energy, and employments are associated with, and dependent on, its quality and well-being. Land remains the most fundamental asset for the majority of vulnerable populations living in developing countries, as their livelihoods are directly linked to agriculture. In the absence of decisive action to protect and restore vital land resources, there is a risk that desertification, land degradation and drought (DLDD) disproportionately contribute to increased poverty, unemployment and inequality; and lead to the forced migration of those already most marginalized and vulnerable. This study results from the decision of States parties to the United Nations Convention to Combat Desertification (UNCCD) to produce a study on *“The role that measures taken to implement the Convention can play to address desertification, land degradation and drought as one of the drivers that causes migration”* (UNCCD 2017a). The study was commissioned to the International Organization for Migration (IOM), who worked in partnership with the Stockholm Environment Institute (SEI).

The first part of the report provides a review of existing evidence on the complex interrelationships between migration and DLDD. The review shows the complexities that underpin population movements in the context of DLDD, by highlighting that the specific impacts of DLDD on migration depend not only on people’s geographical exposure to risk, but crucially also on their pre-existing vulnerabilities. Within local populations impacted by the same environmental threats, vulnerability and likelihood to migrate are determined by a combination of factors, including socio-economic status, demographic characteristics (notably age and gender) and the migration, environmental, and resource management policies in place. Most population movements in the context of DLDD are short-distance and internal; however there is also evidence that international migration in search of employment can amplify at times of drought, especially in places with strong migration networks or traditions.

Although migration has always been a vital strategy to cope with DLDD, migration, in its forced forms, can also contribute to further socio-economic and environmental vulnerabilities. In this context, it is important to avert and minimize forced migration through interventions that address its drivers, including DLDD. Considering that migration is often motivated by the search for better employment opportunities, making sustainable land management (SLM) and ecosystem restoration compatible with the creation of dignified and attractive employment opportunities will be absolutely key to successfully avert and minimize forced migration connected to DLDD.

The second part of the report compiles evidence from around the world on good practices and lessons learned to combat DLDD as a driver of migration; and enhance migration’s adaptive potential to DLDD. This section draws on a call for contributions launched by the UNCCD alongside a review of existing published evidence. The review of good practices shows that sustainable land management and land rehabilitation strategies that can avert and minimize forced migration take many varied forms depending on the local context. Those that are most successful share the following characteristics:

- **Protect and restore fragile ecosystems through participatory approaches;**
- **Create abundant and dignified livelihood and employment opportunities;**
- **Tackle pre-existing vulnerabilities and inequalities.**

Interventions that are usually best able to achieve these aims concurrently present the following characteristics:

- They strive to secure land rights and access to natural resources for those most vulnerable;
- They are gender sensitive and empower the most marginalized;
- They support local knowledge;
- They reinforce local institutional capacities;
- They take into account specific local migration dynamics.

The third part of the report focuses on policy recommendations to avert, minimize and address the adverse consequences of DLDD on migration. These recommendations target UNCCD Parties and other relevant stakeholders. At the global level, enhanced cooperation between key international intergovernmental organizations dealing with migration, labour, environmental protection, climate change, development and agriculture will be key. In this respect, the study recommends further and enhanced collaboration between the UNCCD and IOM, especially with regards to a collaborative implementation of the Global Compact for Safe, Orderly and Regular Migration. This enhanced collaboration should leverage complementary expertise and expand the existing partnership between both organizations. Synergies with the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention on Biological Diversity (UNCBD) should also be strengthened to address the various factors at play in the migration-DLDD nexus. Given the cross-cutting nature of the migration-DLDD nexus, the study also recommends increased collaboration between the UNCCD and other relevant United Nations (UN) agencies, such as the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agriculture and Development (IFAD), the International Labour Organization (ILO), the United Nations Development Programme (UNDP), UN Women and the World Food Programme (WFP).

Considering that most migration in the context of DLDD is either internal or regional, the UNCCD should support regional initiatives and bilateral cooperation between countries. This includes scaling-up existing state-led initiatives, such as the Initiative on Sustainability, Stability and Security (3S Initiative), which aims to create employment opportunities for vulnerable groups and migrants by restoring degraded lands and facilitating land access and tenure. Efforts should also be made to link up with other regional initiatives, including those taking into account pastoralist issues, such as the Economic Community of West African States (ECOWAS) and the Intergovernmental Authority on Development (IGAD).

At the national level, it is essential that the ministries of migration, environment, agriculture, development and labour work in a collaborative and cross-cutting manner when implementing policies that affect any of these sectors, in order to avoid any potential negative trade-offs between them. In this respect, environmental and agricultural policies need to be aligned with migration policies that provide safe and regular migration pathways, and labour policies that create dignified employment opportunities; and vice-versa.

Finally, in terms of research and evidence, there is a need to strengthen the collection and dissemination of knowledge on the links between migration and DLDD, including by encouraging longitudinal and comparative research, promoting and facilitating multi-stakeholders co-production of knowledge approaches, involving local researchers in all phases of research and promoting further knowledge sharing on good practices.

INTRODUCTION

The United Nations Convention to Combat Desertification (UNCCD), signed in 1994, constitutes the sole international agreement linking environment and development to sustainable land management. The 197 Parties to the Convention work together to improve the living conditions for people living in drylands, by maintaining and restoring land and soil productivity and mitigating and adapting to the effects of drought. Dry lands are home to approximately 3 billion people who account for 38 per cent of the global population (IPCC 2019). Today, more than a quarter of humanity faces a looming water crisis, which will only accelerate as the impacts of climate change worsen (Sengupta and Weiyl 2019). The majority of people affected by drought and land degradation are already poor or chronically poor, which means that these phenomena could increase the levels of forced migration by adding a layer of supplementary stress to already vulnerable populations (Black et al. 2011; Mach 2017).

The Convention's preamble recognizes that: "desertification and drought affect sustainable development through their interrelationships with important social problems such as poverty, poor health and nutrition, lack of food security, and those arising from migration, displacement of persons and demographic dynamics." In so doing, the Convention constitutes the first ever intergovernmental environmental agreement to explicitly link migration issues with environmental change. In order to address the specific challenge of forced migration, Articles 10 and 11 of the Convention encourage the development of measures to prepare for and mitigate the impacts of drought through the "establishment and/or strengthening, as appropriate, of early warning systems, including local and national facilities and joint systems at the sub-regional and regional levels, and mechanisms for assisting environmentally displaced persons." The UNCCD is not simply an environmental agreement; crucially, it is also a social agreement that is fully committed to the protection of the most vulnerable groups. As a result, the Convention acknowledges that resolving the impacts of desertification, land degradation and drought (DLDD) must go hand in hand with improving the livelihoods of those most vulnerable.

Improving the living conditions of affected populations is one of the strategic objectives guiding UNCCD's stakeholders and partners for the period 2018-2030, with a view to substantially reduce forced migration in the context of desertification, land degradation and drought (UNCCD 2017, expected impact 2.4). In line with the Convention's mandate and commitments, UNCCD Member States agreed at the Thirteenth Conference of the Parties (COP13) of the UNCCD in Ordos, China, that the UNCCD Secretariat would commission a study on *"The role that measures taken to implement the Convention can play to address desertification, land degradation and drought as one of the drivers that causes migration"* (UNCCD 2017a).

The present study results from that decision, and was commissioned to the International Organization for Migration (IOM), who partnered with the Stockholm Environment Institute (SEI). The production of this study takes place within the framework of a cooperation agreement signed between IOM and the UNCCD in 2014. It seeks to leverage IOM's expertise in migration issues to contribute to the evidence base on migration-DLDD nexus and advance policy thinking on this topic. IOM and the UNCCD work together to create opportunities to improve lives, advance development efforts, strengthen disaster risk management responses and facilitate adaptation to climate change. The IOM-UNCCD strategy for action focuses on three areas of collaboration: i) understanding and analysing the connections between climate change, land degradation and migration; ii) bringing awareness of the migration-land nexus to global policy processes; and iii) supporting the development of policies and practices that link sustainable land management with safe, regular and orderly migration (IOM 2015).

The study is structured as follows: the first part consists of an analysis of existing literature on the complex interrelations between migration and DLDD. The second part of the study reviews good practices and lessons learned from around the world, drawing on a recent call for contributions launched by the UNCCD that was supplemented with additional case-study material to ensure geographical balance and diversity of approaches. This section highlights the positive ways in which land rehabilitation, land restoration and sustainable land management can reduce forced migration. The third part of the study provides policy recommendations that UNCCD Parties and other relevant stakeholders might wish to consider to address desertification, land degradation and drought as drivers of migration.

Given its objectives and scope, this study also aims to contribute to other major international policy discussions that are both directly and indirectly related to the goals of the UNCCD. These include, but are not limited to:

- The Global Compact for Safe, Orderly and Regular Migration (GCM);
- The United Nations Framework Convention on Climate Change (UNFCCC) Task Force on Displacement, created under the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (WIM);
- IOM's intergovernmental work on the migration, environment and climate change (MECC) nexus;
- Regional relevant policy discussions under the Economic Community of West African States (ECOWAS) and the Intergovernmental Authority on Development (IGAD);
- The Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development;
- The United Nations 'Decade on Ecosystem Restoration' (2021- 2030);
- The Almeria Conference on Desertification and Migration.



Residents of the western province of Herat in Afghanistan, have been facing very harsh droughts multiple times. In 2002, after four years of drought it was impossible for people to produce enough food to sustain themselves and had to seek support elsewhere. In 2018 people were displaced due to drought.
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PART I

MIGRATION AND DESERTIFICATION, LAND DEGRADATION AND DROUGHT: A COMPLEX NEXUS

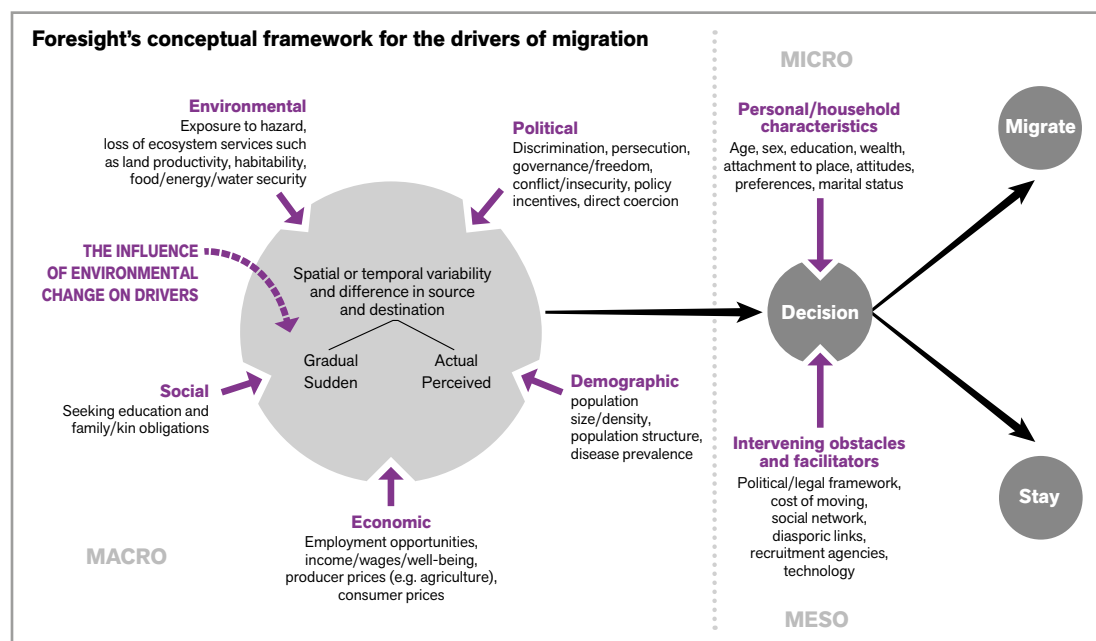
Desertification is threatening traditional livelihoods in Mongolia. © IOM 2017/
Nyamdavaa YONDONJAMTS

INTRODUCTION

The degradation of the world's land surface due to human activities already has negative impacts on at least 3.2 billion people worldwide – a situation that can only be expected to worsen as the impacts of climate change accelerate (IPBES 2018, 263). Land degradation is a pervasive systemic phenomenon that affects all parts of the world and can take many problematic forms, including: chemical contamination and pollution, salinity, soil erosion, nutrient depletion, overgrazing, deforestation and desertification (Andersson, Brogaard, and Olsson 2011, 296). Desertification, a specific type of land degradation that occurs in drylands, currently affects more than 2.7 billion people (IPBES 2018, 36). The rapid degradation of land is often the result of a broken economic system, characterized by an inefficient food production system, combined with other land polluting and degrading practices which usually achieve short economic returns that tend to benefit a few, at the expense of many (UNCCD 2017b, 9). It is commonly acknowledged in scientific literature that “extreme weather and climate or slow-onset events may lead to increased displacement” (IPCC 2019). However, it is important to underline that migration is a highly complex phenomenon where multiple factors interact. The decision to migrate often results from a combination of social, political, economic, environmental and demographic factors that cannot be isolated from one another (Black et al. 2011; Ionesco, Mokhnacheva and Gemenne 2017, 37;– see Figure 1).

