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The State of Environmental Migration 2011

Edited by
François Gemenne (IDDRI)
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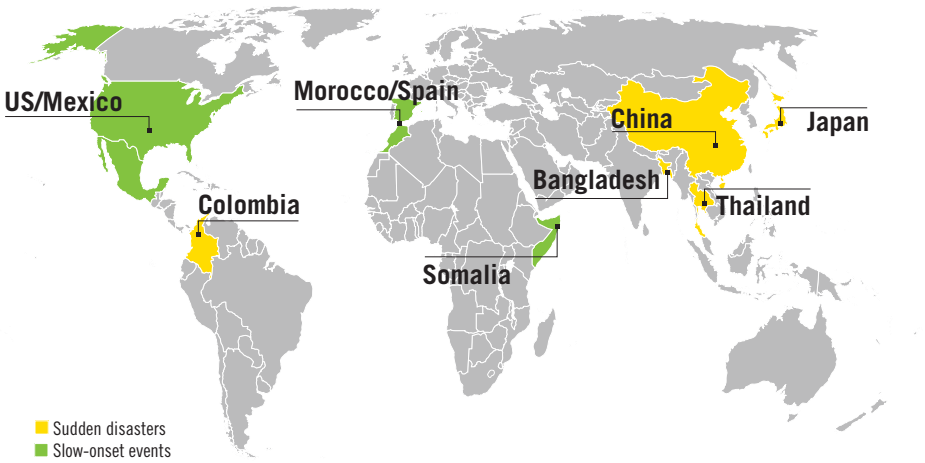

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The State of Environmental Migration 2011

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FOREWORD BY WILLIAM LACY SWING

Director General,
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The impacts of environmental degradation and climate change on human mobility are complex and often long-lasting. People may migrate, for instance, because of environmental degradation as such, or because environmental degradation has led to the loss of their livelihood. In some cases, people have no choice but to move. In other situations, people choose to move. Then again, some who wish to move may not have the means to do so. The State of Environmental Migration shows the complexity of migration in the context of environmental degradation and climate change and calls attention to environmental migrants by offering insights on climate-related events of the year 2011, their migratory impacts, and the policies and programmes that were developed in response.

The working relationship between the International Organization for Migration (IOM) and the Institute for Sustainable Development and International Relations (IDDRI) and, *via* IDDRI, Paris School of International Affairs at Sciences Po, is based on a shared vision that well-managed migration can be an effective climate change adaptation strategy, an innovative response that empowers migrants and strengthens communities. This new edition of The State of Environmental Migration marks the second consecutive year that these organisations have worked together to present an overview of current issues in the field of climate change and migration. The volume brings to light recent research conducted by students on the topic of migration, the environment and climate change. Their views should therefore not be seen as expressions of IOM's or IDDRI's policy positions but as the outcomes of their independent research activities.

The studies in this publication offer both fresh analysis and novel solutions on migration in the context of natural disasters. They cover a wide variety of situations, including, for instance, proposed infrastructure and public works projects to enhance resilience to flooding in Bangkok, Thailand; an examination of the efficacy of circular migration policies enacted in response to flooding in Colombia; and an analysis of policy responses to the earthquake and tsunami in Japan. These articles offer concrete assessments of current shortcomings in policies related to disaster risk reduction and steps that can be taken to enhance preparedness and response capacity. Other papers examine potential approaches to mitigating slow-onset climate change in countries such as Spain and Mexico, highlighting the severe humanitarian consequences resulting from a type of climatic disaster that is too often overlooked. While each paper addresses a specific situation, they all emphasize how migration policy can be used as a tool to manage the pressing needs of vulnerable communities to adapt to disparate environmental hazards.

As the threat of climate and environmental change continues to present challenges to communities and policy makers alike, IOM trusts that the second edition of The State of Environmental Migration will be a useful resource for both policy makers and the general public.

FOREWORD BY LAURENCE TUBIANA

Director,
Institute for Sustainable Development
and International Relations (IDDRI)

Major forces of change, including climate change, are already at play in natural and human environments across the world. Environmental degradation has measurable impacts on migration and presents humanity with unprecedented challenges. The diversity of these challenges argues for a new strategic approach towards policy development. Failing to incorporate migration within the policy discourse could seriously undermine potential alternative livelihood strategies.

Incorporating the voices of tomorrow within the current policy discourse is an important step in developing strong future leadership needed to tackle these difficult challenges. So with this new edition of *The State of Environmental Migration*, it is my pleasure to present our yearly qualitative assessment of the changing dynamics of environmental migration based on a collection of student research papers and case studies documenting some of the most significant situations that took place in 2011. It is thanks to this new generation's expertise, dedication and contributions that we have ensured a broad, global perspective on how to confront and overcome these current challenges and events.

I am particularly grateful to IOM's strong commitment to making *The State of Environmental Migration* an annual publication. The collaborative partnership between IOM and IDDRI present an excellent opportunity to raise public awareness of the complex nature of environmental migration, facilitate policy discourse, and share knowledge and insights concerning the links between migration and climate change. I am also most grateful to Sciences Po's School of International and Public Affairs (PSIA) for supporting this important initiative and for contributing to the success of this edition of *The State of Environmental Migration,* and look forward to those that will follow in the forthcoming years.

INTRODUCTION

François Gemenne, Pauline Brücker and Dina Ionesco

While scientific research on environmental migration has considerably expended over recent years, *The State of Environmental Migration* once again gathers and documents major cases of environmentally-induced migration and displacement that happened during the year 2011. It is meant to feed scholar studies and eventually political discussions. The existence itself of this volume underscores the importance of the subject, but also the complexity of the phenomenon. As we stressed last year in the 2010 edition of *The State of Environmental Migration*, diversity and universality are common features of environmental migration: be they labeled migrants or refugees, affected by human-made or natural events, all those migrating or being displaced seek protection, livelihood and opportunities for a safer future.

Environmental migration, in its forced and voluntary forms, is a reality

Unsurprisingly, the plight of environmental and natural disasters, at a time of profound economical and migration crises, affected both the North and the South. The losses in 2011—about the double of the 2010 toll—were the highest ever recorded, at US$ 380 billion[1]. This includes the US$ 210 billion[2] resulting from the earthquake that hit Japan on March 11, 2011, a disaster that became the costliest in history. Though the number of fatalities from these disasters was lower than feared, the human toll was no less significant, with major population displacements occurring in Thailand, Bangladesh, and of course Japan, where a staggering number of 350,000 people—and rising—are still displaced at the time of writing. According to the Internal Displacement Monitoring Center (IDMC), 14.9 million people were internally displaced in 2011 throughout the world due to natural disasters, mostly related to weather events such as floods and storms. 89% of the displacement occurred in Asia.[3] The IDMC Report also shows that China had the highest number of people newly displaced, with a total of 4.5 million people displaced by ten events, including floods, storms and earthquakes throughout the year.

Millions of people were also displaced by slow-onset degradations of their environment. Although being given less publicity in the media, slow-onset events threaten millions of households throughout the world, and often result in complex emergencies where environmental crisis feed existing instability and political tensions. The drought that affected the Horn of Africa was labeled by the UN as the 'worst humanitarian disaster'. Millions of people were driven away from their homes, both internally and regionally. The refugee camp of Daadab, in Eastern Kenya, close to the Somalia border, already the largest camp in the world, was continuously fuelled by people fleeing the drought and the famine, mingling with those fleeing conflicts. Eastern Africa was not the sole region affected by droughts, and this report also documents other crises from Mexico to Morocco.

If droughts and desertification are currently the major drivers of slow-onset environmental crises, floods and erosion associated with sea-level rise are growing threats, as global warming intensifies year after year. 2011 was a record year for greenhouse gas emissions: according to the International Energy Agency (IEA), 34.83 billion tons of carbon dioxide were emitted, a 3.2% jump over the previous year.

1. According to the annual 2011 statistics released by the NatCat Service of re-insurance company Munich Re.
2. This amount excludes the cost of the nuclear accident that followed.
3. Internal Displacement Monitoring Center (IDMC) and Norwegian Refugee Council (NRC), Global estimates 2011: People displaced by natural hazard-induced disasters (June 2012)

We can thus expect that human mobility will remain and increasingly become a consequence and a response to climate change impacts on livelihoods. According the Gallup World Poll (2011)[4], more than one in ten adults worldwide say they expect to move because of the environment.

Policy responses: managing migration in the context of climate change and environmental degradation

Significant policy developments have occurred while the scientific recognition of the phenomena was growing. In late 2010, at the Cancun Climate Change Conference[5], delegates agreed that policies and projects on migration associated with climate change would be able to receive funding as a form of adaptation to climate change through the Green Climate Fund for instance. This signaled a radical shift in the way environmental migration was perceived: it was no longer necessarily considered as a failure to adapt, but could also become a way for people to adapt to a changing environment. This is a point that we had highlighted in last year's SEM report, and which is again emphasized in different cases featured in this report.

This shift of perspective was reinforced with the publication of the 2011 Foresight report[6], a major research effort conducted by the UK Government. The report also advocated that migration could be an effective adaptation strategy for populations confronted with environmental changes, but also highlighted the plight of the 'trapped populations', that is, populations that find themselves unable to move when confronted to environmental changes. Indeed, as our report shows—in the cases of Japan or Thailand, for example—the most vulnerable populations are often unable to escape the degradations of their environment because they lack access to resources, transport, networks and information.

In 2011, the 17th Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCC) followed up on the Cancun Agreements, with the "Durban Platform for Enhanced Action". This roadmap will serve the drawing up process of a legal framework for climate action by 2015, to be implemented by 2020. Yet, if the thematic of migration is anchored in the climate change text since the COP in Cancun, no more advances on migration-related issues were specifically made in Durban. Nevertheless, progresses were achieved on programmes such as National Adaptation Plans and Loss and Damage, which are related to and impact issues of forced migration, planned relocation, displacement and migration as an adaptation strategy.

Amongst the most noteworthy policy developments in 2011 was the Dhaka Ministerial Declaration of the Climate Vulnerable Forum, following a major ministerial meeting held in Bangladesh. The Declaration[7] was signed by nineteen of the most vulnerable countries to climate change: it emphasizes concerns raised by displacement, relocation and related security matters, and it recognizes migration in its voluntary and well-managed forms as a "viable adaptation strategy". Policy awareness of the impacts of climate change on human mobility is definitely growing, as highlights several other declarations released in 2011.[8]

Moreover, in June 2011, the Norwegian government, with the support of the Swiss government and the UN High Commissioner for Refugees (UNHCR), proposed the Nansen Principles, a set of

4. Gallup World Poll: the Many Faces of Global Migration (based on research in more than 150 countries), IOM and Gallup, 2011.
5. UNFCCC, Cancun Agreements 2010, paragraph 14f: "*Measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels*".
6. Foresight: Migration and Global Environmental Change (2011), Final Project report, The Government Office for Science, London.
7. Dhaka Declaration: "*Aware that climate change induced displacement of people is a major concern and their relocation puts enormous* pressure on infrastructures and service facilities; and furthermore, large-scale displacement has the potential to transform into security concerns; Recognizing that migration is a viable adaptation strategy to ensure that populations are not compelled to reside in high risk and affected areas, and to manage risks during displacement; and furthermore a planned strategy in the long-term to offer displaced populations with enhanced options for dignified and diversified livelihood; (…)In particular, we call for the immediate implementation of paragraph 14 (f) of the Cancún Agreements, which recognises that migration is a viable adaptation strategy to address human displacement induced by climate change, *and includes undertaking measures to enhance understanding, coordination and cooperation with regard to climate-induced displacements, migration and planned relocation, and in this respect call for the commencement of an international dialogue for an appropriate framework*". The full Declaration can be viewed here: http://daraint.org/wp-content/uploads/2011/11/Dhaka.Declaration.pdf
8. Other declarations released in 2011 include the Global Migration Group (GMG) Statement, the European Union Consultation paper on "Migration and Climate Change" (as part of the overall Communication package on the European Global Approach to Migration) and the Dhaka Declaration of the Colombo Process Member Countries mentioning the "possible nexus between environmental degradation and climate change on one hand and human mobility on the other".

guidelines to foster the protection of those forcibly displaced because of disasters. A key outcome of these principles was reached on 2 October 2012 with the launch of the Nansen Initiative, an intergovernmental consultative process aimed at defining a protection agenda for those displaced across borders by disasters. Meanwhile, the Asian Development Bank (ADB) was flagging the issue as one of primary importance for the Asia-Pacific region and advocating more regional and bilateral cooperation, within a development agenda.[9] Indeed, the Asia-Pacific region experiences the highest levels of environmental migration, and this report documents the significant displacements that took place last year in Thailand, China, Bangladesh, and of course Japan. Additional insights in migration and climate change related issues were provided by the United Nations Environment Programme (UNEP) and partners report[10] showing how change in climate trends exacerbate existing vulnerabilities and may become new drivers for conflict or forced migration. IOM for its part has long recognized the linkages between the environment and population movements and has sought an active role in instigating action and discourse in the international community.

From the abovementioned examples, we can see that policy-makers and international organisations are indeed coming to grip with the challenges posed by environmental migration. However, countries often still lack the capacities needed to take action. One major obstacle to policy development is that environmental migration calls for complex cross sector policy responses. Policy makers need to tailor activities within the intertwined fields of emergency relief, humanitarian responses, long-term development strategies, urban and rural planning, human rights, security, disaster risk reduction and adaptation to climate change. This raises concrete issues about which projects can be developed and who should fund them.

Operational solutions: supporting and protecting environmental migrants

The year 2011 was marked by a large number of floods and weather-related events that led to important population displacements and called for both urgent and long-term operational responses. Indeed, natural disasters have immediate and lasting effects that necessitate measures to reduce the incidence of forced migration. When natural disasters hit, the immediate response is humanitarian; at the international operational level, the "cluster system" aims to strengthen the efficiency of humanitarian action[11] to directly respond to forced migration, in particular due to sudden onset events. However, on the long term, solutions need to include development, adaptation and disasters risk reduction elements – in a nutshell, to go beyond short-term policy responses to longer-term planning, aimed at preventing forced forms of migration and facilitating voluntary mobility.

Once the critical immediate relief stage is over, solutions for people affected and displaced are diverse and part of the sustainable livelihoods approach, with activities targeted at building transitional or permanent shelter support, finding suitable relocation space, integrating families on transition or permanent relocation sites, return when possible, reparation programmes, Disaster Risk Management support and other capacity building and preparedness activities. The current edition of *The State of Environmental Migration* shows in each case study how the operational responses are diverse, but often constrained by the local, national and regional conditions and capacities.

Noting for instance that droughts are longer, more frequent and more intense; knowing that droughts drastically reduce livelihood coping capacity for many communities, it is important to acknowledge that migration can be an adaptation mechanism. The examples of slow-onset events in the current edition show that facilitated migration as an adaptation strategy is possible, even though it is still a rare option and raises many implementation questions.

Introducing The State of Environmental Migration 2011

In its 2011 edition, *The State of Environmental Migration* particularly focuses on cross-border displacement, and the securitization of migration, cutting across all policy sectors mentioned above. The Indian-Bangladeshi, US-Mexican and Morocco-Spanish borders stress the difficulties that neighbors found, especially if presenting different social and/or religious and economic status, in pacifically and humanly dealing with the migration issue. As this volume presents, in some

9. IOM-ADB Policy Dialogues on Climate Induced Migration, Geneva (June 9th 2011) and Bangkok (June 16th-17th 2011) http://www.iom.int/jahia/Jahia/iom-adb-policy-dialogues-on-climate-induced-migration/cache/offonce

10. Livelihood Security Climate Change, Migration and Conflict in Sahel, UNEP, IOM, OCHA UNU and CILLS, 2011.

11. CCCM Cluster, Global Camp Coordination and Camp management Cluster, Newsletter, Issue 1, October 2011, UNHCR and IOM

cases the lack of protection standards and legal status of those displaced aggravates a situation where quotas, walls and externalization processes of migration control considerably limit possibilities of migration.

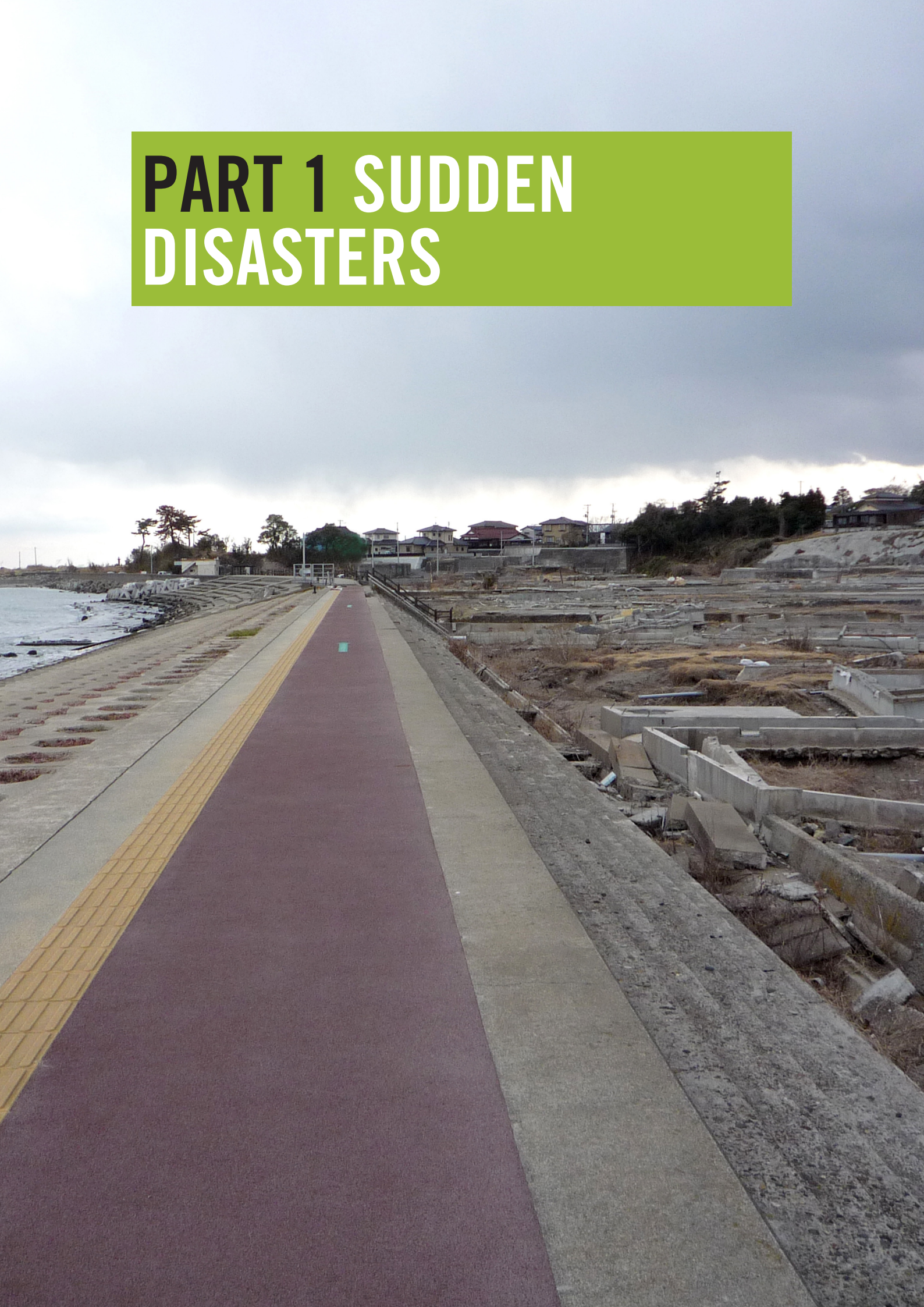
This edition also attracts attention on the diversity and complexity of human mobility in the context of climate change and environmental degradation. While writing the papers, students were often confronted with a number of terminology challenges. Should they speak of forced migrants, internally-displaced people, environmental migrants, evacuees, relocated populations? Very often, situations are not clear cut. Natural disasters can combine for instance with conflict situations causing large number of displaced families, making it difficult to identify one single cause for migration. Moreover, the multi-causal nature of migration makes it often difficult to isolate the environmental factors from other social, political, economic or demographic ones. In addition, in many cases, it is difficult to say whether migration is voluntary or forced, as people often make constrained choices. The glossary (pages 130-131) offers some guidance on the terms used throughout the report, while some of the chapters still contain mixed choices of words, due to the difficulty to describe complex situations.

We like to think that *The State of Environmental Migration* is doing its part in raising awareness about the plight of the people who are on the move, year after year, because their environment is changing, sometimes brutally. Environmental changes are now acknowledged as a major cause of migration and displacement across the world, and this report aims to document the cases where such population movements occur. Though environmental migration remains largely perceived as an issue affecting only developing countries, our report shows a more contrasted reality. Though developing countries remain a prime focus of attention, in particular because they tend to be the most severely hit by the impacts of climate change, our report shows that industrialized countries also have to deal with environmental migration. Indeed, our report documents situations in some of the planet's poorest countries, such as Bangladesh or Somalia, but also in some of richest countries, such as Japan or the United States. It shows situations of desperate plights and dire humanitarian crises, but also situations where migration was used as a tool by resourceful individuals, as a way to deal with an environmental crisis.

This report is the work of the students from the graduate course 'Environment and Migration' taught at the Paris School of International Affairs of Sciences Po. They have been supported by a team of editors who compiled their reports into this edition of *The State of Environmental Migration*. The cases presented here are not the result of a direct fieldwork, but rather of a careful review of secondary sources and interviews with actors directly involved on the field. The report does not claim to be exhaustive in its coverage of the cases of environmental migration in 2011. Many cases are indeed not documented in this report—the Washi typhoon that brought havoc in the Philippines, for example—but an exhaustive coverage of all cases would be impossible, as the cases are simply too numerous and too diverse, reflecting the wide variety of migration patterns that can be found under the umbrella of 'environmental migration'.

This new edition of *The State of Environmental Migration* is an attempt to document some of the most significant situations that took place in 2011. Some of them were reported in the media when they occurred; others were not. Some will be the subject of further academic inquiries; others will not. Meanwhile, we found important to provide empirical evidence of these situations, so that policy debates can be fed with a qualitative, yearly assessment of the changing dynamics of environmental migration. This is the ambition of this edition of *The State of Environmental Migration,* and of those that will follow in the forthcoming years.

PART 1 SUDDEN DISASTERS



Sudden disasters catalyse enormous media attention and generally inspire massive response on the part of governmental and non-governmental actors. They often induce large-scale displacements, particularly in the immediate aftermath. But these displacements can also occur months after the event and can transform into long-term or permanent migration, as the chapter on the Fukushima disaster shows. The year 2011 has been the costliest ever for disasters, with a total cost amounting to US$ 380 billion, according to re-insurance company Munich Re. This sections highlights the human costs of these disasters. In 2011, more than 15 million people have been displaced by disasters, according to the Internal Displacement Monitoring Center. Some of the most salient cases of displacement are presented here, spanning across the globe from Thailand to Colombia, China and Bangladesh. And of course the 11 March catastrophe in Japan, by far the disaster that attracted the most attention in 2011.

Photo credits: Tagajo city, situated 12km north east of Sendai city on 20 March 2012. © 2012. Reiko Hasegawa (IDDRI)

ENVIRONMENT AND MIGRATION: THE 2011 FLOODS IN THAILAND

PATRICK PHONGSATHORN

INTRODUCTION

The floods which inundated Thailand from August to December 2011 were the worst in living memory for most Thais. Originating in the North and Northeast of the country, the floods severely affected sixty-five of Thailand's seventy-seven provinces. In total, over 13 million people were affected, more than 800 were killed, and around 160,000 were displaced. The World Bank estimates that the floods caused $46 billion worth of economic damage, making it one of the top five costliest natural disaster events in history (The Economist, 2012). Although the initial government response to the disaster was faltering, it eventually got to grips with the situation. The decision, however, to divert flood waters to save central Bangkok, causing massive damage and displacement in rural and suburban areas, remains controversial. Moreover, with climate change and rapid development combining to seemingly exacerbate the flooding to which the country is prone, the government's response to the 2011 Floods will be of critical importance for the future peace and stability of the nation.

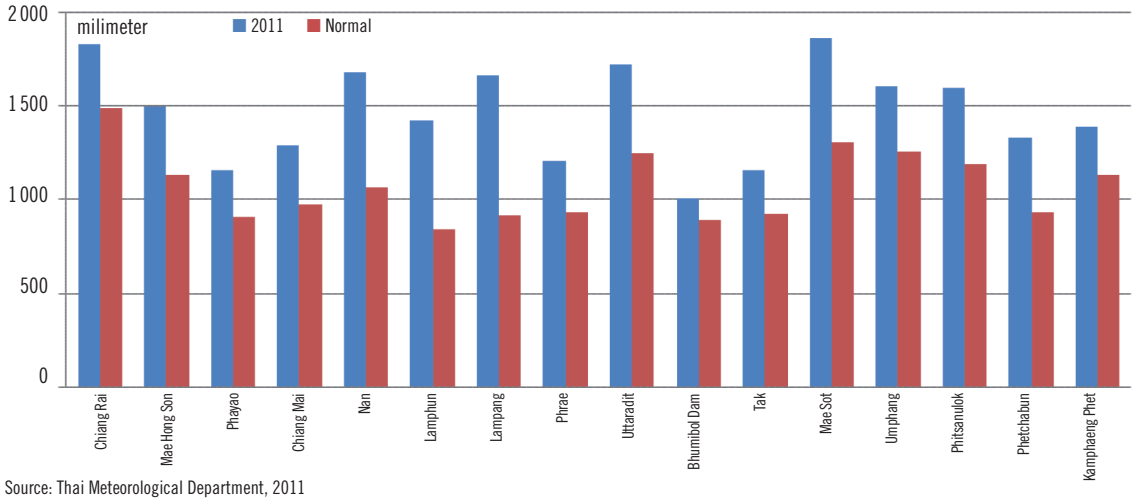
The response of the Thai authorities in this regard may also prove instructive to Thailand's regional neighbours who face similar and, in some cases, more significant threats. According to the Asian Development Bank, in 2010-11 alone 42 million people in Asia and the Pacific were displaced by "extreme environmental events", and the region is "the most prone to natural disasters, both in terms of absolute numbers and populations affected" (Asian Development Bank, 2012) . The scale of this challenge requires innovative thinking and planning on the part of governments and societies across Southeast Asia.

Often only seen as a negative consequence of natural disasters, migration should also be viewed as part of climate change strategy. This chapter will firstly give an account of the 2011 Floods in the Kingdom of Thailand, describing the economic, political and social impacts the floods have had.

Map 1. Map of Thailand

Source: CIA World Factbook

Figure 1. Accumulative Rainfall in Towns and Cities of Northern Thailand, May 1 to October 31, 2011



Source: Thai Meteorological Department, 2011

Next, we will look more closely at the impact the floods had on populations in terms of environmental migration and the government's response to the floods. Finally, this chapter will detail the policy options available to the Thai authorities in the wake of the 2011 Floods, and will recommend that migration should be harnessed within a strategy of national risk diversification and sustainable development. Much of this chapter will address the 2011 Floods as they affected Thailand's capital city, Bangkok. This is not to play down the impact of the floods on other parts of the country, but rather to draw attention to the specific issues faced by Bangkok during the floods, and the challenges it faces in the future.

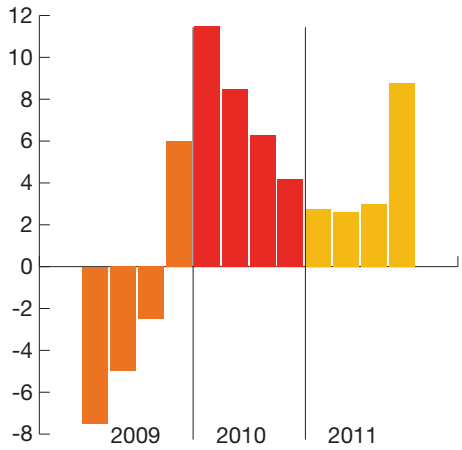
1. THE 2011 FLOODS AND THEIR IMPACTS

The Bangkok Metropolitan Region is situated in the delta of the Chao Phraya River basin, an area of 159,000 km², or around 39% of the total area of Thailand. The region lies in a central floodplain with an average elevation of one to two metres above sea level. Typically floods originating in the north of the country have inundated this floodplain region. These floods have usually taken prolonged periods to drain due to Bangkok city acting as a "bottleneck" to floodwaters, obstructing their natural flow into the Gulf of Thailand (World Bank, 2010a). Bangkok has a tropical monsoon climate, which produces heavy precipitation particularly between May and October. As such, Bangkok is no stranger to large-scale flood events. Major floods have occurred in 1942, 1978, 1980, 1983, 1995, 1996, 2002, 2006, and of course most recently in 2011. According to a recent World Bank report, future flood events in Thailand are set to be more frequent, covering a larger area of land and therefore affecting more of Bangkok's citizens (World Bank, 2010a). The evidence from 2011 certainly suggests this prediction to be accurate.

In the first nine months of 2011 rainfall levels were found to be 32% higher than normal (see Figure 2), as the country felt the effects of three separate tropical storms Nock-Ten, Haitang and Nesat (Thai Meteorological Department, 2011). Severe and violent flooding was first experience in the northern regions of Thailand in August, affecting infrastructure, crops and households in areas such as Chiang Mai, Udon Thani and Nong Khai (Bangkok Post, 2011a). By September, the floodwaters had quickly spread to 55 of Thailand's 77 provinces. The flooding continued to create havoc, destroying crops, inundating industrial parks, and forcing factories owned by multinational companies, such as Honda and Sony, to temporarily shut down (Ten Kate and Yuvejwattana, 2011).

By October the historically- and industrially-rich region of Ayutthaya had been inundated forcing private residences, hospitals and prisons to be evacuated (The Nation, 2011a). Residents of Bangkok prepared for the waters by moving belongings upstairs, stocking up on vital commodities or by getting out of the city entirely. By late October floodwater had breached the barriers of Don Muang International Airport in the north of the city, forcing the government's Flood Relief Operations Centre based there to relocate to dryer ground (The Nation, 2011b). The Bangkok Metropolitan Authority began evacuating neighbourhoods to the north and northwest of the city, whilst monitoring those to the east and west. As November wore on, up to a fifth of Bangkok became submerged. Communities located near and

Figure 2. Evolution of Thailand's GDP 2009-2011



Source: Thomson Reuters Datastream

beside the canals through which the floodwaters surged were severely affected. As the end of the year approached it seemed likely that the majority of Bangkok city centre would be saved by a mixture of government action and pre-existing flood protection measures. All the while, however, many suburban and rural areas surrounding the city remained submerged. By the beginning of 2012 most of the floodwater had drained off from the streets of Bangkok into the Gulf of Thailand. Despite this, the economic, political and social impacts of the 2011 Floods continue to be felt well into 2012.

1.1. The economic impacts

Thailand's 2011 Floods had a significant impact on the national economy. The Thai economy took a sharp dip in the fourth quarter largely due to the floods (see Figure 3). Overall, in 2011 the Thai economy grew by only 0.1% (Robinson, 2012). For an emerging market such as Thailand which in recent years has become used to 5-8% annual growth rates, this sharp decline represented an economic shock. Thailand's economy is highly dependent on exports such as rice, of which it is the world's largest producer, and manufactured goods such as cars and electronics. Thailand is also a major tourist destination; typically this sector makes up 6-7% of annual GDP (Bangkok Post, 2008). The 2011 Floods had a major effect on all sectors of the Thai economy, with manufacturing and tourism taking the hardest hits (Robinson, 2012).

The impact of the 2011 Floods was also felt in the world economy. J.P. Morgan estimates that the floods set global industrial production back 2.5% (The Economist, 2012). Individual companies such as Honda, Toshiba and Western Digital suffered major losses from flood damage and loss of production. Sony, experienced a net loss of $2.1 billion for the final three months of 2011, blaming, among other factors, interrupted production due to the floods for their weak performance (BBC News, 2012). Coming so soon after the Tohoku earthquake and tsunami, as well as a string of preceding natural disasters, the 2011 Floods compounded what has been an extremely costly year in terms of damage caused by natural disasters.

1.2. The political impacts

As well as the economic costs, the political fallout of the 2011 Floods has also been significant. As demonstrated by the violence which erupted on the streets of Bangkok in 2010, Thailand's politics are currently deeply divided. A poisonous political atmosphere infects every issue in Thailand, even ones as seemingly technical as flood mitigation and prevention. During the floods decisions on how, when, and whether to protect central Bangkok from the waters became highly politicised topics. Talk of Bangkok elites having "contempt" for the poor and sacrificing less well-off areas of the city were rife during the floods (The Nation, 2011c). Despite the politics surrounding the issue, the imperative to save central Bangkok from the worst of the flooding was clear. Bangkok is home to almost 12 million inhabitants, contains vital national infrastructure and produces around 42% of Thailand's GDP (World Bank, 2010b). Had the whole city been badly flooded it would have constituted a national emergency. The long-term challenge for the government will be to lessen the vulnerability of Bangkok, possibly through the relocation of some of the country's assets away from its capital city.

In the short-term the government will need to rebuild and repair damaged infrastructure and put in place immediate measures to mitigate the effects of future extreme weather events. In this regard, Thailand is receiving financial and technical assistance from its international partners. The German and Dutch governments have offered valuable technical assistance, and the Japanese government has agreed to provide 8 billion yen (almost $98 million) to help the reconstruction effort and to build new flood defences (Bangkok Post, 2012a). Seeing as much of the infrastructure affected by the floods also serves Japanese businesses based in Thailand, this assistance has advantages for both countries.

1.3. The social impacts

Thailand's international partners, as well as various UN agencies and NGOs, were vital in

responding to the humanitarian crisis caused by the flood. In total, over $20 million was donated to directly aid the victims of the flood. In addition, the Royal Thai Army deployed a total of 56,000 personnel to aid the flood relief effort (World Bank, 2012a). The Thai authorities were also assisted by two U.S. Navy helicopters, deployed to conduct aerial reconnaissance of the flooding (Vaswani, 2011). This international response is symbolic of the magnitude of the floods and the humanitarian toll this disaster took.