Migration outcomes linked to DLDD depend on both the combination of exposure to risk, and on pre-existing vulnerabilities. Land degradation decreases resilience and adaptive capacity to environmental stress; and increases vulnerabilities, especially of the poorest and marginalized populations (UNCCD 2017b, 9). Today, over 1.3 billion people live on degraded agricultural land, and most vulnerable populations tend to lack secure access to land as well as control over land's resources (UNCCD 2017b). At the same time, unemployment rates in developing countries continue to be high, and other sectors of the economy are often incapable of absorbing new entrants to the labour market. Taking into account these different dimensions, it is important to acknowledge that existing migration dynamics are modified or exacerbated by environmental degradation, rather than uniquely caused by it. If no urgent actions are taken to protect, restore and rehabilitate vital land resources, DLDD will increase poverty and inequality, leaving many with few other options than to embark on perilous out-migration journeys. This first part of this study provides a review of the state of knowledge on the interrelations that exist between DLDD and forced migration.

Figure 1. The complex drivers of migration



Source: Figure extracted from *The Atlas of Environmental Migration* (Ionesco D., D. Mokhnacheva and F. Gemenne, Routledge, Abingdon, 2017), page 37.

1. MIGRATION IN THE CONTEXT OF DESERTIFICATION, LAND DEGRADATION AND DROUGHT

Migration has long been one of the most important livelihood strategies available to households to cope with environmental change and relieve population pressure from drylands unable to cope with additional stress (McLeman and Smit 2006; Gemenne and Blocher 2017). Seasonal internal migration represents a vital option to diversify livelihood for people who depend on agriculture, especially at times of rainfall deficits. Confronted with slow-onset environmental degradation, the migration of some (but not all) family members can also help households diversify sources of income, whilst allowing part or most of the family to remain *in situ*. In Mali for example, 96 per cent of the population lives in drylands and agriculture accounts for nearly 50 per cent of the economy. Many families depend on migrants' remittances from Cote d'Ivoire and elsewhere to survive (Dobie 2001). However, different forms of migration have differentiated impacts on populations. Evidence from Bangladesh, Ghana, Guatemala, India, Peru, Tanzania, Thailand and Viet Nam shows that, under certain conditions, migration can be an important adaptation strategy to cope with rainfall variability. Yet, poor populations tend to lack the necessary assets to make migration successful and adaptive (Warner and Afifi 2014a). Although out-migration can sometimes decrease pressure on natural resources in communities of origin and improve resilience to further environmental shocks through socio-economic remittances, this positive outcome depends on households' pre-existing vulnerabilities, socio-economic assets, characteristics of the migrants (gender, age), type of employment found in destination areas (regular, irregular, levels of salary) and the type of social networks migrants can rely upon in destination areas (Vigil 2017; Bachmann et al. 2019).

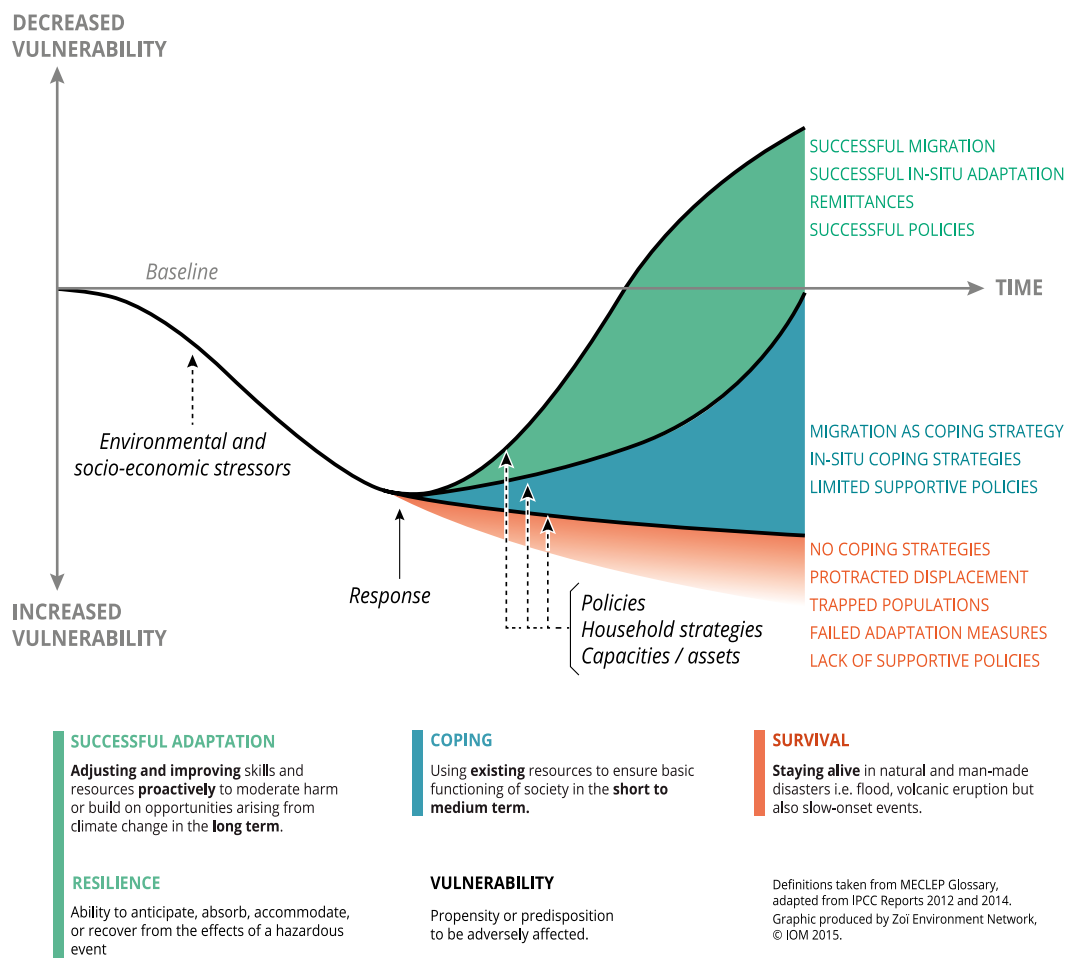
Social inequalities and unequal access to land greatly influence people's vulnerability and coping capacities. Women are particularly vulnerable to environmental change as they often are the most socio-economically marginalized, bear the brunt of domestic labour and face unequal access to land and decent employment. Gender is a critical variable that shapes access and control over fundamental resources, and it intersects with class, caste, race, culture, and ethnicity to shape the vulnerability of people to environmental change (Rocheleau et al. 1996; Resurrección 2017). Moreover, gendered social identities can also influence who benefits from sustainable land management practices.

As a result of their geographic exposure to DLDD and their multifaceted pre-existing vulnerabilities, the most marginalized people are often disproportionately affected by land degradation and drought. About 50 per cent of the total population of Sub-Saharan Africa lives in drylands, yet the percentage of poor people living in those areas is estimated at 75 per cent (IPBES 2018), making this region one of the most vulnerable to the adverse impacts of environmental and climate change. Today, approximately 80 per cent of the world's extremely poor people live in rural areas where land degradation has become an important factor of rural poverty (IPC-IG 2019). Like other systems, the levels of vulnerability of rural systems depend on their ability to adjust to changing internal demands and external circumstances (Carpenter and Brock 2008). However, when natural resources are degraded -especially when these constitute the basic means of livelihoods,- this degradation results in increased vulnerabilities, which in turn decrease migration's adaptive potential (Schouten et al. 2009). At the same time, the rise of land grabbing in rural areas coupled with insecure land tenure for local communities contribute to unsustainable land use and to the expulsion of those most vulnerable (Borras et al. 2013; Vigil 2018; UNCCD 2017b). Despite growing urbanization in poor agrarian-based economies, many urban areas in developing economies have not been able to create employment at the rate necessary to absorb the workforce that is expelled from rural areas and enters the labour market every year. The supplementary stress that DLDD brings amplifies an already difficult reality, upon which the distribution of, and access to resources as diverse as land, water, and employment, play decisive roles.

As a result of these cumulated socio-economic and environmental vulnerabilities, coupled with increased barriers to regular migration, many individuals from rural areas enter migration routes in very vulnerable positions – this can further increase their vulnerability rather than reduce it (Vigil 2018, 2019). The often

recarious conditions at both internal and international areas of destinations mean that migration is not an adaptation option beneficial to all. In fact, in its forced forms, migration is often a last resort option that does not necessarily improve the well-being of those who leave or of those who are left behind (Vigil 2016; Zickgraf et al. 2016). For example, in Ethiopia, where poverty has been accentuated by the combination of drought and limited land holdings, rural out-migration of the most vulnerable has not been adaptive due to the lack of opportunities and the high cost of living in urban areas (Morrissey 2013). Additionally, out-migration, even if it has the potential to relieve environmental pressure in areas of origin, can also exacerbate land degradation. For example, land abandonment in Nepal as a result of migration has been linked with an increased spread of invasive species, as well as a decline in soil fertility (Jaquet et al. 2015).

Figure 2. Migration and environmental change: vulnerability and resilience scenarios



This infographic has been produced with the assistance of the European Union. The contents of this infographic are the sole responsibility of IOM and can in no way be taken to reflect the views of the European Union or of IOM.

Source: Figure created for the IOM Project - Migration, Environment and Climate Change: Evidence for Policy (MECLEP) (2014-2017).

2. TRAJECTORIES AND DESTINATIONS

Internal migration – rural to rural and urban areas

The mobility dynamics in most developing countries that are also the hardest hit by DLDD and other environmental changes, are characterized by the prevalence of internal movements from rural to urban areas and from rural to rural areas (Carr 2009; Zelinsky 1971). When people move in the context of DLDD, studies have found that, while seasonal and short-distance migration increase, long-distance migration to urban and international destinations tends to decrease (Findley 1994; Henry et al. 2004). This is because people tend to use the limited resources and assets they have left to cover immediate basic needs - primarily food - and lack the necessary capital to embark on longer distance migration journeys. For example, one of the first studies on drought and migration conducted in Mali showed that it is often circular and short-distance movements that increase at times of drought (Findley 1994). In Burkina Faso, studies have indicated that people from drier regions are more likely to engage in temporary and permanent migration than those from wetter regions. Within those regions, those with higher education tend to move to urban areas, while those with no education tend to move to rural areas. People from drier regions also appear to be more likely to migrate internally rather than internationally, in comparison to people from wetter regions, due to more limited household resources to embark on international migration (Henry et al. 2004). Evidence from the droughts in Ethiopia in the 1980s also indicates that migration only becomes a livelihood strategy once all other *in situ* adaptation options have been exhausted (McLeman and Smit 2006).

International migration – pastoralists and migrant workers

The majority of population movements in the context of environmental change occurs within countries (Black et al. 2011), and international migration from drought-prone areas has been shown to decrease in some contexts (Henry et al. 2004). However, people affected by DLDD do cross international borders, especially in places located in border zones that are more permeable, such as in the Sahel (Findley 1994). One example is the case of pastoralists, whose production systems are highly dependent on the possibility to flexibly cross borders (Alidou 2016, 6; IOM et al. 2019). Pastoralism is a very diverse system that can be found on all continents, from the drylands of Africa and the Arabian Peninsula to the highlands of Asia and Latin America. It is estimated that a quarter of the world's land surface is managed under pastoral stewardship (IUCN 2014). Pastoral mobility can be seasonal, between two well-defined pasture areas or following erratic rain patterns (FAO 2011). Environmental changes can become prominent issues as they undermine usual patterns of pastoralist mobility which are essential to secure livelihoods (Vigil 2017). For example, in the Sahel, and as a result of the compounded impacts of environmental change, land fragmentation, transfer of communal land and the granting of large portions of territories to large-scale agricultural concessions, nomadic pastoralists are often obliged to move their herds further south from their usual pastures.

Other types of international migration can be observed in the context of DLDD. There is evidence that international migration in search of employment opportunities can grow at times of drought, especially in places with strong migration networks or traditions (Fussell and Massey 2004). For example, studies have found that migration motivated by the search for employment opportunities from rural Mexico to the United States of America is at least partially influenced by precipitation patterns. Declining crop yields in the context of droughts can lead to more migration from Mexican States that have strong social linkages with the United States of America (Feng et al. 2010; Nawrotzki 2013). However, changes in the political and economic situation of host regions also deeply affect these mobility strategies. For example, in Burkina Faso, farmers tended to migrate internationally at times of droughts. This adaptive strategy was reshaped by the crisis in Cote d'Ivoire and farmers favoured investments in small-scale irrigation or gold mining instead of migrating (Barbier et al. 2009).

Box 1. UNCCD survey results on the role of climatic and environmental changes in migration decisions in Morocco

The UNCCD conducted a survey in 2017 with 1,000 migrants on the Western Mediterranean route. The survey sought to unpack how environmental changes were intertwined with other migration drivers in the decision-making process to migrate. Instead of focusing on “sending areas,” this survey sought to assess decision-making perceptions by focusing on people who had already migrated. The survey was conducted in five Moroccan cities (Agadir, Casablanca, Fes, Rabat and Tangier). Most respondents mentioned that the lack of employment was the principal motivation behind their migration decision. However, the survey results also showed that a considerable number of respondents mentioned that different aspects of environmental change played a major or partial role in their decision to migrate, among other socio-economic and political factors:

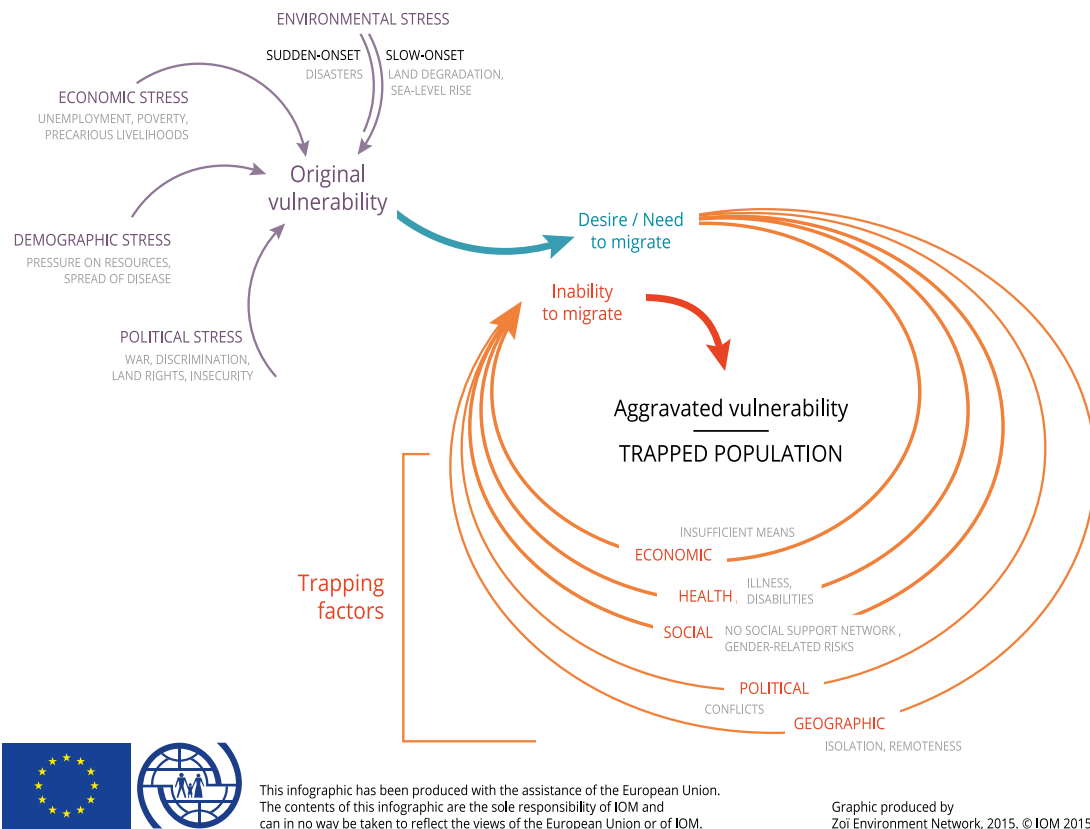
- Drought was considered a very important reason to leave for 21.4 per cent of the respondents and part of the reason to leave for 18 per cent;
- Water scarcity was a crucial driver of migration for 14.2 per cent of the migrants and a partial determinant for 15 per cent of them;
- Declining agricultural productivity was a key factor of migration for 14.5 per cent and a part of the problems that induced migration for 16 per cent of the respondents;
- Floods were mentioned by 14.7 per cent of the migrants as a major driver of migration and by 12.3 per cent as a partial one;
- Landslides was the least influencing factor, with only 3.4 per cent of the respondents considering it very relevant and 5.3 per cent partially relevant.

Although the role of environmental factors was secondary to the search for employment opportunities, approximately 30 per cent of the respondents did mention that environmental changes had influenced their decision to migrate. These findings indicate that environmental and economic drivers of migration have become increasingly intertwined and that they should be addressed simultaneously.

Source: Information extracted from UNCCD, 2019, unpublished survey data).

Trapped populations

Migration often requires human and financial assets that are not available to all and many socio-economic and political barriers can impede migration (Black et al. 2011). As a result, the most vulnerable populations are often not in a position to migrate at times of environmental stress. Results from drought-prone areas have shown that in many contexts, environmental shocks undermine people’s capacities to embark on migration journeys (Nawrotzki et al. 2017). This is particularly evident in the case of the poorest households (Barbier and Hochard 2018). For example, in the rural district of Machaze in Mozambique, circular migration was a key coping strategy as remittances sent by migrants were often the only source of income at times of crop failure. However, during the civil war that broke out in 1977 and lasted 15 years, the presence of armed groups inhibited the movement of people. This forced immobility severely damaged the capacity of Machaze villagers to feed themselves and many human lives were lost during severe droughts in the early 1980s (Lubkemann 2008; Ionesco, Mokhnacheva and Gemenne 2017, 28; - see Figure 3). This example reveals that often, when people do not have the option to engage in migration at times of environmental stress, and when no other options are available for them to remain in decent conditions *in situ*, it is immobility rather than mobility that is the greatest threat to the most vulnerable (Carling 2002). In many cases, it is the elderly and destitute who are left behind and are unable to move out of harm’s way (Zickgraf 2018).

Figure 3. Trapped Populations

Source: Figure created for the IOM Project - Migration, Environment and Climate Change: Evidence for Policy (MECLEP) (2014-2017).

3. AMPLIFYING AND BUFFERING MECHANISMS

Even if socio-political and economic factors play key roles in shaping migration decisions, geographical factors are also important to consider. Drawing on panel data from Africa, Asia and Latin America, a study was commissioned by the UNCCD to Flowminder for this report, in order to test the link between drought, land degradation and migration and provide estimates (Laurent-Lucchetti et al. 2019). The study used regression analysis to explore whether empirical evidence supports the existence of these linkages (see Annex 1 for a detailed description of methods and results). The authors analysed how drought and land degradation affect population movements at the sub-national scale for the years 2000, 2005, 2010 and 2015. In general terms, the results reveal a significant and negative effect of both drought and land degradation on population density in the cells observed. However, this effect is not equally spread across regions. The effect of drought and land degradation on population density is negative in Africa and Asia and stronger than in other regions; unlike in South and Central America where populations do not appear to be more mobile. Therefore, out-migration does seem to be correlated to DLDD in Africa and Asia, but not in South and Central America where levels of out-migration do not seem add to change at the aggregate level (Laurent-Lucchetti et al. 2019).

The results of the regression analysis also show the possible impacts that mineral resources, topology and other geographic characteristics can have in explaining the interconnections between drought and migration. For instance, areas that are abundant in mineral resources, such as gold, diamonds and gems, appear to be less sensitive to out-migration at times of drought. One hypothesis in that respect is that these may provide an alternative source of local income, which contributes to buffering the effects of drought on migration. With respect to geographical location and distance from urban areas, the study shows that populations residing near, and in urban areas are less likely to move after a drought. This is likely due to their higher access to labour and economic markets and a broader range of alternative employment options.

Populations living in mountain areas seem to also be less prone to migrate at times of droughts, either because droughts have a lower impact on their migration decision or because ruggedness hampers mobility. With regards to land degradation, the travel time to the capital city also acts as a buffer lowering the effect of land degradation on migration, although ruggedness does not seem to play a role. When observing how other environmental characteristics interact with drought, results show that populations living in areas with water available for irrigation, such as lakes or rivers, are less likely to move at times of droughts. This set of results paints an overall consistent picture: drought and land degradation appear to be environmental factors that influence population movements at an aggregate level. However, when the studied area is endowed with specific natural or geographic characteristics, the effect of environmental changes on migration appear to decrease or even to be negated (Laurent-Lucchetti et al. 2019).

4. HOW MANY MIGRANTS?

Estimates

Providing particular figures of how many people have migrated in the context of DLDD is extremely difficult because, as outlined above, it is not always possible to isolate environmental drivers from all other complex social, political, economic, and demographic factors that shape population movements. The time lapse that occurs between the moment when a drought hits and the moment when mobility takes place also makes data estimation especially challenging. Often characterized by incremental changes over time, land degradation is difficult to measure and predict with any level of precision because thresholds and recovery potential are uncertain (Ezcurra 2006).

What we do know, however, is that since 2008 more than 686 million people across Africa and Asia alone have been affected by drought, especially in rural areas where people are dependent on land for their livelihoods (IDMC 2018, 81). According to data from the IOM Displacement Tracking Matrix (DTM) and the Office for the Coordination of Humanitarian Affairs (OCHA), in 2017 alone, 13.1 million people were newly displaced within their countries in the context of drought (IOM 2018; IDMC 2018; IDMC 2019). These figures demonstrate the wide-spread influence of drought as the number of people affected by this phenomenon is greater than the number of people affected by floods, storms, and earthquakes combined (IDMC 2018, 81). However, and despite this, *being affected by* is extremely different from *being displaced by* or *migrating as a consequence of*. As mentioned above, not all people impacted by droughts or by land degradation will be able, or willing, to move.

An illuminating example of how land degradation and drought impact other migration drivers can be found in Egypt. Seventy per cent of internal migrants interviewed in the context of the “Where the Rain Falls” project in the Nile Delta and in slums in Old Cairo mentioned both land degradation and water shortages as some of the drivers replace by shaping their decision to migrate (Warner and Afifi, 2014b). In the Middle Draa Valley of Morocco, a household survey found that land degradation was a major – but not the sole – factor in both past migration decisions and migration intentions (Ait Hamza, et al. 2009). Migration linked to water scarcity and prolonged drought has undeniably been a reality for centuries for people around world (Mach 2017), but DLDD should not be understood as an isolated migration driver. It is rather a factor that increasingly influences all other migration drivers, especially in the context of climate change.

Box 2. Projections related to the migration-DLDD nexus

If providing estimates for past events is already challenging, providing projections for the future becomes even more complex. Projections tend to be based on the number of people expected to be exposed to risk rather than on the number of people who would – or who could – engage in migration as a response to risk (Gemenne 2011). In other words, projections tend to assume that all people will be able and willing to migrate (IPCC 2019) and they do not take into account agency in migration decisions or the adaptive capacities of individuals (Hartmann 2010; Piguet 2013). Moreover, all quantitative projections are necessarily limited in scope because they focus on environmental, economic and demographic variables at the expense of all other unobservable factors that contribute to and greatly influence migration, such as pre-existing vulnerabilities, political changes and personal motivations (Laurent-Lucchetti et al. 2019).

In 2018, and on the basis of gravity models, the World Bank predicted that if no urgent actions are taken, over 140 million people could be internally displaced in the context of climate change by 2050 across Sub-Saharan Africa, South Asia, and Latin America (Rigaud et al. 2018). The study by Laurent-Lucchetti et al. conducted in 2019 also provides four tentative migration projections linked to drought. The study results seem to indicate that the number of migrants in the context of droughts will increase by approximately 22 million in Africa, 12 million in South America and 10 million in Asia in 2059, compared to the 2000-2015 period. However, these projections keep the baseline constant, meaning that they assume that no other changes in population or technology will occur (Laurent-Lucchetti et al. 2019). Given the inherent caveats and limitations that are attached to projections, it is extremely important to use them with caution. How environmental and migration policies are developed and enacted today will greatly influence the impacts of DLDD on migration tomorrow.

CONCLUSION

The effects of DLDD on migration cannot be isolated to a singular driver or outcome. Although DLDD is already affecting the livelihoods and migration decisions of millions of people around the world, it is not desirable to artificially isolate environmental variables from all of the other social, political, demographic and economic factors that shape migration decisions. Even within local populations affected by the same environmental threats, vulnerability and likelihood to migrate is shaped by socio-economic status - with those having more resources being able to adapt locally and/or through migration,- demographic characteristics (age, gender, class, etc.), as well as by the political context and existing environmental management and migration policies. Although it is very difficult to predict the exact costs of deteriorating socio-ecological environments linked to DLDD, an intensification of rural poverty can be expected. This will amplify the vulnerabilities of large numbers of people already experiencing chronic levels of material deprivation and employment vulnerability (Vigil 2017). Policies and interventions aiming to avert and minimize forced migration must seriously consider and include actions to address DLDD, as it is an important compounding factor, especially for those most vulnerable in developing countries. Vice versa, DLDD-related policies and interventions should mainstream migration concerns and be sensitive to local migration dynamics. The next section analyses a selection of good practices for addressing the land degradation-migration nexus.



PART II

GOOD PRACTICES AND LESSONS LEARNED



An IDP woman and her child walk in the new section of the IDP camp in Doolow, Somalia. Divided into two sections, the older section opened during the 2011 famine and the new one opened in February 2017, following the drought. © IOM 2017/Muse MOHAMMED

INTRODUCTION

This part of the study showcases diverse sustainable land management and restoration options from around the world which have the potential to create socially and environmentally beneficial conditions that can help avert and minimize forced migration. This section has benefited from a call for contributions launched by the UNCCD in order to collect examples of good practices from UNCCD Parties, United Nations Agencies and other international organizations, Civil Society Organizations (CSOs) and researchers (Annex 2 contains a list of considered submissions). In order to ensure a geographical balance in the scope of good practices analysed, as well as a diversity of approaches, the study also relies on a review of good practices drawn from peer-reviewed literature and published case study reports from other regions. The practices presented in this chapter are often cross-cutting in nature and seek to address multiple dimensions of the migration-DLDD nexus at once. The chapter is divided into four sections that focus in turn on a specific dimension of the migration-DLDD nexus: land protection and restoration, decent employment, addressing pre-existing inequalities and migration-related interventions.

Achieving land degradation neutrality involves adopting measures that both avoid and reduce existing land degradation through sustainable land management and reverse degradation through the rehabilitation and restoration of degraded land (IPCC 2019, 31). Land rehabilitation has the potential to successfully reduce many of the negative impacts of land degradation on rural poverty – and hence on prospective forced migration – by restoring ecosystem functions, diversifying livelihoods, creating and improving employment opportunities, raising household incomes and reducing gender and social inequality (IPBES 2018, 353; Adams et al. 2016).

Given that the majority of people who migrate do so in search of better employment opportunities, making sustainable land management and ecosystem restoration compatible with the creation of dignified and attractive employment opportunities will be absolutely key for averting and minimizing forced migration connected to DLDD. Nearly 8 out of every 10 working poor people live in rural areas and more than 42 million new jobs are needed every year to meet the growing numbers of new entrants to the labour market (ILO 2012). However, the working conditions in rural areas – where most people affected by DLDD live – are often precarious, difficult and hazardous. This is because jobs are mostly informal, with no written contracts and little or no social protection (Deotti and Estruch 2016). In order to retain and attract rural youth who have become increasingly disillusioned with the prospect of working in rural areas, it is essential to improve the quality of jobs, especially for those least protected, poorly remunerated, and of low status (ILO 2017).