It is estimated that as many as 1.5 million homes and other structures were affected by the floods, with around 300,000 homes being damaged in the greater Bangkok Metropolitan Region alone (Aon Benfield, 2012). Livelihoods were also severely affected. Known as the 'Rice Bowl of Asia', rice production plays a highly significant role in Thailand's economic, social and political life. It is estimated that the floods wiped out as much as 14% of paddy fields (Javier and Suwannakij, 2011). This devastation threatened to seriously impact the incomes of farmers and the wellbeing of communities dependent on low rice prices. Due to a mixture of local resourcefulness and government intervention, rice production has not been adversely affected (Sinpeng, 2012). It was not only in rural areas, however, that the impact of the flood was felt.

Perhaps the populations taking the hardest hit from last year's floods were impoverished urban communities based in and around central Bangkok. Such communities are often established around Bangkok's network of canals, in cramped, make-shift settlements (see Figure 4). As such these settlements are extremely vulnerable to flooding. Even before the floods reached Bangkok, these communities were suffering from the rise in vital commodity prices caused by panic buying and shortages (Voice of America, 2011). Production of certain commodities was also severely interrupted by the floods, causing real health threats. In particular, bottled water supplies were affected when the floods knocked out production at all of Thailand's biggest water suppliers (Fuller, 2011a). As a result, members of Bangkok's most vulnerable communities were not able to stock up on essentials before the floods hit, putting them in a bad position to deal with the disaster.

2. THE FLOODS AND ENVIRONMENTAL MIGRATION

In this section we will look more closely at the environmental migration caused by this sudden-onset disaster. The response of the Thai authorities to the 2011 Floods will then be discussed.

2.1. Population displacement and 'trapped populations'

The 2011 Floods were one of the most prolonged periods of flooding Thailand has ever experienced, causing the highest levels of population displacement seen in the country since the Second World War (Tansubhapol, 2011). At their height the number of internally displaced people (IDPs) reached more than 165,000 (World Bank, 2012a). Due to the relatively slow progression of the floodwaters, however, this displacement was generally well-ordered and the authorities, as well as non-governmental organizations and private citizens, were in a good position to come to the aid of the majority of the displaced. At the peak of the flooding around 2,600 shelters took in over 165,000 IDPs (World Bank, 2012a).

Initially, as the floods affected the rural north and northeast of the country, communities were displaced either towards local disaster shelters, to regional cities, or towards Bangkok, depending on their social and financial capacity to relocate. In late October when the flood waters reached Bangkok, the government declared an emergency five-day holiday and urged residents living in flooded or flood-prone areas to evacuate to safer locations. Major disaster shelters were established within Bangkok in sports stadiums, university campuses,

Vulnerable Migrant Communities in Bangkok: Living on the Edge

Since the latter half of the twentieth century Thailand has enjoyed rapid economic development, increasing urbanization and migration towards the capital. There are approximately 3.5 million international migrants in Thailand, the majority of whom originate from the surrounding countries of Myanmar, Cambodia and Laos (IOM, 2011). Thailand also experiences high levels of internal migration, amounting to approximately 1.2 million people annually (IOM, 2011). These migrant communities often live in informal settlements in urban and peri-urban settings which are exposed to variety of vulnerabilities. Firstly, they are often made up of poor quality housing, precariously balanced on the edge of canals (see Figure 4). Such proximity to canals and the poor quality of housing creates a multitude of health, environmental and disaster-related dangers. Secondly, due to the informal and often illegal nature of these settlements they lack the infrastructural and social support afforded to other communities, negatively impacting their ability to cope with floods and other natural disasters. Thirdly, again owning to their often illegal nature, these settlements are periodically targeted by the authorities for relocation (Davivongs *et.al.,* 2012).The precarious legal and environmental existence of migrant communities in Bangkok discourages them from investing in improvements to the quality of their homes and neighbourhoods, increases their social marginalization, and exposes them to a lack support and capital necessary to cope with the impact of floods and other natural disasters.

A view of the Mae La refugee camp in Thailand.

Photo credits : © IOM 2007 - MTH0249 (Photo: Thierry Falise)

and airport terminals. Many residents preferred, however, to flee the city entirely, with large numbers heading towards the southern beach towns of Hua Hin, Pattaya and Phuket, and others towards safer cities in the country (Konglang, 2011). Airports, bus terminals and train stations all became packed to capacity and those wishing to leave by road faced traffic jams of between six to ten hours (Tansubhapol, 2011).

Some of Bangkok's residents did not have the capacity to leave the city and became trapped in their residences with little access to daily necessities for the duration of the floods. According to the government, this trapped population amounted to as many as 800,000 individuals in Bangkok alone (Tansubhapol, 2011). As the floods continued this trapped population became increasingly isolated, and without access to electricity, clean water or easy access to food, this population became susceptible to a variety of health risks including skin infections, dysentery, malaria, dengue fever, accidental drowning and electrocution (Bland, 2011).

The inability or unwillingness of certain sectors of Bangkok's society to move away from flooded or flood-prone areas stemmed from their pre-existing vulnerabilities in society. Sectors with particularly high-levels of marginalization and vulnerability include migrant communities (see Box 1). The floods significantly impacted locations and industries with high migrant concentrations, including industrial parks in Ayutthaya, Pathum Thani and Nakorn Pathom provinces where many migrants are employed. The inundation of these locations put many migrant workers, temporarily or permanently, out of work. The already vulnerable position of migrants was, therefore, further weakened by the 2011 floods. Lacking employment, many migrant workers decided to return to their countries of origin. Between September and November 2011 around 100,000 migrants from Myanmar returned to Myanmar through the Mae Sot border pass (Bangkok Post, 2011b).

2.2. Response of the thai authorities

During the floods the authorities took a variety of steps to manage the disaster, provide aid to victims, and communicate information on the situation to effected communities and the nation as a whole. Initially, the actions of the authorities came across as confused and uncoordinated, displaying a lack of preparedness and an unwillingness to cooperate during a time of national catastrophe. Miscommunication was rife and the newly-elected Prime Minister Yingluck Shinawatra seemed more willing to delegate and "skirt around tough decisions" than get to grips with the situation (Pongsudhirak, 2011). Moreover, political infighting between the government and the opposition-led Bangkok Metropolitan Administration led to contradictory reports, public confusion, and a failure to take advantage of the international assistance offered to Thailand (Alertnet, 2011).

The response of the authorities was supposed to be coordinated through the Flood Relief Operations Command (FROC), an ad-hoc body created by the government. Until the Prime Minister personally took charge of this body, however, its efforts were significantly hampered by infighting

and a lack of coordination with other agencies. The direct involvement of Prime Minister Yingluck appeared necessary as it became increasingly clear that some officials were not obeying her instructions. As well as taking direct control of flood management efforts, the Prime Minister also declared that the Disaster Prevention and Mitigation Act would be thoroughly enforced, a law which includes punishments for disobedient officials (Fuller, 2011b). With the chain of command clarified disaster management efforts seemed to improve. Political questions still persist, however, over the response of the authorities, especially their decision to safe-guard central Bangkok, while keeping surrounding communities inundated.

Anger was particularly directed at the use of 2.5 tonne sandbags, employed to protect central Bangkok (Alertnet, 2011). While offering protection from inundation to some, these sandbags trapped flood waters in neighbourhoods particularly in the north of the capital for weeks destroying homes and livelihoods and enflaming communal tensions. For the fledgling government of Prime Minister Yingluck, elected on a largely populist agenda, the decision to appear to sacrifice poorer neighbourhoods on the outskirts of Bangkok for the privileged city centre has made many question the governments' loyalties.

There was also a controversy over the treatment of migrants and discriminatory distribution of assistance. During the floods many migrants avoided evacuating to disaster shelters for fear of arrest and deportation. Those who decided to seek shelter in their countries of origin faced extortion at the hands of border officials and opportunistic gangs (Petty, 2011). There have also been reports of discrimination against migrants in the delivery of flood assistance, and activists have claimed that the Thai authorities failed to help migrants trapped in houses and factories (Win, 2011).

Since the end of the crisis period the government has embarked on a major programme of recovery and reconstruction the estimated cost of which is THB 1.5 trillion, approximately $50 billion, over five years (World Bank, 2012a). A recent World Bank report, written in collaboration with the Thai Ministry of Finance, has presented an initial policy framework which may provide a clue as to the direction of recovery and reconstruction (World Bank, 2012a).

The first policies presented are directed towards providing financial and infrastructural support to affected populations, with a particular focus on poorer and more vulnerable groups. The second branch of this policy framework looks at investing in a more climate resilient Thailand. The report proposes strengthening flood and water management mechanisms, hazard mapping, early warning systems, and upgraded infrastructure as a means to this end. Thirdly, the report highlights the need to take advantage of the opportunities the reconstruction period present to rethink development priorities, review land use practices, improve economic planning and environmental management, all with a view to reduce vulnerability to hazards and ease social conflicts (World Bank, 2012a).

3. POLICY OPTIONS AND RECOMMENDATIONS

In this section we will review some of the policy options available pursuant to creating a more climate resilient Thailand. Firstly we will explore the development and migration challenges faced by Bangkok in relation to urban flooding. Secondly we will detail the policy options, of both a structural and non-structural nature, open to the Thai government in the wake of the 2011 Floods. Finally this section will make a case for integrating migration and migrants into the policy response.

3.1. Migration and urban flooding in Bangkok

Over the past thirty years rapid urbanisation has created greater urban sprawl throughout the entire Bangkok Metropolitan Region, creating one of Southeast Asia's largest mega-urban regions. As such, this region attracts migrants not only from rural areas of Thailand, but also from all around Southeast Asia. To provide employment for these newcomers developers have built commercial centres and industrial zones all around the Bangkok Metropolitan Region. Bangkok and its vicinity has thusly become a highly dynamic urban region accounting for nearly one half of all industrial production in Thailand (World Bank, 2010a). But it has also caused a variety of new environmental hazards, and has enhanced existing ones. One such hazard is urban flooding.

The Bangkok Metropolitan Region, owing to its nature as a fertile floodplain, was originally settled as a site for agriculture. As such, irrigation systems, constructed to facilitate farming and transportation, have been present in this region for centuries. Since the onset of rapid urbanization, however, many of the canals that make up these systems have been filled in or have been allowed to fill up with silt and debris through neglect. This has meant that agricultural areas surrounding urbanized zones have suffered from the disruption to irrigation system and have become untenable, making possible the continued outward sprawl

of urbanisation (Naivinit *et.al.*, 2008). This continued urbanisation has further altered land use, changing water flows and expanding impermeable surfaces, thereby enhancing the flood hazard (World Bank, 2012b).

The challenge to Bangkok has not only been the extent of urbanisation, but also the form that some of this urbanisation has taken. The phenomenon of seasonal migration poses a particular challenge for urban planners in Bangkok. This variety of migration has long been practiced by rural households as a response to "land pressure, economic crisis and/or opportunity, and the seasonal nature of rice cultivation in Thailand" (IOM, 2011: p. 14). Insufficient resources have, however, been dedicated to this additional population, resulting in urban poverty, unsafe and unsanitary living conditions, and a particularly weak level of resilience to floods and other natural disasters within these communities.

As climates become more uncertain and extreme weather events more frequent, the need to build ecologically sound and well planned urban regions has become a priority for countries everywhere. Uncertain climates will also provide incentives and, in some cases, imperatives for populations to migrate. The ways in which Thailand faces the twin challenges of continued development and increased migration will determine the resilience of the nation to future floods and other natural disasters.

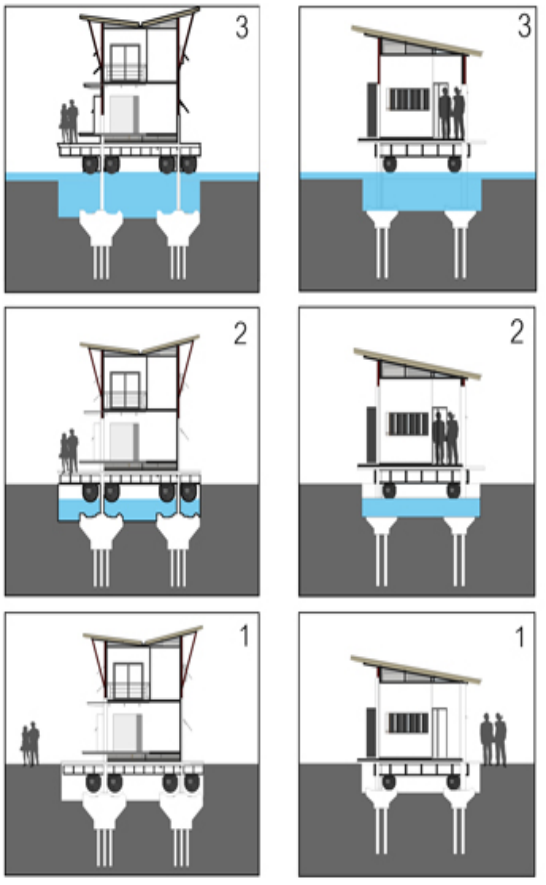
3.2. Policy options: structural measures

Structural measures in flood risk management are changes induced in physical environments engineered to manage the risk of flooding. Such measures typically include 'hard-engineered' solutions, such as dams and irrigation channels, but may also include 'complimentary or alternative' measures such as wetland creation (World Bank, 2012b). Although these measures are taken to modify the natural environment, they also have a social impact. A particular theme of heavily-engineered responses is that they tend to transfer flood risks from one location to another (World Bank, 2012b).

One structural measure already touted as a possible solution to Bangkok's urban flooding problems is the dredging of canals. By dredging and clearing the debris from canals the authorities hope to improve the capacity of these canals to carry floodwaters safely out of the city. Currently, dredging projects are being carried out in 18 districts in the Bangkok Metropolitan Region, with a further 12 having been targeted for such projects (Dredging Today, 2012). These projects will hopefully also improve the environmental condition of Bangkok's canals, and improve the lives of those living close to them, as well as reducing the risk of flooding within these areas.

Another structural measure being adopted by the Thai authorities is the creation of water retention areas, covering a total of 4,800 km² of farmland. Districts in eight provinces, including in Ayutthaya Province, have been particularly targeted for the creation of water retention areas intended to absorb the bulk of floodwaters before they reach highly-populated areas. The creation of new floodplains is not entirely popular however, and petitions have already been lodged at the Administrative Court by farmers whose land has been targeted by this scheme (Bangkok Post, 2012b).

Figure 3. Site-Specific's Amphibious House Project



Source: http://asitespecificexperiment.wordpress.com/2011/05/12/amphibious-house/

A perhaps more popular government programme would be one that seeks to improve the quality and resilience of housing, as part of a 'build-back better' campaign. In earlier eras Thai buildings were built with floods in mind, in that they were built high off the ground on long stilts. In conceiving of modern buildings that would be able to cope better

with flooding events, Thai architecture firm Site-Specific have come up with an innovative solution that harnesses elements of traditional Thai architecture to mitigate the effects of flood disasters. They have developed the concept of 'Amphibious Houses' designed with a prefabricated steel flotation systems which sits in a trench underneath the house. In times of flooding the trench will fill with water, activating the flotation system and giving the house buoyancy (see Figure 5). Site-Specific has recently been given $90,000 by the National Housing Agency to see if their 'Amphibious Housing' project could become a reality (Tang, 2012). If this concept proves to be practical it may well become part of a wider programme to build-back better after the floods.

3.3. Policy options: non-structural measures

Non-structural measures in flood risk management are non-physical measures taken especially to enhance capacities to cope and respond to flood events (World Bank, 2012b). This category of flood response typically involves issues of governance, planning and awareness. The success of non-structural measures requires community engagement and clear communication. If these measures are successful they can reportedly provide "multiple benefits, over and above their flood management role" (World Bank, 2012b: p. 288).

During the 2011 floods the response of the authorities to the unfolding disaster often seemed confused and contradictory. Government miscommunication created unnecessary panic and hampered disaster management efforts. Jerry Velasquez, a Senior Regional Coordinator with the United Nations International Strategy for Disaster Risk Reduction, has stated that the problems of disaster response were due to the fact that there are "about eight institutions centrally that deal with water in Thailand" (Global Ecology Network, 2011). Having a more streamlined system of disaster management with a clear chain of command would have multiple benefits. It would help to improve the coherence of the government's response, enable increased national preparedness, and improve the clarity of government communication.

Another non-structural measure that could be promoted in Thailand is the greater uptake of property insurance schemes. This measure could aid land use governance and enhance community resilience. Currently the level of household insurance coverage in Thailand is low. Increasing coverage, in conjunction with improved urban planning, could improve community resilience by providing funds for repairs and improvements in the wake of future floods or other natural disasters. Moreover, through financial disincentives insurance schemes could be used to discourage inappropriate or dangerous land use (World Bank, 2012b). Thailand as well as other emerging nations may become increasingly important markets for insurance companies in the future.

Improved disaster response and resilience requires a combination of both structural and non-structural measures. The Thai government should also take this opportunity to rethink the development policy of the nation and try to address the unbalanced nature of economic development in Thailand. One way to re-balance development would be to encourage the migration of people and industries to locations elsewhere in the country other than the Bangkok Metropolitan Region.

3.4. Policy recommendation: integrating migration into the disaster response

As pointed out by *The Economist*, "a growing share of the world's population and economic activity is being concentrated in disaster-prone places" (*The Economist*, 2012). As one of Southeast Asia's most dynamic mega-urban regions, which is also at continued risk of disastrous flooding, the Bangkok Metropolitan Region is an example of this trend. Rapid development and urbanisation have aggravated environmental hazards and endangered the lives and livelihoods of more people. Moreover, the unbalanced development of Bangkok in comparison to the rest of Thailand has placed many economic assets at unnecessary risk. This was exemplified by the massive economic damage caused by last year's floods. Encouraging the migration of people and industries away from the Bangkok Metropolitan Region could form part of a strategy of national risk diversification, and could help spread the benefits of development more evenly across the nation.

As part of a build-back better policy agenda the government should also look to develop national infrastructure links, such as airports and highways,

Migration towards Disaster Zones

As well as prompting population movements away from disaster zones, sudden-onset disasters can also pre-empt movements towards the affected areas. In the case of the 2004 Asian Tsunami migrant workers from rural areas and surrounding countries arrived in Thailand to take up reconstruction jobs (IOM, 2007). Such employment will also be available in the wake of the 2011 Floods. As such, immigration policies may need to be modified to adjust to an increasing need for migrant labour.

in locations other than the Bangkok Metropolitan Region. This would encourage the movement of industries to underdeveloped regions, would lessen the strain on Bangkok's infrastructure, and may well help to improve the environmental and ecological health of Bangkok and its surroundings by decreasing the pollution levels. While employing such a strategy, however, the authorities should be cautious not to simply re-locate the problems faced by Bangkok to other locations. Any policy agenda aimed at building a more climate resilient Thailand should look towards achieving a more environmentally sustainable development model as part of a campaign to build-back better.

Finally, attention should also be given to the plight of migrant communities in the wake of the 2011 Floods. They are some of the most marginalized and vulnerable communities in Thai society, whose lives and livelihoods have been severely affected by the floods. In the labour-intensive public works programmes soon to be initiated by the government, priority employment should be given to vulnerable and marginalized sectors of society, such as migrant communities (World Bank, 2012a). Migrant communities should also be more productively engaged by the authorities in order to improve their resilience to floods and other natural disasters and to integrate them further into society. After the 2011 Floods Thailand should not only aim to be a more climate resilient society but also a more just and inclusive one as well.

CONCLUSION

Thailand has seen a strong economic recovery in the wake of the floods, experiencing a 0.3% GDP increase in the first three months of 2012 (Yuvejwattana and Munoz, 2012). The nation should therefore take this opportunity to start investing in a more climate resilient Thailand. With this aim in mind the government of Thailand should encourage the re-balancing of the Thai economy, towards underdeveloped upcountry locations and away from the over-burdened central plains area. Such a strategy would help to mitigate the risks associated with climate change, and may also help to ease tensions between urbanites and rural communities.

Finally, special attention should be given to migrant communities in the recovery process. These communities were perhaps some of the hardest hit during the floods, and some of the least able to respond to such an impact. Yet in the recovery period their labour will be crucial. Such employment will hopefully mean that migrant communities will not be so vulnerable in the future and will become more valued sectors of Thai society.

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TEMPORARY AND CIRCULAR LABOR MIGRATION BETWEEN SPAIN AND COLOMBIA

TATIANA RINKE

INTRODUCTION

Due to recent climatic events in Colombia, which were very probably triggered by the global climate change, many houses and livelihoods were destroyed and many people were forced to migrate. Indeed, since the late 1970's, important pattern changes in the climatic event El Niño-Southern Oscillation (EN-SO) have been observed. This climatic event is composed of El Niño and its counterpart La Niña. It manifests itself in a temperature variation of the ocean's surface. The main reason for this is thought to likely be the global climate change induced by the emissions of greenhouse gases by mankind, even if the possibility of a random fluctuation has not yet been totally discarded (IPCC, 2007). When the coupled atmosphere-ocean event EN-SO appears, this happens in two phases. Typically, the first one to occur is El Niño, which warms the surface of the ocean by a few degrees. Generally, this climatic event happens more or less every five years and has important consequences on most of the continents. In the United States of America, for example, the winters are drier and warmer in north-western, north-midwestern and north-mideastern regions during "El Niño-years". Tropical cyclones are also influenced and the rainfall pattern is greatly disturbed. In opposition to El Niño, La Niña is a climatic occurrence during which the average surface temperature of the equatorial Eastern Central Pacific Ocean lies a few degrees lower than usual. Once again, the climate of various regions is affected by this. In Colombia, specifically, the rainy seasons tend to last longer during "La Niña-years". This climatic phenomenon is provoked by strong winds which have been created along the coasts of South America due to a pressure difference between the eastern and the western Pacific Ocean triggered by the unusual temperature of the ocean surface.

This climatic disturbance of the usual rainfall pattern forced many people to migrate, as they could not carry on their usual agricultural activities. Many find themselves in situations where their vulnerability to both poverty and climatic events increases dramatically. In an attempt to increase the resilience of the people affected by the climatic consequences of La Niña in Colombia on the long run, a labour migration programme has been implemented between Spain and Colombian by the International Organization of Migration (IOM) in cooperation with Fundació Pagesos Solidaris (FAS), a Spanish agricultural union. The project, named "Temporary and Circular Labour Migration Project" (TCLM), facilitates temporary migration to Spain in order to work in the agricultural sector for a limited time. This project is being funded under the AENEAS programme of the European Union. It has been quite successful in trying to create a triple win situation for all involved parties: the receiving state, the sending communities and the migrants themselves. Temporary circular migration has proven quite successful in various cases and this chapter will assess its implementation in the bilateral agreement between Colombia and Spain.

1. COLOMBIAN FLOODS 2010-2011

1.1. Course of events

Colombia was affected by very serious floods in 2010 and 2011. La Niña, combined with Hurricane Tomas, triggered an unusually heavy rainy season. Such important rainfalls, which started in June 2010, had not been registered in Colombia for 40 years. According to the Office for Coordination of Humanitarian Affairs (OCHA) from the United Nations, more than 3 million people

(3.9 million according to the OCHA)[1] got affected by the floods and ensuing landslides between April 2010 and April 2011 (OCHA, 04/27/2011). Between September 2011 and beginning of December 2011 alone, 145 people died (OCHA, 12/15/2011). However, the rain did not stop and after almost 11 months of continuous rainfalls, floods and landslides were still affecting large parts of Colombian in June 2011. After only a few months of rest for the land and the people, the rain started again in September 2011, as it was time for the usual start of the rain season. Even if the rainfalls were not as heavy as the former year, the registered intensity of this rainy season was still seven times stronger than it normally would have been during an average year. Concretely, this can be translated into damages amounting to several billion dollar. Alone for the year 2011, estimations amount to more than 5 billion dollar. In 2011, the Central Emergency Response Fund (CERF) from the OCHA "coordinated the mobilization of $6.6 million in CERF allocations and $1.6 million in ERF resources to help 211,000 people"[2]. In 2010 the Colombian government made a credit request of 150 million dollar to the World Bank which was granted (World Bank, 2010).

According to a report issued by the Panamerican Health Organization on November 29th, 2010, the 2010 floods and the ensuing landslides affected people in 28 of the 32 Colombian provinces. The most affected areas as identified by national catastrophe answer groups are the following: Bolívar, Magdalena, Córdoba, Sucre, Chocó, Nariño, Cauca, Norte de Santander and Arauca. The people that were most affected were internally displaced people (IDP) that were displaced as a result of the violent conflict between the Colombian government and peasant guerrilla groups such as Fuerzas Armadas Revolucionarias de Colombia (FARC).

As precipitation was five to six times heavier than during a normal rainy season, the logical consequence was that the rivers flooded over as they could not carry all the rain water anymore. As it had been raining with such intensity and for such an extended period of time, the soil was totally saturated and unable to drain the overflowing water from the rivers. Consequently, the natural drainage of the flood waters was compromised, accentuating the instability of lands and resulting in numerous landslides in areas that were normally not prone to such problems.

1. http://www.unocha.org/annualreport/2011/col (07/10/2012)
2. Ibid.

Heavy rainfall continued to affect Colombia until April 2011. The rain finally stopped after almost 11 months, which is not without reminding of the 5-year-long rainfall occurring in the Nobel-prize winning novel "One Hundred Years of Solitude" by the Colombian author Gabriel Márquez. Therefore, the affected areas had only a few months to recover before the rainy season started again in September. This means that it rained during what normally is the dry season in Colombia and that this extended rain season almost merged with the next rain season. Once again, important human and material losses were registered. A state of emergency was declared for the whole country and $178 million was made available by the Colombian government. However, the damages were estimated to more than $5 billion (UPI, 2011).

1.2. Governmental response

In an attempt to rapidly identify the needs of the affected population, the Hydrology, Meterology and Environmental Studies Institute (IDEAM), the Geographic Institute Agustín Codazzi (IGAC) as well as the National Statistics Department (DANE) issued a common report on August, 30th, 2011 aiming to identify the affected areas and people and the most appropriate response to the devastation. The government hoped to use the report to allocate aid funds in the most efficient way possible. This report[3] defined areas that are at risk and high-risk of flooding under normal conditions: around 9.2% of the Colombian territory has been deemed to be periodically flooded, representing 10,508,251 ha.. It also states that during the floods of 2010 and 2011, 20,718,175 ha. were affected nationwide, which represents an area twice as large. This takes into account cultivated land, exploited forests and land used to feed cattle. In total, 2,510,858 families were affected by the floods and the landslides.

The common report issued by IDEAM, IGAC and DANE highlights the first needs of the affected people, especially in terms of health, water, emergency medical assistance, hygiene, protection, food aid, education and lodging. To prevent epidemics, such as cholera, it is especially critical to distribute water filters and to educate the population on how to use them. This may prevent epidemics such as cholera. The health issue is identified as the most pressing one to tackle. This is why the Organización Panamericana de la Salud/ Organisation mondiale de la santé (OPS/OMS)

3. IGAC & IDEAM & DANE (2011), "Reporte Final de Áreas Afectadas por Inundaciones 2010-2011"

Colombia has decided which actions must be prioritized. This includes intensifying the surveillance of epidemics and their development, better quality of and access to drinking water and strengthened action on waste management, food manipulation, hygienic infrastructure of housing and disposal of solid excrements.

The damage done to the infrastructure, housing, and agricultural land throughout the floods forced many people to leave their homes and migrate. In an attempt to mitigate the impact of unplanned migration from Colombians to both national and international destinations, the European Commission, in cooperation with IOM Colombia and PagoSolidarios implemented a temporary and circular migration project between Colombia and Spain. The Temporary and Circular Labour Migration Project (TCLM) is an innovative and unique project funded by the European Commission and implemented in Spain and Colombia with the help of the IOM Colombia. The project started in December 2006 and finished in December 2008. According to the IOM 1,519 Colombian workers took advantage of this project through the IOM until 2007[4]. In one of his background paper[5], the Global Forum on Migration and Development in Athens 2009 states that "8,115 Colombians have benefited from the programme under TCLM". They were selected by the IOM in Colombia. Most of them are people that have been affected by recurring natural disasters, such as the eruption of the Galeras volcano or the 2010-2011 floods. These people receive assistance to go to Spain to work in seasonal agricultural for a maximum time of nine months. When their visa expires, they must return to Colombia. They may be re-eligible to return to Spain if they successfully comply with all conditions set by the programme. The main reason to link the TCLM project to environmental migration is that those who lost lost all their means of subsistence to the floods and landslides may earn some money in Spain in order to reconstruct their lives in Colombia as well as acquire new skills that they may use to contribute to the country's development. At the same time, this alleviates the pressure on the soil from Colombian territories that are trying to recover from the 2010 and 2011 floods. The resilience of the people sent to Spain is increased and they are less dependant on the climate to survive and sustain a certain standard of living. This may help to avoid unplanned forced migration which can cause additional damage to both the concerned populations and the territories of destination. The following section will deal thoroughly with this project, its objectives and achievements as well as its advantages and flaws.

2. TEMPORARY CIRCULAR LABOR MIGRATION PROJECT

Catalonia is the Spanish province with the highest rate of migration workers: more than 21% of the migrants living in Spain are living in Catalonia (IOM, 2009). This can be explained by the fact that agriculture is the province's most important economic sector and that many low skilled workers are needed. Skilled migrants and Spanish citizens tend to be rather reluctant to take on those jobs. Consequently, in 2006, 74,1% of those employed in the agricultural sector were foreigners (IOM, 2009). The main agricultural union of Catalonia, Unió de Pagesos de Catalunya (UP), has long been able to recognize the potential of this occurrence and has decided to put it to use for the common good. It started by helping to recruit potential workers and to facilitate their stay. In 2001, it was decided that an official and well-constructed project needed to be implemented in order to further develop this recruiting process. This is why the UP founded Fundació Pagesos Solidaris (FAS), a foundation aiming to support the development of rural communities from different countries on different levels: social, economic and humanitarian. To achieve those goals, UP promotes cooperation between rural communities from different perspectives by, for example, providing support and assistance to the environmental migrants from Colombia who are coming to Spain. Pagesos Solidaris' approach is based on co-development, a philosophy elaborated by Sami Naïr in his 2007 *Report on the outcome and tendencies of the co-developement policy related to migration flows*. Co-development is "a proposal for integrating immigration and development in a way that migration fluxes will benefit both the country of origin and the country of destination. This is a consensual relationship between two countries that will allow migration to the country of destination not to imply an equivalent loss in the country of origin" (Magri, 2009). In order to implement this co-development the FAS divided its work in two parts: recruiting the migrants in their country of origin and further supporting them in various ways once they arrive in Spain. The temporary and circular migration system is seen by some as a way

4. http://www.iom.int/jahia/Jahia/facilitating-migration/pid/2017 (07/10/2012)

5. Global Forum on Migration and Development (2009), "Background Paper; Roundtable 2: Migrant integration, reintegration and circulation for development; Session 2.2 Reintegration and circular migration – effective for development?"

to achieve co-development (De Moor, 2010). IOM is working in cooperation with FAS on this project which is funded by the European Commission in the framework of the AENEAS programme, which supports temporary circular migration.

2.1. Project implementation

The IOM Colombia is taking care of the selection of workers in Colombia. As the work in Spain is either fruit-picking and/or conditioning those fruits, the project targets low skilled workers for seasonal agriculture work. This enables many people to apply for the migration program. As many people have been affected by the 2010 and 2011 floods in Colombia and have seen their whole means of subsistence disappear in torrents of water, this is particularly attractive for affected farmers and internally displaced Colombians. The IOM is basing its selection criteria on how big their involvement in their home community is. As a concrete example on how the selection process works, we can look at Usaquén, a community located in the Bogotá province. The selection committee located there tends to favour people already involved in small productive businesses. This way, the administrative and financial skills as well as the agricultural techniques they learn in Spain can directly be applied to their business upon their return, augmenting their productivity and stimulating the local economy. The higher the involvement of the individuals in their community of origin, the more likely they will return to Colombia after the expiration of their work permit and visa. It would completely "undermine the credibility and the benefits for the entire community" (Magri, 2009) if a large amount of selected migrants decided to overstay their welcome and thus harm the ones applying later. Secondly, the probability that remittances will be invested in projects which benefit the whole community is higher. Lastly, the whole community may also benefit from the skills the migrants learned overseas if they decide to put those skills to use for the public good once back home. The skills migrants may learn abroad are the following: 1,519 people were trained by the IOM in basic technical skills, 1,021 in financial skills and 322 in leadership and local development[6].

Remittances remain the private property of the migrants. Therefore, nobody can force the migrants to spend their money to fund community projects instead of using remittances for personal purposes. However, a study by the Alma Mater University has shown that even if for the first two or three years remittances are mainly used to pay off private debts or improve the living conditions the migrants might be willing to channel their money toward productive projects in subsequent years that benefit not only the migrant and the migrant's family but also the whole community (Magri, 2009). Thus, the selection process is really important to the success or failure of the whole project. The project only makes sense if the migrant comes back as initially planned and puts to good use skills learned overseas.

Globally, the opportunity to engage in the TCLM is perceived as a community project rather than a personal project by the local people (Magri, 2009). Migrants often feel peer pressure from the communities of origin, as their participation to the programme impacts on the sustainability of the project. Also, in IOM interviews with migrants (IOM & European Union, 2010) it appears that they feel some kind of commitment to the community, to those which were not given the opportunity to go abroad. This fact increases the probability they will use their remittances to fund community projects (Magri, 2009).

Travel arrangements that need to be made such as visa, purchase of the flight ticket, etc. are taken care of by the TCLM project. Once the migrants arrive in Europe, the project continues to support them by finding a place to stay and providing them with further information about issues such as the Spanish health care system. The project also provides general assistance in case any problems should arise. Before the departure to Europe, activities and workshops are organized to inform the migrants about the living and working conditions in Spain. This exercise explains the social and cultural context and provides a general view on how their life will be in Spain. This is done so that migrants are able to integrate themselves in the best possible and efficient way. The consequences of failing to comply with the expiration date of their visa as well as the benefits that they receive are again clearly explained and stressed to reduce the risk of migrants deciding to stay in Europe.

The goal of the project is to enable Colombian workers to gain knowledge and experience as well as specific skills so that they may establish a business when coming home and produce economic gain for themselves, their family and the whole community (IOM, 2010). The ultimate goal is the increased resilience of Colombian farmers and IDPs toward changing climatic conditions (De Moor, 2010). By enabling migrants to develop more diversified livelihoods, they lessen the probability that they will one day be forced to move due to slow-onset climate change or severe climatic event.