Restoration projects must address ecological, economic, and social needs, including community development and the well-being of the restoration work force (Higgs 1997). However, given the complexities of each context, the most socially and economically appropriate options should be determined by taking into account the specificities of the landscape as well as the needs of the communities who inhabit these landscapes (DellaSala et al. 2003). When appropriately designed and implemented, sustainable land management and restoration practices can offer great hopes; not only for the protection and rehabilitation of land, but also for the creation of dignified employment options for the rural poor, youth, and vulnerable groups. This in turn can help tackle the underlying and pre-existing inequalities which turn hazards into disasters and push people into forced migration.

Finally, measures linking sustainable land management and migration policy and practice have also proved to be of relevance to create positive opportunities. These innovative migration practices can benefit migrants at different stages of their journey: in communities of destination, in transit and when returning to areas of origin. They can also be positive for host communities who can benefit from migrants' engagement to adopt sustainable land management practices.

The good practices included in this section are illustrative of the need to address the DLDD drivers of migration from a multiplicity of perspectives, bringing together different expertise and communities of practice.

1. LAND PROTECTION AND RESTORATION

Examples of sustainable land management are varied and include, inter alia, agroecology (including agroforestry), conservation agriculture and forestry practices, crop and forest species diversity, appropriate crop and forest rotations, organic farming, integrated pest management, the conservation of pollinators, rain water harvesting, range and pasture management and precision agriculture systems (IPCC 2019, 31). According to estimates from the Global Partnership on Forest and Landscape Restoration, approximately 2 billion hectares worldwide (the size of South America) offer potential opportunities for restoration. Most of these areas are suited to 'mosaic restoration' which involves combining forests and trees with agriculture, waterways, protected areas and settlements (Besseau et al. 2018, 13). However, restoration options also depend on a great number of economic, political, social, cultural and technical factors (IPBES 2018, 445) that will together contribute to shaping migration decisions. In order to be successful, these interventions must be designed and implemented in a participatory manner that ensures both social and environmental co-benefits.

Supporting small-scale farmers and agroecological practices

Small-scale farmers make up the majority of the world's poor, yet they are also the main safeguards of soil and ecosystems. On a global scale, 85 per cent of farms are less than two hectares in size. This amounts to 1.5 billion smallholder farmers, primarily in Asia and Africa, who carry out 60 per cent of global agricultural activities and provide 80 per cent of food in developing countries (IPBES 2018, 372). Small scale farmers, producers, fisherfolk and other people working in rural areas play a leading role in ensuring food security, as they feed 70 per cent of the people in the world (Wolfenson 2013). However, many smallholder farmers are facing the combined challenge of increased imports and large-scale foreign land investments that have the potential to amass their land, put them out of business and degrade the environment (Vigil 2018, 2019). As a result, large numbers of smallholders worldwide experience processes of forced migration from their lands that unfold over multiple stages. This forced migration is often linked to agricultural and development policies that have favoured input-intensive agriculture and natural resource extraction and export, at the expense of traditional agrarian practices, local markets and producers. In order to retain the small plots of land they have, many families are often forced to turn to labour migration (Carte et al. 2019), which often exacerbates their vulnerabilities (Vigil 2019). This situation can be counterproductive in terms of addressing drivers of migration, and it can also represent an important environmental threat.

The 2019 IPCC report on climate change and land highlights that agroecology, including agroforestry, represents an important opportunity. Agroecological systems are integrated land-use systems that maintain species diversity, enhance agrobiodiversity, and improve ecological processes and the delivery of ecosystem services. Additionally, they contribute to strengthening local communities and enhance the recognition of the role and value of indigenous knowledge (IPCC 2019, Ch 5). Agroecological initiatives aim to transform industrial agriculture by transitioning away from fossil fuel-based production for export, which can produce not only great environmental benefits but also social ones (Altieri and Toledo 2011). With regards to employment creation, agroecology contributes to rural development and land conservation, as it is relatively labour intensive and is most effectively practiced on relatively small plots of land. This in turn can alleviate the pressures that lead to forced out-migration in search of employment. Many smallholder farmers in developing countries already adopt sustainable and resource efficient production practices (Godfray et al. 2010; Bossio et al. 2010). Additionally, studies indicate that these smallholder farms tend to be more productive and secure higher yields on a per unit area basis, as opposed to large-scale intensive cultivation systems. This is mostly due to a higher resource and labour use efficiency, but is also linked to higher crop diversity, intercropping and mixed farming (IPBES 2018, 372). Moving away from a system principally based on industrial food systems would thus likely contribute to protecting land, lessen adverse impacts of climate change and improve livelihoods.

Benin: Facilitating agroecological transitions

In Benin, the cotton sector plays a key role in agricultural development and remains the main source of income for a large community of farmers. However, inadequate techniques have led to land degradation and crop failure. This has reduced the attractiveness of agricultural livelihoods for rural youth who are often migrating in search of alternative livelihood opportunities. The project “Projet d’appui à la Transition Agro-écologique dans les Zones Cotonnières du Bénin – TAZCO”, funded by the French Development Agency and initiated in 2017, aims to support farmers in northern Benin to adopt more sustainable cotton farming practices that can help increase their long-term incomes as well as environmental sustainability (see project 1 in Annex 2). The project seeks to restore degraded soils and preserve the natural resources upon which small-scale family farmers are dependent, reinforce the resilience of the sector to climate change and improve the working conditions of farmers. Importantly, it adopts sustainable land management techniques by integrating pastoralism and agriculture. The target populations are: i) youth from cotton farms who lack the economic means to combat desertification and to benefit from farm modernization; ii) unemployed youth who might seek to migrate to find other opportunities; and iii) educated youth in search of employment opportunities. In total, 89 farms have benefited from integrated management of agriculture and livestock over a cumulated area of 22.5 hectares. With respect to the integrated management of soil fertility, 586 parcels covering an area of 146.5 hectares have benefited from the introduction of agroecological techniques. Sustainable techniques for water and soil conservation as well as agroforestry, coupled with agricultural conservation, have allowed the replanting of parcels and the protection of additional parcels. Thanks to the project, soil erosion has considerably diminished, production has increased, conflicts between farmers and herders has decreased, and the youth has regained an interest in cotton production. Although it is still too early to assess a potential effect on migration, the increase in productivity might make cotton farming more attractive and higher employment opportunities can be expected to play an important role in decreasing out-migration of the rural youth from the area. The initiative is planned to be scaled up to other areas from 2020 onwards (see project 1 in Annex 2).

Rwanda: Supporting integrated agricultural practices

More than 80 per cent of the population in Rwanda works in agriculture; but rural poverty, food insecurity and out-migration are common in a country where many families are unable to produce enough food for their own sustenance (Oakland Institute n.d.). The 1994 genocide displaced millions of people and left 14 per cent of the population landless. One of the many consequences of the genocide has been the decline in livestock holding. Between 1990 and 2001, cattle stocks declined by 11 per cent, goats by 37 per cent, and sheep by 66 per cent. This decrease had grave consequences on households’ nutrition levels and on soil fertility. While the former can be linked to a decreased availability of protein, the latter can be attributed to decreased manure. As a combined result of socio-economic, political and environmental hardships, productivity has waned and over half of Rwandan farmland is affected by soil erosion and nutrient losses. Various non-governmental organizations (NGOs) and government programmes are promoting integrated livestock systems throughout the African continent to restore degraded soil fertility, improve local diets and generate revenue for smallholder farmers. These integrated systems combine livestock, gardening and fodder production, with proven agroecological and economic benefits. Fodder species such as *Macuna* (velvet bean), *Cajanus cajan* (pigeon pea), and *Sesbania magrantha* fix atmospheric nitrogen in the soil. Moreover, decomposing fodder branches improve soil fertility and boost its ability to retain nutrients. Fodder also provides nutrient-rich protein for livestock and can be used to maintain soil fertility.

An example of such initiatives is the “Support Project for the Strategic Transformation of Agriculture” (PAPSTA); a USD 20 million dollars initiative funded by the International Fund for Agricultural Development (IFAD) and the United Kingdom Department for International Development (DFID) from 2005 to 2013. The programme focused on improving existing farming practices in Rwanda, privileging livestock production for food - milk and meat - and manure to sustain organic farming in kitchen gardens and small plots. Under integrated livestock systems, basic needs in vegetable and milk were met on small landholdings, and surpluses sold on the local market. In 2007 and 2008, 2,729 farmers, 47 per cent of them women, were

trained in organic vegetable production and livestock husbandry. Farmers reported five-fold yield increases and considered that the adoption of agroforestry techniques greatly improved soil fertility. By 2008, nearly 10,000 hectares of degraded land were rehabilitated. This was 15 times more land than was expected in the project's original plan. By improving livelihood opportunities for local populations, the project raised hope for local communities to be able to build a future at home instead of being forced to migrate (Oakland Institute, n.d.).

Lebanon: Supporting traditional coping strategies and agricultural terracing

Stone terraces are a key feature of traditional Mediterranean agro-silvo-pastoral ecosystems. Agricultural terracing was the main strategy that allowed locals to grow crops in the rugged mountainous landscapes of many Lebanese mountain villages. However, during the civil war, many people were forced to migrate and this resulted in the collapse of entire agricultural communities. Today, farmers are exposed to decreased rainfall and increased temperatures which are affecting their ability to generate sufficient food and income. As a result of diminishing incomes, many plots of lands are abandoned and farmers often lose interest in traditional livelihood options. Land abandonment is not only linked to migration, but also to land impoverishment as invasive species spread. As terraces collapse, soil loss can occur, especially during heavy rainfall episodes which are common in the Lebanese mountains. This further weakens the landscape and contributes to land degradation. As a result, farmers living in vulnerable areas are increasingly forced to look for employment elsewhere.

In order to address this situation, the Forest and Landscape Restoration Mechanism of the Food and Agricultural Organization of the United Nations (FAO) implemented pilot initiatives to rehabilitate stone terraces in several areas of Lebanon: three sites in the Qadisha Valley (a United Nations Educational, Scientific and Cultural Organization - UNESCO - World Heritage Site); seven sites in the Shouf Biosphere Reserve (SBR - a UNESCO Man and Biosphere Reserve and the largest nature reserve of Lebanon); and in one site in the village of Mhaidthe (Rashaya district) (see project 2 in Annex 2). Lands with fully or partially collapsed stone terraces were selected and the farmers/landowners were included in decision-making throughout the restoration process, from planning to implementation. Damaged walls were restored and the farmers were supported to select appropriate crops suited to the landscape and climatic conditions. In Qadisha, the project favoured traditional fruit crop varieties and the aromatic shrub *Origanum syriacum*, whereas in the SBR the restoration process was based on agroecological processes. The rehabilitation of terraces proved to be a successful model that has potential for replication across a diversity of Lebanese landscapes. Land restoration also supported the preservation of Lebanese cultural heritage, promoted the use of more sustainable approaches to agriculture and secured local livelihoods. The model presented in this project can be enhanced by providing less costly alternatives to the current stone terraces rehabilitation. With lower costs, more landowners could be enticed to embark on this restoration journey. This would thus create more job opportunities for both restoration workers involved in stone terrace rehabilitation and agricultural workers, who will have more opportunities to work as more lands become available for cultivation. This can create new incentives for populations to restore their traditional agricultural systems and make a living through this process, whilst decreasing the need for forced out-migration.

Lebanon: Encouraging a multi-level stakeholders approach to sustainable land management

Land degradation and loss of biodiversity in the Qaraoun catchment of Lebanon have reached critical levels, affecting hundreds of families who depend on the catchment's natural resources to secure their income and livelihoods. Considerable parts of land are at moderate or high risk of desertification: 97.4 per cent in Rachaya, 90.4 per cent in West Bekaa, 83.3 per cent in Zahle and 73.2 per cent in Baalbek. The high desertification rate is due to various interrelated and complex causes, including deforestation from forest fires, excessive firewood collection and land use changes, overstocking and overgrazing of rangelands and pastures, inappropriate use of pesticides and fertilizers as well as unplanned infrastructure development,

such as urban settlements. About 88 per cent of Lebanon's population already live in urban areas, a trend that has been increasing over the past decades due to urbanization and rural to urban migration. Although the exact numbers of migrants in the Qaraoun catchment area are unknown, land degradation and the pressure on ecosystems are likely to have a negative effect on the population's economic welfare, reducing income generation opportunities especially for the younger generations, and thus encouraging migration to urban areas. On the other hand, the influx of refugees, mostly from Syria, adds another layer of complexity. At the heart of these challenges is the lack of an effective and integrated approach to land use management in Lebanon. Although policies and plans have been adopted, they have a narrow sectoral focus and do not specifically take land degradation into account. In addition, responsibilities for implementation are fragmented which can lead to a lack of efficiency (see project 3 in Annex 2).

The development of an effective land use management plan, as well as alternative livelihoods options to sustain the current population are key factors to improve livelihoods of the rural poor, avoid further degradation of the land and lessen related migration pressures. To address both the drivers and effects of land degradation in the Qaraoun catchment, the Government of Lebanon, in partnership with the United Nations Development Programme (UNDP), is currently implementing a sustainable land management project. The implementation takes into account three levels of intervention: national, district and local. At the local level, interventions include the identification of degraded forests, rangelands, and cropland for improved management and rehabilitation, with a view to restore vital ecosystems and prevent conflicts between land users. At this level, the project also supports existing livelihoods, namely forestry, livestock management and agriculture; and develops and tests new business opportunities identified through the project, such as beekeeping, rural tourism, dried fruits, keshek (a high-value local goat dairy product) and grape molasses. Ultimately, the implementation of the project is expected to increase the resilience of local populations, thus decreasing the pressure to migrate from rural to urban areas in search of better economic opportunities; while simultaneously introducing more sustainable and eco-friendly agricultural practices (see project 3 in Annex 2).

Developing community-based forest management

Land restoration and rehabilitation efforts are more effective when policies support local management of natural resources, while strengthening cooperation between actors and institutions at the international level (IPCC 2019). In many cases, evolution of conservation and restoration policies beyond traditional top-down state policies has led to a range of governance regimes and new institutional arrangements, with a transfer of responsibilities towards local governments and non-state actors (Agrawal 2008). Community-based forest management has long proven to be one of the most effective ways to improve the livelihoods of local communities, conserve biodiversity and mitigate climate change (Putraditama et al. 2019). In Nepal for example, deforestation resulted from inadequate forestry policies coupled with agricultural expansion, commercial and household wood extraction and inadequate infrastructure construction. However, changes in forestry policies that focused on greater decentralization of forest control towards local communities have led to great progress in terms of forests' protection and restoration (Agrawal and Ostrom 2001). The 1993 Forest Act created 17,000 autonomous community forest user groups, with rights to manage and control access to the forests. Since then, the national forest cover has increased by a fifth, which is one of the fastest rates of forest recovery in the world (Niraula et al. 2013, 20–21). Activities in restored forests provide a source of income for communities, hence contributing to averting and minimizing forced migration due to environmental and economic factors (Pearce 2017). This example highlights that giving exclusive rights to local communities to regulate forest-related activities can bring great benefits, contribute to poverty reduction and environmental conservation, empower populations to protect their resources and ultimately contribute to addressing DLDD drivers of migration. However, without addressing the adverse impacts of agricultural expansion and industrial plantation linked to large industrial companies, community forestry alone will not be able to reduce the overall rate of forest destruction and provide adequate conditions to address forced migration.

2. DECENT EMPLOYMENT

In addition to protecting and restoring land, which in itself can provide livelihood opportunities and contribute to averting and minimizing forced migration, effective measures should prioritize the creation of sufficient numbers of quality jobs. Although policies to safeguard employment have generally been prioritized by governments, the creation of new labour opportunities in rural areas of developing countries can lead to important benefits, since underemployment and demographic growth remain high in many developing countries where industry and services sectors are unable to absorb excess labour. Although many countries have experienced sustained economic growth, this has often been jobless growth. While urban-based manufacturing services are expected to absorb an increasing amount of the labour force, as witnessed recently in Asia, rural-based activities still need to generate high numbers of quality jobs to ensure that no one is left behind (Oya 2019, 12).

To be attractive, these jobs must be decent. Decent work is defined by the International Labour Organization (ILO) as work that is productive and delivers a fair income, security in the workplace and social protection for families; offers prospects for personal development and social integration; allows people the freedom to express their concerns, organize and participate in the decisions that affect their lives; and provides equality of opportunity and treatment for all women and men (ILO 2013).

Morocco and Tunisia: Reviving oases and enhancing livelihoods

Reviving oases is crucial to fighting desertification, and can also provide new and more attractive livelihoods to local populations who have increasingly looked for alternative opportunities in urban areas or in other countries. There are more than 180 oases in the southern provinces of Guelmim, Assa-Zag and Tata in Morocco. They are mostly located in mountainous and deserted areas which are also prone to social tensions. Oases account for more than 100,000 hectares of land in that region and are important centres of economic activity, as well as being of great social and ecological importance. However, they are suffering today from land degradation mainly linked to their overexploitation. This has in turn led to desertification, loss of tree cover and agricultural productivity and an abandonment of the oases. With a large youth population aged between 16 and 24 years old, unemployment and out-migration have become a major challenge.

The project “Oasis Sud” in Morocco was able to decrease both social and environmental vulnerabilities (see project 4 in Annex 2). The project was developed through a bottom-up consultation process of municipal planning committees that allowed for the identification of main priorities, constraints and needs of local populations. The project involved sustainable water management, with a focus on traditional practices of water allocation. New and alternative livelihoods for local communities, specifically targeting the youth and women, were introduced through the development of sustainable tourism. Women empowerment and decision-making were promoted through the creation of a new Commission on Parity and Equality of Chances, which led to 12 women winning communal elections in 2009. The programme also helped increase women’s economic participation and their access to education and childcare. By 2014, the project had created an estimated 5,500 jobs, 2,000 of which were for women. Thus, the programme generated a wide range of positive benefits, decreasing land vulnerability to degradation and desertification, improving sustainable water resource management and improving livelihood options (see project 4 in Annex 2).

In Tunisia, where oases account for more than 40,000 hectares of agricultural land and are home to around 10 per cent of the population, the lack of employment opportunities for youth as well as increased environmental degradation are also exacerbating the abandonment of these areas. Land degradation and a decrease in the water quality of the oases are aggravated by the adverse effects of climate change, such as temperature rise and changing rainfall patterns. In order to address this situation, the Government of Tunisia adopted a strategy for the sustainable development of these oases which focused on reviving the oases’ traditions and jobs and managing natural resources more sustainably. On the environmental side, soil rehabilitation initiatives created new and alternative livelihood options, in particular for youth and women,

such as the production of date honey and date jams. As of November 2018, approximately 893 hectares of land were sustainably managed through the project, and 735 jobs were created (see project 5 in Annex 2). Improvement in sustainable land management coupled with a focus on employment allow the creation of alternative livelihoods in these landscapes. Such approaches can contribute to addressing some of the drivers of migration in the context of the degradation of oases.

Brazil: Protecting biodiversity and livelihoods in the Atlantic Forest

The Atlantic Forest is one of the world's top five biodiversity hotspots and the largest biosphere reserve designated by UNESCO. In Brazil alone, more than 130 million people live in the Atlantic Forest. However, deforestation and unsustainable agricultural practices have led to the disappearance of 88 per cent of the original forest. In 2009, the Atlantic Forest Restoration Pact (AFRP) was initiated to coordinate restoration efforts; it is a regional, multi-stakeholder platform comprising various NGOs, research institutions, the private sector and government agencies (Brancalion et al. 2016). The aim of the Pact is to restore 15 million hectares of tropical forest by 2050 in order to prevent biodiversity loss, provide ecosystem services for over 60 per cent of the Brazilian population living in the area, generate thousands of green jobs (defined as decent jobs that contribute to protecting and restoring the environment), increase income levels and comply with the national forest code (Brancalion et al. 2016, 16). Employment is one of the main indicators included in the monitoring protocol adopted by more than 80 institutions. This indicator is measured in terms of not only the number of jobs created, but also on the provision of health insurance, training programmes and compliance with labour legislation (Melo et al. 2013, 399). Through multi-stakeholders engagement, the AFRP helped mainstream small-scale and isolated restoration efforts into a large-scale programme. Although most large-scale forest and landscape restoration programmes are designed and promoted by large international organizations, decentralized government arrangements and local stakeholders' engagement in decision-making processes are also important. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) recommends that the governance innovations achieved in the AFRP be extended beyond Brazil (Brancalion et al. 2016, 17; IPBES 2018, 453).

Indonesia: Restoring degraded lands to ensure sustainable livelihoods

The GLACIER (Green Livelihood Access for Central Kalimantan's Inclusive Environmental Response to Climate Change) project was implemented in 2012-2013 by ILO and the United Nations Development Programme (UNDP). It was a REDD+ (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) project seeking to rehabilitate degraded land, restore forest and peatland and improve community livelihoods in Central Kalimantan, Indonesia. The project's main objective was to improve access to sustainable livelihoods for local communities, notably through participatory approaches taking into account local conditions and resources, including techniques linked to peatland regeneration. The main beneficiaries of the projects were women, youth and people with disabilities. The project exceeded expectations in meeting its targets and reforestation and agroforestry activities directly contributed to the rehabilitation and revitalization of degraded land. These activities benefited the livelihoods of local communities and provided alternative sustainable livelihood options, which in turn have the potential to reduce forced migration in search of better opportunities (see project 6 in Annex 2).

3. ADDRESSING PRE-EXISTING INEQUALITIES

Today, there is a very scarce availability of 'idle' land and much of the land that is perceived as underutilized is claimed under customary or traditional land ownership rights that are not always acknowledged. To be successful, land restoration efforts need to respond to local customary land needs and secure the rights of the most vulnerable. As the latest IPCC report on climate change and land highlights, large-scale implementation of Bioenergy with Carbon Capture and Storage (BECCS) and large-scale afforestation could increase pressures on land and create high risks for food security (IPCC 2019). When they are not aligned with local people's rights and their needs to access natural resources, large-scale reforestation and rehabilitation efforts can pose additional social and environmental threats and aggravate conflict over natural resources (Marino and Ribot 2012; Vigil 2018). Consequently, and in order to successfully address both environmental stress and forced migration, reforestation and rehabilitation measures must aim to protect the environment, but also the local populations that rely on these natural resources.

Protecting and recognizing land rights, including for indigenous peoples and local communities

Land rights determine who is allowed to use what resources, in what ways, for how long and under what conditions (Larson and Dahal 2012). Insecure land tenure impacts the ability of people, communities and organizations to make changes to land that could advance both sustainable land management and climate change adaptation and mitigation. A limited recognition of customary access to land can result in increased vulnerability and decreased adaptive capacity; these factors also shape dynamics of forced migration. Difficulties to secure legitimate rights for indigenous peoples, women and local communities to access the resources they depend on for their livelihoods seriously hamper the conservation of vital natural resources (Larson and Springer 2016), as well as options to live decent lives at home.

Throughout the world, many indigenous peoples and local communities struggle and lose their lives to protect and assert ownership of land and associated natural resources, in a context where land encroachment linked to commercial interests, such as agribusiness, dams, logging and mining, is often prevalent (Drbohlav and Hejkrlik 2017; Fraser 2019). Although there are examples of traditional institutions and local customs that historically provide indigenous peoples and local communities with tenure security, growing threats and a lack of legal recognition can lead to insecurity and loss of land. For example, in Africa, an estimated 79 per cent of the land is held by local communities; yet only 27 per cent of land ownership is recognized under national laws (Mowat and Veit 2019). The lack of recognised rights – together with the lack of implementation of the protection of these rights – can often lead to land grabs that result in expulsion and forced migration (Chatty and Colchester 2002; Vigil 2018, 2019). However, as highlighted in the latest IPCC report, indigenous peoples and local communities play a fundamental role in the protection of forests and land (IPCC 2019). Indigenous peoples, together with local communities around the world, have crucial context-specific knowledge and practices and are at the core of forest and ecosystem restoration and food security (Altieri 2002, 2004; IPBES 2018). Securing land rights is also critical from a gender perspective, as land rights are linked to higher decision-making power in the household and an increase in income (Larson and Springer 2016). Sound land policies, including recognition of customary tenure, community mapping, redistribution, decentralization and co-management, can therefore provide adaptive options for people to conserve and restore their lands (IPCC 2019, 31). This in turn can decrease forced migration by providing options to remain *in situ*.

The Philippines: Supporting community initiatives in the Northern Mindanao

Indigenous peoples typically migrate to cities as a result of loss of livelihoods, lack of access to social services and community conflicts. However, indigenous peoples who migrate to urban areas often face discrimination, difficulties to secure employment and limited access to social services and housing. As a result, “many young indigenous peoples find themselves in ‘no man’s land’ between the urban societies that do not fully accept them and their indigenous communities that often fail to offer them the opportunities they need and desire” (UN Permanent Forum on Indigenous Issues, n.d.).

High levels of poverty are experienced in the Northern Mindanao community of the Philippines, which are linked to people’s landlessness, lack of assets and a lack of social infrastructure. Unemployment, illiteracy and high rates of poverty are much more pronounced among upland populations who lack basic services and have limited access to fundamental resources, such as forests and pasture. A new legal framework allows for the issuance of titles to ancestral lands to indigenous peoples, but it has not yet been widely implemented. In this context, a six-year project (2003-2009) supported by IFAD aimed to reduce vulnerability and enhance food security for about 58,500 low-income households (310,000 people) living in Northern Mindanao. The target group comprised poor and disenfranchised groups, including indigenous peoples, fisherfolk, beneficiaries of agrarian reforms, landless workers and upland dwellers. The project adopted a participatory approach and supported the development of community infrastructure. Importantly, the project focused on increasing the representation of indigenous peoples in local councils and improving the security of land rights. As a result, land rights were secured in 14 indigenous peoples’ areas covering 299,980 hectares, which benefitted the four major indigenous groups in the region. Improved land tenure status, additional livelihood activities as well as social and resource protection activities contributed to improving livelihoods, food security and stability for an estimated 59,507 households (96 per cent of the target) in the project area. Additionally, the project was evaluated positively in terms of promoting and strengthening community institutions and conserving and protecting the natural resources base (IFAD 2012). Although the main focus of this project was not to address forced migration per se, the improvement in livelihoods options and access to resources achieved by the project could have contributed to averting and minimizing forced migration.