6. http://www.iom.int/jahia/Jahia/facilitating-migration/pid/2017 (07/10/2012)

2.2. Evaluation of the project

2.2.1. A triple-win situation?

The TCLM project in the Colombian flood case is being used as an adaptation strategy to climate change. According to many official reports, among them the Mauritius Workshop on circular migration (2008), there is a triple-win situation. But some critics, such as Piyasiri Wickramasekara of the Global Union Research Network (GURN), imply that benefits may have been exaggerated (Wickramasekara, 2011). He recognizes some benefits of circular labour migration but challenges the idea of a triple-win situation on the grounds that the foundations of the argument are weak. Wickramasekara questions the assumed preference of migrants for circular migration as well as the benefits for employers and especially the benefits for the communities of origin. Further criticism of temporary circular migration is the lack of legal protection for migrants. In an attempt to address this issue, the TCLM project informs migrants about their rights and duties before and during their involvement in the project through workshops and activities. The more informed migrants are, the more probable they will make the most appropriate decisions (IOM, 2008). The next big issue is the risk of circumvention of the authorized stay by migrants. In an attempt to counter the fact that some migrants might want to stay in Spain after their visa expired, the migrants participating in the scheme have to present themselves at the Spanish embassy in their country of origin within one month of the expiration date of their visa. Failure to do so would result in them being disadvantaged if they ever wish to re-enter the circular migration program. Also, migrants who comply with the set rules for at least two years are registered on a special database and are given priority whenever they apply again for the same migration program or even a permanent worker visa. This mechanism aims at increasing the attractiveness for those migrants to play by the rules.

Despite those issues, according to the philosophy of co-development, the temporary and circulatory migration system is trying to create a triple win situation for migrants, their communities and country of origin and the receiving state. The benefit for each actor will be analysed in the following sections.

2.2.1.1. Migrants

The benefit for the migrant is quite clear. By moving to a country with higher wages, migrants increase their income and are able to send remittances to their family. This in turn improves their living conditions if they can, for example, build a house, buy indispensable tools or open a small business. The skills they learned abroad[7] may eventually enable them to open, create or expand some kind of small business in their community of origin. This will promote the local economy as well as increase the resilience of the migrants and their family to any environmental change. In Usaquén, the IOM noted that, on average, each migrant came back home with savings which can range between €350-2,300. The resilience of the environmental migrants is also an important point. By going abroad, migrants diversify their income through the money earned abroad but also through the possibility to apply their new skills in ther activities. They are able to better face environmental degradation and ensuing loss of subsistence means. Consequently, they become less dependent on their environment and can adapt more easily to changing environmental conditions, be it slow-onset change or more sudden events.

2.2.1.2. Community of origin

The benefits for the community have been partially explained in the above section. Migrants strengthen their sense of commitment to the people who stayed in their community of origin, as they feel they were privileged by being chosen for the project (Magri, 2009). They invest their money gained abroad in projects which will ultimately benefit the whole community. Also, their newly-gained skills, which could be called 'brain gain' in opposition to 'brain drain', and experience will help them set up economic activities that promote the local economy, thus prompting development. In the specific case of Colombia, migration also enables the territories affected by the floods and landslides to recover, which takes some time. Replanting the land right away may be unproductive, as precious minerals have been washed out, leaving the land infertile. If the people from the affected areas do not use the land for a few months or even years, this will allow it to recover more quickly and more thoroughly. Upon their return, not all migrants will pick up their agricultural activities again, as they will have gained new skills that they might prefer to apply, for example by opening a new business.

2.2.1.3. Receiving country

The benefit for the receiving country, in the case of Spain, is that it is provided with workers to fill a gap in the agricultural labour market. As mentioned above, the jobs in the agricultural sector that the Colombian environmental

7. See Section 2.1. Project implementation for the kind of skills migrants learn abroad

migrants are taking are seldom taken up by available domestic workforce. Therefore, it is wrong to assume that these migrants are working at the expense of someone else: they are only filling a void. The Spanish legislation, as seen above, is very clear on this point: the employer has to make sure that no other worker residing in Spain wants to take up the job.

2.2.2. Implementation in other countries

Implementing a similar project in other countries is possible and could yield many benefits. Circular labour migration can support development, relieve demographic and unemployment pressure in developing countries as well as fill gaps in the workforce in developed economies if there is a real need for labour and a legislative framework guaranteeing rights for migrants. As stressed previously, the legislative framework has to be adequate to allow migrants to easily adapt to the changing employment situation. Spain's legislation allows a quick worker quota adjustment to the changing economic and labour conditions.

To implement a similar project in other receiving states, Rush (2005) points out that some conditions need to be fulfilled. In his publication, six essential points can be identified. Castle (2006) summarises them as follows:

- "The strict enforcement of immigration and employment laws, especially against employers who illegally employ migrants and/or violate minimum wage and employment regulations.
- The regulation of the cost at which migrants are made available to employers through, for example, the charging of monthly work permit fees for each migrant employed.
- The implementation of effective labour market tests, i.e. , of mechanisms that create incentives for employers to recruit migrant workers only after all reasonable efforts have been made to recruit local workers.
- The regulation or at least the monitoring of the migrant recruiting industry with an eye to controlling migrants' costs of migration.
- The protection of migrants' rights by making work permits portable within certain sectors or occupations after a certain period of time.
- Mixed incentive-enforcement measures to facilitate the return home of migrants whose temporary work permits have expired."[8]

Spain has implemented most of these measures through its laws and regulation. The TCLM program in Spain is considered overall a great success both for the Colombian migrants and the Spanish agriculture sector according to the IOM but other find it quite hard to measure exactly its impacts, as only few people have been involved (Mc Loughlin & Münz, 2011). States that wish to implement a similar project should take into account the previous points.

Some limitations to the application of a temporary and circular migration project between two countries do exist. The most obvious one is that the communities of origin where this project is implemented should not be permanently uninhabitable. Therefore, the implementation of such a project is best suited for cases like Colombia, where the land needs some time to rest but offers to the returning migrants the possibility to continue living on and from it. It is also quite clear that the amount of people who can take advantage of this project is rather limited. As the economies from developed states need only a limited number of low skilled workers from third countries, the number of people who can enrol in this project is also limited.

3. POLICIES AND LEGAL FRAMEWORK ON TEMPORARY AND CIRCULAR LABOR MIGRATION

The Global Forum on Migration and Development, which took place in 2008, issued the following statement: "Temporary labour migration can work to everyone's advantage if it is legal, protective and linked to real labour needs. […] In the absence of a functional multilateral system, bilateral arrangements have been found to operate effectively in certain countries. […] Joint arrangements between origin and destination countries, particularly for lower-skilled migrants, can help enforce the laws to protect temporary migrants and enhance their contribution to their families and home communities" (GFMD, 2008). The UN Secretary General's Report on International Migration and Development highlighted this already in 2006: "[…] there is potential for these programmes to result in beneficial synergies for migrants, countries of origin and countries of destination" (UN, 2006). Other international organizations such as the UN Department of Economic and Social Affairs, the Global Commission for International Migration and the World Bank have also issued positive statements on this topic (IOM, 2008). It can therefore be said that a number of relevant worldwide organizations agree on the advantages of a temporary and circulatory migration system which would fill the labour gap in a national economy while contributing to the development of

8. S. Castle. 2006. "Guestworkers in Europe: A Resurrection?" (pp.747-748).

an other one. This system of cooperation between countries has not yet been fully exploited.

3.1. Spain

The Spanish position regarding temporary and circular migration is quite advanced compared to those of other member states from the European Union. The Plan Estratégico de Ciudadanía e Integración (Strategic Plan for Citizenship and Integration) which has been elaborated by the Spanish Ministry of Work and Social Affairs in 2007-2010 highlights this. This plan aims at using migration as a tool of co-development between the country of origin of the migrant and the migrant itself (De Moor, 2010). Spain was able to recognize the importance of cooperation between local governments and the benefits it can generate both in the country of origin and the country of destination if the remittances are channelled in the most effective way.

Spain's policy on migration has historically been favourable to temporary migration. The Organic Law N° 4/2000: Article 39; Implementing Regulation: Articles 77-80 (De Moor, 2010) allows workers from countries outside of the European Union to live and work in Spanish territory. Some conditions need to be fulfilled for the law to be applicable and migrants cannot stay more than nine months in Spain within the same year (12 consecutive months). Also, employers must make it certain that no worker already legally residing in Spain can take over the job (IOM, 2009) and that the position is indeed needed within the Spanish economy. Quotas are being determined by the Spanish state regarding the number of migrants already in its territory and the provisional need for low skilled workers each year and may vary depending on the economic situation of the country. These quotas are first proposed to the countries with which Spain has signed a bilateral agreement aimed at facilitating access for citizens of those countries to the Spanish labour market. Up until now, Spain has signed bilateral agreements on migration with Colombia, Ecuador, Morocco, Nigeria, the Dominican Republic, Poland, and Romania. The bilateral agreement between Spain and Colombia was signed in 2001. The configuration of the Spanish economy makes it essential for Spain to import workers from third-countries at periodic moments of the year. Indeed, a lot of low skilled workers are needed to help in the harvest of agricultural products. Workers already legally residing in Spain often do not want to take over these jobs. The workers from third countries are therefore only recruited for some sectors of the economy, as defined by the Royal Decree (2393/2004) (De Moor, 2010), to counter the shortage of willing workers. However, as the harvests only takes place a few months a year, they would become unemployed as soon as the harvesting season is over and instead of supporting the Spanish economy, stress it. This is why Spain favours temporary and, above all, circular migration. The greater flexibility of the Spanish legislation in regard to changing the work place also works in favour of seasonal migration, as it allows the migrants to move on as soon as one harvest is over and seek an other work place.

3.2. Europe

On the European level, the European Commission is favourable to a harmonization of the different national legal frameworks regarding the implementation of a project similar to TCLM. This can clearly be seen by the elaboration in 2005 of a Policy Plan on Legal Migration (European Commission, 2005). This plan aimed at fighting irregular migration by allowing greater integration of the selected migrants and thus trying to make illegal migration less attractive. This Policy Plan was however not able to convince the member states and the five legislative instruments it contained did not have the expected impact. The 2005 Policy Plan was followed by the European Pact on Immigration and Asylum adopted by the European Council in October, 2008. The introduction of this is pact states that "Although real progress has been achieved on the path to a common immigration and asylum policy, further advances are necessary". In 2009, the Council adopted the Stockholm Programme which highlighted once again the European Commission's commitment to the Policy Plan on Legal Migration from 2005. Yet, the only directive that has been implemented until now is the Council Directive 2009/50/EC of May 25th, 2009. This directive, also called the "Blue Card Directive", allows high-skilled workers from third-countries to live and work in the European Union with the exception of Ireland, the United Kingdom and Denmark. Even this directive is found to be "rather a symbol of good-will than than a strong measure for attracting highly-skilled migrants" (Meyer, 2010).

The lack of commitment from the different member states regarding a common legal framework on seasonal circular migration can partly be explained by the feeling of most states that the migration issue is directly related to their sovereignty. They do not want to leave the decision power to another authority, as they fear a loss of control over who lives in their national territory. However, the evolution that has been

observed at the European level, starting in 2005 with the Policy Plan on Legal Migration, has continued with a directive on seasonal migrants proposed in 2010[9]. The explanatory memorandum of the directive proposal clearly states that "This proposal forms part of the EU's efforts to develop a comprehensive immigration policy. The Hague Programme of November 2004 recognized that '[l]egal migration will play an important role in enhancing the knowledge-based economy in Europe, in advancing economic development, and thus contributing to the implementation of the Lisbon strategy'". This directive proposal, called the "Single Permit Directive" has been adopted in December 2011. It established rights for workers from third countries residing within the European Union. In May 2011, the European Union started a consultation on migration and climate change. This consultation influenced the revision of the EU Global Approach on Migration from November 2011. This shows that the European Commission is interested in implementing a common legislative framework to facilitate the mobility of temporary and circular migration and recognizes the advantages that this can bring to European national economies if correctly implemented.

CONCLUSION

One of the main advantages of the TCLM project compared to other migration programs is that it links environmental degradation to development strategies. It tries to create not only a win-win situation between the migrant and the destination country but a win-win-win situation between the migrant, the destination country and the region of origin. The migrants become "agents of development" (De Moor, 2011) through the remittances sent back home and the skills they learn abroad and apply at home. This has been recognized in many official international publications, for example in the UN Secretary General's Report on International Migration and Development (2006). The degradation of the environment is taken as a starting point to promote development by giving the affected people the opportunity to enhance their skills and knowledge in the hope that this will indirectly trigger economic development at a local level. It tries to turn a negative situation into a positive one. The people who choose to take advantage of the TCLM project may not have done so if their living resources such as their land and/or housing had not been affected. This can be deduced from the testimonies of migrants involved in this project who are reluctant to leave Colombia. They do not wish to leave their families and friends behind but confess that they nonetheless had to do so because of the financial need of their families (IOM, 2010). Without them leaving and acquiring new skills, the development which has been observed after their return to their home communities would not have occurred.

Furthermore, the rights of the migrants are being better protected as movement takes place within a clearly defined project which accompanies migrants and makes sure their rights are respected. At the same time, all measures are taken so that migrants do respect their duties and do not overstay their welcome.

In the case of Colombia, the objectives of the project have been met and it can be said that the project has been, and still is, successful. The resilience of the Colombian workers to climate change consequences has been increased and the development of the local communities is promoted. The implementation of a similar project between other countries is possible and is even advised in certain cases. For example, a developing country with a climatic event which disturbs greatly, but at the same time only temporarily, the ecosystem and the means of subsistence of the population would be a good candidate for the implementation of a temporary and circular migration project.

Migration, and especially environmental migration, is becoming an international concern. Thanks to globalisation, travelling great distances has become increasingly easy. The number of those who want to increase their income and living standards by migrating and working in countries with more developed economies are seizing their chance in a legal, and sometimes also illegal, way. The global community needs to cooperate and work out a common strategy regarding labour migration so as to provide the migrants with the best possible conditions to enable states to fully benefit from co-development. Temporary circular labour migration would make irregular migration less attractive and would help manage unwanted migration flows. Supply and demand could be better monitored and help international economies to adapt better to the rapidly changing conditions of the global markets. Temporary circular migration can be an asset to adapt to the effects of global climate change but can foremost be a mitigation strategy. International cooperation is required for it to work successfully. Policy-makers need to keep this in mind when mapping the response to the biggest challenge they have ever faced: climate change.

9. "Proposal for a directive of the European Parliament and of the Council on the conditions of entry and residence of third-country nationals for the purposes of seasonal employment"

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THE 11 MARCH TRIPLE DISASTER IN JAPAN

CLARA CRIMELLA, CLAIRE-SOPHIE DAGNAN

The earthquake, tsunami and nuclear accident that occurred in Japan on March 11, 2011 induced important population movements that can be qualified as "environmental migration", according to the definition set by the International Organization for Migration (IOM). The Japanese government had to organize and manage population displacements that were of unprecedented scale in the country. The displaced populations faced three major challenges: long-term relocation in the wait for decontamination and reconstruction; the vulnerability of the territory which makes it vulnerable to other natural risks in the near future, and the multi-faceted risk of nuclear radiation. The triple disaster also raised the question of the confidence in public authorities, which is crucial for the implementation of the recovery program and the cohesion of society.

For this paper, we chose a chronological approach to describe the population movements caused by the March 11 events, as well as their management: we begin with the description of the evacuation, then proceed to its aftermath, and conclude with the long-term policies for reconstruction, return and recovery.

1. AN UNPREPARED CATASTROPHIC SCENARIO

1.1. A country prone to natural disasters

Because of its geographical position, as an archipelago situated on the Ring of Fire, Japan has always been subject to natural risks such as earthquakes, tsunamis, typhoons and volcano eruptions. For the Japanese people, nature is inherently risky and they have to coexist with that risk – this is called the "saigai" conception (Augendre, 2012). When natural disasters happen, they reflect an unbalanced relation to nature or the result of inadequate preventive measures. Humans can prepare themselves to respond to those risks. The term *zeijaku*, meaning vulnerability, is very little used by Japanese people—they consider it derivative of a Western point of view (Ibid).

The awareness to natural risks, and the need to prepare for them, are part of Japanese education and legislation. People receive training, beginning in childhood, which includes safety instructions in the case of an earthquake or a tsunami. On September 1st, every year since 1960, the country celebrates the National Day of Disaster Reduction. In 1981, the New Building Standard Act was adopted; requiring buildings to be designed to sustain slight cracks in case of a medium-scale earthquake, and to avoid collapse when a major earthquake occurs (United Disaster International Strategy for Risk Reduction, 2005). After the traumatic *Great Hanshin (Kobe) Earthquake* of 1995, systematic inspection of buildings, as well as the improvement of standards to strengthen their resistance, was implemented by law in 1995 and 2006 (Augendre, 2012). More recently, Japan adopted, in 2005, the 10-year Hyogo Framework for Action, to reduce disaster losses and increase resilience.

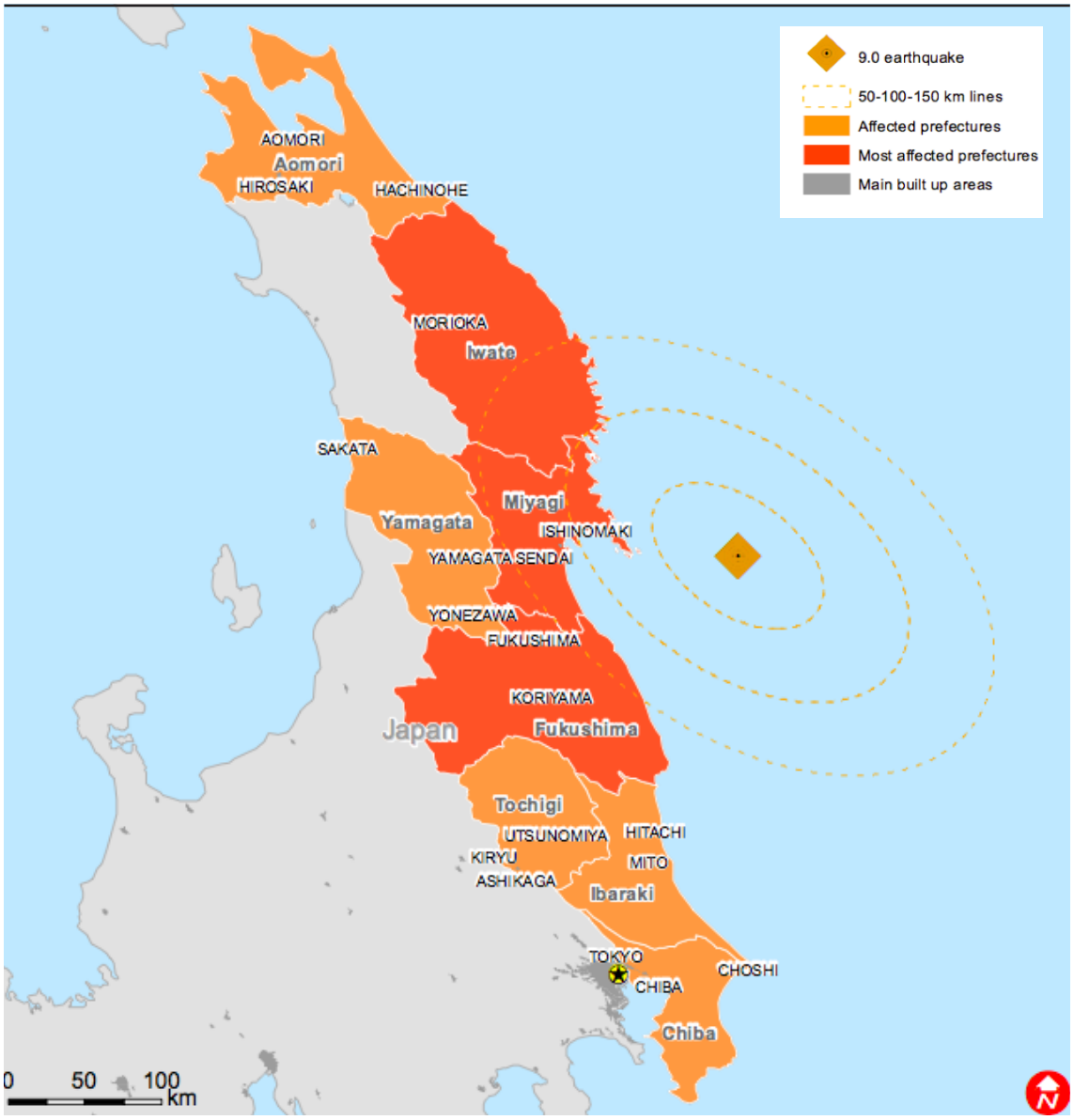
Though Japan is prone to earthquakes and tsunamis, the prevention measures proved largely inadequate and could not prevent the March 11 earthquake and tsunami from causing massive damage, nor could prevent the Fukushima nuclear accident.

1.2. Miscalculation of the risks induced by the March 11 events

1.2.1. The triple disaster

The March 11 events refer to the succession of three major disasters: two natural disasters that induced a third one – an industrial disaster.

Map 1. The March 11 earthquake and tsunami.



Source: International Federation of Red Cross and Red Crescent Societies, March 2011.

At 2.46 pm, on March 11th, 2011, the fourth largest earthquake in history hit the Sanriku coast in Japan. The quake, of a magnitude 9 on the Richter scale, was followed by a tsunami spreading from Hokkaidô to Tôhoku, and then to the Kantô region. The waves reached 40.4 meters at their highest point, and they travelled as fast as 15 km/hour inland. The most affected prefectures were those of Iwate, Miyagi and Fukushima.

The earthquake damaged the Fukushima Daiichi I Nuclear Power Plant, one of the 25 largest nuclear power stations in the world, entirely built and run by the Tokyo Electric Power Company (TEPCO). ¶The earthquake resulted in the loss of the offsite power which is the normal power supply to the plant; reactors shut down automatically and emergency diesel generators started and powered the station's emergency cooling systems.

Approximately one hour later, the station was struck by the tsunami, which inundated the fuel tanks. This disabled the emergency diesel generators needed for backup power. Consequently, the site lost all emergency power supply. The offsite power could not be restored and the pumps that circulate to cool water in the reactors ceased to work, and hydrogen was produced from metal-water reactions in the reactor. As workers struggled to cool the reactors, several hydrogen explosions occurred.¶

Japanese authorities initially assessed the accident as Level four on the International Nuclear Event Scale (INES). The level was successively raised to five and eventually to seven, the highest, causing widespread contamination with serious health and environmental effects (Japanese Ministry of Economy, Trade and Industry, April 12th 2011). The Fukushima accident is registered as the second largest nuclear accident after the Chernobyl disaster, which occurred in Ukraine on 26 April 1986. It was the only level-seven accident on record before March 2011.

1.2.2. Inadequacy of the safety and emergency procedures

The preventive measures to mitigate the effects of the earthquake and the tsunami were insufficient, showing a lack of anticipation by the Japanese authorities.

The reduction of the tsunami's impact was planned via the construction of dykes 10m high and 2.5m long in Miyagi city, called the Great Wall, and the world's biggest breakwater - 63m deep in the sea and 8m above in Kamaishi. The breakwater collapsed after the 2011 tsunami hit.

The earthquake alarms operated properly in the targeted region; the tsunami warnings began three minutes after the first main shock from the earthquake and were disseminated through media, sirens and wireless system. However, as the earthquake hit Tôhoku, electric power was cut off. Consequently, individual radios did not work and sirens at the top of electric poles fell down. According to surveys conducted by Reiko Hasegawa, researcher for the DEVAST project[1], "residents could not hear the second evacuations alerts. When they could, they were told to flee in a very polite, Japanese way, with a calm voice saying things like 'Please, evacuate'." People did not understand the urgency of the situation and the survivors have complained that the evacuation orders were not transmitted appropriately for the gravity of the situation. Furthermore, people did not expect a second wave to hit, nor that it would be higher than six meters – which was thought as the maximum possible height from previous experiences of tsunami in the region. Ten minutes after the earthquake came the first wave. It gave time for people to escape, to keep themselves safe while the wave entered the city and then to come back home. Forty minutes after came the second wave, the "real" tsunami, taking people by surprise. As Hasegawa notes, "their experience became their vulnerability".

With regard to the Fukushima accident, the Japanese authorities admitted that the nuclear disaster found them unprepared. In this case, the lack of preparation was caused, in part, by a public myth of "absolute safety" that nuclear power proponents had nurtured over decades (Behr, 2012). Japan's Prime Minister, Yoshihiko Noda, declared in March 2012 that the Japanese government shares the blame for the Fukushima accident since officials had been blinded by a false belief in the country's "technological infallibility" (Tabuchi, 2012).

Although nuclear regulators and plant operators had been thoroughly trained on security measures, the accident was seriously worsened by an overall underestimation of the possibility of significant natural disasters and serious accidents, an inadequate design basis of the nuclear power plant taking into account a massive tsunami event, and poor coordination between the Fukushima nuclear operators and the Japanese government. Plant workers had no clear instructions on how to respond to such a disaster, especially after the loss of all energy supply. They did not understand immediately what was going on and did not know how to follow the emergency procedure and therefore made significant mistakes.

1.2.3. The concept of environmental catastrophes redefined.

The conjunction of the three disasters was surprising and unexpected. It found the Japanese authorities unprepared to face the tsunami and even less the consequences of the nuclear accident. The March 11 disasters represent a new category of "environmental disaster" and a major shift in the way of thinking about risk. They frame a global conception of "environment" which does not refer only to nature and in which one specific risk unleash a chain impact on other components of the environment. In this case, the earthquake and the tsunami damaged the nuclear power plant, affecting in turn the natural environment through nuclear contamination. The nuclear contamination becomes a polymorphic risk that is present in the sea, in the soil and in the food, involving environmental and health issues. Moreover, the risk scales up as it can have consequences worldwide.

1.3. Public confidence and trust toward the authorities

The disasters caused huge damage across the affected region. Fires following the earthquake and the tsunami destroyed around 90,000 houses and 128,651 buildings (Japan Centre for International Exchange, 2011). The fishing industry,

1. See http://www.devast-project.org

which is a cornerstone of Tohoku's economy and provides a significant share of Japan's seafood, was completely wiped out. The agricultural and manufacturing sectors were also deeply affected. The earthquake damaged the transportation network, transmission lines, and power plants were forced offline, causing continuous blackouts. The Japanese government estimated the total costs to be $216 billion (¥17 trillion). Collapses of buildings also caused debris to fall in the sea and on the ground. The debris has now to be stocked, sorted and treated – which will take time. In Miyagi prefecture alone, the debris is estimated between 15 to 18 million tons (Asian Disaster Reduction Center, 2011). The disaster took place in an impoverished region suffering from a chronic loss of population. The remaining population was mostly made up of fishermen living by the sea and therefore exposed to tsunami.

Figures about human loss and displacement should be carefully considered. They vary according to official governmental and prefectural reports. The Japanese National Police Agency, in May 2011, stated that 15,129 people died during the tsunami. Among those, 13% were unidentified and 9,034 people were counted as missing people (The Yomiuri Shimbun, 2011). Senior citizens over the age of 60 formed the largest proportion of victims, accounting for 65% of deaths. Before the disasters, 30% of Tôhoku's population were 60 years old or above (Japan Centre for International Exchange, 2011). These figures reflect the fact that the evacuation measures were not adapted for a vulnerable population such as the elderly, who need assistance in emergency situations. Crossing information coming from different reliable sources, it is estimated that two days after the disasters there were more than 450,000 evacuees from the tsunami and 170,000 related to the nuclear accident. On top of these numbers, one needs to add the number people who decided to leave by themselves, though this number is unclear at the time of writing.

Following the March 11 events, public distrust and hostility over the government's response to the disasters have arisen and the level of confidence of the victims toward national and local authorities has declined steadily. A distinction can however be made between two categories. Evacuees from the tsunami-hit areas, who used to have a close relationship with municipalities before the disaster, tend to blame the latter, saying that it is a human-based disaster rather than a natural one. They blame the municipalities for carelessness in the placing of evacuation centres for earthquakes in coastal areas, located on the lower grounds of the cities that were swept away by the tsunami. However, it may be understood as a way to vent their frustration at somebody (Hasegawa, 2012). On the other hand, evacuees of the nuclear disaster tend to blame more heavily the central government. Trust in the government has considerably faded, and this undermines the governmental management of the population as well as the society's cohesion.

2. PEOPLE DISPLACEMENTS

2.1. The confusing organization of people's evacuation and housing

The Japanese response to the crisis was impeded by delays in issuing evacuation orders, and delays in releasing data about dangerous radiation leaks, difficulties in keeping records and documentation about the key meetings held during the early and crucial days of the crisis. All of these factors contributed to the disaster worsening, and to the loss of confidence of the Japanese population towards the central government, which has been highly criticized by the evacuees for its handling of the emergency and lack of transparency.

According to Reiko Hasegawa, local municipalities and the population basically shared the "same destiny" and "feeling of abandonment; they were both in the dark as to what should be done with regard to evacuation, because of a lack of communication from national officers. Municipalities had to decide by themselves, and most declared the evacuation of the whole population without waiting for the evacuation orders from the central government). Such orders would often fail to reach the municipalities because of flooded or broken communication systems.

Evacuation orders succeeded day after day. After the official declaration of a nuclear emergency at 19:03 on March 11, the Fukushima prefecture ordered the evacuation of 1,864 people within a distance of two kilometres from the nuclear power station. This zone was extended to three kilometres during the evening by a directive from Prime Minister Naoto Kan, which affected 5,800 people, together with instructions for residents living within ten kilometres of the plant to take shelter.

In the following days, residents living within twenty kilometres from the plant were obliged to evacuate. Over 50,000 people were evacuated on 12 March. The Prime Minister also advised residents of the Fukushima area to take shelter, stay inside, close doors and windows and turn off air conditioning. They were also advised to cover their mouths with masks, towels or handkerchiefs as

Displaced persons camp, Tohoku area, March 2012.

Photo credits: © 2012. François Gemenne (IDDRI)

well as not to drink tap water. Air traffic was restricted in a twenty kilometres radius around the Fukushima Daiichi site (Weisenthal, 2011).

After officials admitted the possibility of a meltdown, on 13 March, some 170,000 people were evacuated, joining more than 450,000 evacuees from other regions affected by the earthquake and the tsunami (Harlan, Mufson, 2011). On the morning of 15 March, the Prime Minister issued instructions that any remaining people within a twenty-kilometre zone around the nuclear plant had to leave, and advised those living between twenty and thirty kilometres from the site to stay in their houses and shut windows and doors. The evacuation area was further extended during April. Residents in the thirty-kilometre circle were urged to leave their houses as well (Makinen, 2011) and the Japanese government created a "no-go zone" for the 20 km radius zone. This order affected more than 80,000 residents.

The International Atomic Energy Agency (IAEA) recommended expanding the evacuation area further, having found contaminated soil samples in the village of Iitate, about forty kilometres northwest from Fukushima, but the Chief Cabinet Secretary Yukio Edano stated that the government would wait to see if the high radiation continued before widening again the evacuation zone (Takahara, Nagata, 2011).

In May, the Japanese government began the evacuation of people from the area that had an air radiation dose of 20 mSv/year. As of September 2011, more than 100,000 Fukushima Prefecture residents were reported to be still subject to several kinds of evacuation measures, forcing them to live outside and sometimes far away from their home cities and towns.

Right after the disaster, people were evacuated to shelters such as municipal buildings, schools, and gymnasiums. The second step was to move to transitional shelters, also known as temporary housing, provided by public authorities. Transitional shelters were made available by the prefectural governments; the municipality made the selection of the sites for housing, and the funds came from the central government. The final step

of the process is permanent housing: either people build their own houses, or they live in rented public housing with a discount on the rent (International Recovery Platform and Kobe University, 2012).

There are different types of transitional shelters. Temporary houses are pre-fabricated houses whose size is around 29 square meters. People can also rent private houses as temporary housing, and the local government pays the rent. This solution is mostly found in urban areas, and is cheaper, more comfortable than temporary houses. Finally, there are also public housing and government-owned accommodation, for which the rent is also paid for by the government.

Criticism has been raised regarding the system of temporary housing. Housing is allocated to evacuees on a lottery basis. Information was not circulated properly and some people were not able to be present at the place where the lottery was drawn. The houses are small, conceived of as single-family homes. They are located far from the places people used to live in and are built on inland areas, much colder than coastal areas. In the coastal areas, where the tsunami hit, temporary houses had to be built quickly and without some special materials, as manufactures were destroyed: this raises questions about the durability and quality of those buildings (Brice-Asanuma, 2011). To counterbalance those issues, the government and non-profit organizations have emphasized the support for residents of the temporary houses. They provided improvements to the houses (insulation and soundproofing, interior furniture) and a transportation network, and they manage projects for people to earn some income by selling their handmade products.

Continuous attention needs to be paid to the displacement of evacuees, since their life condition is unstable: they do not know how long they will have to wait before they can come back to their houses, and they still wonder whether such a return will be possible or not. Some locations close to the nuclear power plant are estimated to be contaminated with accumulated radiation that diminishes the residents' hopes to return home any time soon. Those zones have to be decontaminated to reduce radiation levels, and there is no certainty about the length of the decontamination process. The situation of families and farmers in the region remains delicate. Some of them had to leave their houses, their lands, their animals, kill their cattle and destroy their harvests. The suicide rate among evacuees, especially among those in temporary housing, is not negligible (Hasegawa, 2012).

2.2. Voluntary evacuation

2.2.1. Leaving abroad

The nuclear threat provoked departures from the country, despite reverse recommendations from the Japanese government to foreigners as well as local population.

The departure abroad of foreign nationals can be understood as a strategy of precaution rather than a forced migration. In Japan, the three largest foreign communities are the Chinese, the South Koreans and the Brazilians of Japanese descent. In the four weeks following the disasters, 531,000 foreigners left with or without their country's governmental assistance: amongst them were 185,000 Chinese, 107,000 South Koreans and 39,000 Americans (Richard, 2012). Pressure from family, instructions given by the head offices of foreign firms, and recommendations from embassies and consulates played a role in the decision of foreigners to leave Japan. American nuclear experts recommended an evacuation of a much larger perimeter than that recommended by Japanese officials (Sanger, Wald, Tabuchi, 2011). Also Spain, Germany and South Korea advised their citizens to stay much farther away (at least 80 kilometres) from the nuclear plant (Ibid).

On the other hand, Japanese nationals left the country by their own means, with no governmental assistance—official figures about those departures have not been released. Foreign countries showed their interest in attracting Japanese talents and offered them to settle down. As an example, the official communication from the Hong Kong Immigration Department (April 4th, 2011) states: "Countries all around the world are fighting over talent exiting Japan because of the earthquake. We hope that they consider long-term settlement in Hong Kong." A visa done in 48 hours was made available for executives working in banks or multinational companies of finance, earning between $150,000 and $300,000 a year (The Wall Street Journal, 2011).

Table 1. Departures outside Japan in the weeks following the tsunami, according to figures from the Japanese Ministry of Justice

Period relative to Tôhoku earthquake	Arrivals	Departures	Net
Week minus 1	157,000	140,000	+ 17,000
Week 1	58,000	244,000	- 186,000
Week 2-4	244,000	287,000	- 43,000
Total weeks 1-4	302,000	531,000	- 229,000

Source: Richard J.L. 2012.

2.2.2. Internal migration

At the internal level, if most of the population in the evacuation areas were forced to leave their homes, many more, especially those who lived in the zones affected by the instructions to remain indoors, decided to evacuate voluntarily as the provision of supplies in the region was not always assured and they suffered from a severe lack of resources (Isoda, 2011a). Residents evacuated with the institutional evacuation scheme left their communities with buses provided by the local government. Others, who wanted to leave on their own because they feared the radioactive leak, decided to travel with their own car and sought shelter with relatives and friends (Isoda, 2011a).

The regions directly affected by the natural disaster and the nuclear accident are the Hamadori region along the coast, separated by Abukuma Mountains from the central and more populated Nakadori region, and the western Aizu region.

It is difficult to analyse the geographical spread of the population after the earthquake, the tsunami and the nuclear disaster, since voluntary migrants have no legal obligation to report to the authorities their whereabouts and those who take shelter with relatives or friends do not necessarily report their change of address to the municipal government. Although the exact number of evacuees has not been captured and no reliable statistics on the evacuations are collected, some data are available and can help to grasp an overall picture of the Fukushima Hamadori diaspora. These are presented below.

Table 2. List of evacuees and destination of relocation

Cities within the Fukushima Prefecture	Number of evacuees
Fukushima City	4,773
Tamura City	4,621
Koriyama City	3,713
Iwaki City	2,657

Cities outside the Fukushima Prefecture	Number of evacuees
Katashina-mura (Gunma Prefecture)	1,959
Yuzawa-cho (Nigata Prefecture)	935
Nagaoka City (Nigata Prefecture)	877
Nigata City (Nigata Prefecture)	869

Source: Fukushima Prefecture, April 15th 2011.

The majority of evacuees from the regions under evacuation orders were evacuated outside their own municipality. Most of these evacuations are registered in surrounding municipalities including the largest cities of the Fukushima Prefecture. The remainder evacuated to the Ibaragi, Saitama, Akita and Tochigi Prefectures. Further to the west the number of evacuees decreases as the distance from Fukushima Prefecture increases.

Families coming from the regions affected by the tsunami and the nuclear disaster coped with the crisis through different strategies and solutions. In April, 2011, Yuzuru Isoda conducted a study in which he examined the situation of the institutional evacuees hosted within evacuation facilities.[2] According to the author, there has been a general tendency to use family separation as a strategy to handle the trade-off between maintaining a link to the original community in order to better access announcements and opportunities in the native municipality and having safe and sound living conditions in other municipalities (Isoda, 2011a).

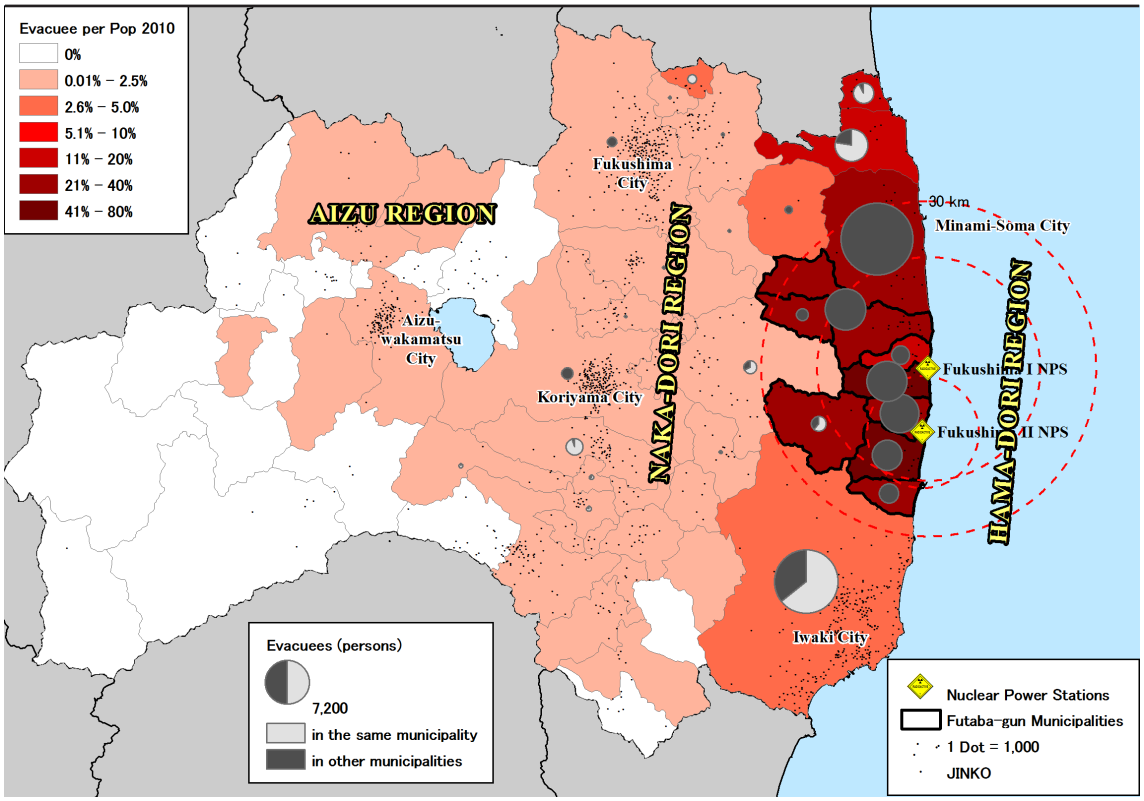
Indeed, he found that young children and their mothers, as well as young adults, evacuated more frequently to distant locations outside Fukushima Prefecture while older male workers and their parents [3] usually stayed in Hamadori region near their home towns (Isoda, 2011a). However, family separation does not always reflect a precise strategy but sometimes is the result of tension between husbands (who usually preferred not to leave) and wives (who were worried for their children's health and see the displacement as a necessary solution). Many self-evacuees mentioned that separations may result in divorces (Hasegawa, 2012).

According to a survey conducted in June 2011 by the municipality of Okuma, which hosted the Fukushima Daiichi Nuclear Station, soon after the nuclear disaster, some sort of stratification occurred among the evacuees from Fukushima Prefecture, especially depending on individual or family connection to regions outside the affected area (Isoda, 2011b). People who worked for a company based outside the region affected by the disaster or people who had part of their family in a different Japanese prefecture were better off, while evacuees who worked for a local company, who had all their relatives in the region or who were owning a house within or in the proximity of the evacuation areas were highly disadvantaged. Among the former, more than 50% of the full-time workers were still employed full-time after the disaster (Isoda, 2011b). They usually continued to work for the same company and had the chance to be transferred to a different branch. The fact that they had a full-time job enabled this category of workers to rent private housing while full-time self-employed workers found it much more difficult to be

2. His study takes into account the age and sex of evacuees. The author warns that his analysis could include some bias since there can be double counts of evacuees who moved to different facilities, came back home, were hospitalized or were host by families and relatives in private evacuation location.

3. aged 75 or more.

Map 2. Evacuees by municipalities in Fukushima.



Source: The 2011 East Japan Earthquake Bulletin of the Tohoku Geographical Association, April 2011.

employed and rent accommodation after the nuclear accident. A significant number of male workers in their 30s and 40s were evacuated to Niigata Prefecture. This is probably associated with the transfer of personnel working in nuclear related activities to the Kariwa Nuclear Power Station.

2.3. Tensions within the local community

A disparity exists between those who left their municipalities and those who could not leave and were obliged to remain in their home prefectures because of their jobs, family obligations or possessions in those regions. This is particularly true for those regions that were not declared under the evacuation orders. Indeed, in the Hamadori region, the easternmost of the three regions of Fukushima Prefecture in Japan, many were forced to leave because of government decisions and the population showed great solidarity. On the contrary, in those regions that were not under evacuation orders, but were significantly contaminated, tensions between those who left and those who stayed arose.

In addition, people who decided to leave voluntarily were considered as cowards, betrayers, traitors, "anti-Fukushima" and "anti-Japan" (Hasegawa 2012). Those people knew that, once they left, they would not be welcomed back. The psychological suffering of both groups, those who left and those who stayed, cannot be ignored.

Compensation is also an important element to understand the jealousy of people who could not leave, and therefore do not receive any assistance from the central government, as well as a crucial element to analyse the decisions made by evacuees. Compensation may encourage evacuees to start a new life, but also deter citizens from doing so, allowing them to rely only on payments from TEPCO.

Because of the long-term consequences of the disaster, in February 2012 the government's centre for settling disputes over compensation for nuclear accidents set new restitution standards for the on-going Fukushima nuclear crisis. These new standards are very specific and call on TEPCO to pay to every person that has left their home $1,246 per month as well as a compensation for the psychological pain. This amount will not be halved after 7 months,[4] as was initially planned. In addition, TEPCO should pay to all voluntary migrants the cost of transportation and accommodation

4. The duration of these compensations has not been defined clearly.

expenses in excess of the amounts listed by the interim guidelines set by the government's Dispute Reconciliation Committee for Nuclear Damage ($5,037 for children and expecting mothers, and $1,000 for all others persons). However, this is a one-time payment that applies only to the voluntary evacuation that occurred before December 2011. The operator of the Fukushima Daiichi Nuclear Power Plant is also required to pay compensation for any damage caused by the nuclear accident to properties in evacuation areas on the basis of residents' demands.

If some restitution standards have been gradually set, there are some important elements that are very difficult to evaluate and quantify such as the loss of value of houses and properties in the region affected by the nuclear accident, the right to 'life-time' employment, personal and professional network and membership to a community. The prolonged evacuation has important mental, physical and economic consequences on evacuees, but it remains difficult to determine the appropriate level of compensation.

3. CONCLUSION: IS A RETURN POSSIBLE?

The government has been actively promoting the revitalization of the disaster-hit zones through a reconstruction policy and the attraction of migrants, whether internal or foreigners.

Special measures have been taken to enhance reconstruction projects proposed by municipalities, and approved by the state: flexibility regarding regulations and financial or monetary aid, allowing deregulation for medical services, agriculture industry and manufacture in the affected zones. For instance, the Iwate prefecture has launched a "special zone for health, care and welfare" project since February 2012. It benefits from flexibility regarding the repartition of medical personnel in disaster-hit zones for them all to have access to sanitary services. Another example is that of Miyagi prefecture's project to promote private investment: it plans to create 389 industrial poles in 34 municipalities, including automobile and food industries, renewable energies, aeronautics, etc. The firms recently settled in the region will benefit from tax exoneration for five years and, for those already present, tax deductions for the same period.

Employment is key for the sustainable development of the region and the population. The Ministry of Health, Labour and Welfare defined in October 2011 the third phase of the "'Japan as One Work Project", launched in April 2011. Its aim is to support job creation through the reconstruction of local industries. Through subsidies, it provides support for enterprises that establish themselves in the zone and for the creation of small-and-medium firms. Emphasis is upon agriculture, forestry and fishing industries. The creation of companies hiring disaster victims is also encouraged. The third phase of the project is expected to generate around 500,000 jobs and support 70,000 already existing. The previous phases have resulted in the job placement of 64,000 people in Iwate, Miyagi and Fukushima prefectures (Japanese Ministry of Health, Labour and Welfare, 2011).

The Japanese government has also called on foreign countries to take part in the "Open Reconstruction Plan" organized by the Ministry of Foreign Affairs, the Cabinet Office and the Ministry of Economy, Trade and Industry. It consists in attracting tourists, talented students, highly qualified professionals and foreign investment.

From November 2011 to March 2016, foreigners who wish to stay in the affected prefectures will benefit from flexible administrative arrangements, including an exemption of visa fees. Foreign companies established in Special Zones for Reconstruction will be exempted of corporate tax as well as receive financial support for research and development. So far, the presence of foreign firms in North of Japan has not been significant (Hasegawa, 2012).

In interviews reported by the national and international press, the elderly Japanese have expressed their willingness to rebuild the villages where they and their ancestors were born. They want to rebuild the community as it existed before the tsunami. A 76-year old man, living with his wife and disabled son, said, "If we leave Nagahara (in Miyagi prefecture) we'll have no friends. I want to die where I know everyone's face" (The Mainichi, 7 April 2012). This feeling is called "kizuna", which means connections with people, and local authorities place it at the core of their reconstruction projects. However, it does not take into account the young generation's preference for safety, since they form a demographic minority and are used to deferring to their older relatives. As a consequence, young people tend to leave the coastal areas and the fishing villages for higher grounds, and to find jobs in other big cities. As Yoshiaki Suda, mayor of the affected town of Onagawa, put it, "For whom are we rebuilding?" (The New York Times, 12 February 2012). The issue of villages becoming depopulated is an important issue when considering long-term reconstruction (Hasegawa, 2012).

The situation of the people displaced by the nuclear accident is very specific. In order to prepare the return of displaced people, the government

reorganised in April 2012 the evacuation zones into three categories in the Fukushima prefecture: a forbidden zone, where radioactivity levels are equal or superior to 50 millisieverts (mSv) per year, a "no-residence" zone where radioactivity levels are between 20 and 50 mSv/year, and one where return will be possible with radioactivity levels between 1 and 20 mSv/year. The two latter zones will be decontaminated: whereas the "no-residence" zone will remain uninhabitable for several years, the zone for return will benefit from the reconstruction of its infrastructures (Le Monde, February 24th 2012) and the progressive lift of entry ban, town after town. Nonetheless, big challenges may prevent a massive return: unachieved decontamination, unrestored infrastructures and public facilities.

The issue of return is highly sensitive and politicized. The tsunami survivors keep on paying housing loans for houses that disappeared. When they attempt to buy other land to build their house, they end up paying double loans. Hasegawa has noticed a difference in the assistance offered by different cities: "in Sendai, land is offered for free whereas in other cities, you have to pay for it. This will delay considerably the reconstruction process"(Hasegawa, 2012). In addition to that, psychological suffering often prevents people from resettling in places where they lost relatives and friends.

More than one year after the 3/11 events, both people who left voluntarily and people who have been displaced are still in a very vulnerable position, as they are still, for most, unable to go back home. The study of the population movements highlights the necessity for Japan to reinforce its risk prevention and its assistance policies for the displaced population. This is an urgent issue, since the country expects greater natural catastrophes to hit in the coming years – such as the "Big One" (earthquake) in Tokyo.

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THE 2011 SOUTH CHINA FLOODS - DROUGHT, THREE GORGES DAM AND MIGRATION

NADJA JELENKOVIC

1. FLOODS AS A HISTORIC PROBLEM

The legend tells of Yu the Great, son of Gun and a morally upright ruler, devising a successful system of flood controls, which led to the prosperity of the Chinese heartland, hence allowing him to found the Xia Dynasty (2100-1600BC). Not adhering to his father's method of "blocking" (directly damming rivers), he sought to "relieve" river flows, by opening irrigation canals, diffusing water into fields, and dredging riverbeds. This technique was studied and repeated in historical water regulation strategies such as by: Emperor Suai (6-1BC) of the Han dynasty, Emperor Ming of the East Han dynasty (69AD), and then more substantively in the Yuan and Ming dynasties.

Just as the story of Yu stays with the Chinese people today, so does the problem of floods. Since ancient times, floods have been plaguing the Chinese soil. Partnering with drought, earthquakes, and slower onset hazards like desertification with the Gobi desert growing at 10,400 km2/year, floods represent themselves as only one of China's numbered natural disasters. (Stojanov, 2005) They fall into a greater compound crisis circle of water security of the country. Rapid growing rates or urban areas and industries compete with high agricultural consumptions of water resources. In a state where 21% of world's population feeds on only 7% of the world's cultivated lands, water poses itself as a food security issue to Chinese; whereas urban economic development needs of water creates social security tensions; safe drinking water then threatens human security; and deforestation and soil erosions make environmental security fragile.

Of the two main Chinese rivers (the Yellow River and the Yangtze River), reports say the Yangtze is accountable for 70% to 75% of all China's floods. (Butler, 2007) It is known to recurrently overflow its banks and flood huge plains of land along the river basin. These floods occur every year during the monsoon season from June to September. While on average a couple hundreds of people die annually as a result, the Yangtze floods had notoriously produced catastrophic floods. In the 20th century alone, four major floods in 1931, 1935, 1954 and 1998 had taken more than 300,000 lives.

The Three Gorges Dam is modern China's most ambitious project and the largest construction work taken place. The multi-folded purpose of the venture includes:

– Flood prevention: would enhance the Jing River flood regulation capacity so that gigantic floods with unordinary disastrous effects happen once in 100 years instead of once in 10 years; and reduce flood threats to middle and lower reaches of Yangtze.

– Power generation: hydropower as a renewable energy, production measuring up to 84 billion kilowatt-hours of electricity per year, or one eight of the country's total electricity output.

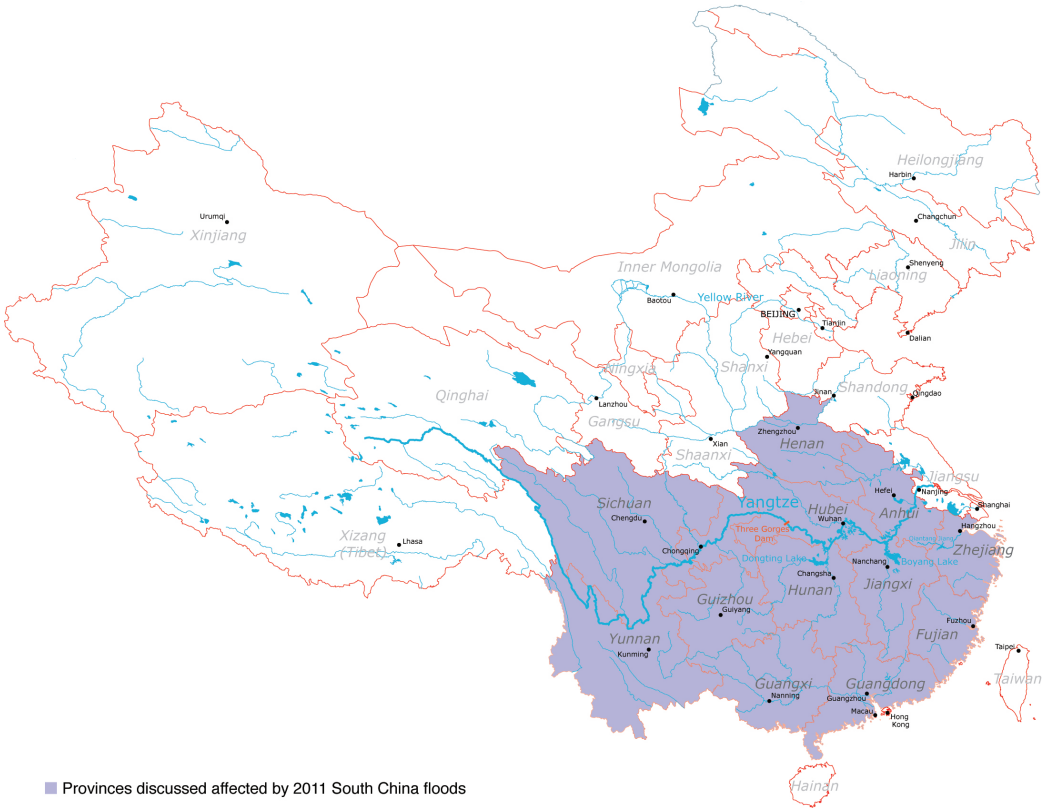
– Transport and trade: improve navigability of the Yangtze, allowing ships to reach as far as Chongqing, and promoting economic development of the Southwest.

– Water diffusion: support water needs in cities and economic zones located in mid and lower streams of Yangtze; and facilitate water diffusion for Northern uses.

– Other benefits: agricultural irrigation. (source: The fifth meeting of the Seventh People's National Congress, 1992)

When it was first approved in 1992, the Three Gorges Dam construction was estimated to cost USD 8.3 billion. The World Bank originally intended to provide loans for the project, but was discouraged due to pressure from environmental and human rights groups and the United States.

Map 1. Chinese provinces affected by 2011 South China floods



2. THE FLOODS

In 2011 rains from tropical cyclones and typhoons caused a series of floods in the central and southern parts of the People's Republic of China (PRC). The China Flood Control Office first reported on June 10, 2011 that tropical storm Sarika would be landing between Shanwei city of Guangdong province and Zhangpu city of Fujian province. (Xinhua, 2011a) Subsequently on June 12, the Chinese Meteorological Administration sent out a level III flood emergency warning for the Yangtze River Basin. The alert had then been raised to the maximum level of IV as of June 17 2011. Southern China suffered a further hit from June 16 to June 25 due to tropical storm Haima (Egay), which landed at the Guangdong province; while the east was struck by Sever tropical storm Meari (Flacon), flooding the Zhejiang, Shandong and Liaoning provinces. (Xinhua, 2011b; 2011c) Two tropical depressions reached coastal China in mid July and the southern province of Fujian took the final blow from typhoon Nammadol (Mina) from August 21 to August 31.

Water levels recorded a new height since 1955, surpassing the safety benchmark at the Dongting and Boyang Lakes, the two largest natural lakes that help store and regulate water along the Yangtze River, and overflowing smaller reservoirs. (BBC China, 2011a) In Zhejiang province, hefty rains caused the Qiantang River to swell hazardously, amounting to 2.4m above safety levels. Authorities evacuated 292,000 people in the city of Lanxi for fear of breaches of the 70 kilometer-long dykes along the Lan River, which was "already overflowing at some points while other dyke sections barely holding." (Martin, 2011) Meanwhile two dyke breaches were reported in smaller lakes affiliated to Boyang Lake. (BBC China, 2011b)

As much as 3m of floodwater was observed in certain areas such as the Jiangxi province. (Xinhua, 2011b) To aggravate the situation, saturated soil from over precipitation also caused many landslides.

Reports show a total of 13 provinces and autonomous regions being heavily hit by floods. With the floods spreading over a huge area, coherent centralized official data regarding the whole series of floods is absent. Centralized official reports with the highest figure of casualties record 239 deaths, 88 missing persons, 36.73 million people affected, 106,500 houses collapsed, 1.16million hectares of farm land destroyed, and a direct economic loss standing at RMB 43.2 billion (USD 6.65 billion). (Xinhua, 2011d)

3. THE DROUGHT

The greatest paradox that occurred regarding the floods was the six-month long severe drought that haunted various parts of the PRC and continued in certain parts as the floods ended.

In the middle reaches of the Yangtze, drought left many reservoirs dry or filled with "dead" water, as was the case of the 1,392 reservoirs in Hubei province. Long expanses of the Yangtze River itself was closed to water transport, leaving hundred of vessels beached in the shallows. (Hays, 2011) Statistics of the Ministry of Civil Affairs in May 2011 showed 35 million people affected by the drought, 4.24 million people suffering from acute water shortage, and 370,000 hectares of harvestable crops being destroyed. At the middle and lower streams of the Yangtze River, average precipitation since spring 2011 was only 194mm, which meant 51% of normal precipitation, a record low in 60 years. (BBC China, 2011c) In regions such as Hunan and Jiangxi provinces, that allow villagers to own small farmlands as well as fishponds, news reports mention drying up of land and ponds deprive people of livelihoods. Many villagers flocked to search for job alternatives in cities. (BBC China, 2011c).

Upon the first two to three days of torrential rain in early June, drought situations in the middle and lower streams of the Yangtze River got alleviated. Government representatives from Jiangxi province expressed relieve but warned of the catastrophe turning from drought to flood, and cautioned the people against land and rockslides. (BBC China, 2011b) According to provincial government statistics, 3.3 million people and 22,000 hectares of land were still affected by drought in Jiangxi; as for the neighboring Hunan province 6.1 million people were in acute water shortage conditions while 6 million were affected by various levels of floods. (BBC China, 2011b) The central government Flood Control Office later announced that despite the rains, 37% of drought-hit lands in the five provinces at mid and lower Yangtze stream remained arid, and 22% of the affected population continued to suffer from acute water shortage. This unprecedented drought followed by huge floodwater exacerbated local afflictions.

4. DROUGHT, FLOOD, AND THE THREE GORGES DAM

In May 2011, as the drought crisis worsened, a lot of spotlight had gone to the Three Gorges Dam. Pent-up anger released as torrents of blames on the construction project, not only for causing the drought situation but also earthquakes in the nearby regions, environmental pollution, and great misery suffered by the 1.4 million original inhabitants relocated to make way for dam building.

There had been suspicions that the operators of the Three Gorges Dam hydropower plant were holding back drought-relief water and resisted release so as to sustain optimum power generation. At the end it took a highly publicized command from the central government to open the gates and let out 3.7 billion tones of stored water, roughly equal to 10% of the Three Gorges reservoir volume, downstream at a rate of 11,000 cubic meters per second as compared to 7,000 cubic meters per second as prior to May 7. (Lee, 2011) Apart from this operational issue, the artificial accumulation of water in the upstream led to reduced volumes reaching the Dongting and Boyang Lakes. Surplus water that helped to enlarge or maintain the sizes of the two lakes before 1998 was now replaced by the gradual drying up of the lake borders, hence reducing both their reserve capacities for drought and regulation capacity as flood basins. (Dingzhi Peng et al., 2005).

General criticisms on the Three Gorges Dam project include:

– Submerging 13 main cities, 140 minor ones and towns and 1,352 villages. Relocation of 1.4 million people in respected areas of the Yangtze basin to make way for the dam construction. Often transferred in blocks, people were sent of various parts of China. While some are happy about relocating, some have been complaining about poor compensations, corruptions that have taken away their entitlements, and a shortage of jobs or land in the newly resettled areas.
– As water level of the reservoir rose, landslides have become a problem. As of autumn 2007, directly related landslides exceeded 4,700 and required the evacuation of or concrete reinforcement for 1,000 localities.
– Links have been made to earthquakes, when a government seismologist study published in 2011 revealed a 30-time increase in minor local shakings since the construction of the dam. (Adams, 2011)
– Silt and sedimentation is said to be a major issue, as coarse gravels and rocks from Sichuan could not be flushed out and would stay behind the dam, while reduced discharge volume causes silting in the mid and lower courses as well.
– Of pollution resulted from dam construction, environmentalists estimate 250 billion of raw sewage and other industrial contaminants are trapped behind the dam.
– Environmental catastrophe for aquatic animals.
– Sinking of valuable archeological sites, promoting illegal excavations and smuggling of national properties to foreign countries for sale.
– Corruptions yet to be unmasked, vis-à-vis residents relocation in particular, pollution causation, dam construction and operational benefits.

However, these claims were being rebuked as absurd by hardcore government officials like Zhang Boting, Deputy General Secretary of the China Society for Hydropower Engineering, who said in an interview, "there are more than 20 dams in the world larger than the Three Gorges Dam. But I have never heard of them causing droughts. The big flood last year (2010) could be a good refutation of this claim. It is impossible for it to cause both drought and flood." (Global Times, 2011) By increasing the water storage level to 175m behind the dam in October 2010, the dam had been highly praised by its operators, the China Three Gorges Project Corporation, to have prevented a dire flood. The highest previous record had been 172.8m, set in 2008. The company chairman Cao Guangjing held that the 2010 act was a "historical milestone" that would enable the project "to fulfill its functions of flood control, power generation, navigation and water diversion to the full". (Kurtenbach, 2010) Yet the flashfloods of summer 2011 put the Three Gorges Dam into question once again.

While drawing a straight line between the Three Gorges Dam and the 2011 droughts and floods would be oversimplifying the causal relationship, it is an underlying fact that the dam is built to hold back Yangtze water and gives to its planners powerful flexibility in managing the retention and discharge of water, as appropriate according to extremities in rainfall.

Meanwhile, following the prolonged drought catastrophe, the central government made a rare acknowledgment of the downside of the project. In the State Council meeting on May 18 2011, Premier Wen Jiabao openly addressed the "urgent problems" faced by the Three Gorges Dam and announced another RMB 20 billion (USD 3 billion) spending to deal with relocation, pollution and landslide issues. Particularly worthy of mentioning is the first of the six directives established in his "Post-Three Gorges Working Plan", which provided that livelihoods of dam construction affiliated relocated persons should equate that of residents of Hubei province and Chongqing city by 2020; a strategic economic plan would be put in place for transport, water and other urban facilities development, as well as a social security net that covered both urban and rural areas. (Xinhua, 2011e) In fact already in 2008, when the Premier halted the Leaping Tiger Gorge Dam after reading an investigative article published in the Guangzhou newspaper Southern Daily, the central government's position on mega projects seemed to have shifted. In the case of the Three Gorges Dam, whether it was to promote the caring facet of the government or a genuine response to popular discontentment, his words had drawn great attention and appreciation. Headlines of western press wrote for example "China drought renews debate over Three Gorges Dam". (Zi, 2011) Other government responses to the droughts and floods are to be examined further below.

5. FROM EMERGENCY RELIEF TO RELOCATION AND MIGRATION

Government emergency relief of the 2011 floods saw the substantial mobilization of soldiers of the People's Liberation Army, military police, firemen and civil defence units. In the hard hit Wangmo county of Guizhou province for example, 1200 military persons were involved in rescue, evacuation and relief work, and another 3000 party officials in logistics, communication and coordination. (Xinhua, 2011f) In other places news reports carry photos of uniformed young men maneuvering boats crowded with people stranded in floods. (BBC China, 2011d)

People were relocated to nearby areas to await the retreat of water, which took a few days to a week's time. The displacement of people followed a number of different initiatives. While those in most dire need benefited from the government-provided public shelters and temporary tents, others found more accommodating refuge in homes of families and friends. In Huainan city of Anhui Province for instance, of the 6061 evacuated, 4770 were unable to return home three days after the flood, 3324 stayed on for a longer period in homes of relatives and friends, 1104 in government public shelters, and 342 in government emergency tents scattered over 14 localities. (Ye, 2011)

About relief supplies, Victor Kan, World Vision program quality director was quoted saying, "food is (was) urgently needed. It is (was) estimated that the affected communities will suffer from food shortages over the next two to three months. Farmers have been struck twice, first with drought and then floods. Many of them are likely to face total crop failure this year." (Xinhua, 2011g) In places like Zhejiang and Hunan, major crops like corns, soybeans, sugar canes and peanuts were destroyed by the flood, and fishes in ponds were washed away. One Zhejiang city had 70% to 80% of all paddies damaged. People lost their life bearings. (Xinhua, 2011h)

Newspaper reports have noted government deliveries of cup noodles, rice, blankets, medical supplies, temporary shelters and cement (for reconstruction purposes) to victims. (Xinhua, 2011i) In Guizhou province, as one of the first emergency response plans for the summer floods, the National

Commission for Disaster Reduction and the Ministry of Civil Affairs ordered 2,000 quilts, 3,000 clothing and over 100 tents to be delivered. (Xinhua, 2011j) In later rounds of floods, the Guizhou people's government assured that there were adequate food supplies and that each flood victim received 0.5kg of rice per day until the sufficient betterment of their situations. (People's Daily, 2011)

Given that it was a short sudden on-set event, all relief efforts were meant to be provisional, until daily lives return to normal. Government directives were limited to the emergency response period, whereas local initiatives were encouraged in post-disaster recovery. According to Art. 4.18 of *Regulation on the Relief of Natural Disasters* promulgated by the State Council and revised in 2011, evacuation and resettlement was to be

> *"organized by the locality's people government, under the pretext of safe situation. It would decide on the best resettlement measures for a transitional period. The process would be a mixed method of government directed resettlement and people's self-directed resettlement.*
>
> *Resettlement locations should be chosen based on transport accessibility, and ease to facilitate recovery and production. Areas prone to potential hazard recurrence should be avoided, so should cultivated farmlands.*
>
> *Locality's people's government should encourage and organize people for self-help recovery."*

Articles 4.19 to 4.20 then provide for reconstruction and reparation of houses destroyed in the natural disaster. After individual or collective application from the people, the government would review needs and realities and provide appropriate financial and material aid.

As the statute denotes, the return to and recovery of flood-struck areas were the optimum goals. As if it were a habit, the Yangtze River floods recurrently every year, though with different intensities. And people habitually return as well. Those who try to avoid the adverse effects of floods may move, but these displacements are more often regarded as a part of the rural-urban migration trend in the PRC, where economic considerations triumph. In China's recent history, the largest known mass migration resulting directly from Yangtze overflows is a state planned mass relocation as a response to the devastating 1998 floods. The event brought attention to the vigorous illegal land encroachment by farmers and developers that deeply harmed the environment and reduced of the nature's water regulation capacities. The slogan of the project was called "return of farmlands to forests and lakes", suggesting a return of grain plots on slopes and reclaimed land to forests, grasslands and lake areas. 2,460,000 people over four provinces along the Yangtze were reported to have been resettled since 1998. (China News Weekly, 2011) Otherwise, no separate data indicate migration directly and solely as result of Yangtze floods, apart from government initiated relocations such as that pertaining to the Three Gorges Dam construction or others related to water and environment regulatory projects.

Both kinds of displacements meanwhile face the same problem of household registration (*Hukou*) restriction (planned relocation to a smaller extent, as residency status in properly handled cases are changed accordingly). The *Hukou* systems links social welfare of nationals to their places of birth, which means that rural-urban migrants are oftentimes denied social benefits like public health care, housing and education when they leave their villages to work elsewhere. The system was created in 1950s to prevent formation of ghettos in urban areas, but eventually resulting in a worrying situation where rural-urban labor migrants are treated as second-class citizens in cities. They also constitute China's huge floating population. Most of them earn as low-skilled labors, go back home for Spring Festival during the annual hump of human migrations, and do not return to the previous work place anymore, prompting wage rises and other economic problems. Although *Hukou* requirements have been relaxed to a degree to accommodate economic growth, the floating population is still not officially authorized to dwell permanently in the receiving cities and towns. This is the major social policy obstacle for any permanent migration as a solution to floods.