Madagascar: Protecting and rehabilitating land to increase food security

In the southern region of Androy, Madagascar, drought pushed many people to migrate towards regions where forests and land are available. The effects of drought were worsened by food insecurity, tenure insecurity, structural socio-economic problems and a lack of alternative opportunities (Canavesio 2015). Boeny, one of the most productive rice regions in the country, is an area of destination. However, land degradation in the area has been compounded by the arrivals of migrants, adding to other existing pressures. To address this issue, a project led by the German Development Agency (Deutsche Gesellschaft für Internationale Zusammenarbeit – GIZ – GmbH) was developed in Boeny, under the ‘One World, No Hunger’ initiative. Entitled “Protection and Rehabilitation of Land to Increase Food Security”, the project focused on achieving tenure security, land rehabilitation and reversing soil erosion (see project 7 in Annex 2). To achieve tenure security, the project established an inventory of land occupation, including of private and communal parcels not yet registered, in order to define securitization of land in line with the needs of local populations. Although the initiative is still in its pilot phase in Madagascar, GIZ has already implemented ‘One World, No Hunger’ initiatives in several other parts of the world including Benin, Burkina Faso, Ethiopia, India and Kenya. Expansion to several other countries is under consideration. The initiative promotes a sustainable approach to land use to address structural causes of hunger, contribute to rural development and create ways out of poverty through sustainable agriculture. As a result, it aims to increase prosperity in rural areas, promote a sustainable use of natural resources and create opportunities, particularly for youth, through the creation of green innovation centres (BMZ 2017). By focusing simultaneously on these multiple objectives, the initiative has the potential to reduce pressures that might lead to forced migration as well as provide opportunities for migrants who already moved in connection to DLDD drivers.

Enhancing women's empowerment and social equality through land restoration

Deeply entrenched patriarchal structures often hamper women's participation in decision-making over land management and restoration. Women and men have equal rights to use and control land in only 37 per cent of developing and developed countries, even when legal frameworks formally recognise equality (IPCC 2019). Despite evidence that shows the differentiated impacts of environmental degradation on women and men, gender issues have only been marginally addressed in land restoration and rehabilitation efforts (IPCC 2019, Ch 3, 36). A deliberate focus on gender and social equity can help achieve more inclusive co-benefits that empower the most vulnerable and avoid forced migration in the context of DLDD (IPCC 2019, Ch 7, 69). A focus on gender and social equity is also necessary when considering the reintegration of previously displaced populations.

Senegal: Rural women's associations and sustainable agriculture

Ongoing conflict in the region of Casamance in southern Senegal is linked to community tensions, destruction of villages, displacement of tens of thousands of people and the decline of what was once a vibrant local economy. Since the 2004 peace agreement, many women who returned to their villages have developed farmers' organizations and networks to capitalise on new opportunities, such as their legal right to own land, a decentralization process that provides more decision-making power and resources to rural communities and international funding sources aiming at improving infrastructure and increasing connection to markets. In order to enhance these opportunities, the New Field Foundation developed an innovative collaborative programme between 2006 and 2012 that awarded community grants to rural women's groups to directly support farming activities, the use of sustainable technologies and knowledge sharing. These grants allowed women to purchase seeds, livestock and basic farming equipment, and to increase the area of land collectively farmed from a few hectares to several hundred hectares. Importantly, beneficiaries were able to secure official titles to land to ensure registered group ownership for collective farming activities.

Additionally, new investments in agricultural technologies lowered women's burden in terms of labour, allowing them to derive profit from farming without creating unsustainable additional time pressure on their daily lives. Such equipment included solar pumps, multi-functional platforms and rice hullers and these techniques allowed greater crop diversification for local consumption. Moreover, the project enhanced women's decision-making power by supporting women running for election in local institutions and district councils that determine how agricultural resources are allocated and formulate local agricultural policies. An evaluation of the project published in 2014, surveying 379 female grant beneficiaries, showed that awarding USD 5,000 dollars a year to women's community organizations, for at least two years, improved economic and household well-being. Increased access to education for children, health and food benefits were also significant outcomes (Oakland Institute n.d.). All these factors contributed concomitantly to a more sustainable use of land and to the reduction of pre-existing vulnerabilities, which are often at the root of forced migration out of rural areas in countries such as Senegal.

Kenya: The Green Belt Movement

The Green Belt Movement (GBM) is an environmental organization that empowers communities, particularly women, to conserve the environment and improve livelihoods, reducing drivers of forced migration in the process. The movement was initiated in 1977 by Professor Wangari Maathai under the auspices of the National Council of Women of Kenya (NCWK), to respond to the needs of rural Kenyan women who reported that their streams were drying up, their food supply was less secure and that they had to walk increasingly long distances to obtain firewood for fuel and fencing. The aims of the GBM are to promote tree planting and agroforestry amongst small-scale farmers, create employment for people with disabilities and school graduates in their own communities, generate income for women, facilitate education on the interrelations between the environment and other issues, such as food, production and health, curb

forced rural migration to urban areas, promote environmental education and promote soil conservation (Michaelson 1994). The GBM encourages women to work together to grow seedlings and plant trees for soil binding and firewood and store rainwater (GBM 2019). Today the movement has grown and developed but it still uses tree planting as an entry point for better environmental management, empowerment of local communities and improvement of livelihoods. The movement is often considered a great success precisely because it concurrently promotes empowerment of women and the most vulnerable, protection of the environment and creation of thousands of jobs. Professor Wangari Maathai received the Nobel Peace Prize in 2004 as a result of her contribution to “sustainable development, democracy and peace” (GBM 2019). This inspirational movement demonstrates that when communities and grassroots organizations are supported and empowered, they can achieve multiple-co benefits that can have deep and long-lasting transformative effects.

4. MIGRATION-RELATED INTERVENTIONS

Although it is critical to develop measures that reduce forced migration, it is important to note that migration is not a phenomenon that can, or should, be avoided. It is widely acknowledged that migration can bring benefits to individuals, as well as communities of origin and destination. The practices presented in the previous sections can improve living conditions and provide sustainable employment opportunities for those who desire to stay in their places of origin but are unable to do so. However, it is important to underline that, even when successful adaptation to environmental stressors does take place *in situ*, this does not necessarily mean that migration will or should stop. Very often the opposite happens. The practices presented in the following section demonstrate that it is possible for migrants to contribute to sustainable land management in their areas of destination, but also of origin; and that migration can represent an adaptation strategy to the adverse effects of DLDD. It is therefore important to acknowledge that alongside policy efforts to address DLDD drivers of forced migration, it is critical to promote the rights of people on the move, - including land-related rights - and provide migrants with opportunities that maximize benefits for all.

Ethiopia: Enhancing adaptive migration through land restoration

Data from the project entitled “Land degradation, land rehabilitation and out-migration from the northern Ethiopian highlands” implemented by the Helmholtz Centre for Environmental Research reveals that migration patterns were reshaped as a result of measures to deal with DLDD, but were not reduced (see project 8 in Annex 2). The project also found that improved livelihoods, regardless of the underlying reasons for improvement, changed the type of migration rather than minimized it. Improved livelihoods helped farmers to invest in migration as a household strategy to earn additional income. During drought episodes, short term migration to nearby destinations represented an important coping strategy to respond to the most urgent needs of subsistence farmers, such as to cover food gaps. This additional income was often invested in setting up small businesses in the area of origin. This example reveals that improved livelihoods can help turn migration from a coping strategy into an adaptation strategy; but also that migration can contribute to stabilizing local populations, including by encouraging local investments.

Niger: Supporting migrant reintegration through land restoration

The International Organization for Migration (IOM) is implementing a community stabilization project supported by the UNCCD and financed by the Italian Agency for Development Cooperation, under the umbrella of the Sustainability, Stability and Security Initiative (3S Initiative), an intergovernmental action launched by Morocco and Senegal to address the root causes of instability in Africa. The project focuses on migrant reintegration and on countering radicalization in the region through the creation of jobs related to the restoration of degraded lands in Agadez, Niger. Agadez was chosen as a ‘demonstration site’ for creating the first land-based jobs under the 3S Initiative due to the region’s location and its migration characteristics. Niger is one of the poorest countries in the world and its economy is based on agriculture. More than 100,000 hectares of arable lands are lost each year due to desertification. The Agadez region is one of

the most affected by desertification, and its population has been surviving for years on economic activities related to migration, such as providing catering, transport, and accommodation for migrants in transit. However, increasingly strict immigration policies have left inhabitants with few options to migrate in a safe, orderly and regular manner.

Since December 2018, migrants staying at IOM's transit centre have been undertaking training in sustainable agriculture. Migrants also have access to a range of services including accommodation, medical care, preparation of travel documents, psychosocial support, recreational activities and vocational trainings in business management. Agricultural training takes place on plots of land allocated by the city of Agadez. So far, 200 hectares of land have been identified as suitable for restoration, and this restoration has the potential to lead to the creation of green jobs for unemployed youth, former smugglers and returning migrants. Five hundred migrants have already been trained in SLM techniques whilst residing at the IOM transit centre and awaiting return to their countries of origin, according to information from the IOM Country Office in Niger. The project seeks to provide returning migrants with appropriate training in agricultural practices in order to create opportunities for better livelihoods when they return to their places of origin. This in turn has the potential to reduce the necessity to embark on dangerous migration journeys and promote opportunities for a sustainable reintegration of migrants in their countries of origin, whilst delivering land restoration benefits.

Burkina Faso, Niger and Senegal: Supporting diaspora's investments in sustainable land management in migration-prone areas

A project entitled "Promoting sustainable land management in migration-prone areas through innovative financing mechanisms" was jointly implemented by IOM and the UNCCD in West Africa, with the financial support of the Italian Agency for Development Cooperation. The project sought to contribute to the prevention of land degradation as well as to the restoration and rehabilitation of degraded land by increasing investments from diaspora communities in sustainable land management in migration-prone areas. The project targeted three countries of origin (Burkina Faso, Niger and Senegal), as well as one country of destination (Italy). Several workshops were organized and policy analysis was conducted in order to define and make available opportunities for diaspora to contribute to sustainable land management in their countries of origin, especially in the regions where people are at risk of forced migration. This activity highlighted that with relevant policies, there are potential opportunities for migrant communities abroad to be involved in sustainable land management practices and contribute concretely to both the landscape and community wellbeing in places of origin.

Benin: Protecting pastoralist mobility

Pastoralism represents one of the most resource-based adaptive strategies in developing countries. However, pastoralism has become increasingly constrained in some contexts because of weakened traditional governance over communal natural resources, restricted mobility, land fragmentation, sedentarization, increased barriers to movement and changes in agricultural production methods. Pastoralists are increasingly vulnerable to droughts and other shocks; this is often linked to inadequate policies and investments. Pastoralists are often ethnic minorities and are commonly amongst those most politically and economically marginalized, with the least access to resources such as land, water, pasture and basic services, including health and education. In addition, the value of livestock production tends to be grossly underestimated in official statistics. This means that investment in this sector is often not considered attractive (FAO 2011).

However, with adequate support, an environmentally sustainable use of resources by pastoralists is possible, as this community only uses resources seasonally and soil fertility tends to benefit from manure produced by their animals. However, pastoralists have to engage in continuous negotiations with other resource users in order to adopt sustainable arrangements. This is why strengthening the institutions that support negotiations over rights of access to pasture and water is an important tool to secure pastoral mobility (FAO 2011). For example, Benin hosts every year migrant pastoralists originating from bordering areas in

Burkina Faso, Niger and Nigeria. Public sector initiatives supported by development partners are underway to ensure a participatory approach in resource management that involves both local communities and transhumant pastoralists (Alidou 2016). In that context, pastoralists' resilience to drought and adaptive capacity should also represent a policy priority (IOM et al. 2019).

Uganda: Facilitating access to land for refugees and other migrants

Securing access to land for local communities usually contributes to sustainable land management and poverty reduction. Equally important is to ensure the facilitation of access to land for migrants and refugees. When land rights are provided to migrants, sustainable land management can be enhanced. For example, Uganda hosts refugees from Rwanda, Burundi and the Democratic Republic of the Congo. In 2006, the Government adopted a progressive Refugee Act that guarantees certain rights to refugee populations. These include the right to work and freedom of movement, but also property rights and access to land to support independent livelihood options. An important outcome of this policy has been the adoption of sustainable land management practices introduced by Rwandan refugees. For example, in the Kagyera village of the Kabale district where more than half of the population are immigrants or refugees, communities have introduced a wide range of sustainable practices such as grass strips on terraces, water channels in valleys, check dams and tree planting. Additionally, refugees from Rwanda have introduced sustainable practices that originate from their country, such as growing climbing trees on bench terraces. Given the positive impacts of these practices, other community members have replicated them. This case shows that if governments invest in welcoming migrants and providing them with access to land and social services, migrants have the potential to generate positive impacts on land management in host regions. Supportive policies are therefore key to harness the benefits of migration for sustainable land management (Bachmann et al. 2019, 54–56).

CONCLUSION

Poor and marginalized people often bear the brunt of the adverse impacts of DLDD. At the same time, drylands and rural areas are home to a disproportionate share of the world's most vulnerable populations. Although many different sustainable land management and restorations options exist, their success is highly dependent on local socio-economic and political conditions. As a result, there is no 'one-size-fits-all' solution to improve the livelihoods of those most vulnerable, and hence contribute to diminishing forced migration. Sustainable land management and restoration options need to be finely attuned to the local contexts in which they are to be implemented, in order to avoid potential trade-offs between global benefits - for example increased carbon capture and storage,- and local impacts such as the forced migration of those who depend on forests and land for their livelihoods. Avoiding these types of socio-ecological trade-offs calls for systematic participatory approaches in the design and implementation of diverse measures.

While these will remain context specific, the review of good practices analysed in this section allows to underline certain characteristic that will usually be applicable to most contexts and that should enable positive socio-ecological co-benefits that will contribute to averting and minimizing forced migration.

Successful interventions share three characteristics:

- They protect and restore fragile ecosystems through participatory approaches;
- They create abundant and dignified livelihood and employment opportunities; and
- They tackle pre-existing vulnerabilities and inequalities.