6. LEGAL ISSUES

Three main laws govern issues surrounding our topic of discussion. To start with is the *Water and Soil Conservation Law of the People's Republic of China*, as amended by the 18th meeting of the Standing Committee of the 11th National People's Congress of the PRC in 2010. The law is:

> *"formulated to control and prevent water and soil loss; protect and reasonably utilize water and soil resources; reduce disasters of flood, drought and sandstorm; improve the ecological environment and guarantee sustainable economic and social developments", (Art.1)*
>
> *where "the state shall give priority to prevention, make overall planning, exercise comprehensive control, adopt measures suited to local conditions, strengthen scientific management, and lay stress on efficiency" (Art. 3)*
>
> *under the supervision of "the water*

administrative department of the State Council (which) shall be in charge of the water and soil conservation work of the whole nation." (Art.5) Sub-authorities then include the "river basin administrative bodies" and departments of forestry, agriculture, and land and resources at or above the county level. (Art. 6 and 7)

This statue emphasizes long-term prevention and protection, overall monitoring of water and soil conditions in the country, and sees itself more appropriately applicable in slow onset, or smaller scale natural or man-made damages to the natural environment. For sudden catastrophes, as the flash floods of summer 2011, other statutes play a more important role. Also about prevention is the *Regulation on the Defense Against Meteorological Disasters*, enacted by the State Council in 2010. Elements of meteorological disasters include

"damages caused by typhoons, rain and snow storms, sand storms, cold spells, extreme temperatures, droughts, thunders, hails, frosts and fogs.

Prevention against direct and indirect damages from flood and drought disasters, soil and tectonic disasters, oceanic disasters, as well as forest and prairie fires shall be governed by respective laws and administrative provisions." (Art. 2)

"Disaster prevention stresses human-oriented, scientific research and development, inter-departmental communication, and societal participation." (Art.3)

"Guiding and coordination efforts should be stressed at the people's government at the county level and above; where meteorological disaster preventions are incorporated into economic and social development plans, related financial estimates reflected in budgetary plans." (Art.4)

Finally, emergency relief work is governed by the *Regulation on the Relief of Natural Disasters* promulgated by the State Council. It details response intensity level (I-IV), supervising authority (headed first by the Natural Disaster Reduction Office, reviewing various demands from localities and coordinating works of various departments, such as transport, logistics, agriculture, trade, food, communication, etc. when the intensity level reduces, work is transferred back to the State Council) and relief procedures, post relief aid and rehabilitation work. What they have in common is a desired cooperation between various government departments at different levels, headed by a strong central office at the top.

These laws have been working in line with a number of other natural-disaster relief laws, including the *Emergency Response Law of the PRC* promulgated by the National People's Congress, the *PRC Regulation on the Defense against Earthquakes* and the *Regulation on the Defense Against Drought in PRC* put in place by the State Council. The Twelfth Five Year Plan announced by the National People's Congress in March 2011 recognized the successes in disaster management during the Eleventh Five Year Plan but accentuated the increased frequency and severity of natural disasters in the same period, naming specifically the Wenchuan and Yushu earthquakes, Zhouqu land and rock slides, snow and cold rains over the South, severe floods, droughts, typhoons, wind hails, ocean ice, heavy snow, heat waves and forest fires. (State Council, 2011) It called for amelioration of disaster prevention and management mechanisms and pertaining legal systems. Further, the Five Year Plan reviewed and republished the five legal instruments discussed above.

Follow up government efforts were observed henceforth, especially in disaster review and documentation at the national level. In the annual disaster report issued by the Office of Disaster Reduction, it is stated that floods and droughts across the PRC in 2011 accounted for 40% and 30% of the nation's total natural disasters in the year. (Civil Affairs Department Office of National Disaster Reduction, 2012) In another flood prevention meeting that took place in Chongqing in February 2, 2012, data from the 2011 floods had been taken as reference for 2012 estimations and selected area focuses. It reported a total economic damage from floods and the prolonged drought of RMB 23.92 billion. Damages of floods stood at RMB 31.01 billion, affecting 31 localities. As much as 260 rivers countrywide had water levels reaching the alarm benchmark, out of them 50 surpassed the safety guarantee level, and 11 of all documented historic levels. Qujiang, the tributary of Jialing River saw a volume surpassing the 1939 records, making it the biggest flood in 100 years. (Lu, 2012)

From the Three Gorges Dam reevaluation to emergency statutes review and to post disaster policy articulation meetings, differing government actions indicate greater eagerness to better address disaster prevention and management.

However though, according to Zhang Qingfeng, water specialist at the Asian Development Bank, China "has a stunningly agile disaster response system but not a corresponding system of risk reduction and management. In other words, China does not prepare for climate-related disasters; it only reacts to them." (Zhang, 2011) His critic came in June 2011 right in the midst of the devastating floods that followed the second spell of drought in the Yangtze River basin.

He pointed out that damages of natural disasters could not be reduced because most local

governments missed the opportunity to guard their locality against the impact of the hazards. There was a lack of a comprehensive national policy compelling local governments to keep watch for natural hazards like floods and droughts.

Two studies completed by the Asian Development Bank (ADB) in 2010 on Chinese flood and drought management found the two management strategies highly similar, and "stuck in a reactive mode". (ADB, 2010a; see also ADB, 2012b) Reactions were limited until after an emergency situation had been declared.

Zhang attributed the problem to an absent separate disaster risk management agency. As articles 5-7 of the *Water and Soil Conservation Law of the People's Republic of China,* article 4 of the *Regulation on the Defense Against Meteorological Disasters,* and various provisions of the *Regulation on the Relief of Natural Disasters* show, risk management responsibilities in the PRC are divided among a number of agencies, which are then brought together by means of a strong central control. This structure limits optimum policy focuses on resources direction and determination of hazard cycles; instead, allows room mainly for an alone-insufficient "reaction" to natural disasters.

7. POLICY RECOMMENDATIONS

As already proposed by the ADB report in 2010, the PRC's disaster management should be extended "to a six-step risk management: early warning, monitoring and forecasting; risk assessment; risk mitigation; impact mitigation and emergency responses; recovery, evaluation and contingency planning; and stakeholder participation and public education and awareness." A sound monitoring and early warning system would help greatly diminish response time and cost, hence the flood damage and restoration cost.

A well-defined disaster management policy should be considered together with other dimensions to build a comprehensive integrated approach. Critical it is that long-term plans devise reserves and healthy ecosystem services that would function during floods and drought. In the case of Yangtze River, ecological degradation both related and not related to the Three Gorges Dam are seen and known. They serve to reduce the resilience of the ecosystem to counter impacts of climate change such as extremities in precipitation.

The State Forestry Administration's large-scale national lake and wetlands survey showed more than 1,000 natural lakes and wetlands disappeared since the establishment of new China, and lake areas totaling 1.3 million hectares reclaimed for either urban or agricultural development. It is not an avant-garde suggestion that more afforestation programs be put in place as a remedial measure. As for conservation and prevention, existing related legal instruments must be applied with greater vigor. They should together form an integrative river basin management model.

Despite the fact that this paper does not draw a direct causal link between the Three Gorges Dam and the natural disaster discussed, it does try to explore their inter-relatedness. To reduce environmental damage and the need of displacing persons, some experts have suggested limiting the maximum height of the water behind the dam for 30m. Technical solutions as such worth much in depth study, but would be beyond the scope of this study. Meanwhile, holding the manipulation power, the dam operators must be more vigilant of water needs and water conditions in the mid and low reaches of Yangtze. Power generation can in no way override humanitarian needs.

Regarding the flood victims, post-disaster financial compensation had proved to be inadequate. Recovery burden had not been sufficiently shared by the government. Ecological compensations and later-stage assistance mechanisms should be given greater emphasis in government response policies. To facilitate rehabilitation of both urban and rural lives, soft-mechanism social assistances must be provided, such as aid to employment, trainings to strengthen skills, etc. Migration as a post-flood solution to better livelihood has been limited largely due to the *Hukou* system. Calls for the system's reform are already heard. Now or later the government must consider it seriously. Allowing broader population mobility will be a need in the PRC's future development.

CONCLUSION

Floods as a historic plague on China reappeared in 2011, devastating the Yangtze River basin and other areas of PRC. The fact that they came following months of detrimental droughts show the imbalances and uneven distribution of precipitation brought by climate change. The two disasters depict also the compound water crisis the PRC is facing; the floods and drought caused direct human and food insecurity, aggravated by environmental degradation, and threatening social and economic securities. The 2011 floods must therefore be looked at as part of China's overall water problem.

The Three Gorges Dam was built under strong central government directive to address the plight. With its full operation commencing only a few

years ago, and in view of the recent government admission of its downsides, the project is open to debate once again. Whether the Three Gorges Dam is a mere "blocking" mechanism like the one used by Yu's father, or a more flexible combination of "block" and "relief", is yet to be demonstrated by the central government's future policy directives.

The people affected by the discussed natural disasters and the dam construction portray also a population problem to the PRC. For the 2011 South China floods affected population, evacuation and relocation had been provided when the disaster struck. But people were expected to return to their places of origin, despite annual recurrences of the problem. Appropriate post-disaster social assistances given to individuals were restricted in both the time and material extent. For government directed permanent relocations pertaining to the Three Gorges Dam, critics have long been pinpointing the deprival of human rights, as people were forcibly moved, settled in worse living environments and given little social assistance. Head of Hehai University Migration Research Centre and Expert Advisor to Three Gorges Dam Migration Development Shi Guoqing estimated that by 2050, more than 5 million Chinese would become environmental migrants, either due to government regulatory projects over the major river basins or other natural disasters. (China News Weekly, 2011) Present social systems, notably *Hukou* would be one of the leading obstacles to personal mobility as a solution to natural disasters. These would need to be better addressed by the government.

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FLOODS IN BANGLADESH AND MIGRATION TO INDIA

MARTIN QUENCEZ

INTRODUCTION

At the beginning of the 2000s, the Indian government estimated that over 20 million Bangladeshis were residing illegally in India (*Voice of America,* 2003). The decision to migrate stems from several economic, political and social reasons, but environmental factors also play an underpinning role as they shape the conditions in which migration waves are triggered. Bangladesh is especially prone to flooding, 25% of the territory is inundated during the monsoon and up to 70% is "exposed to intermittent extreme flooding"(Hossain, 2005, 1). Such floods occur in one the most densely populated areas in the world, and more than a million were directly affect 2011 (IRIN Reports, 2011). Environmental crises force Bangladeshis to adapt or to leave as their homes and sources of living are destroyed. This takes place in the context of a larger displacement of population phenomenon and has become a regional issue. Due to important economic discrepancies and political instability in the region, illegal migrants crossing the Indian border are considered by the the Indian government as potential sources of trouble that have to be stopped. (Kumar, 2011)

Thus, migration resulting from annual episodes of flooding in Bangladesh has quickly turned into an important migration issue and a key element of bilateral relationships between India and Bangladesh. This study aims at presenting a specific case of environmental migrations, with a focus on the reports of the 2011 floods in Bangladesh and considerations on the particular context of Indo-Bangladeshi relations. The objective is first to show the complex link between floods and transnational migrations in Bangladesh, then to analyse the 2011 episode and the political response that emerged, and finally to contextualize Bangladeshi flood-induced migrations to India in order to present the specificities of this international issue.

1. FLOODS AND MIGRATION IN BANGLADESH: A STUDY OF PATTERNS

1.1. The threat of environmental disasters and climate change in Bangladesh

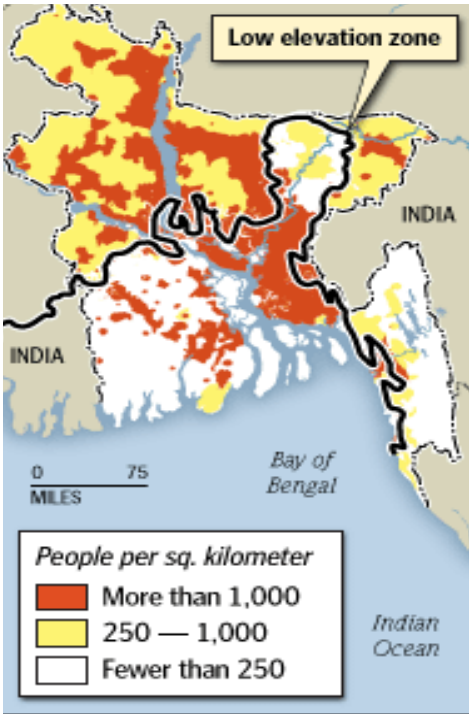
Bangladesh is at present widely considered as one of the most vulnerable countries in the world regarding climate change and environmental degradation. (Panda, 2011) It is threatened by a large range of sudden-onset disasters including storms, earthquakes,tsunamis, and floods as well as long-term processes such as sea-level rise and salt-water intrusion. (IOM Reports, 2010). It is interesting to start by explaining these natural phenomena and analysing the context in which they take place.

1.1.1. Risk profile of Bangladesh

When trying to draw up the risk profile of Bangladesh, one must first look at geographic and demographic factors. The population of Bangladesh was 142 million on a territory of 144 384 km² in 2005. Even more importantly, it is expected to reach 243 million by 2050 (Demeny & McNicoll, 2006, 257). Therefore extremely densely populated, the country is almost entirely located on a gigantic delta of three rivers : "floodplains of the Ganges, Brahmaputra, Meghna and smaller rivers occupy about 80 per cent of the country; hills occupy

12 per cent and uplifted fault blocks (so-called terraces) 8 per cent" (Brammer, 1990, 12). With 230 rivers, of which 57 are international, Bangladesh is in most cases "the lower riparian country", (Hossain, 2005, 1), and almost 70% of the entire national territory is less than one meter above the sea level.

Map 1. Bangladesh's population density



Source: USAID.

Located on the Tropic of Cancer, Bangladesh experiences heavy monsoons, with the most significant precipitation occurring between May and September. Their intensity also varies geographically, since "mean annual rainfall increases from about 1250 mm in the centre-west to over 5000 mm in the extreme north-east". (Brammer, 1990). It is considered that "in an average year, 40% of Bangladesh's total land area is flooded and river erosion washes away 1% of arable land" (Hagerty, 2008, 182), These floods are caused by monsoon rains as well as by rare and extreme storms, but they are also linked to the melting glaciers in the Himalayas, and by 2030 Bangladesh could lose up to 20% of its land (Wax, 2007). Such predictions make even more sense when you consider that "half of Bhola Island, Bangladesh's biggest island, was swallowed by rising sea levels, leaving 500,000 people homeless"(Ibid).

According to the 2008 Census, 88.45 per cent of Bangladeshi households are located in rural areas (Bangladesh Bureau of Statistics, 2008,), and though the level poverty decreased from 59% to 40% between 1991 and 2005 (Government of the People's Republic of Bangladesh, 2008,), more than 50 million people still live in poverty in the most ecologically endangered areas of the territory (IOM reports, 2010). If rapidly adapting to the floodplain environment and developed new sources of living has been necessary, Bangladeshis remain highly dependent on traditional rice production as occupies about 80% of the cropped area (Brammer, 1990, 13).

Bangladesh experiences a multitude of environmental problems, from tsunamis to water scarcity, and their considerable effects, though varying tremendously, are tragically affecting the economic and social development of the country.

Environmental and humanitarian catastrophes often feed off each other feeding themselves, as in 1974 when heavy storms produced a flood that was followed by a famine killing 30,000 people. (Brammer, 1990, 12). In 1989, a tornado killed about 1,000 north-west of Dhaka after a several-month long drought that destroyed most of the crops (Ibid).

The impact of environmental disasters on the population can be calculated, and statistics show the intensity of each catastrophe. Obviously, the consequences of cyclones, floods and drought depend on the characteristics of the region (population concentration, types of habitat, level of development and reactive capacity of public services among other factors) as well as on the seriousness of the natural event.

Table 1 shows the number of people affected and killed by natural disasters between 1980 and 2010. One can already see that floods by far affect the most people, with 45 million and 36 million Bangladeshis affected respectively during the tragic years of 1988 and 2004. Storms, in the most extreme cases, kill more people, but on average are less damaging than floods.

Figure 1 confirms that floods are by far the most dangerous disaster for the Bangladeshis, both in terms of security for people and for goods. In terms of the number of citizens potentially affected by floods, Bangladesh ranks first out of 162 countries with economic damages reaching almost 10% of national GDP.

Thus, diverse in nature and in their effects, environmental disasters have an extraordinary effect on the lives of Bangladeshis. They have weakened the development of the country and provoked tragic humanitarian crises several times during the last 30 years. Statistics show that among all of these disasters, floods emerge as the most dangerous for people and the most

Table 1. Bangladesh top 10 natural disasters reported between 1980-2010

Human exposure

Modelled number of people present in hazard zones that are thereby subject to potential losses

Hazard type	Population exposed	Percentage of population (0 5 10 20 40)	Country ranking
Cyclone	4,641,060		6th out of 89
Drought	642,277		63rd out of 184
Flood	19,279,960		1st out of 162
Landslide	3,758		35th out of 162
Earthquake	1,330,958		17th out of 153
Tsunami	1,598,546		3rd out of 76

Legend:

Tropical cyclones (Saffir-Simpson categories)

Cat 1 | Cat 2 | Cat 3 | Cat 4 | Cat 5

Earthquake (modified Mercalli scale classes)

V & VI | VII | VIII | XI to XII

Economic exposure

Modelled amount of GDP (Gross Domestic Product) present in hazard zones that are thereby subject to potential losses

Hazard type	GDP exposed (billions-US$)	Percentage of GDP (0 5 10 20 40)	Country ranking
Cyclone	2.39		12th out of 89
Flood	9.74		3rd out of 162
Landslide	0.16		25th out of 162
Earthquake	6.81		42nd out of 153
Tsunami	0.66		15th out of 76

Source: PreventionWeb.net, based on EM-DAT: International Disasters Database, Université catholique de Louvain, Brussels, Belgium.

frequent. Extreme floods continue to kill people and destroy resources, proving the relevance of this issue and the potential threat it holds for millions of lives. In addition, not all Bangladeshis have shared equally in the growth of the country and many remain entrenched in extreme poverty. These populations remain particularly vulnerable to natural disasters that will grow in frequency and intensity in coming years. In 2010, the IOM stated that this destruction will become more and more important in Bangladeshis' decision to migrating. The core articulation flood-migration remains to be analysed, but the looming danger of the issue is already observed.

"Environmental factors will be an increasingly important component of people's migration decisions over the course of the 21st century. While it remains crucial—morally and practically—to be aware of the long-term threat from climate change, the best way to prepare for the consequences of climate change in 2050 or 2100 is to improve the ability to deal effectively with Bangladesh's existing vulnerabilities now." (Walsham, 2010, X)

1.1.2. Floods: history and explanation of the phenomenon in Bangladesh

According to the IOM, reducing the threat of floods constitutes the first priority for the Bangladeshi government (IOM Report, 2010). As shown before, one must distinguish normal flooding, induced by the monsoon season, and the seasonal melting of Himalayan peaks from their worsening by other factors such as storms and abnormal temperatures.

In his article on the geographical background of the 1987 and 1988 floods, Brammer accurately explains the seasonal flow characteristics of the three great rivers of Bangladesh : the Ganges, Brahmaputra and Meghna. Their seasonal

Figure 1. Bangladesh top 10 natural disasters reported 1980-2010

Affected People

Disaster	Date	Affected (no. of people)
Flood	1988	45,000,000
Flood	2004	36,000,000
Flood	1984	30,000,000
Flood	1987	29,700,000
Drought	1983	20,000,000
Storm	1991	15,438,849
Flood	1998	15,000,050
Flood	2007	13,771,380
Flood	1995	12,656,006
Flood	1993	11,469,537

Killed People

Disaster	Date	Killed (no. of people)
Storm	1991	138,866
Storm	1985	15,000
Storm	2007	4,234
Epidemic	1982	2,696
Flood	1988	2,379
Flood	1987	2,055
Epidemic	1991	1,700
Flood	1984	1,200
Flood	2007	1,110
Flood	1998	1,050

Source: PreventionWeb.net, based on Global Assessment Reports, Last update: 2011-09-21.

fluctuations differ, since" the Brahmaputra and the Meghna begin to rise in March-April as a result of snow-melt in the Himalayas and pre-monsoon rainfall in Assam and the north-east of Bangladesh", whereas "the Ganges starts to rise later, in May, since its catchment is mainly in relatively drier areas where the rains start later" (Brammer, 1990, 14). The three rivers continue to rise in June-July and reach generally their peak level in July-August in the cases of the Brahmaputra and Meghna, while the Ganges reaches its peak a month later. During the months of late September to November, they follow a similar pattern of decrease although some areas remain under waters until December-January because of periodic depressions and congested drainage. (Ibid)

Thus, the cycles of the main rivers in the delta are potentially fluctuating, and early normal flooding can have tragic consequences since farmers do not expect it. Nevertheless, "the flooding is mainly by rainwater and not, as is popularly supposed, by silty river water" (Brammer, 1990, 15) and the physical and human causes of the floods are therefore more complex as they affect other dimensions than the single flow of the river.

These dimensions can be internal to Bangladesh, such as the population pressure and the urbanization that "has resulted in the sinking of many new wells resulting in the lowering of the water table and the subsequent subsidence of land making it even more prone to flooding" (Saifullah, 2009), but they can also be linked to external elements. For example, flooding has been impacted by the construction of dams in India over the streams that feed into these main rivers as it increased the problem of sedimentation in Bangladesh. Similarly, deforestation in Nepal and the Himalayas has increased the risk of floods downstream by changing the geological structure around the trans-boundary river system (Lhaled Saifullah, 2009).

Thus, both socially constructed and taking place in a certain natural context, flooding in Bangladesh is the result of several dynamics that create conditions for disasters to occur. Even if these floods have consequences on the lives of the Bangladeshis that are statistically proven, it remains to be seen if they actually trigger migration from Bangladesh to India.

1.2. Linking floods and migrations : interests and limits of the Bangladeshi example

1.2.1. Methodological issues of searching for correlation

Indeed, this study tries to articulate the link existing between two phenomena : floods in Bangladesh and migration patterns between Bangladesh and India. The most obvious answer would be to assume that they are linked by the pragmatic decision of Bangladeshis to leave the land that is destroyed by recurrent flooding. Human casualties and economic damages explain the departure to less ecologically-fragile territories.

Nevertheless, this mechanism remains unsatisfactory, as the rationale behind each individual's choice remains unknown and that what may appears as a causality on the statistical tables is in reality barely correlated. To start with, the IOM provides a certain grid to read a potential link between climate change and migrations:

"These changes are expected to affect the movement of people in at least four ways: 1) the intensification of natural disasters—both sudden and slow-onset - leading to increased displacement and migration; 2) the adverse consequences of increased warming, climate variability and of other effects of climate change for livelihoods, public health, food security and water availability; 3) rising sea levels that make coastal areas uninhabitable; and 4) competition over scarce natural resources potentially leading to growing tensions and even conflict and, in turn, displacement ." (Walsham, 2010, 5)

Table 2. Bangladesh migrants present in various States

Numbers in million	States
5,4	West Bengal
4	Assam
0.5	Bihar
1.5	Delhi
0.8	Tripura
0.5	Rajasthan
0.5	Maharashtra

Source: Joyti M. Pathania, 2003.

The official figures of the Government of Bangladesh, quoted by the IOM, give certain answers : "In the last 25 years, Bangladesh has experienced six severe floods, with the 1988 and 1998 floods alone causing 2,000-6,500 and 1,100 deaths respectively and displacing as many as 45 and 30 million people."(Walsham, 2010, 9). Anthropological studies show that these crises are clearly influencing the decision to migrate to other regions, either inside Bangladesh or internationally. For instance, research shows at the level of a village that floods, "are structural forces that have induced and shaped patterns of contract migration" (Rahman, 2010,), and that more generally, "The environmental and economic backdrop of [the village] induced villagers to look for alternatives" (Rahman, 2010, 113). Therefore, if larger collections of data are necessary to conclude on the actual incidence of floods over migration patterns, it is clear that environmental factors—among which floods, as we have seen, are the most important ones—participate in the decision to migrate, at least at the local level.

A closer look to the Bangladeshi migration to India seems to confirm this assumption.

Indian estimations of the number of Bangladeshis that have illegally migrated to North-East India since the independence of the country in 1971 are approximately 12 million (Kumar, 2011, 106). To this number must be added millions of Bangladeshis that have illegally moved to other parts of the country, especially the dynamic economic centres of New Delhi and Mumbai (Ibid). It is considered since the early 2000s that the number of these illegal migrants in India is closed to 20 million, though this remains contested by the Bangladeshi government (Panda, 2011, 9). These migrants have essentially settled in the neighbouring states of West Bengal and Assam. Hundreds of thousands are also said to reside in the main cities of mainland India, especially in Delhi and Mumbai.

Table 2 figures, if they do not inform us of the reason for migration, tend to show that Bangladeshis that have left their country were influenced by the economic pull-factors—which explains the importance of Delhi and Mumbai in the statistics—but that other factors led them to stay in north-eastern states. One hypothesis is that migrants have moved to areas close to them culturally and from where it is easier to be in contact with the country of origin. Another explanation could be that migrants have been forced to leave their homeland because of a direct danger for their security. Similar to migration patterns in the case of armed conflicts, these migrants would have simply fled the most dangerous zones and settled as soon as it is possible. This would confirm the idea that Bangladeshis illegally crossing the Indian border are not only attracted by the opportunities of economic prosperity, but also to escape a situation of great danger for their lives. Floods appear thus as a pertinent answer for this assumption: not only depriving millions of Bangladeshis from their sources of living, they actually kill thousands and create violent humanitarian situations. Migrating becomes a possible response to the brutality of the environmental crisis. The choice of the destination is then made based on family or community ties, economic opportunities and cultural closeness. (TERI, 2009, 4)

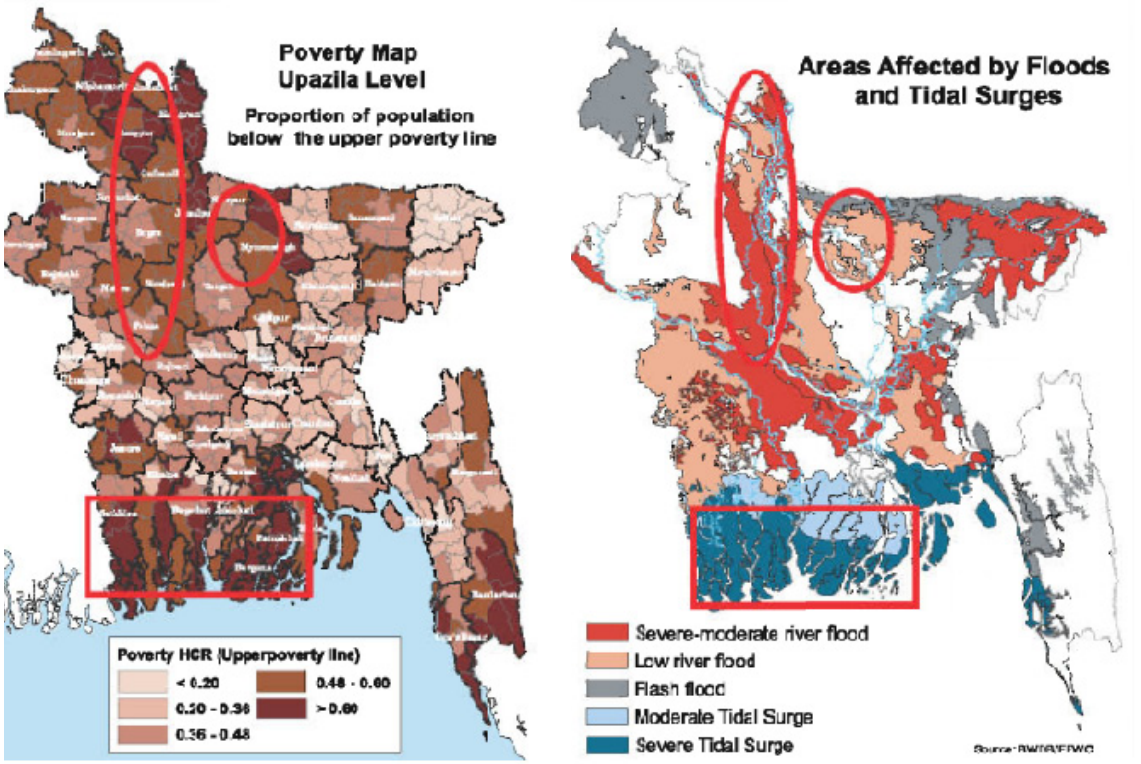
1.2.2. The difficult distinction between migrants

The scientific approach of environmental migrations studies faces the traditional pitfall of making objective phenomenon that cannot be scientifically defined. Indeed Looking at environmental migrations means characterizing complex human situations in rational, closed concepts. The definition of an environmental migrant is problematic in itself, and the case of Bangladesh offers a remarkable insight into the complexity of such phenomena.

The IOM states : "while there is good data on initial displacement as a result of floods there is less evidence on longer-term impacts of floods on migration decisions. Evidence from India suggests that floodplains are characterized by a variety of migration dynamics, including periodic movements to high ground for shelter and temporary work as well as permanent migration where people's livelihoods are more severely affected". (Walsham, 2010, 10)

It is therefore particularly difficult to clearly differentiate the economic and the security elements from the environmental one: floods, per say, press Bangladeshis to migrate as they fear for their lives and see all perspectives of economic prosperity disappear. The mechanisms are by definition highly intertwined. This is one of the most fundamental questions of environmental migrations, but it is all the more important in the case of the Bangladeshi displacement, as reports show the direct link between environmental damages and economic pressure (Black 2001;

Map 2. Bangladesh's map of poverty compared to map of areas affected by floods and tidal surges



Source: Bangladesh Bureau of Statistics, "Updating Poverty Maps of Bangladesh", 2009, p.10.

Castles 2002). Estimations made in 1994 were that up to 17 million Bangladeshi had moved to India since the end of the Second World War due to 'environmental scarcity'(Homer-Dixon, 1994, 22). But these figures hardly create a real model of the link of environmental factors in the more general economic context, and "despite evidences of people migrating from Bangladesh to India the debate is still unsettled as to how climate change will induce large influx of population to India, their extent and magnitude and will be the consequences" (Panda, 2011, 10).

For instance, the maps of floods and poverty in Bangladesh can be read in different ways, since economic problems and environmental crises are highly connected. Indeed, the correlation appears clear while studying the localisation of the most important floods and the regions where the level of poverty is highest. Yet, such statistics do not provide us with a causal link, since the damages yielded by the floods obviously create more poverty, but this poverty is also likely to produce an environment with poor infrastructure and high human density where heavy monsoon and river overflowing are likely to result into important episodes of flooding.

As a result, floods and migrations have to be considered in a more complex relationship than simple causality. However, if they do not create the migrations per say, floods create the conditions for these migrations to develop. They superimpose on social, political and economic factors an environmental crisis that can only strengthen the incentive for departure (Hagerly, 2008). In that sense, a real 'flood-migration nexus' has emerged in Bangladesh, both at the national level with an increasing displacement of rural populations to urban areas (Alam & Rabbani, 2007) and at the international level with important migration to India. Bangladesh is in the front line of countries affected by climate change, and this nexus is likely to gain in importance in the near future.

The 2011 floods constitute an interesting case-study of the development of such environmental catastrophes, and of the political responses that are organized in Bangladesh and by the international community. More than a mere illustration of an annual tragedy, the 2011 floods are remarkable in that they are considered as the symbol of future trends, as political actions try to take form while flood waters attain new areas and create new pressure on the lives of millions.

2. THE 2011 FLOODS

2.1. Describing the phenomenon and the specificities of the 2011 case

The 2011 floods in Bangladesh were not extraordinary in their intensity and the damages they caused. Yet, they present in their development and their consequences a pertinent illustration of flooding cycles in Bangladesh. According to an IFRC report in August, 2011, floods affected more than 1.5 million people and the situation continued to worsen as the monsoon depression kept fostering heavy rains. A million people, including 200,000 children, were left homeless, taking refuge in temporary shelters. (Fuller, 2011)

If, from an historical perspective, this year does not belong to the most tragic episodes of flooding of the last 30 years, as shown below, it nevertheless reveals perfectly what can be considered as the normal destruction that occur from June and July to October each year in most of Bangladesh.

Table 3. Bangladesh's floods and their impacts (1984-2007)

EVENT	IMPACT
1984 Flood	Inundated over 50, 000 sq. km, estimated damage US$ 378 million
1987 Flood	Inundated over 50, 000 sq. km., estimated damage US$ 1 billion, 2,055 deaths
1988 Flood	Inundated 61% of the country, estimated damage US$ 1,2 billion, more than 45 million homeless, between 2,000-6,500 deaths
1998 Flood	Inundated nearly 100, 000 sq. km., rendered 30 million people homeless, damaged 500, 000 homes, heavy loss to infrastructure, estimated damage US$ 2,8 billion, 1,100 deaths
2004 Flood	Inundation 38%, damage US$ 6.6 billion, affected nearly 3,8 million people. Estimated damage over $2 billion, 700 deaths
2007 Flood	Inundated 32, 000 sq. km, 85, 000 houses destroyed and almost 1 million damaged, approximately 1,2 million acres of crops, destroyed or partially damaged, estimated damage over $1 billion, 649 deaths

Source: Government of Bangladesh, 2008, 8.

Yet, in 2011, although the intensity and the length of the monsoon rains were not particularly disastrous, flooding reached new areas previously protected. This change is likely explained by increasing deforestation that causes the soil to loosen and finally accumulate in the rivers and channels that are then more easily overflowed (IRIN, 2011).

The monsoon season lasted five months, from June to October, but flash floods and tropical storms were experienced almost the entire year. The lean seasons of food insecurity in Bangladesh—called Monga—took place from March to April and then again from September to November.

In late May, the glaciers of the Himalayas had only started to melt and the level of the multitude of rivers running through the border between India and Bangladesh were not yet inundating the planes. The Brahmaputra River, clearly visible on the picture, still appears relatively narrow at that moment of the year. The rainy season usually begins during the first weeks of June.

Two months later, the width of the Brahmaputra River increased dramatically, and the delta transformed into a gigantic flooded area. This zone of hundreds of square kilometres was then totally flooded by multiple channels. Crops were submerged and the living became extremely difficult.