Interventions that are usually best able to achieve these aims concurrently present the following characteristics:

- They strive to secure land rights and access to natural resources for those most vulnerable;
- They are gender sensitive and empower the most marginalized;
- They support local knowledge;
- They reinforce local institutional capacities;
- They take into account specific local migration dynamics.

PART III

POLICY OVERVIEW AND RECOMMENDATIONS



Haiti, 2017. Climate change and deforestation dramatically reduced the farmland in the Haitian countryside and led to migration into urban areas contributing to overpopulation and development of slums areas.
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Policy discussions related to environmental change and its impacts on migration have intensified in recent years; and a number of important intergovernmental policy processes at global and regional levels have now formally integrated issues related to environmental migration in their work, including DLDD. This reflects the relevance of environmental migration issues for both developed and developing states and their increasing political will to develop policy and programmes that address these complex challenges (Traore Chazalnoel and Ionesco 2018a). It is of utmost importance that global policy discussions integrate the realities observed on the ground, and vice versa, that initiatives at the local, national and regional levels take into account the outcomes of policy discussions at the international level. The following section presents a short and non-exhaustive overview of some of the main policy discussions of relevance that could be leveraged to address the DLDD drivers of migration.

OVERVIEW OF SELECTED RELEVANT POLICY PROCESSES

The Global Compact for Safe, Orderly and Regular Migration

Following the New York Declaration for Refugees and Migrants in 2016, United Nations Member States, for the first time in their history, committed to develop and negotiate a Global Compact for Safe, Orderly and Regular Migration (GCM). The GCM was adopted in December 2018. It is a non-binding cooperation framework that articulates a common set of commitments for states to respond to challenges and leverage opportunities of contemporary international migration. The GCM also formulates provisions for implementation, follow up and review. The GCM represents a turning point in global environmental migration policy as it articulates a wide and comprehensive understanding of these challenges. The text acknowledges the multi-causality of migration as environmental drivers interact with social, political, economic and demographic drivers. It also identifies slow onset environmental degradation, disasters and climate change impacts as major challenges to address in contemporary migration policy and practice (Ionesco and Traore Chazalnoël 2018).

The GCM outlines the need for states to cooperate to identify, develop and strengthen solutions for people migrating in the context of slow-onset environmental degradation (in particular desertification, land degradation and sea level rise) and slow-onset disasters (drought). These solutions include the design of appropriate measures in countries of origin that can help make migration a choice rather than a desperate necessity, such as climate change adaptation and mitigation measures, disaster preparedness, disaster risk reduction and disaster response; and the facilitation of population movements in cases where adaptation in countries of origin or the return of migrants is not possible (Ionesco and Traore Chazalnoel 2018). At a time when national and regional migration and environmental and climate policies increasingly seek to address the migration-environment nexus (IOM 2018a), the provisions outlined in the GCM are especially relevant to the development and/or strengthening of national and regional migration policies and practices that seek to respond to the complex challenges experienced by states and communities, including on DLDD. In the implementation phase of the GCM, it will be crucial to ensure that DLDD and SLM issues are taken into account, especially in programmes rolled out at the country level.

International Conference on Migration and Desertification, Almeria

At the Intergovernmental Conference to Adopt the Global Compact for Safe, Orderly and Regular Migration in 2018, Spain announced the organization of an International Conference in Almeria in 2019 (Almeria III) to examine the links between desertification and migration, as well as the implementation of a Strategic Plan on Citizenship and Integration that seeks to promote social cohesion and inclusion. In 1994, the first Conference on Desertification and Migration was held in Almeria, with a view to provide scientific evidence on the role of desertification as one of the drivers of migration. The Almeria Statement highlighted that forced migration from arid areas was a grave concern that needed to be addressed. Twelve years after, in 2006, a second conference (Almeria II) took place with a focus on sharing information and evidence with policymakers. In response to the major environmental and climatic disruptions that occurred in the last decade, the forthcoming conference (Almeria III) will aim at mobilizing a coalition of stakeholders to move from policy to implementation and develop practical actions to address the environmental drivers of migration. The outcomes of the Almeria International Conference could be instrumental in promoting the implementation of initiatives related to the migration-DLDD nexus in the upcoming years, such as the 3S Initiative.

The UNFCCC Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts and the Task Force on Displacement

The 2015 Paris Agreement on climate change, negotiated under the United Nations Framework Convention on Climate Change (UNFCCC), acknowledges the need to respect the human rights of migrants when taking climate action. The Agreement also mandated the creation of the Task Force on Displacement (TFD), a working group comprising 13 members (States parties to the UNFCCC, UN agencies - including IOM, civil society representatives and relevant UNFCCC entities).

Formed under the leadership of the Executive Committee (ExCom) of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (WIM), the Task Force's original mandate was to develop recommendations to avert, minimize and address displacement of populations in the context of climate change. The finalized recommendations include dimensions of particular relevance to the migration-DLDD nexus, such as encouraging countries to integrate climate change and migration concerns when formulating national laws, policies and strategies; and to support the facilitation of regular and safe migration pathways (Traore Chazalnoel and Ionesco 2018b). The recommendations were delivered to States parties to the UNFCCC in December 2018, at the UNFCCC Twenty Fourth Conference of the Parties (COP24) in Poland. These recommendations were then endorsed in a decision by states and the mandate of the TFD was renewed for another two years (UNFCCC 2018). In parallel, the WIM ExCom also endorsed a five-year work programme where one workstream relates to migration, displacement and human mobility.

The creation of the Task Force and the five-year work programme of the WIM ExCom represents a major advance in discussions related to migration issues in global climate change negotiations, as they anchored the topic in the long term work programme of the UNFCCC. There is scope to more systematically include issues related to DLDD across the implementation of the Task Force's work plan and the Excom/Wim and create more synergies between the UNFCCC and the work conducted under the UNCCD.

Intergovernmental migration policy within the International Organization for Migration

As the only intergovernmental organization exclusively focused on migration, IOM, the UN Migration Agency, works to promote orderly and humane migration by delivering people-centered services and advocating for the well-being of migrants and their families. IOM's mandate allows the Organization to work with migrants, refugees, displaced persons and others in need of migration services or assistance. This mandate includes migrants moving in the context of DLDD, climate change, environmental degradation and disasters. Intergovernmental dialogues on environmental migration take place regularly under IOM's policy discussion spaces, such as the International Dialogue on Migration (IDM) and the regular meetings of IOM's governing bodies. DLDD and SLM issues are regularly raised in IOM's policy discussions and there is scope for further consideration of the interlinkages between DLDD and migration, including supporting the development of national and regional policies that address the migration-DLDD nexus and the implementation of relevant programmes in regions where DLDD impacts migration patterns.

Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests

The 2012 Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security resulted from intergovernmental negotiations supported by the Food and Agriculture Organization of the United Nations (FAO). The document outlines internationally accepted principles and practices of relevance to governments when developing laws, strategies, policies and programmes related to land, fisheries and forests rights. The overall aims of the Guidelines are to achieve food security for all and the right to adequate food, by improving secure access to land, fisheries and forests and protecting the rights of millions of often very poor people. The Guidelines were officially endorsed by the Committee on World Food Security in May 2012 and their implementation has been encouraged in a number of international forums, including the United Nations General Assembly. The implementation of these guidelines is key to ensure the recognition and protection of land rights and food security, and hence contribute to diminish pressures that might lead to forced migration.

United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas

The United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas was adopted by the UN General Assembly in 2019, following five years of intergovernmental negotiations. One of the main aims of the Declaration is to promote the respect, protection and fulfilment of the rights of peasants and other people working in rural areas, including migrants. The Declaration makes multiple references to issues of migration and recognizes the necessity to promote livelihood diversification in rural areas in light of increasing migration from rural to urban areas. The Declaration explicitly applies to all rural communities, including nomadic populations and migrant workers. Given the focus of this Declaration on the most vulnerable people affected by DLDD, support to its implementation has the potential to lower the socio-economic vulnerabilities that contribute to forced migration.

Regional policy cooperation

The Economic Community of West African States (ECOWAS) has developed since 1998 several frameworks, policies, and strategies on transhumant pastoralism and the livestock sector, including the 1998 ECOWAS Transhumance Protocol and the Regulation relating to its implementation (2003). This regional framework has several aims, including the promotion of peaceful management of transhumance and the prevention and management of conflict linked to transhumance. The Protocol introduces the ECOWAS International Transhumance Certificate, an instrument that enables free passage of herds across borders along pre-defined itineraries. The Protocol and the Certificate represent a major regional policy achievement, providing visibility to the often thorny question of cross-border livestock movements and highlighting transhumance's economic potential, in a context where other African regions have not yet passed specific legislation on these matters (IOM et al. 2019).

The States parties to the Intergovernmental Authority on Development (IGAD) are currently negotiating a Draft Protocol on Free Movement of Persons (IGAD 2019). The Draft Protocol has been under development for several years and includes provisions related to both pastoralists and people displaced by disasters. The Protocol, if adopted, will contribute to greater regional integration in the Horn of Africa as well as improved regional migration governance. This could be instrumental to safeguard the rights of, and provide alternative options to, vulnerable individuals and communities affected by DLDD in the region. These examples of practices stemming from regional policy discussions have the potential to be scaled up and replicated in other regions of the world.

Box 3. The 3S Initiative - “Sustainability, Stability and Security”

The 3S Initiative is an intergovernmental action launched by Morocco and Senegal at the African Action Summit (Marrakesh, November 2016) to bring a “voice for Africa” to the debate on drivers of migration and instability on the continent. The Initiative is supported by the UNCCD Secretariat and aims at minimizing forced migration and radicalization by creating employment options for young people, women and migrants, through a number of land-related measures: promoting restoration of degraded lands, strengthening land access and tenure rights and enhancing early warning systems to predict drought and other natural hazards and support effective responses to the forced migration of affected populations (3S Initiative 2019a).

Sixty-six per cent of the uncultivated arable land left in the world is located in Africa, yet this land is highly vulnerable to DLDD and land productivity is declining at unprecedented rates. As the majority of employment is based on agriculture and land exploitation, declining land productivity traps millions of farmers in poverty, slows growth and compels many young people to seek opportunities elsewhere, including through irregular migration or by joining extremist groups.

The 3S Initiative is a determined effort to transform degraded lands into inclusive and income-generating employment opportunities. Fourteen countries joined the Initiative: Benin, Burkina Faso, Central Africa Republic, Chad, Gambia, Ghana, Mali, Morocco, Niger, Nigeria, Rwanda, Senegal, Zambia and Zimbabwe. These countries recognize that land is a critical source of income on the continent. They believe that social cohesion, peace and prosperity can be achieved by providing access to land and secure tenure to youth and other vulnerable groups, and by investing in restoration of land and rural infrastructure. The successful implementation of the 3S Initiative could therefore have an immensely positive impact in terms of addressing DLDD drivers of forced migration on the African continent, and could offer hope to rural populations that viable alternatives do exist.

RECOMMENDATIONS TO STATES PARTIES TO THE UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION AND OTHER RELEVANT STAKEHOLDERS

The most vulnerable populations in the world are disproportionately concentrated in areas that are already suffering the worst impacts of DLDD. Migration is an extremely complex process where multiple factors interact at different scales to shape outcomes. Yet it is also clear that these outcomes are often worse in developing countries exposed geographically to adverse DLDD impacts and suffering from socio-economic vulnerabilities that limit their capacity to successfully adapt. The detrimental effects of climate change often amplify these existing vulnerabilities. As a result, sustainable land management and land restoration policies that aim to successfully contribute to averting and minimizing forced migration in the context of DLDD need to deliver multiple benefits simultaneously and avoid social and ecological trade-offs.

In this context, Parties to the UNCCD and relevant stakeholders of the United Nations system, intergovernmental organisations and civil society could consider the following recommendations to address the DLDD drivers of migration. These recommendations are aligned with those developed under the Task Force on Displacement under the UNFCCC (UNFCCC 2018), the commitments expressed in the Global Compact for Safe Orderly and Regular Migration (UNGA 2018) and in the Sendai Framework for Disaster Risk Reduction (UNGA 2015), and with the pledges under the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (FAO and CFS 2012) and the UN Declaration on Rights of Peasants and Other People Working in Rural Areas (UNGA 2019).

Prioritizing community-focused sustainable land management and restoration efforts

- Prioritize the implementation of land restoration and sustainable land management measures in the most fragile areas and communities affected by DLDD, with a view to reduce the risk of forced migration.
- Support efforts to enhance the capacity of countries most vulnerable to DLDD to understand and address the adverse impacts of DLDD on migration.
- Support the scaling up of good practices stemming from regional state-led initiatives, such as the Sustainability, Stability and Security (3S) Initiative, Economic Community of West African States (ECOWAS) and Intergovernmental Authority on Development (IGAD).
- Support the review and/or development of national land-use, development and agricultural policies to include issues related to i) ecological restoration adapted to both local landscapes and communities; and ii) efforts to avert forced forms of migration.
- Strengthen access to land and tenure in rural and fragile areas, especially amongst vulnerable groups, including migrants, refugees, internally displaced persons, women, indigenous peoples and rural youth.
- Prioritize the creation of dignified, decent and aspirational employment opportunities for migrants, returning migrants and host populations, including through support to and scaling up of activities such as the Sustainability, Stability and Security (3S) Initiative.