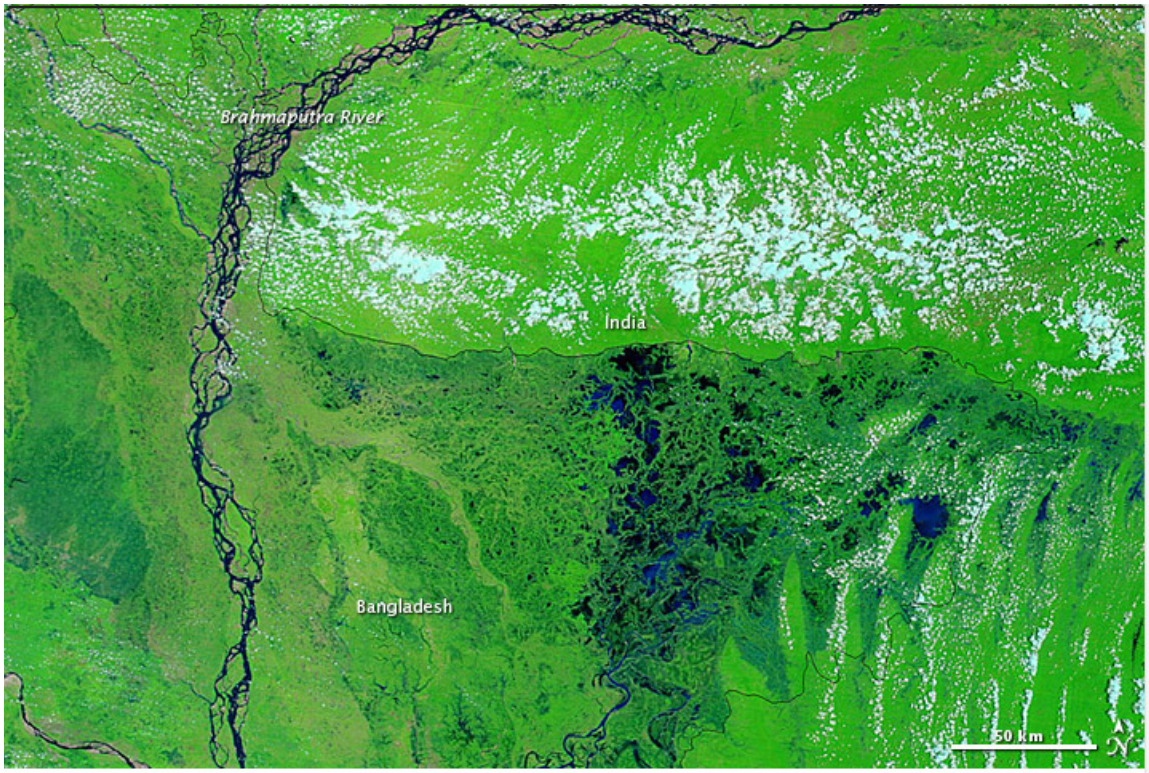
However, Map 3 and Map 4 only show the Northeastern region and the 2011 floods touched the entire country, as the tragic reports from the Cox Bazar district in the extreme south-east of Bangladesh illustrate. Indeed, in late July 2011, more than 20,000 people had been forced to leave their houses in the Upazilas (administrative subdivisions of a district in Bangladesh) of Cox Bazar and Teknaf. In this region prone to such problems, the 2011 floods took many by surprise due to their severity (IRIN, 2011) .

Similarly, in its official report of the flood situation in September 2011, the Government of Bangladesh lists the damages district by district and gives information concerning the expected evolution of the flooding.

The official discourse is revealing of what can be the norm of such an event. For example, in the single district of Naogaon, the situation is considered as 'normal', even if water entered into the upalizas of Manda and Atrai, directly affecting 960 families in the former and 1100 in the latter, after embankment were breached. Agricultural resources were greatly damaged as "according to the Agriculture Department 3300 acre of land and crops went under water in Atrai Upazila". (Government of Bangladesh, 2011)

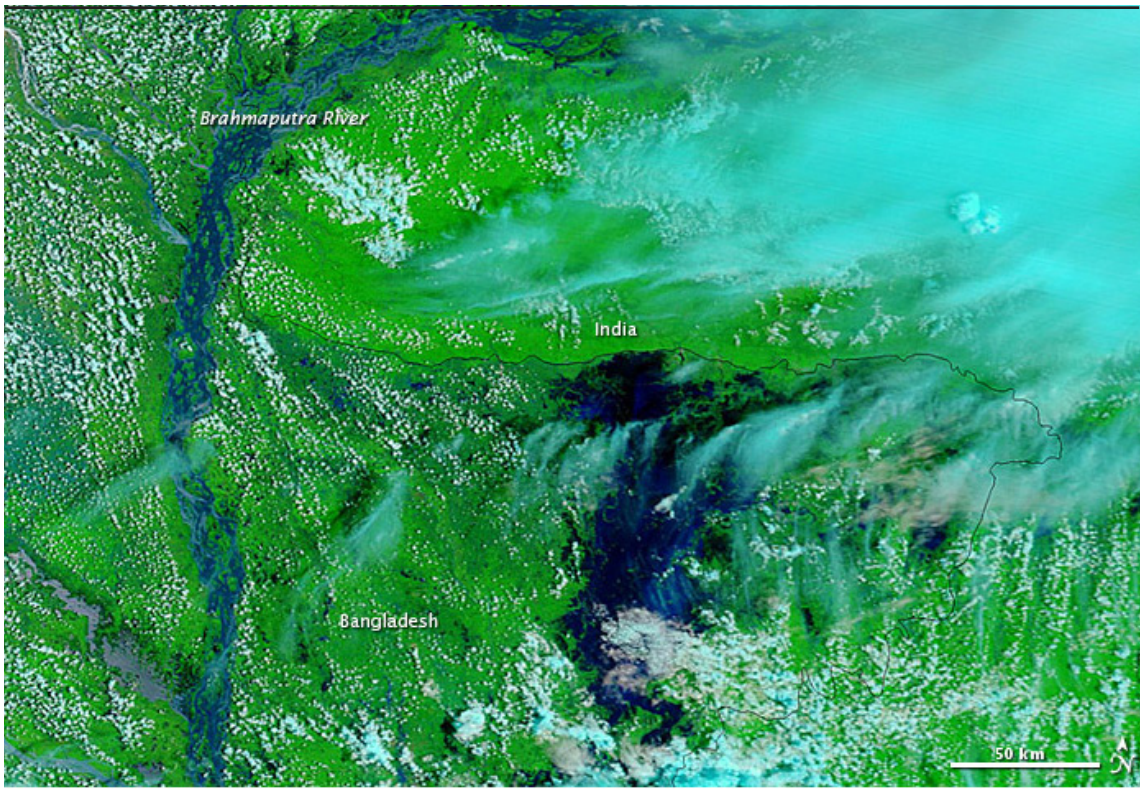
The district of Satkhira, at the extreme southwest of the country has been the most hard hit by the floods. "Around 20,000 houses in 548 villages collapsed completely, and poor farmers and share croppers have lost their investment as over 66,000 acres of standing crops have been either partially or fully damaged by the floods" (Ibid) . At the national level, the south-western districts of Satkhira, Khulna and Jessore faced the worst floods in 2011. Data on the damages of these regions remains scarce. The reports are indeed evolving strongly from month to month, and the situation of the people varies. By the month of August, 2011, in the six most affected Upazilas of Satkhira, more than 68,000 people had been reported to have taken "temporary shelter in school buildings, roadsides

Map 3. Flooding in Bangladesh (Late May 2011)



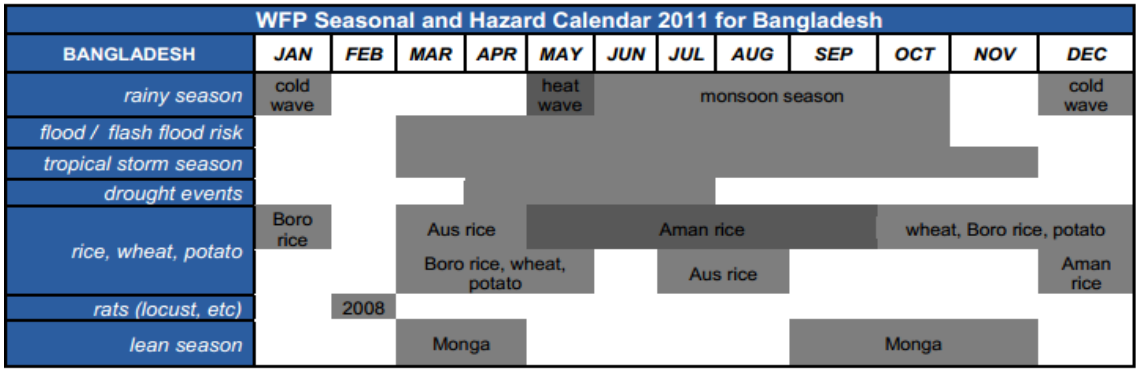
Source: NASA Images, http://earthobservatory.nasa.org/NaturalHazards/view.php?id=51441

Map 4. Flooding in Bangladesh (Late July 2011)



Source: NASA Images, http://earthobservatory.nasa.org/NaturalHazards/view.php?id=51441

Table 4. WFP seasonal and hazard calendar 2011 for Bangladesh



Source: "Bangladesh July-August 2011; Secondary Data review", ACAPS, September 2011, 7. NASA satellite images enable detailed examination of their evolution from late May to late July.

and other buildings which were not affected by flood waters. […] The number of people without shelter is unknown as of the reporting date" (Oxfam, 2011, 2). The 2011 case also showed the risk of crisis spill over from one country to another. The situation experienced in West Bengal of India, with several barrages releasing water to decrease the pressure, has direct implications for the region of the South-Western Bangladesh. The inability of the Indian barrages to resist the rise of water levels during the monsoon season aggravated the situation in the other side of the border (Ibid3).

2.2. Political responses to the crisis

In 2011, an institutional framework existed for both risk prevention and damage reduction. The state of Bangladesh has worked on the limiting flood-induced damage through the Ministry of Food and Disaster Management. It attempts to control the issue via the development of an efficient system of prevision of floods and of quick alerts to the population (Kholiquzzaman, 2006, 82). Thus in 2011, the Bangladeshi state published regular forecasts on the evolution of the floods in each district, and information could be used to warn endangered villages.[1] However, this system could be improved, especially in remote areas where better means of sharing and disseminating information is required. (Ibid, 83). In the case of the 2011 floods, better knowledge of changes in the water levels of rivers coming from India would have enabled authorities to alert the populations of Upazilas of South-Eastern Bangladesh in advance. In practice, the limited agreement between Indian and Bangladeshi's data recollection stations can have tragic consequences for the life of the inhabitants of the border. Indeed, without data coming from upstream, the Bangladeshi authorities are unable to design and implement quick responses to the crisis: the issue here is not related to a lack of infrastructure, as facilities to gather accurate data exist, but to the weakness of sharing of information at the bilateral level (Ibid, 85).

At the national level Bangladesh is "one of the most active countries in terms of planning and action on climate change" (Sterrett, 2011, 28). Several plans have been designed to combat the effects of global warming and environmental crises in general, the National Climate Change Strategy and Action Plan signed in 2008 being the most recent one. Working under the United Nations Framework Convention on Climate Change, several national programs also aim at supporting adaptation policies in Bangladesh. The National Adaptation Program of Actions adopted in 2005 is the best example of the work done at the local level to help the population adapt to crises such as floods and reduce their human and material damages (Ayers, 2011, 64). By 2011, the Bangladeshi government had already tried to push forward a more structural approach to the issue in parallel to mechanisms to answer emergencies (Kholiquzzaman, 2006, 84). It is important to note that these actions do not take into account the flood-migration nexus. Efforts have addressed the primary needs of people directly affected by catastrophe. Thus, long-term programs to alleviate pain and significantly reduce damage caused by floods exist, but there is a lack of mid-term programs to manage displaced populations.[2]

1. The Flood Forecasting and Warning Centre was created in 1972 and release short daily reports on the water level, as well as regular maps of the inundations

2. See for example Bangladesh Center for Advanced Studies, "Scoping Assessment on Climate Change Adaptation in Bangladesh", October 2010

Koyra neighboorhood, South West Bangladesh, Sundarbans region, March, 3rd, 2012.

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The 2011 crisis triggered international reactions from both NGOs and international organizations. On the 19th September, 2011, the European Union allocated €5 million to "respond to the urgent humanitarian needs of Bangladeshis who recently have been affected by severe monsoon floods". and another €8 million at the end of the year in order to finance the pumping out of flood waters (European Union—Delegation to Bangladesh, 2012, 1). Similarly, NGOs around the world provided better media coverage and alerted the population of the increased risk of such environmental catastrophes in the future.

Nonetheless, the management of the 2011 floods has been criticized for the limited reactivity of authorities. Oxfam reports stated, for example, that "no humanitarian support has been provided to the people in the most affected districts by the government, local, national and international NGOs as of 11 August 2011" (Oxfam, 12 August 2011). Similarly, the lack of coordination structure at the national level resulted "in a response that is prone to ad-hocism, overlaps and gaps" (Oxfam, 2011).

To conclude, the 2011 floods provide an outstanding example of environmental disasters, their evolution, consequences, and responses designed at different levels. If the damages caused by the floods were terrible, they cannot be considered exceptional relative to recent Bangladeshi history. Hundreds of thousands were forced to move, the management of the Ganges-Brahmaputra-Meghna river system were rapidly overcome by the rains, and the dams built upstream put many lives in dangers. Precise data concerning climate-induced migrations remain extremely scarce and are urgently required in the region (Sterrett, 2011, 6) but reports show that patterns of flood-induced migrations to India are changing and numbers increasing (BCAS, 2011).

The analysis of the political answers to the crisis tend to prove that solutions can only emerge with additional action at the national, regional and international levels. Cooperation between the countries of South Asia is particularly fundamental given the influence of transnational rivers in flooding in Bangladesh. However, it is clear that the construction of effective responses is highly affected by the difficult bilateral relations between India and Bangladesh regarding water management and border control (Kholiquzzaman, 2006). In 2011, new attempts at finding agreement over water issues were observed, but the situation of millions that are directly threatened by seasonal floods in Bangladesh still depends on the ability to increase cooperation between the two countries. It is therefore important to understand the context in which these policies are formed, and how environmental migrations have become a security issue in Bangladesh.

3. CONTEXTUALIZATION: BANGLADESHI ENVIRONMENTAL MIGRATIONS TO INDIA AS A SECURITY ISSUE

As floods in Bangladesh trigger trans-border migrations, it emerged as an international issue that became both cause and consequence of the complex politics of India Bangladesh relations. Indeed, the literature treating the question of Bangladeshi migrants to India and the impact of environmental disasters on the issue insists on the political dimension of the international reaction (Kumar, 2011). In parallel to the 'natural' development of flooding and pressures on the population to migrate, a process of securitization has been happening, informed by the complex history of India-Bangladesh relations and from the geopolitical context of the region The specificity of the flood-induced migrations in Bangladesh has to be considered in terms of national perception and discourse, as they influence the responses to the crisis and frame it as a security issue. (Hossain, 2005)

3.1. Readings of the phenomenon on both side of the border

The official position of Bangladesh is to refuse sole responsibility for the issue, and that Bangladeshis victims of others' behaviours (Friedman, 2009). The question behind climate change enables them to point out the responsibility of industrialized nations in the dramatic increase of flooding and sea-level rise that are destabilizing the country (Government of Bangladesh, 2008). Bangladesh's official discourse therefore stresses the efforts demanded of poor countries whereas the situation is by definition an international concern (Walsham, 2010). Cooperation at the international level is necessary to tackle the issue of climate change, while regional dialogues are the only way to deal with environmental refugees in South Asia.

However, other voices in Bangladesh claim that this position is sheer denial by a government that does not have the capacity to deal with the issue. Floods are, in this perspective, disasters that can be dealt with at a national level and even if Bangladesh is not responsible for climate change it should not use this to justify its lack of responses (Friedman, 2009). The difference of perspective between the two countries is also based on a war of figures between Bangladesh and India. The Bangladeshi government keeps blaming New Delhi for exaggerating the problem by artificially increasing its statistics regarding Bangladeshi immigrants. This struggle has been affecting scientific studies of the issue for decades and the conceptual pitfalls of the definition of 'environmental refugees' can only aggravate the falsification of numbers. According to Homer-Dixon in 1994, "detailed data are scarce, since both India and Bangladesh manipulate their census data for political reasons, and the Bangladeshi government avoids admitting there is large out-migration, because the question causes friction with India" (Homer-Dixon, 1994, 22).

Finally, the discourse of the government of Bangladesh insists on plans that have been designed to mitigate the effects of floods since the late 2000s. Real efforts have indeed been made, and are now showed as evidences of the good will of the Bangladeshi government and its work to improve the situation. For instance, a 'Climate Change Action Plan over 10 years (2009-2018) is implemented in order to "build the capacity and resilience of the country to meet the challenge of climate change". (Government of Bangladesh, 2008, 28) Based on six pillars—food security/health, infrastructures, comprehensive disaster management, research, mitigation, and capacity building—the programme tries to promote an optimistic perception of the future with the idea of a special adaptation capacity of Bangladesh (Ayers, 2011). Nevertheless, concrete consequences remain to be seen, and the 2011 floods tend to show that despite past experiences and the adaptation of Bangladeshis to natural disasters, environmental damages continue to weaken the entire country's development.

On the Indian side, the migration of Bangladeshis is mainly pictured as a threat to internal stability. Again, historical events influence the perception of the issue as shown by statistics analysing the impact of the 1971 war on it (Pant, 2007). Traditionally, the Indian discourse insists on the security issues that are linked to migration. ""If one-third of Bangladesh is flooded, India can soak in some of the refugees, but not all," Retired Air Marshal A.K. Singh, the former commander of India's air force, told a London conference recently. "Low-lying coastal area flooding is a national security issue" (Friedman, 2009). Potentially, climate-induced migrations could accentuate competition for resources and ethnic tension at the border, and the resulting internal instabilities increase the risk of armed conflicts. (TERI, 2009, 3-4)

Lately, in addition to this pragmatic vision has emerged the idea that the Bangladeshi migration was politically driven and used by Dhaka for geopolitical purposes, the existence of a large Bangladeshi diaspora in the region being a source of political influence (Kumar, 2011, 108).

Therefore, environmental migration is seen as the most recent facet of a long-term process that should not be treated differently than any other type of migration, which is to say as a tool for Bangladeshi, or even Pakistani, interests inside Indian. (Kumar, 2011; Pant, 2007, 242)

Nonetheless, knowing that certain perspectives already announce 200 million environmental migrants worldwide due to monsoon rains and floods, the Indian government takes the question very seriously (Panda, 2011). While India does not deny the emergence of an environmental crisis, its discourse blames Bangladesh for using climate change for political purposes. For India sees Bangladesh as ground zero of such migrations. Up to 78 million Bangladeshi are expected to be forced to move because of environmental impacts by 2020 (D'Costa, 2012, 150). Therefore this concern is regularly tackled during bilateral meetings, especially as they are a bargaining tool for India in the question of water sharing. The intense upstream use of the main rivers crossing Bangladesh is considered by New Delhi as the sovereign right of the Indians to dispose of their national resources, but this process directly threatens Bangladesh's agriculture and environmental stability. (Pandev, 2011) The bilateral negotiations for an agreed use of these waters are therefore affecting the India-Bangladeshi relationship and the settlement of the migration issue. In September 2011, Prime Minister M. Singh's visit to Dhaka was the occasion to deal with water sharing as much as border security concerns, though it failed to lead to any agreement (D'Costa, 2012, 152).

To conclude, it appears that the Indian discourse is driven by security and political concerns, based on a rather pragmatic approach of the issue, without denying the looming environmental crisis. It is linked to a network of interconnected issues—from illegal trafficking to water sharing—and is both cause and consequence of each of them. Thus, if floods in Bangladesh "depend to large extent on the water sharing agreement between the two countries" (Panda, 2011, 14), such agreements are also dependent on the potential for cooperation over the flood-induced migration question.

3.2. 'Securitization' of the issue : when environmental migrations take place in the highly unstable area of the India-Bangladesh border

The constitution of Bangladeshi migration to India as a security issue stems from several political and historical factors, and the emergence of an environmental crisis is only the most recent layer of a decades-old concern.

3.2.1. The politicization of environmental migrations: between history and electoral use of tensions

This securitization process is articulated according to political rationale, and environmental migrations between Bangladesh and India are to be understood in this larger context, as it frames the antagonism and the potential cooperation between the two countries.

Due to historical reasons, Bangladeshi migration to India has existed since the Partition in 1947. Up to 1 million Hindus living in East Pakistan fled 'Muslim-led Pakistan' in the late 1940s and the independence of Bangladesh in 1971 triggered another wave of departures. (Homer-Dixon, 1994, 22) Thus, this migration has always been highly politicized, and today's security policy at the border is clearly influenced by electoral purposes (Pant, 2007). Nationalist and religious forces tense up the relationship as reports of discrimination towards the other's citizens are released on both sides of the border (IDSA, 2012). The demographic dimension of the migration, especially in the north-eastern states of India, where tensions between Christian, Muslim and Hindu communities are used to enhance political oppositions, is therefore regarded as a very serious menace for the ethnic balance of the region (Pant, 2007).

Bangladeshi migration takes place in a very sensitive area of the India. The north-eastern provinces are the crux of many security concerns for New Delhi, the Naxalites movements and the penetrations of Chinese agents being the most visible (Pant, 2007). Geographically, the north-eastern states are connected to the mainland by the Siliguri corridor, also known as the 'Chicken's Neck', a strip of land of less than 40 km of width and of great geostrategic importance. Any potential troubles are therefore regarded as a serious threat to the internal cohesion of the country.

The instability of the region is also linked to its terrain, which makes any attempt at controlling the border difficult and enables the development of trafficking and political unrest (Pattanaik, 2011). As a result, illegal Bangladeshi migrations are seen as part of the general context of insecurity, and the struggle against migrants has to be understood through this lens (Kumar, 2011).

3.2.2. Fences, violence and potential for cooperation: what expectations for the future?

India's most significant measure to treat this issue as a security concern was taken in the mid 1980s

with the construction of fences along the border. This highly political decision embodied the 'securitization' of the dealing with Bangladeshi migrations. Although it was supposed to be finished by 2007, the work is still ongoing along 2,544 miles of the border. In 2010, India announced that it had completed 70% of the project (Banerjee, 2010).

Nevertheless, the fencing policy is highly symbolic politically, but has yet to prove its efficiency in security terms. The terrain and the length of the border as well as the internal troubles of the north-eastern Indian states make it extremely difficult to control the frontier. The outcomes of the fencing remain to be analysed, but it risks being unsustainable economically and militarily in the case of a strong increase of Bangladeshi migration (Pant, 2007, 242). Besides, the very notion of a border can be questioned in the case of the India-Bangladesh frontier, For people living on both sides of the border traditions of migration in the region track back to centuries before the construction of the two nation-states (Pattanaik, 2011).

Parallel to the very concrete work of fencing the frontier, India has put into place patrols and a series of strict policies regarding illegal Bangladeshi migrants.[3] These policies have been at the centre of controversy as they resulted in violence against and even killing of migrants trying to cross the border. This context of violence is all the more crucial as environmental migrations increase the tensions between the two countries and make each government less disposed to hear the other's rationale : India fearing the displacement of millions of people and Bangladesh insisting on the regional dimension of the issue.

Nonetheless, potential for cooperation exists, and the politicization of the issue can also bring the two parties to discuss and find an alternative strategy to a security issue. Indeed, both Dhaka and New Delhi consider the dealing of the border as unsatisfactory, and the emerging environmental crisis may oblige them to find a solution as early as possible. If environmental migrations are a security issue, then solutions are to be designed as strategies based on rationality and pragmatism. In this context, the last India-Bangladesh meetings over the sharing of water resources can be seen as reasons to be optimistic. The March 2011 Agreement on the non-use of lethal weapons by the Border Security Force, as well as the Coordinated Border Management Plan signed in July, 2011, and the Protocol to the Agreement concerning The Demarcation of Land Boundary signed in September, 2011 are interesting steps in the appeasement of the situation (Das, 2011).

CONCLUSION

Flood-induced migrations from Bangladesh to India are a remarkable expression of the complexity of environmental migrations today. The Ganges Delta has a long history of destructive floods and the populations have had to adapt to regular damages due to environmental crisis, but the current trends are subjected to external phenomena such as global warning and intense use of river water. Besides, the flood-induced migrations take place in a tense regional context and solutions to the humanitarian crisis are highly influenced by security considerations. The 2011 floods have showed the need for international cooperation and highlighted the need of better management of the issue at the bilateral level. Indeed, if actions are taken at the Bangladeshi national level to struggle against environmental crises, India has a great role to play in their resolution. The two countries are bound as they share the waters of the main rivers running through Bangladesh, and a better management of these resources is essential for any attempts at improving the existence of millions. Moreover, India cannot afford to reject the management of migrants fleeing the floods to its neighbour, especially considering the looming consequences of global warming on the Bangladeshi territory. That is why the question of environmental migrations here is highly political and is to be understood in its larger context of Indo-Bangladeshi relations.

This study presents the different aspects of the issue of Bangladeshi flood-induced migrations to India. If the crux of the problem remains the long-term reduction of damages due to floods, mid-term responses have to be designed to deal with the increasing number of migrants that continue to suffer from this phenomenon. From this perspective, bilateral cooperation appears as the only solution to an increasingly important issue.

3. The use of military to deal with environmental crises and especially with migrations that are triggered by such disasters has been particularly studied after the Hurricane Katrina and the controversies in the U.S. (Smith, 2007 ; Wisner & Walker, 2005) Refugees of such catastrophes share with conflict refugees the abruptness of the 'pull-factor' and their displacement becomes therefore a potential danger for the stability of the region of arrival.

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PART 2 SLOW-ONSET EVENTS

Slow-onset events tend to attract far less attention from the media and the international community. Yet they induce diverse and complex migration patterns that are too often overlooked. The heterogeneity of these migration patterns makes them difficult to address and apprehend. Many of these slow-onset events will be exacerbated by climate change in the coming decades. This section addresses some these slow-onset events that were particularly prominent in 2011, but have often been ongoing for several years. They include the dramatic drought that ravaged the Horn of Africa and led to massive population movements, but also the long-standing flows of migration between Mexico and the United States, whose environmental component is often neglected. But the section also features a case of a proactive policy-response to environmentally-induced migration, the Almeria model of circular migration by Morocco and the region of Almeria in Spain.

Photo credits: US/Mexican fence, Douglas, Arizona, USA. June 1st, 2012. © 2012. Pauline Brücker (IDDRI)

DROUGHT IN SOMALIA: A MIGRATION CRISIS

MEHDI ACHOUR, NINA LACAN

INTRODUCTION

Although Somalia is prone to harsh climatic condition, distinguishing migration factors of Somali migrants is extremely difficult because of the strong inter-linkages between conflict and environmental condition. The drought that hit Somalia in 2011, after two years of rainfall interruption, was no exception, as it occurred in the context of the civil war that has been tearing the country apart since 1991. In fact, one of the reasons for Kenya's military intervention in Somalia in October 2011 was to stem the flow of Somalis entering the country and the Dadaab camps because of drought and conflict. In the Somali case, armed conflict and environmental conditions seem to be mutually reinforcing factors for migration. Today, the Somali population is weakened by past droughts and floods and the ongoing conflicts, which paralyze the country's activity. The lack of an effective Somali government, which could play a role as stabilizer in territory, has left populations alone to manage crises like diseases, droughts, and floods on their own. As a result, they are highly dependent on international assistance and struggle to have access to sustainable livelihoods. In particular, migrants inside the country form a very vulnerable group, one example of this being that in 2001, internally displaced persons constituted more than 60% of the food insecure (Gundel, 2002).

This case study concentrates on the 2011 drought in Somalia and the environmental migrations induced both internally, within the Somali borders, and internationally, in the neighboring countries. Since July 2011, it has been estimated that more than 1.3 million people were internally displaced and 290,000 forced to flee across the border (UNHCR 2011c).

Whether or not those displacements are direct consequence of climate change is difficult to assess. The frequency of droughts—currently one every two or three years, approximately, compared to one every seven years during the 1980s—could be a direct consequence of climate change.[1]

Before describing the conditions and factors of the migrations that took place in the context of the 2011 drought, as well as the Somali migrants' profiles and trajectories, we will try to understand the reasons why such a humanitarian disaster could not be prevented in Somalia, in spite of the general awareness of the climatic situation and the high probability of droughts. Finally, we will discuss the role of national and international actors, trying to pinpoint the difficulties faced by humanitarian and development aid actors.

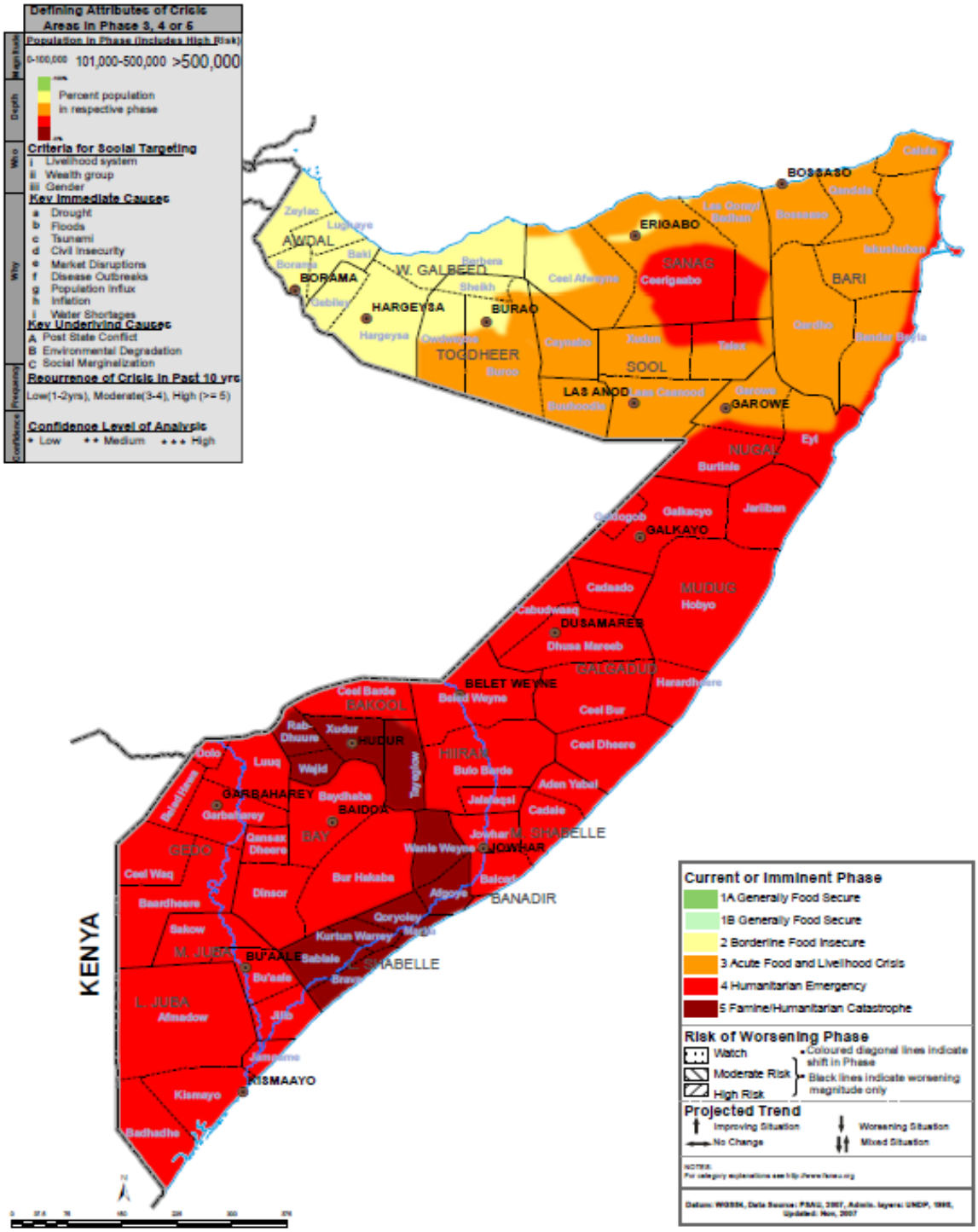
METHODOLOGICAL CONSIDERATIONS

Although we were able to gather different figures from available data, it is not certain that they encapsulate the totality of the phenomenon of migrations linked to the drought in Somalia. Two main methodological issues explain this acknowledgement.