Harnessing migration policy and practice

- Develop and/or strengthen national and regional policies, strategies and legal frameworks of relevance to address the DLDD drivers of both internal and international migration, in close collaboration with relevant migration actors, such as the International Organization for Migration (IOM).
- Recognize state commitments made under the Global Compact for Safe, Orderly and Regular Migration and contribute to the implementation of measures relevant to the migration-DLDD nexus.
- Support the facilitation of access to land and sustainable land management training opportunities for migrants, refugees and returnees.
- Encourage a regional approach to address cross-border mobility of pastoralists living in drylands.
- Create synergies with the Regional Consultative Processes on migration as well as other relevant regional stakeholders, such as Regional Economic Commissions, to facilitate the development of dignified, safe, orderly and regular migration pathways.
- Acknowledge the adaptive potential of migration in the context of DLDD when migration is managed in a safe, orderly and regular manner and support the facilitation of regular and safe migration pathways.
- Acknowledge and refer to agreed relevant principles and rights, negotiated language and existing good practices in terms of migration and environmental and climate change.

Maximizing synergies across policy areas

- Enhance collaboration with the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) to design interventions that can benefit the States parties to the three Conventions.
- Recognize state commitments linked to the recommendations of the UNFCCC Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts and its Task Force on Displacement.
- Support efforts to enhance collaboration with and within the United Nations System to address cross-cutting issues, including but not limited to: i) the Food and Agricultural Organization of the United Nations (FAO) to support the national implementation of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests; ii) the International Labour Organization (ILO) to support adherence to internationally recognised guidelines on decent work; iii) UN Women to ensure that interventions are gender sensitive and achieve the empowerment of women and girls; iv) the International Fund for Agriculture and Development (IFAD) and the World Food Programme (WFP) to support efforts towards food security; and v) the United Nations Development Programme (UNDP) to support the inclusion of migration-DLDD issues in development planning.
- Strengthen inter-ministerial collaboration to ensure complementarity of approaches at the national level, especially between the ministries in charge of environment, agriculture, migration, labour and development.
- Support the development of a new narrative of future opportunities in the context of sustainable land management and restoration, to foster hopes and meet the aspirations of those most marginalized in rural areas.
- Support investment in health services, education and infrastructure in order to make areas of origin habitable and desirable and to avert and minimize forced migration.
- Support data collection, analysis and sharing of existing knowledge on the migration-DLDD nexus to assist the development of evidence-based policies, in consultation with all relevant line ministries and stakeholders, and to ensure coherence between migration, environment, development, labour, employment, social protection and other relevant policies.

KEY DEFINITIONS

Desertification: The UNCCD defines desertification as “land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities” (UNCCD 1994, Article 1). Desertification, therefore, denotes a form of land degradation specific to dry lands.

Drought: The UNCCD defines drought as “the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land production systems” (UNCCD 1994, Article 1).

Drylands: The UNCCD defines drylands as areas where the aridity index is less than 0.65.

Ecological restoration can be understood as “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed” (SER 2004).

Environmental Migration: “Environmental migrants are persons or groups or persons who, predominantly for reasons of sudden or progressive change in their environment that adversely affects 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, 33).

Forced Migration: “A migratory movement which, although the drivers can be diverse, involves force, compulsion, or coercion” (IOM 2019, 75).

Land: Different countries, cultures and communities define, perceive and value land in very different ways. The UNCCD defines land as “the terrestrial bio-productive system that comprises soil, vegetation, other biota, and the ecological and hydrological processes that operate within the system” (UNEP 2007, 21).

Land degradation can be defined as “the many human-caused processes that drive the decline or loss in biodiversity, ecosystem functions or ecosystem services in any terrestrial and associated aquatic ecosystems” (IPBES 2018, 2300).

Land Degradation Neutrality (LDN): The UNCCD defines land degradation neutrality as “a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems” (UNCCD, 2015)

Land Grabs: Land grabs are land deals that are one or more of the following: 1) in violation of human rights, particularly the equal rights of women; 2) not based on free, prior and informed consent of the affected land-users; 3) not based on a thorough assessment, or in disregard of social, economic and environmental impacts, including in the way they are gendered; 4) not based on transparent contracts that specify clear and binding commitments about activities, employment and benefits sharing, and; 5) not based on effective democratic planning, independent oversight and meaningful participation (ILC 2011).

Migrant: “An umbrella term, not defined under international law, reflecting the common lay understanding of a person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons. The term includes a number of well-defined legal categories of people, such as migrant workers; persons whose particular types of movements are legally-defined, such as smuggled migrants; as well as those whose status or means of movement are not specifically defined under international law, such as international students” (IOM 2019, 130).

Migration: “The movement of persons away from their place of usual residence, either across an international border or within a State” (IOM 2019, 135).

Sustainable Land Management (SLM) was defined at the Rio Earth Summit in 1992 as “the use of land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions” (Sanz et al., 2017).

Vulnerability: “The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity or susceptibility to harm and lack of capacity to cope and adapt” (IPCC 2014).



Amina, has been a resident in the Doolow IDP camp in Somalia since the previous drought in 2011 forced her to leave her home. Despite her hardships, Amina used her farming skills to build a garden and dug a small canal from the nearby IOM water point for irrigation. She was growing Sorghum, beans, pumpkin, and other cash crops, which she hoped would help her face the 2017 drought. © IOM 2017/Muse MOHAMMED

ANNEXES

ANNEX 1: EXTENDED ABSTRACT - QUANTITATIVE STUDY ON DROUGHT, LAND DEGRADATION AND MIGRATION

“Drought, Land Degradation and Migration”

Authors: Jeremy Laurent-Lucchetti (University of Geneva), Mathieu Couttenier (University of Lyon), Theo Vischel (University Grenoble Alpes), and Xavier Vollenweider (Flowminder Foundation).

Human migration is the result of a complex decision combining many interrelated factors: poverty, social and political exclusion, conflicts, labour requirements as well as many household characteristics (size, income, landholding, aspirations...). Environmental changes, such as drought or land degradation, are typically categorized as part of these factors. However, households do not necessarily react to the same environmental changes in a similar way: individuals are inherently different and make their decisions depending on the specific opportunities that are offered to them and the various constraints they face. If environmental degradation and drought can contribute to migration for some households, it can also hamper the ability of others to do so by lowering the local economic resources necessary for migrating.

This quantitative study assesses the role of drought and land degradation as factors that influence population movements at a sub-national scale for 2000, 2005, 2010 and 2015, focusing on three regions: Africa, South America and Asia. This large coverage coupled with a relatively high spatial resolution (inside cells of approximately 55 x 55 km at the equator) allows to study the possible long term, persisting effects of environmental changes on human movement. The study run a series of standard regression analyses with fixed-effects in order to (i) elicit the effect of drought and land degradation on population migration and (ii) highlight amplifying mechanisms. It is noteworthy that the study does not elicit the direct effect of environmental changes on individual decisions of migration (the study does not rely on micro-data) but rather observes the average aggregate effect of environmental changes on population movements. The difficulties, which are also the limit of the approach, lie in (i) the careful choice of the set of fixed effects and the control variables (i.e. results crucially depend on the control of potential confounding factors) and (ii) low ability to generate counterfactual policies (counterfactuals and projections depend directly on keeping the baseline constant).

Data on population density is used at the cell level (approximately 55 x 55 km at the equator) to construct a proxy of net migration per area. The main explanatory variable is a drought index, the Standardized Precipitation Evapotranspiration Index (SPEI), constructed by Vicente-Serrano et al. (2010). As the name implies, SPEI is a drought index reflecting the climatic water balance, i.e., the monthly difference between precipitation and potential evapotranspiration. A proxy of land degradation is also used, namely degradation in soil organic content (following the Good Practice Guidance for SDG indicator 15.3.1, Sims et al. 2017 and recovered from trend.earth).

Results show a significant and negative effect of both drought and land degradation on population density. One more month of drought over the two previous years generate a human movement equivalent to 1% of the average population in a cell. For instance, in 2015 across Africa, South America and Asia, this represented approximately 21 million people moving from their home area. Furthermore, the study

indicates that (i) this effect is especially strong in Africa and Asia (and reversed in South America) and (ii) this effect on migration increases non-linearly as drought become more intense (i.e. more severe droughts have a bigger impact on migration). Using a similar approach, it is also shown that land degradation has a significant effect on migration: an increase in land degradation from its lowest level (no degradation) to its worst observed value (20% of a land degraded between two periods in a cell) would lead to a migration representing 13% of the average population in this area.¹

This report also investigates factors amplifying or mitigating the effects of environmental changes on migration, in order to design more effective mitigation policies. First, it is observed that the proximity to the capital city in a given country mitigates the effect of drought on migration: distance to the capital city may act as a proxy for access to market, mitigating the negative effect of drought on income (similarly to the income mechanism lowering reported conflict in Berman and Couttenier, 2015). Furthermore, the study indicates that access to natural resources (especially mineral resources such as diamonds, gold and gems) significantly diminishes the impact of drought on migration, certainly because it provides an alternative source of income and thus lowers the negative impact of drought on local economic conditions. Finally, the geographic characteristics of a cell---its partition in terms of Agricultural, Urban, Forest and Water areas--- can impact significantly the baseline result. Interestingly, the scarcity of blue water (amount of water readily available for irrigation, such as lakes or rivers) in a cell significantly increases the impact of drought on migration. This set of results paints an overall consistent picture: drought and land degradation are environmental factors that influence migration at an aggregate level. However, when the considered area is endowed with natural or social characteristics mitigating the detrimental impact of these environmental changes on local income and livelihood, the effect of environmental changes on migration is lowered (or even negated).

The Intergovernmental Panel on Climate Change technical report (AR5, stocker et al., 2013) on climate change and water concluded that many dry regions, including regions in Sub-Saharan Africa, are likely to receive even less rainfall in the future. This study thus provide tentative projections of drought-induced human migration based on 4 climate models (selected among 13 to represent the spread of climate projections) for the 2040-2059 period, over the 3 continents that are considered. Averaging over the 4 projections, results imply an increase of the number of migrants impacted by droughts of approximately 22 million in Africa, 12 million in South America and 10 million in Asia in 2059, compared to the 2000-2015 period (with a very large spread across models, translating a high uncertainty). Of course, these projections depend directly on keeping the baseline constant, they are thus purely tentative and indicative: they should be interpreted as the increase in migration triggered by droughts if the world in 2000-2015 happened to experience the predicted 2059 climate (they consider that no socio-economic factors, such as population or technology, will change). Furthermore, they compound two types of uncertainty: (i) uncertainty about climate projections (reflected in the different model predictions) and (ii) uncertainty in the effect of drought on migration (both in the variance in the estimates and in the future relation between drought and migration).²

In conclusion, the study turned toward a systematic and global quantitative assessment to elicit the net effect of drought and land degradation on migration. Of course, this quantitative analysis should not be perceived as the only way to address the question, and the methodology should be seen as complementary to other recent quantitative and qualitative work on the topic. A phenomenon as complex as migration can only be understood by using a wide array of methodologies and approaches. Any quantitative assessment of the drivers of migration is necessarily limited in scope: it leads to a focus on environmental, economic and demographic variables at the expense of all the other unobservable factors that trigger migration. This study should be complemented by qualitative studies to better understand migrant's motivations and constraints specific to each region in the world in order to deepen understanding of the links between environmental changes and migration.

¹ However, this result has to be interpreted with caution as population is very likely to directly impact our proxies of land degradation as well which may lead to a reverse causality issue and a biased estimate.

² Projections based on the regression analysis assume a constant climate-migration statistical relationship between current and future periods. This is a limitation of the approach with respect to Rigaud et al. (2017): gravity models are more adapted to simulate future migration than inference from a regression analysis requiring to keep the baseline constant.

ANNEX 2: LIST OF SELECTED CASE STUDY CONTRIBUTIONS

	Name of Project	Country	Objectives and Implementing Agency
1.	Projet d'Appui à la Transition Agro écologique dans les Zones Cotonnières du Bénin (TAZO)	Benin	Support a socially and environmental transition of cotton producing communities Improve rural livelihoods Promote sustainable agriculture and agroforestry French Development Agency (AFD) and Ministry of Agriculture (Benin)
2.	Forest and Landscape Restoration Mechanism	Lebanon	Restore agricultural terracing FAO
3.	Sustainable Land Management in the Qaraoun Catchment Area	Lebanon	Alleviate land degradation Maintain ecosystem services Improve livelihoods Government of Lebanon in partnership with the United Nations Development Programme (UNDP), funded by the Global Environment Facility (GEF)
4.	Living Oasis Programme (Oasis Sud)	Morocco	Rehabilitate and protect oases as a barrier to desertification, through the creation of Community Development Plans promoting inclusive and sustainable development. Government of Morocco supported by various donors
5.	Oasis Ecosystems and Livelihood Project	Tunisia	Promote a participatory approach for oasis management: Reinvigorate oasis' traditions and sources of employment Manage sustainable natural resources Promote sustainable agriculture World Bank
6.	GLACIER (Green Livelihood Access for Central Kalimantan's Inclusive Environmental Response to Climate Change)	Indonesia	Promote the restoration of degraded lands Enable sustainable livelihoods ILO, UNDP
7.	Protection et Réhabilitation des Sols pour Améliorer la Sécurité Alimentaire	Madagascar	Protect land rights and promote soil rehabilitation GIZ
8.	Land degradation, land rehabilitation and out-migration from the northern Ethiopian highlands	Ethiopia	Introduce drought and frost resilient seeds and terracing to reduce vulnerabilities to DLDD in an area with high levels of out-migration Helmholtz Centre for Environmental Research



Dorvilia, a 56-year-old former farmer living in the village of Baie de Henne, Haiti, has not been able to grow vegetables for seven years because the sun is stronger than before and it burns everything she plants. In addition, rains are very rare in her village; it had rained only once in the past 13 months. © 2017/Alessandro GRASSANI

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