It is difficult to assess the number of migrants that moved because of the drought because distinguishing the migration factors in Somalia is no easy task. The complexity of the humanitarian crisis that developed in Somalia makes it difficult to separate persons fleeing the drought from persons displaced by the conflict or moving to improve their economic situation. According to a USAID report dated April, 2011, both drought-related

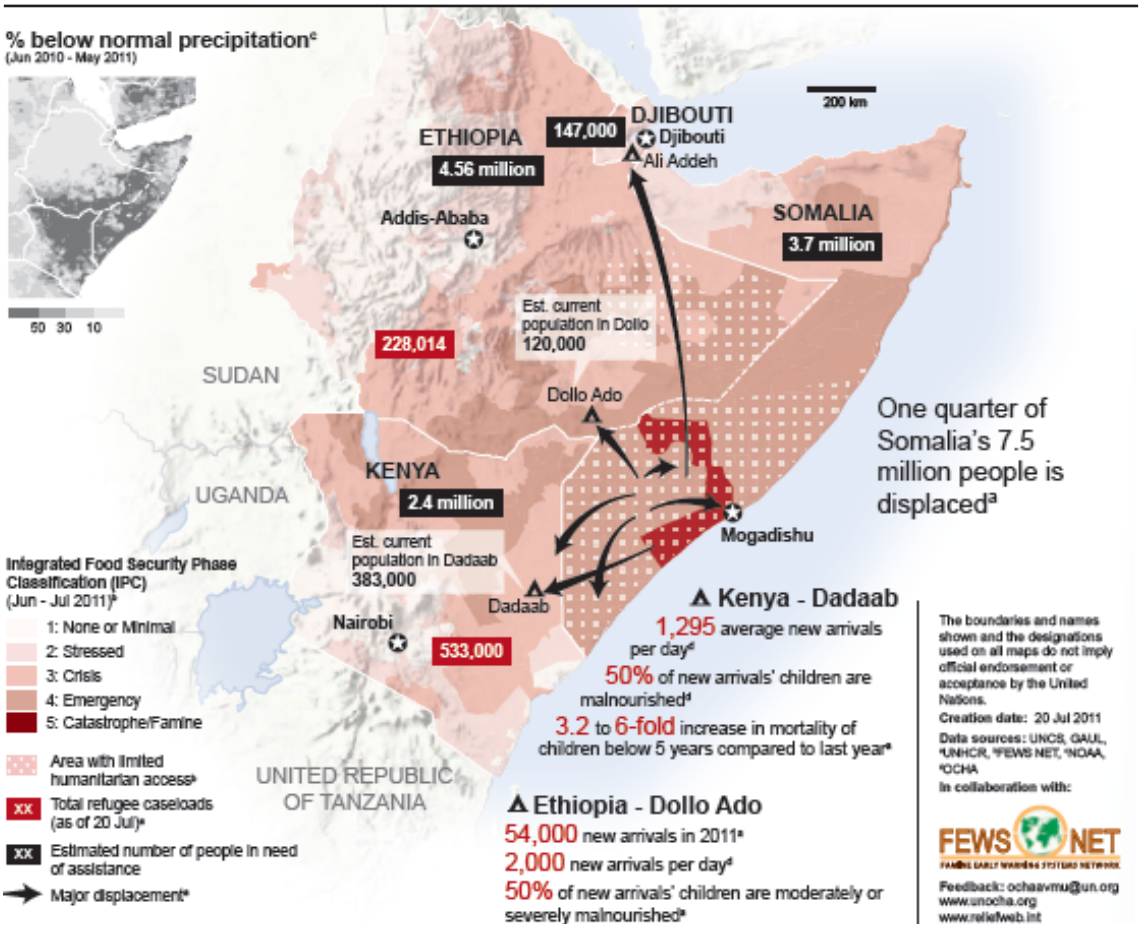
1. The last droughts in Eastern Africa took place in 2006 and in 2008-2009.

Map 1. Somalia Integrated Food Security Phase Classification, July 2011



Source: Food Security and Nutrition Analysis Unit—Somalia

Map 2. Food Security and Humanitarian situation assessment in the Horn of Africa, as of July 2011



Source: FEWSNET-OCHA, Eastern Africa: Drought – Humanitarian Snapshot (as of July 20 2011)

and conflict-related migrations were increasing at faster rates than usual during that period (USAID – FEWSNET, 2011). Accordingly, it seems reductive to explain the increase in the rate of migrations of Somalis in 2011 by the only drought: migrants affected by the drought could also be migrating because of the insecurity induced by the conflict, as well as to improve their socioeconomic situation. This does not support the idea that talking about "environmental migrants" in the aftermath of the 2011 drought is inadequate but rather that numbers should be used cautiously.

Indeed, numbers available from the UNHCR mention the increase in the total number of refugee, and not of migrants. As a reminder, we underscore here that the persons registered by UNHCR under the Refugee Status Determination procedure is restricted to those falling into the legal definition of a refugee, enshrined in the 1951 Geneva Convention. In many cases, category of environmental migrants and refugees are clearly distinguishable, which is yet hardly doable in the case of Somalia—as already argued. Accordingly, if these figures capture the numbers of migrants who actually went through the registration process and obtain the refugee status, then it is likely that they give a low estimation of the number of migrants displaced by the drought. Yet, it seems reasonable to suggest that part of the huge influx in refugees in the spring and summer of 2011 was linked to the drought occurring at the same time in Somalia. This hypothesis is actually corroborated by elements developed below.

1. DROUGHT-RELATED MIGRATIONS IN SOMALIA IN 2011: QUANTITATIVE AND QUALITATIVE ASSESSMENT

1.1. Droughts in Somalia and vulnerability factors

Somalia has experienced many disasters before the drought in 2011 and we can draw numerous similarities with past experiences. In 1974-75, 2001,

Moving from Somalia to Kenya

Photo credits : © IOM 2011 - MKE0406 (Photo: Lovorka Ikovac)

2006 and 2008, Somalia suffered droughts in different parts of its territory.

The food situation deteriorated in 2001 because of heavy rains in Ethiopia, which resulted in floods in Southern Somalia. Large migration flows were observed at the time and problems of food supply already existed. The 2001 flood was then followed by repeated droughts, limiting the future resilience of populations to stronger natural disturbances.

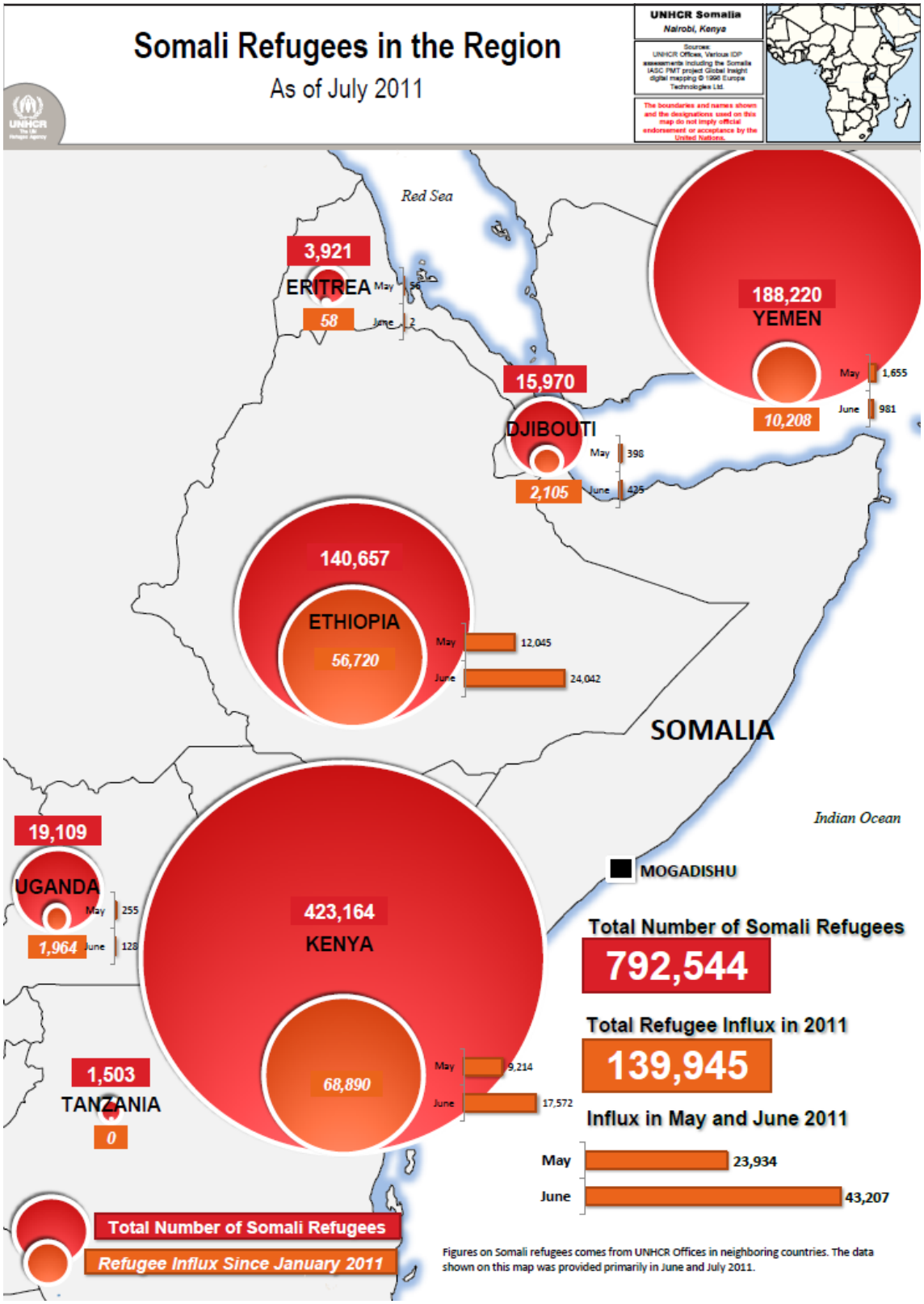
As 2011 was the driest year in decades, the Somali population was hardly able to face it. In the summer, the drought transformed into a major food crisis, as acute food insecurity developed in certain regions of South Somalia. On July 20th, the state of famine was declared by the United Nations in two regions, Lower Shabelle and Bakool (UN News Centre, 2011). By the beginning of August, the number of people needing urgent food assistance in Djibouti, Ethiopia, Kenya, Somalia and Uganda had reached 12.4 million, twice the number of the beginning of year. The state of famine in Somalia extended to three other regions between July and August: some areas of Middle Shabelle, the Afgooye corridor refugee settlement and the internally displaced communities in Mogadishu. The UN considered the food crisis as the most serious one Africa had known in the last twenty years. (L'Expansion, 2011). The two maps below show food security and humanitarian situation assessments for the month of July. Somalia, as can be seen, presents the most serious humanitarian situation, as entire areas have only limited humanitarian access while famine levels have developed in certain regions, and one quarter of the country's inhabitants are displaced.

The environmental situation on Somalia had strong impacts on the population, which, we argue, were partly predictable. The lack of environmental regulations and disaster risk reduction policy in Somalia, to be put down to the extremely turbulent political context and the lack of national government since 1991 with the end of Siad Barre's dictatorship, explains why civilians did not received national support and assistance. All attempts to bring a solution to the policy vacuum and address the lack of administration that Somalia was experiencing were unsuccessful. Hopes were raised in 2004 with the establishment of Somalia's Transitional Federal Government, but the different parties of the civil war have been unable to bring peace, stability and protection. The conflict that has been concentrated in the South of Somalia since 2009 between the forces of the TFG, assisted by AMISOM (African Union Mission in Somalia) to various Islamist factions, namely Al-Shabaab, have further complicated the political situation. This lack of effective and unified sovereignty from national institutions over the Somali population has impeded a proper management of the crises that has affected the country. As a result, populations are left even more vulnerable after each crisis, in a region (the Horn of Africa) that is already considered the poorest in the world.

Regional tentative to prevent drought and desertification impact yet exists. In 1996, six countries of the Horn of Africa decided to create the Intergovernmental Authority on Development (IGAD), which aims at reducing famine and starvation in the region by promoting development and drought control through the creation of plans to cope with future disasters. As a result, some countries in the Horn of Africa succeeded in implementing prevention systems. For instance, Kenya and Ethiopia, dependent of humanitarian aid, were able to determine their future needs and foresee the management of the crisis. The lack of stable political institutions in Somalia partly might explain the failure of the initiative in the country.

Other important factors explaining the vulnerability of the Somali population are the demographic changes that the country has gone through in the past decades coupled with the lack of food production improvements. If Somalia's population has more than doubled since 1970, the food production has not increased so as to satisfy the rising demand. Somalia attempted to respond to these growing needs situation by implementing development policies to enhance sustainable agriculture, but these policies were impeded by war

Map 3. Snapshot of Somali Refugees in the Horn of Africa, as of July 20th, 2011



Source: UNHCR Offices, Various IDP assessments including the Somalia IASC PMT project Global Insight digital mapping

expenses. Food shortages and the lack of economic opportunities from agriculture greatly increase vulnerabilities. Indeed, the livelihood of Somalia's rural population is greatly dependent on the agricultural sector, but it suffers from a lack of elementary tools to increase its productivity (machinery, fertilizers, etc.). Land aridity in the Horn of Africa has never been tackled, which explains the difficulty for farmers to produce enough yields to feed the population. Even in good years, farmers are unable to produce enough reserves to prevent future possible disasters.

Accordingly, it appears impossible to understand the impacts of the 2011 drought without addressing the linkages between the famine and previous socio-economic patterns. Not only farmers face extremely worrying threats to their livelihoods, Somali pastoral societies are also extremely weakened by environmental conditions. Because of the premises of drought witnessed in 2009 and 2010, with strong interruptions of rainfalls, nomadic pastoralists, who represent the major part of the Somali population, lost their livestock. Without any back-up resources, the pastoralist population did not have enough resources to prevent the effects of the 2011 drought nor to adapt to the new situation.

1.2. Quantitative assessment

The drought that hit the Horn of Africa in 2011 generated complex multi-directional flows of migrants, both inside the affected countries and outside. Prior to the drought, migrations were already a distinctive feature of the region's dynamics, as highlighted by IOM's Director of Operations and Emergencies Mohammed Abdiker, according to whom "drought related migration is exacerbating an already complex situation of displacement and movement, triggered by conflict and instability and the returns of many Ethiopians and Somalis from Yemen" (IOM, 2011). In fact, the power struggles taking place across the southern and central regions of Somalia have already caused mass displacement within the country. Drought appears as an additional migration factor, in a context where migration has been and remains the unique source of immediate security for Somali citizens (Thiollet, 2009:81).

The regions where famine was declared were pastoral areas. The effects of the drought in these areas included an increase in the price of cereal and water and higher livestock mortality rates. Pastoral families were left in a situation where their survival was threatened by lack of water, pasture and food, and they decided to leave their land, at least temporarily. Massive flows of Somalis arrived in Mogadishu during the peak of the crisis, but many others decided either because of connection abroad or geographical proximity to cross national frontiers and enter neighboring countries, such as Kenya and Ethiopia, or more faraway ones from Yemen to South Africa.

Although quantitative data on environmentally induced migration are scarce, numbers are available from different report published by humanitarian agencies, operating in Somalia and neighboring countries. Occasionally they were able to survey the number of migrants whose main reason for moving was the drought. According to the OCHA Somalia Situation Report issued on July 26th, the number of new internally displaced people (IDPs) in Somalia between

Table 1. Comparison of the number of Somali arrivals in Yemen, between 2010 and 2011, and between the 2nd and 3rd quarter of 2011

Period	Number of Somali arrivals on the Yemeni shores	Percentage increase	Number of non-Somali arrivals on the Yemeni shores	Percentage increase
April-June 2011	4,415	103, 26%	15, 740	27, 89%
July-September 2011	8,974	NA	20, 130	
January-September 2010	10,051	92, 92%	NA	NA
January-September 2011	19,390	NA	NA	

Source: Own elaboration, from Yemen Mixed Migration Task Force, July-September 2011 quarterly review

Table 2. Origin of registered Somali asylum seekers in Yemen, during the 3rd quarter of 2011

Origin of Somali asylum seekers in Yemen (July-Sept 2011)	Number of migrants	Percentage of total
Middle and Lower Shabelle	3,711	42,59%
Bay	1,977	22,69%
Banadir	1,653	18,97%
Other	1,372	16,75%
South-Central Somalia	NA	97%
Puntland	NA	2%
Somaliland	NA	1%

Source: Own elaboration, from Yemen Mixed Migration Task Force, July-September 2011 quarterly review

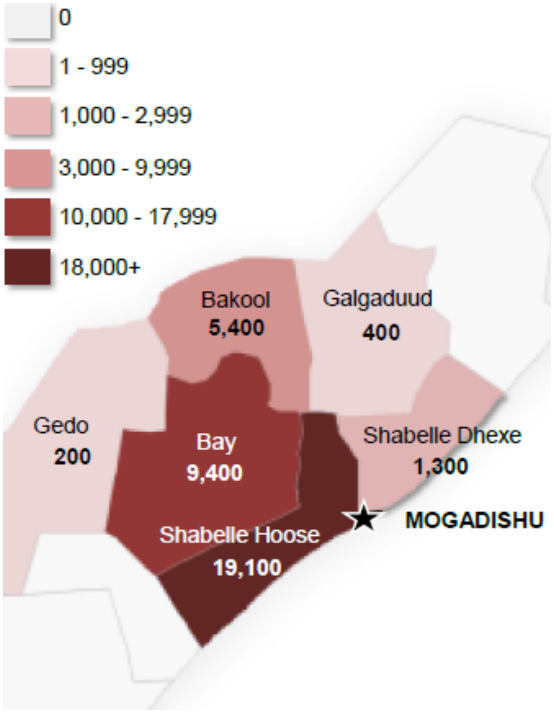
June 6th, 2011 and July 26th, 2011, amounted to 62,500, of whom 82% had moved because of the drought. The rate of migrants entering Kenya and Ethiopia during this period, considered as the peak of the crisis, amounted to 3,500 per day (UNOCHA, 2011).

The map below, constructed with data from United Nations High Commissioner for Refugees (UNHCR) offices in countries neighboring Somalia, gives an assessment of the numbers of Somali refugees registered by the agency in the region as for July, 2011. The map shows that the main countries that received Somali refugees during the drought were Kenya, Yemen and Ethiopia. Kenya received the biggest share of these migrants, with 68,890 new refugees coming in between January and July 2011. Ethiopia came second, receiving 56,720 refugees and Yemen third with 10,208 refugees. Between May and June, the number of new Somali refugees in the region increased therefore by 80%.

Finally, it is possible to know the number of migrants coming from Somalia who arrived in Yemen during the period of the drought. The numbers are presented in the table below, which shows the evolution of the number of Somali arrivals on the shores of Yemen from one period to the other during the year of the drought, and from one year to the other, comparing 2011 to the previous year.

Table 1 shows that the number of Somali arrivals on the Yemeni coasts more than doubled between the second and the third quarter of the year 2011, while at the same time the number of non-Somali nationals only increased by less than 30%. Data collected by the Mixed Migration Task Force (MMTF) also shows that a large majority of Somali asylum seekers registered in Yemen during the period of July to September 2011 came from regions were famine or acute food insecurity was reported during the period. If the link establishing a direct causality between drought-affected areas and migration could be debatable on the sole analysis of origin of Somali asylum seekers, the Yemen Mixed Migration Task Force was able to assess for a 10% sample of the registered new arrivals, their main reason of departure. While insecurity was the main reason evoked during the April-June period, drought and the inability to access basic needs, as well as other economic factors, had become the primary reasons for fleeing by the July-September (Yemen Mixed Migration Task Force, 2011).

Map 4. Source of displacement of Somali IDPs arriving in Mogadishu, July-September 2011



Source: UNHCR BO Somalia, Nairobi, July to September 2011

I.3. Migrant profiles and migration factors: who are the migrants, where do they go, why do they move?

Somali migrants moved from their homes to urban areas and other countries because the degradation of environmental conditions posed a threat to their livelihood and even their survival. For pastoralist communities, which represent more than the half of the Somali population, the consequences of the drought were the incapacity to find pastures to feed their livestock as well the lack of water. Somali nomadic populations have always used short-distance mobility as an answer to drought, mobility being one of the conditions for survival in this arid area. However, several factors including the growing population in rural areas, the competition for land and water, the ecological damage to resources and the restricted mobility across political boundaries have made it harder for them to continue to depend on this as a coping mechanism. Regions where the famine was declared in July 2011, Low Shabelle and Bakool, were areas where the armed conflict between the government troops and the Shebab rebels was taking place. Conflict prevented pastoralist families from getting access to assistance

during the food crisis, forcing them to migrate to more faraway places. Those who did not move from the areas worst affected by the drought were usually Somali families with too little economic resources to leave or the families of male migrants that stayed behind waiting for the return of the head of the family.

Some of the migrants headed for Mogadishu, the capital of Somalia. Others took the direction of the two northern regions of Somalia, Somaliland and Puntland, sometimes to settle temporarily there, or to head to other destinations, namely the Arabic Peninsula. Other migrants headed to neighboring countries, mainly Kenya and Ethiopia, where they could receive shelter and assistance by entering the refugee camps located next to the borders. For a fraction of the migrants, going to Kenya was only one step in a longer journey that was supposed to take them to Southern African countries, especially South Africa.

Internally displaced people (IDPs)

During the month of July, the number of IDPs migrating away from the South-Central region of Somalia started to decrease. Possible reasons for this decline include the arrival of Islamic NGOs distributing relief aid in some of the areas worst affected by the famine, such as the Bay and Bakool regions, but also the fact that internally displaced people also started heading for surrounding towns, such as Baidoa, Wajid, Berdale, Qasaxdhere and Bardera (not just to Mogadishu or the Northern regions of Somalia). Other possible reasons include the fact that after some time, those who could afford to move had already done so, while the situation of those who remained behind without sufficient means to move had not changed.

Mugadishu

According to a document based on IASC Population Movement Tracking data published by UNHCR on November 18th, 2011, the largest influx of IDPs coming into Mogadishu, the capital of Somalia, occurred in January, 2011, However, starting in March, the rate of new IDPs arriving to the capital started increasing steadily. Here are the key numbers and features of these IDP flows, for each quarter of the year.

From January to March, 2011, the total IDP arrivals in Mogadishu amounted to 31,400. The highest number arrived in January. Sixty-six percent of the IDPs had been displaced because of the drought. Twenty percent said they had migrated because of lack of livelihood. These movements are actually likely to be related to the drought. Seven percent of the IDPs coming in had moved because of insecurity. Seven percent of the displaced had been evicted from IDP settlements in the Afgooye corridor. Most of the IDPs arriving in Mogadishu during this period came from the Lower Shabelle region.

From April to June 2011, the total IDP arrivals in the capital of Somalia amounted to 8,500 (a significant decrease compared to the previous period). 83% of these arrivals were linked to the drought, while 16% were linked to insecurity. The IDPs mostly came from Bay region.

From July to September 2011, the total number of IDPs arriving in Mogadishu was 35, 800. Seventy-seven percent of these migrants arrived during the month of July when the state of famine was declared in Lower Shabelle and Bakool. Ninety-eight percent of arrivals during this period of time were drought-related, according to the UNHCR report.

From October to November, the reasons for displacement were reversed, as the effects of the drought disappeared and military conflict started again between government forces and Al-Shabaab rebels in the region of Mogadishu. Ninety-three percent of the total arrivals during that period were linked to insecurity.

The Afgooye corridor

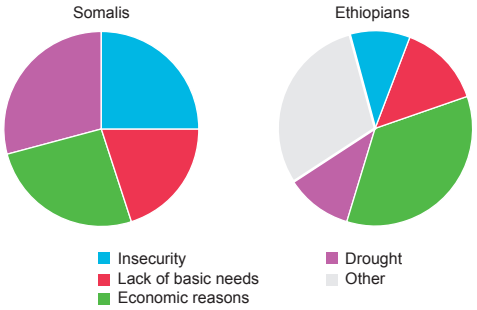
It is the main road between the cities of Mogadishu and Afgooye. This corridor is the area where Somali migrants go when intense fighting in Mugadishu creates serious safety risks. It is actually the largest single concentration of internally displaced people in the world.

In August 2011, the prevalence of acute malnutrition and the rates of mortality surpassed famine thresholds in the Mogadishu IDP community and in the Afgooye corridor IDP settlement (FNSAU– FEWSNET, 2011). In fact, the UN declared on August 3rd that the famine had spread to three more regions of Southern Somalia since July 20th: the Afgooye corridor, Mogadishu, and the Middle Shabelle region.

Migration to Puntland and Somaliland

Migrations inside the country happened inside a context of growing securitization because of the conflict. Upon arriving in Somaliland and Puntland, migrants from the South of Somalia faced suspicion from the part of the local populations or police forces. In the semi-autonomous Puntland state, identity cards were handed out to IDPs from Southern Somalia in order to distinguish them from militia or criminals. Poor local communities in these regions have helped to settle unusually large numbers of displaced people, sometimes drawing on traditional and Islamic principles. Sufi brotherhoods that are known for linking people from different clans and origins played a role in this integration process.

Figure 1. Main reasons for flight among Somali and Ethiopian migrants arriving in Yemen between July and September 2011



Source: Yemen Mixed Migration Task Force, 2011*

*Taken from a 10% sample of the 12,507 registered arrivals.

Entrance into other countries

Yemen

The majority of migrants arriving to Yemen were male. According to the Yemen MMTF, Somali males often left their families behind in Somalia, Kenya or Ethiopia to make the journey to Yemen. Their objective was to find employment in Yemen and to send back money to their families. Also, they were afraid of getting conscripted by the Al-Shabab insurgent groups or arrested by them on pretext that they were supporting the government if they stayed in Somalia.

Figure 1 shows the complexity of the reasons pushing Somali and Ethiopian migrants to the coast of Yemen during the period of July through September, 2011. The data reflect the importance the drought had as a primary factor for migration, especially for Somalis. Twenty six percent of new Somali arrivals during that period were caused primarily by the drought. The majority of the Somali arrivals were migrants coming from the South-Central regions of the two Shabelles, Bay and Banadir regions. In the previous quarter, encompassing April through June, 2011, insecurity had been the main factor of migration to the Yemeni coast.

Many of these migrants wished to move to Saudi Arabia after getting to Yemen. Yet, because of the ongoing conflict in Yemen, this was not possible. Work opportunities were also lacking for migrants from the Horn of Africa. The report explains that a part of the young migrants were disappointed and wished to go back to their country.

Kenya and Ethiopia

Both countries have had a leading role in welcoming Somali refugees during the 2011 drought, as can be observed on the map in section I.2. Both Kenya and Ethiopia possess legal standards concerning refugees and have created government bodies geared to these issues, which work in close cooperation with UNHCR for refugee registration and status determination (Yemen Mixed Migration Task Force, 2010). In Kenya, refugees from Somalia are accepted on a *prima facie* basis, which illustrates how normalized Somalia's humanitarian situation has become from the perspective of its main neighboring and host country[2]. Yet in both countries, although Somali migrants enjoy recognition of the refugee status, they are only granted limited access to social protection and benefits, such as employment, education, health care and even freedom of movement, namely because of the difficulty they face in obtaining documentation in those countries. During the drought, although Kenya and Ethiopia were used by some migrants as transit countries when heading to the Arabic Peninsula or to Southern countries of Africa, the bulk of Somalis arriving in both countries was headed for the refugee camps, which played a crucial role in welcoming migrants affected by the drought and food insecurity.

Although there are several refugee camps inside Somalia, the camps that welcomed the most migrants during the drought were located in neighboring countries. The Dadaab complex, located in the North-East of Kenya, is by far the most important in terms of size. The camp features an important UNHCR base. The international humanitarian organisation CARE is UNHCR's partner for managing the camp. During the first eleven months of 2011, Dadaab received over 160,000 new refugees, most of them coming from the drought-stricken southern and central parts of Somalia (Dar and Khan, 2011). In July 2011, at the peak of the crisis, it was receiving 1,300 migrants per day. The second most important refugee camp is Dollo Ado, located in the South of Ethiopia, close to the frontier with Somalia. Although these complexes are relatively old, the intensity of the influx of migrants arriving during the drought led to the opening of new camps within these complexes. In Dollo Ado, three additional camps were opened between June and November, 2011, in order to relieve the congestion that increased everyday due to the arrival of new migrants. The last one, Bur Amino, was opened in November 2011, when the four existing camps at Dollo Ado had a total population of 137 000. After much negotiation, the Kenyan government agreed to open two additional camps, Ifo-2 and Kambioos in the context of the growing humanitarian crisis caused by the drought.

2. This is also the case in Yemen (Yemen Mixed Migration Task Force, 2010).

South Africa

Migration of Somalis to South Africa during the drought is revealing on this issue. Since 1994 South Africa has prided itself on having officially welcoming arms for all migrants. According to Loren B. Landau, Director of the African Center for Migration and Society, South Africa's refugee law guarantees freedom of movement, access to numerous social services, and rights to compete in labor and housing markets. It is intended to maximize the refugee's freedom and protection and to promote their temporary integration into local communities (Landau, 2006). South Africa's refugee and asylum seeker policy was lauded in 2007 by the UN High Commissioner for Refugees, Antonio Gutierres, for its progressiveness and commitment to ensuring access to basic services to refugees.

However, the reality experienced by Somali migrants arriving at the South African border in the wake of the drought was very different. Since they were coming from a country experiencing a military conflict, they could legitimately ask for asylum and refugee status in the country. Yet, according to the Chairperson of the Somali Community Board, a local organisation defending the interests of Somalis in South Africa, a new unofficial policy restricting entrance for Somali and Ethiopian asylum seekers developed starting in May 2011, as the level of migrants coming into the country from the Horn of Africa to seek asylum began to increase rapidly (IRIN News, 2011a). A June 2011 issue brief by Roni Amit from the African Center for Migration and Society suggests that the justification used by the Home Affairs Department for refusing asylum to migrants was that they should have sought asylum in the first safe country they reached. According to the researcher, not only does South Africa's use of the 'first safe country' principle lack any basis in international or domestic law, but it also fails to consider claims individually before turning asylum seekers away, as demanded by international law (Amit, 2011). Its implementation thus deprived migrants arriving from the Horn of Africa as a result of the drought and/or the civil war of any legal or effective protection, forcing them to remain in a situation of physical insecurity, whereas they could have asked for asylum given the political situation of Somalia.

The South African policy had effects on other countries in the region, for instance Zimbabwe, which closed its borders to migrants unable to present an identity document. One of the reasons for the strengthening of Zimbabwe's immigration policy was that migrants coming into the country and seeking asylum would just stay long enough to receive material assistance, and then go away again, before their case was adjudicated. For Zimbabwe, this meant extra administrative and social costs and a weakening of the refugee procedure.

This change in the South African immigration policy also caused a reaction by Mozambique, one of the transit countries for migrants heading to South Africa. Border authorities started restricting the movements of asylum seekers outside of the country's only refugee camp (the Maratane refugee camp, in Nampula Province). In June, 2011, because of the large influx of migrants, border officials and police started intercepting migrants arriving at Palmaand deporting them back across the border to Tanzania, regardless of their status. In August 2011, 833 Ethiopian and Somali migrants were detained in Mtwara prison in the south-east of Tanzania.

2. PROTECTION AND SECURITY CONSIDERATIONS

2.1. Migration and security issues

Internal migration related concerns

The absence of efficient administration services led to a lack of control over refugees and migration flows in the south and the center of the country. The conflict increased the risks as well as the benefits associated with migration. Indeed, very striking migrant behavior has been observed, especially migration flows in areas directly affected by the conflict. The location of IDP camps requires Somali migrants to move inside rebel zones, even when these zones are witnessing episodes of violence. Sometimes, migrating to an IDP camp does not guarantee improved living conditions, because these settlements, located near the capital, are affected by violence, poverty and disease. However, the lack of information led to huge migration flows toward these areas.

The other choice, moving from conflict zones to neighboring regions or countries, is a risky. By exiting stable zones migrants and refugees expose themselves to other dangers including insecure roads and security checkpoints demanding illegal payments.

Puntland and Somaliland proclaimed foreigner expulsion policies in 2011 concerning migration flows toward the the Gulf of Aden. This worsened migration conditions, despite strong condemnations from international actors, especially the UN. The need to move away from the area of conflict can be seen as a push factor which explains these long distance migrations. Besides, Somalis can often

rely on transnational networks and communities abroad.

Some attempts have been made to improve Somali migrants' conditions in Puntland. The Danish Refugee Council worked on the customaries with traditional elders, representing a legitimate authority without an effective state administration. The reform of Xeer (unwritten traditional rules) was promoted to recognize minorities' and foreigners' rights. But there are no measures of behavior improvements which have followed the decision of the elders.

Regional migration

The environmental migrations caused by the drought in the Horn of Africa confronted countries with the problem of mixed migrations. According to IOM, mixed migrations are "complex migratory population movements including refugees, asylum seekers, economic migrants and other migrants" (IOM, 2004). They constitute a policy issue for welcoming countries since these countries are compelled by international law to accept asylum seekers, but do not want to bear the costs of large numbers of other types migrants flowing into their country. Part of their dilemma is that it has become increasingly difficult to separate refugees and asylum seekers from other types of migrants. There have been growing concerns about letting people abuse national asylum systems. Moreover, migrants from the Horn of Africa are seen as a threat to national security.

The huge flows of migrants coming from the Horn of Africa during the period of the drought have thus revealed the challenge faced by certain African countries who experience large influxes of "mixed migration", as well as the many threats imposed to migrants, in this case Somali, arriving in these circumstances: even as asylum seekers, they risk being refused entrance into the country. The shift in policy that took place in South Africa had a knock-on effect on other countries in the region. As a result, many migrants, including environmental ones fleeing drought and famine, were forced to seek help elsewhere or enter countries illegally. In these cases they remained in a situation of deprivation and physical and legal insecurity.

The deportation and imprisonment of several hundred migrants coming from Somalia during the drought casts light on the dangers resulting from the lack of a coherent immigration strategy among countries in the region and more generally the absence of any kind of law aiming at taking care of environmental migrants. This case highlights how relevant an international law for environmental migrants could be. For one part, it would not leave the fate of environmental migrants in the hands of States, which tend to shun the responsibility of welcoming large flows of foreign "refugees", especially during a humanitarian crisis and when these refugees come from a fragile country like Somalia. Secondly, it could provide environmental migrants with more protection and security than what they are receiving today.

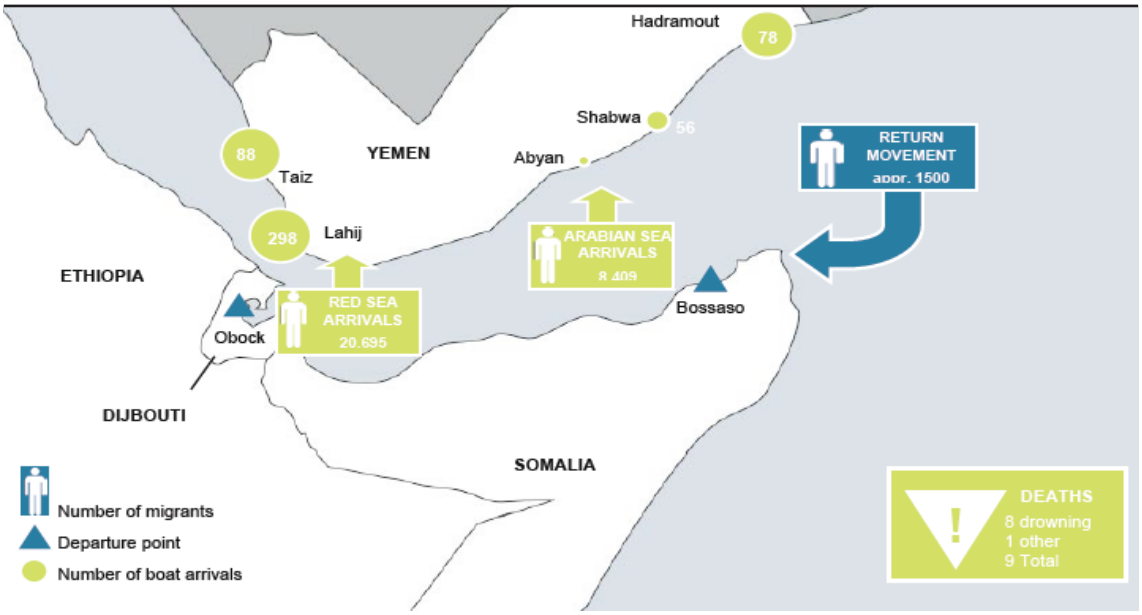
2.2. Safety conditions of regional displacement

One of the particularities of the migrations due to the drought in Somalia is the harsh safety conditions they took place in. These conditions epitomize the vulnerability of part of the Somali population during the period of the drought, deprived of legal protection by the absence of an effective national government, deprived of assistance because of the conflict and the presence of Al-Shabaab, weakened by the drought and famine, and exposed to the threats existing in the region. To give an example, a mapping technique commissioned by IOM showed that 85% of drought-affected Somali refugees and host pastoralist communities were using nearly 1,230 kilometers of unofficial border routes to reach Kenya's Dadaab refugee camp in the second half of 2011. The migrants faced dehydration, lack of access to health services, rape, theft and extortion. Only 10% of official routes were being used to reach Dadaab. Yet even the official routes lacked essential infrastructure, such as mobile water points, medical facilities and resting points.

Crossing the Gulf of Aden to go to Yemen was another path taken by Somali migrants fleeing the drought. It is an extremely dangerous journey. Cases of drowning on the way to Yemen are not rare. The maps below, taken from the Yemen MMTF Report for the period July-September 2011, illustrate the geography of the flows of migrants between the Horn of Africa and the Yemeni coast and also the risks inherent to the journey of migrants fleeing drought and conflict in the most risk-exposed parts of the Horn of Africa.

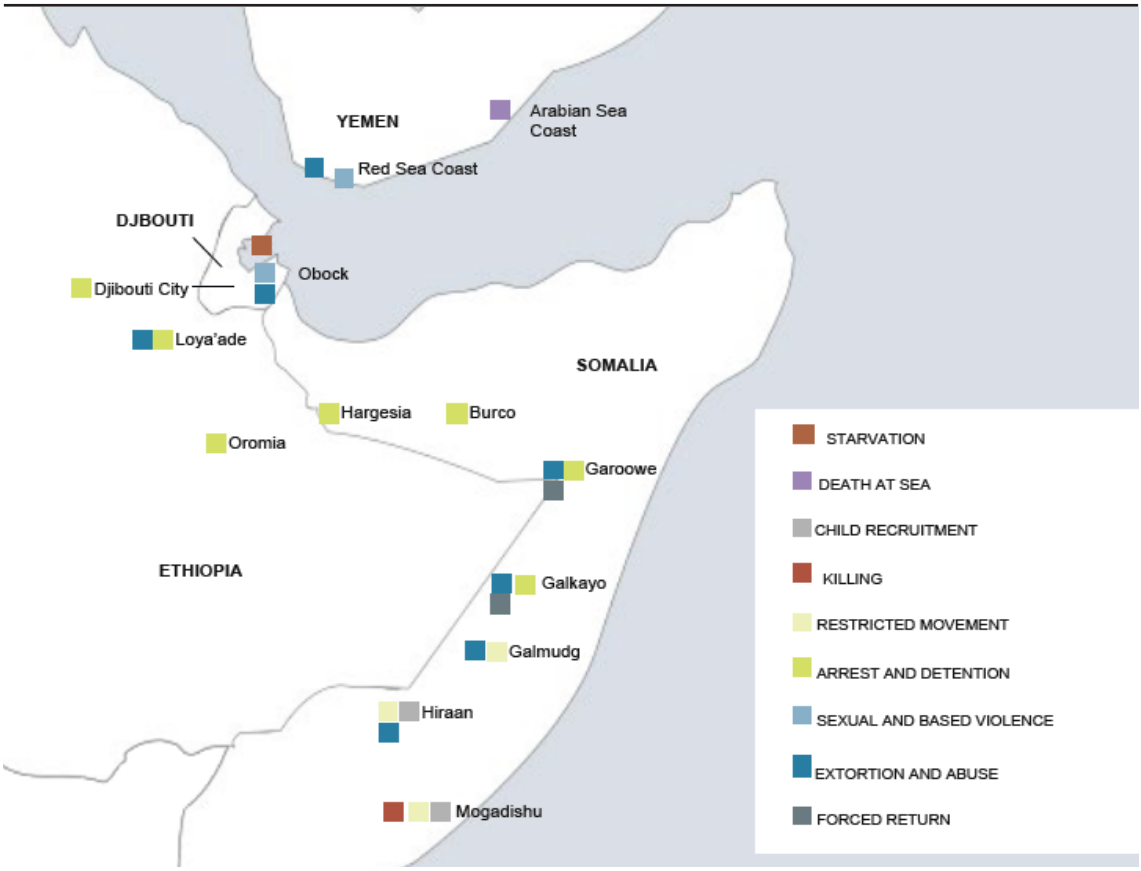
Smuggling appears a necessary part of most of the environmental migrants' journey. Migrants are smuggled by boats, sometimes carrying several thousand, from Somalia to Kenya, and then from Kenya to Mozambique, or from Somalia to Djibouti and then to Yemen. Migrants often do not know how to swim. They can also get robbed and physically assaulted when they arrive at their destination. According to Sheikh Amil of the Somali Community Board in South Africa smugglers charge up to $3,000 to bring Somalis from Kenya to South Africa. Migrants have to pay half before they leave

Map 5. Key migration flows from Somalia to Yemen (July to September 2011)



Source: Yemen Mixed Migration Task Force, 2011.

Map 6. Risks incurred by the migrants



Source: Yemen Mixed Migration Task Force, 2011

and half when they arrive. If they fail to do so they can be held as hostages.

Another serious threat known by Somali environmental migrants, especially women and children, is human trafficking. In fact, there have been reports of women and children fleeing drought in Somalia being trafficked into Kenya and sold into prostitution or forced labour. Generally speaking, according to Jean-Philippe Chauzy, Head of Communications at IOM, the huge influx of refugees into Kenya during the drought increased the vulnerability of people to trafficking, smuggling, and exploitation (Guardian Development Network, 2011). Nairobi appears as the central market for girls who are distributed to Kenya and other countries, where underage girls are frequently trafficked for sex tourism in other parts of the country. Hence drought, poverty and conflict represent a windfall for the economy of smuggling and trafficking in the Horn of Africa.

2.3. The particular case of refugee camps

The humanitarian challenges faced by these complexes increased significantly as a result of the drought and subsequent famine, which translated into overcrowding, extremely high malnutrition levels and disease prevalence. Overcrowding of the camps had several negative implications: it placed greater strain on existing resources, while increasing the risks of disease spreading among refugees, and creating more insecurity for fragile groups within the camps. Another problem raised by the existence of these refugee camps is the relationship between the refugees and the local population living next to the campsite. For example, Somali refugees outnumbered Kenyan locals in Dadaab by a quarter of a million at least during the drought crisis. The unequal access of locals compared to refugees to basic needs, as well as the pressure exerted on resources in the region by the camps, created tensions between the two groups at a time when food insecurity was generalized in the region (IRIN News, 2011b).

What will be the future of the "refugees" who have fled the drought? Will their situation converge with that of the political refugees, fleeing the civil war in Somalia, some of whom have been living in Dadaab since its creation in 1991-92? The lack of a long-term plan or exit strategy in a refugee camp such as Dadaab appears as a crucial problem because the situation of the complex is no longer sustainable.

3. POLITICAL ANSWERS TO THE MIGRATION CRISIS

Apart from the migrants' profiles and trajectories which explain the higher vulnerability of Somali migrants during the drought crisis, it is indispensable to look at other explanatory factors for the lack of support and of adequate policy responses that might be particularly relevant to explain the difficulty of defining the impact of the environment on Somali migrations.

3.1. Somalia's "failed state", acute human insecurity and consequences for international assistance

The livelihood crisis reached its peak in the areas controlled by the Shebab rebels. The presence of these armed groups impeded the mobility necessary for people to have access to water and food when drought strikes. In 2011, 1.7 million people suffered and still do not have access to humanitarian aid because of al-Shabaab control of the regions in the south. The absence of a state translated into the absence of disaster risk prevention linked to droughts in the country, as well as the lack of implementation of any adaptation strategy at the national level (migration or other). Hence, it increased the need for these populations to migrate along greater distances to Somaliland, Puntland, to neighboring countries and to more far away countries, as this article described.

The transitional government has been recognized internationally as the only actor able to take charge. With the support of the African Union, the Transitional Federal Government took back the capital Mogadishu from al-Shabaab troops in 2011. However, Somalis consider this effort to stabilize the country as an attempt of one militia to surpass the others. Moreover, the international support for the TFG is seen as interference in the conflict and not always understood. This intervention of other countries has raised the suspicion upon international aid and especially NGOs. In January 2012, the Islamic group Al-Shabaab banned the International Committee of the Red Cross (ICRC) from South Somalia after accusing the organisation of attempting to poison food that was past its use by date (Mahmoud, 2012). In addition, al-Shabaab denied access to the World Food Program, UNICEF since 2010. The introduction of the political struggle into the context of humanitarian crisis has worsened the possibilities of international assistance agencies to work among the internally displaced and the populations in need.

3.2. What is at stake for international organisations?

As was described before, political and security issues in Somalia make the conditions of international intervention harder. Nevertheless, UN agencies and other international organisations are present on the field, and have played an important role in trying to respond to the needs of migrants and refugees in the region, despite more difficulties since the drought. This non-exhaustive list will present major actors and programs which have contributed to providing assistance to the environmental migrants in Somalia during the period of the drought.

The UN Refugee Agency (UNHCR) has set up aid programs to provide shelter and emergency relief to drought victims and environmental migrants. Two monitoring systems, the Population Movement Tracking and the Protection Monitoring Network, have been designed to inform agencies on IDP migrations paths and to list violence against Somali population. Moreover, UNHCR works in cooperation with other UN agencies and NGOs to ensure more support for the IDPs.

UNHCR action aims to prevent conflict due to drought: the analysis of the Commissioner highlights a strong risk of violence emerging on competition for the control of resources. Furthermore, UNHCR is working on IDP integration in host regions to reduce xenophobia towards migrants and refugees. A revision of the legislation in Somaliland and Puntland that considers IDPs as foreigners is in discussion. This intervention is part of the Regional Protection Program designed by UNHCR to enhance cooperation of neighboring states (Yemen, Ethiopia and Somalia) for the protection of refugees.

UNHCR intervention also concerns refugee camps in Ethiopia and Kenya, especially the Dadaab camp. Recently with the increase of arrivals, UNHCR has tried to implement other ways of assisting refugees. For instance, the Commissioner tried to involve communities in the management of the camp, ensuring training for volunteers. Services are maintained with more efficiency to detect needs and respond to them thanks to this involvement of the local population and of migrants. UNHCR is also improving sanitation use by creating sanitation committees who are acting at the household level. Other services have gained by this new implication of refugees in the camp management: teachers have been recruited from the refugee population and schools have remained open (UNHCR, 2012).

The International Organisation for Migration (IOM) is also working with the Somali Transitional Federal Government to implement capacity-building in migration management. Precisely, the office is trying to improve the management of migration to facilitate the work of international agencies and NGOs. The creation of IOM migration desks and migration data centers has helped to provide more precise information of the situation. IOM is also working with migrants to improve their conditions or remediate their situation. Examples include assisting the voluntary return of Somali willing to come back to their origin region and counter-trafficking projects to tackle human traffic development.

Initially proposed by the Intergovernmental Authority on Development, the **African Union Mission in Somalia** is a peacekeeping mission created by the African Union Peace and Security Council and approved by the UN Security Council. Its mandate has been extended until 2013. This mission of peace enforcement aimed at the reassurance of TFG's control area and the liberation of Mogadishu.

Thanks to the contribution of the UNHCR and IOM, **a Somalia Mixed Migration Task Force (MMTF Somalia)** was created in 2007. UN OCHA, the Danish Refugee Council and the Norwegian Refugee Council are also involved in this task force designed to "respond to protection and humanitarian needs of migrants and asylum seekers transiting through Somalia" (Mixed Migration through Somalia and across the Gulf of Aden, June 2010). In addition, another task force has been created in Yemen to build planning of the migrants' reception in the region. The main role of this program is to reduce negative impacts often associated with migration in promoting coordination and diffusing information. Moreover, the program supports the development of infrastructure designed to respond to the causes of migration, especially food insecurity. This second objective is dedicated to tackle migration by giving Somali populations the possibility to avoid taking the risky choice of economic migrations. The MMTF is co-chaired by UNHCR and IOM.

Despite this situation of cooperation, there is a lack of detailed information on these organisation's activities in Somalia. Furthermore, the intervention of UN agencies is limited by rebels groups such as al-Shabaab who are unwilling to open strategic areas of control to international actors.

With regard to NGOs, their leverage of action has been considerably reduced for two reasons: some areas under the control of rebels have been closed to international humanitarian actors and the

violence against NGO staff has increased. For instance, **Doctor Without Borders (Médecins sans frontières, MSF)**, which had returned in the country in 2007, left Somalia at the beginning of 2008 because of the murder of 3 volunteers. Despite the lack of international staff on the field, MSF carried on its activities thanks to local personnel. MSF is still involved in Mogadishu with an emergency surgery service and continued temporary missions to help against malnutrition and cholera.

Some NGOs still remain in the countryside regions and in Mogadishu: **Action Against Hunger (Action contre la faim, ACF)** continued its action despite the danger and the increase of the needs since 2011. The organisation programs reached nearly 300,000 people and provide help against malnutrition and famine. However, ACF has been expelled from some regions, like Majid, leaving populations without solutions to their basic needs.

3.4. What is at stake for international diplomacy?

In February 2012, a major conference took place in London, gathering representatives from over 40 governments and multi-lateral organisations, in order to increase understanding on the Somali crisis. Several recommendations were asserted by the participants. Regional actors should use their influence to reach an agreement and build a strong state which will be able to face the different needs of the Somali population. However several criticisms have followed this conference.

First of all, the official Somali actors refuse to engage negotiations with al-Shabaab, despite a strong representation in the country. Secondly, policies aiming at security in the Gulf of Aden have been reaffirmed. Some observers have highlighted the fact that the funds devoted to the reassurance of maritime traffic could answer much more easily to the issue if they were devoted to humanitarian aid and Somalia's development.

Finally, a lack of determination for developing the resilience of populations has determined some actors, like Oxfam, to criticize the conference results due to not accounting for the Somali population's true needs. Indeed, the occurrence of the drought in Somalia suggests that the phenomenon will happen again, destroying attempts to bring stability to the country and leading to more environmental migrants in the future.

Moreover, the many security issues faced by environmental migrants from the Horn of Africa during the period of the drought have confirmed the need to broaden legal migration channels in order to avoid problems of smuggling, trafficking and illegal crossing of borders.

CONCLUSION

The 2011 drought has exacerbated pre-existing problems in Somalia. Relative to the civil war, the issue of famine and environmental migration received more attention but was less likely to be addressed by policy responses, because of the complexity of national and international actor interactions.

As a consequence, the drought, which particularly affected poor populations dependent on agriculture and pastoralism, raised the question of the vicious circle of uncontrolled violence and poverty. National policies designed by the Transitional Federal Government have aimed at promoting international aid and the interference of UN and AMISOM. But the lack of recognition of this administration as a legitimate one, the lack of control over the national territory and the lack of resources explain the difficulties of enforcing efficient policies towards migrants.

As for now, there are major uncertainties about the future of those displaced: should they be resettled or can they return? Many families who had gone to Mogadishu to flee the drought decided to return in November, 2011, to take advantage of the rainy season. To a certain extent they were helped to do so by aid agencies, like the United Arab Emirates Red Crescent Society, who helped resettle drought IDPs. Helping these environmental migrants resettle required addressing their needs in food, transportation, shelter material, and money. For agropastoralists to start afresh and resume their livelihood, some kind of livestock was needed. Some displaced families decided to send back the most capable in order to start again and left behind the elderly, women and children temporarily. In the refugee camps of Ethiopia and Kenya, families who wanted to go back also started doing so when the rain began to fall again, in spite of the conflict, in order to start over again.

Along with the protection of displaced population, one of the most important challenges today is probably to ensure the emergence of a true national union government which would have enough support to facilitate reconciliation and manage the consequences of disasters such as the 2011 drought.

Somalia is locked in a vicious circle of disasters contributing to instability and conflicts. The mix between refugees, economic migrants and environmental migrants is huge and the region is in deep need of better tools and data on the migration nexus. Above all, Somali populations need to develop their resilience against drought, especially in a climatic, demographic and social context that has greatly changed and which impedes the

traditional responses from being fully effective. A regional adaptation strategy in the Horn of Africa, which would include Somalia, could help answer this problem, but this option is dependent on the degree of cooperation that regional actors are ready to foster.

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DROUGHT AND MEXICO-US MIGRATION

MONICA COLUNGA, FERNANDA RIVERA

INTRODUCTION

In 2010, Mexico ranked as the country with the highest rate of outward migration according to World Bank figures. It is clear that the specific dynamics of Mexico's migration patterns are inextricably tied to its economic and geopolitical proximity to the United States. However, droughts and desertification—specifically their link to extreme poverty in the most arid areas of the country—are a major factor driving outward migration for economic purposes. This study seeks to illuminate the link between drought and migration by examining how low agricultural yields and food insecurity may have contributed to the migration of scores of Mexicans to the country's northern neighbor, the United States. The first section will provide a survey of the incidence of drought and an analysis of the determinants of droughts and migration by providing a snapshot of the state of international discourse on environmental migration between Mexico and the United States. The second section will describe the characteristics of the drought of 2011. The third section will describe the migration patterns between Mexico and United States. The fourth section will explore the various government structures designed to mitigate the effect of drought and desertification on rural poverty. Finally, the fourth section will provide recommendations for a more robust government safety net for environmental shocks and will explore the potential of circular migration programs in mitigating the economic effects of climate change in Mexico.

1. MEXICO'S VULNERABILITY TO DROUGHTS AND DESERTIFICATION

The effects of and implications of environmental degradation in Mexico are significant. Currently, most of the country's territory is undergoing some process of degradation, and it is estimated that approximately 2,250 square kilometers of potentially productive farmlands are damaged or abandoned every year as a consequence (Leighton & Notini, 1994). The implications of desertification are particularly deleterious for people whose livelihood depends directly on the quality and overall health of the soil, such as subsistence farmers.

1.1. History of droughts in Mexico

Mexico's experience with droughts and desertification dates back as far as the eleventh century, and migration has been linked to this climatic phenomenon since the ancient civilizations of the Mexican valley (Liverman, 1990). In 1450-1454, it is believed that a famine caused by an intense drought led to mass out-migration from the Valley of Mexico under the Aztec Civilization. Although the Aztecs routinely distributed corn during times of famine, this drought period was so terrible that it led families to make human sacrifices to Tláloc, the god of rain, and to sell family members into slavery (Liverman, 1999). Recently, archeologists have also suggested that droughts could have played a role in the collapse of the Mayan and other Meso-American civilizations (Ibid 1990, Ibid 1999).

According to Florescanno (1995), droughts may have also played defining roles throughout Mexico's most important historical moments. He argues, for example, that the Hidalgo Rebellion of 1810, which marked a moment of catalysis in the Mexican War of Independence, and the War of the Castes of the 1830s could be linked to food insecurity crises due to droughts (Ibid; Florescano, 1980 quoted in Liverman, 1990). Over a century later, the events leading up to the Mexican Revolutionary War may also have been compounded by a particularly severe drought. (1995).

Florescano further argues that historical records also give strong indications that the adaptive capacities of inhabitants in the territory of contemporary Mexico have declined over time (1995). The indigenous populations of the Mesoamerican plateau are believed to have practiced conservation agriculture and other agroecological practices such as crop rotation; land management adapted to soil fertility; use of natural compost for fertilizer; and cultivation in terraces and embankments. Accounts from Toluca in the Mexico City Valley indicate that indigenous communities may have abandoned these practices by the sixteenth century with the arrival of Spanish colonizers. Over time, their traditional practices were replaced by the European parceling system and by mono-cropping, which severely compromised the health and productive capacity of their soils. The introduction of cattle, an animal species which is not endemic to the American continent, contributed to overgrazing, leading to further land degradation, and placed indigenous communities at a higher risk of vulnerability to droughts and food insecurity (1995; 35-43).

Climatic data shows that droughts have become less frequent but more intense from 1930 to 1970 (in CONAZA, 1994). During this period, 20 droughts were severe and six were extremely severe. Florescano (1980) estimates that in 1949 and 1969, losses linked to drought were 77% and 73% of total agricultural losses for each year respectively (Ibid). Other sources indicate that in the past century, the most severe episodes include the 1957, 1969, 1989, and 1997 droughts, which had ravaging effects for agriculture (Quintero, 2012). Liverman (1999) indicates that the effects of droughts coupled with poor economic and social conditions can be observed in the variations in corn production and imports since 1960. Using this data, decreases in production can be observed for the periods 1973-1976, 1979, 1982, and 1986-1989 which can be partly linked to droughts and compounded by economic crises.

Generally, the patterns observed suggest that droughts are severe and cyclical and that this climatic phenomenon has historically led to the loss of as much as 10% to 20% of the total planted area in Northern Mexico, particularly in the most vulnerable states of Aguascalientes, Nuevo León, and San Luis Potosí (1999).

1.2. Environmental determinants of droughts

One of the primary risk factors in the incidence of drought is desertification, which is the most prevalent form of land degradation in Mexico. Agenda 21 of the 1992 Rio Declaration defines desertification as the "degradation of land in arid, semi-arid, and sub-humid dry areas caused by climatic changes and human activities…accompanied by a reduction in the natural potential of the land" (United Nations, 1993). In Mexico the primary anthropogenic causes of desertification include the excessive clearing and cultivation of land unsuitable for agriculture, the exploitation of forests and biomass for fuel, overgrazing practices, unsuitable or inefficient irrigation practices, mining activities and urban expansion (Leighton & Notini, 1994, p. i). Droughts and desertification go hand in hand, and natural climatic changes are just as important as the evolution in political and economic frameworks that define the way Mexico's inhabitants interact with the environment.

According to government figures, mild forms of desertification affect over 90% of the territory and 60% are affected by more severe forms (CONAZA, 1994). Expert findings in 1978 reached the same conclusion, estimating that approximately 80% of the country's surface was affected by desertification, totaling over 150 million hectares of land (Leighton & Notini, 1994). A scenario drawn from the same study predicted that desertification would continue to overtake approximately 100,000 to 200,000 hectares of land per year, which is consistent with the current trend experienced in Mexico. Sodification and salinization, physical degradation, biological degradation, and chemical degradation also comprise the process of desertification. Of these, sodification and salinization— which are caused by inadequate irrigation practices— are of particular concern, affecting arid states like Sonora severely. It is estimated that about 10% of the country's surface is highly salinized. Moreover, between 50% and 80% of lands are arid or semi-arid. Of these lands, approximately 8 million hectares, making up 45% of land used for agriculture, are farmed or used for grazing. Overall, about 87% of desertification is believed to be caused by anthropogenic factors, while 13 percent is believed to be the result of natural climate change (Leighton & Notini, 1994). More specifically, 80% of the loss in soil fertility nationally is believed to be linked to inadequate use of the land (CONAZA, 1994).

Environmental shocks in Mexico are also the effect of the El Niño Southern Oscillation (ENSO), a non-regular cyclical (5-7years) climatic phenomenon associated with the changes in sea surface temperature and pressure in the tropical Pacific Ocean; and its counterpart La Niña (Aguilar and Vicarelli, 2011). ENSO generates extreme weather effects such as floods, heat waves, and droughts, while La Niña causes extreme precipitation. Both of these phenomena affect Mexico in a significant manner, particularly its southern regions such as

the states of Guerrero, Hidalgo, Michoacán, Puebla, and Veracruz, among others (Aguilar and Vicarelli, 2011).

1.3. Political determinants in vulnerability to droughts

Mexico's vulnerability to droughts should be assessed within the host of social, political, economic, and technological processes over time. Modernization of agriculture, for instance, may have contributed to the intensification of droughts indirectly by encouraging the expansion of farming activities into highly degraded water scarce areas (Liverman, 1990). Other stress factors that contribute to land degradation and the intensification of drought include population growth over time—the Mexican population has more than quadrupled over the past forty years—as well as the expansion of commercial agriculture (Ibid; Leighton and Notini, 1994).

Drought and extreme poverty

Perhaps most importantly, there is a high overlap between the segment of the Mexican population comprised of rural subsistence land ownersand those who live in extreme poverty conditions. Some estimates suggest that over 60% of rural dwellers live in extreme poverty, while more recent figures indicate that this proportion may be as high as 70% today (World Bank in Leighton and Notini 1996; La Jornada, 2012). Furthermore, it is estimated that currently over 40% of rural inhabitantsare affected by food poverty (La Jornada, 2012). Some of the causes of the high incidence of extreme poverty among subsistence smallholders can be attributed to the losses in agricultural and plant productivity that are linked to droughts and desertification.

Land tenure reform

The Plan de Ayala, which stipulated that one third of all lands held by large landowners be redistributed to landless farmers, served as the basis of the Mexican Revolution (1910-1920) (Lewis, 2002). The new agrarian law was one of a set of measures to enhance the autonomy of the peasant classes in Mexico, seeking to rectify the inequalities created during the dictatorship of Porfirio Diaz, which spanned over three decades from 1876 to 1910. At the completion of the Diaz dictatorship, over 96 percent of the Mexican population was landless, and 97 percent of the land was concentrated in the hands of 1 percent of the population (2002).

Some studies argue that despite its lofty intentions, the implementation of the communal land tenure laws or *ejido* system had serious flaws. While the *ejido* system was modeled after prehispanic systems, in the original granting of the land, the government promoted agricultural expansion and grazing in marginal lands, instead of taking land from large landowners (Liverman, 1990; Leighton and Notini, 1994). This has had a two-fold effect over time. First, peasants have contributed to the degradation of the marginal lands distributed by the government. Secondly, as these lands became increasingly less productive, smallholder farmers sought the authorization to take over other marginal lands that were also unsuitable for agriculture (Leighton and Notini, 1994). With amendments in the laws that allow ejido owners to sell or rent their land, this mechanism of marginalization through resettlement has continued as commercial land owners purchase the lands of poor farmers, displacing them into even more marginalized soils (Leighton and Notini, 1994).

Distorted fiscal incentives

Another important distortion in the safety net for smallholders stems from fiscal incentives given by the National Bank. Historically, the National Bank has financed the cultivation of staple crops such as beans and corn, often overlooking the suitability of these crops for the land in question (Ballin-Cortes and Vasquez Rocillo interview, 1993, in Leighton and Notini, 1994). These perverse fiscal incentives not only resulted in further land degradation, but in financial losses for the National Bank. Given the lack of productivity of these crops in certain areas, the loans given by the bank were often defaulted and reduced yields resulted in lack of profits (Leighton and Notini, 1994.

Amendments to exploitation rights

Finally, the amendment of Article 27 of the Mexican Constitution in 1992, which allowed *ejido* owners to sell or rent their land, has led to a changing of the demographic and economic picture of land exploitation in Mexico (Lewis, 2002). Almost two decades ago, Article 27 was amended to put an end to the repartition of *ejido* lands and to liberalize the use of these communal properties (Ibid, La Jornada, 2012). As a result of the new 1992 Agrarian Law, recent estimates indicate that 60% of *ejido* lands in the municipalities of northern Mexico are rented out to commercial farmers or for other economic land exploitation purposes such as mining (La Jornada, 2012).

Changes in economic and export/import patterns

Other important changes in the 1990s led to further marginalization of small holder farmers. In the past two decades the share of imported

agricultural products has risen by a factor of five from 10% to 50% (La Jornada, 2012). This process has been accompanied by the emigration of over 2 million Mexicans since the implementation of the new agrarian law in 1992. Moreover, a fall in credit of over 80% during the 1980s and 1990s has resulted in the abandonment of agricultural activities in over 10 million hectares each year and over 2 million rural jobs lost (La Jornada, 2012).

The fall in investment in agricultural activities and productivity losses have led to two important demographic trends in the last two decades. With the emigration of young male farmers, there has been a feminization of the agricultural sector in Mexico. In the past fifteen years, there were relatively no female official landowners. Currently, 1,138,969 women are official owners of about 11.6 million hectares and 25% of rural households are headed by women (Ibid, 2012). Another trend is the aging of the rural population. Currently, the average age of agricultural landowners is 56 years.

2. THE STATE OF THE DISCOURSE ON MEXICO-US ENVIRONMENTAL MIGRATION

According to the World Bank, Mexico is the largest sender country of emigrants in the world, and the United States-Mexico corridor is unparalleled in its scope (World Bank, 2011). Although it is difficult to produce precise data for these migration flows, estimates range from 150,000 to between 500,000 and 600,000 migrations per year (Leighton and Notini, 1994). Many studies have been conducted to understand the determinants of international migration and its different modalities. However, in assessing the empirical evidence available on the topic, we have ascertained that environmental considerations have only recently become prominent in the literature on Mexico-US migration. It is thus instrumental to recognize that although environmental degradation is pointed to in the literature as a potential determinant of migration, there has been no significant political recognition of environmental migrants on either side of the border.

2.1. Environmental Determinants of Mexico-US Migration

Although studies often point to the potential role of environmental degradation as a causal factor of migration, there are a limited number of studies that have directly examined the environment-migration nexus in Mexico. Notably, in 1978, Fernando Medellin estimated that around 600,000 Mexicans resorted to migration as a survival strategy in the context of poor agricultural outputs linked to land degradation and desertification (Quoted in Alscher, 2008). In 1993, Norman Myers called this tendency, coupled with other stress factors such as high population growth, an "agricultural squeeze" (141, quoted in Alscher, 2008). In 1994, Taylor deployed data from an investigation in Oaxaca highlighting that there is a negative correlation between rural productivity and migration, and suggesting that migration results in disinvestment in land-quality dependent activities. An important takeaway from this study is that the higher incidence of livestock raising can exacerbate overgrazing and land degradation, and the opportunity cost of land conservation in the context of migration can serve as a disincentive for practices that decrease the vulnerability to droughts (Correspondence with Taylor, 1994, in Leighton and Notini, 1994).

In 1990, the U.S. Commission on Immigration Reform was authorized as a bipartisan effort to analyze the socioeconomic, demographic, and environmental effects of US-Mexico migration policy. One of the outcomes of the commission's initiatives was a report that examined the link between desertification and migration carried out by the Natural Heritage Institute in California. Although an exhaustive research undertaking was beyond the scope of the study's mandate, the authors used an analysis of geo-statistical and migration data to conclude that for individuals whose livelihood depends primarily on the agricultural output of their land, the economic costs of desertification are a strong inducement to migrate toward the United States (Leighton and Notini, 1994).

Table 1. US migration outlook – Mexican migrants (2010)

Country	Population
Total US population	308,745,538
Number of migrants in the US	39,956,000
Share of the population	*12.9%*
Number of Mexican migrants in the US	11,587,250
Share of the migrants population	*29%*

Source: U.S. Census Bureau

2.2. The 2011 Situation

In 2011 alone, more than 28 states in Mexico were affected by droughts (Notimex, 2012). In the states of Sinaloa, Chihuahua, and Durango, this drought period constitutes the most severe in the past 70 years. Although it is estimated that droughts will not subside until the start of this year's rainy season, droughts have already affected over 2

million hectares of land at the national level, leading to the total loss of over 7% of the country's agricultural land (El Universal, 2012; Zabludovsky, 2012). Moreover, roughly 450,000 cattle have perished in arid lands, dams were at less than half of their typical capacity relative to the same time last year, and many farmers in states like Durango have begun to migrate due to the high levels of food insecurity (Torres, 2012).

Drought coupled with cold snap in the beginning of 2011 also led to significant losses in food production. Production of corn for example, has been predicted to fall from the projected 23 million tons to 20 million tons, and production of beans is expected to fall by 28% (Notimex, 2012). As one of the world's top five producers of corn, Mexico's drought crisis is likely to drive up the price of this staple crop. Ignacio Rivera, an official at the Mexican Ministry of Agriculture and Rural Development predicted that corn production would likely recover to 25 million tons in 2012, aided by government assistance. Thus far, of the 8.1 million hectares insured against natural disaster—Mexico has total arable land of 22 million hectares—approximately 600,000 claims have been filed, reporting losses on 3.8 million hectares. The government has allocated over 1.6 billion pesos to cover these losses (Ibid).

Although the government has a permanent safety net of programs against drought in place, it responded with large sums of disaster relief aid in late 2011 and the early months of 2012. It is important to note that Mexico is no longer a recipient of humanitarian or foreign development aid, so the bulk of disaster management and assistance falls within the jurisdiction of the national government. Reports indicate that the government became aware of the severity of the drought in May, 2011, and responded by creating a Strategy to Assist States Affected by Drought (Pérez, 2012). Since then, it has approved over $2.63 billion pesos in aid, including the creation of temporary jobs in the areas most affected by drought, the distribution of potable water and food aid. The National Comission of Watter (CONAGUA) , and other agencies have also distributed water for personal consumption, and doctors and nurses have been deployed to the most affected states. Recently, the government has also created a new mechanism within the Inter-ministerial Commission for Sustainable Rural Development to evaluate and measure the impacts of the 2011 drought (Michel, 2012).

The 2011 drought is not the first to have hit Mexico in the past decade, but it is different for a number of reasons. First, this crisis has attracted more attention and support from the government due to the media coverage that it has received from national and international sources alike. In early January 2012, an independent group posted a video on social media claiming that crop failure had driven more than 50 Tarahumara Indians to commit suicide by jumping off a local cliff (BBC, 2012). Although this report was later denied by local authorities, the news that the Tarahumara—who call themselves the raramuris and are known for their resilience and long-distance running abilities—were being affected by the worst drought in 70 years led to a wave of support including supplies and foodstuffs. However, the government's strategy has not escaped criticism. Notably, Javier Avila told *El Informador*, a Mexican newspaper, that human rights groups are "interested in tackling the causes, not the effects, because every year food and blankets are sent, but…every year indigenous people suffer hunger" (2012).

The plight of the Tarahumara has become emblematic of the mismanagement of drought hazards in Mexico. Recently, Isaac Oxenhaut, national aid coordinator for the Mexican Red Cross, said that the situation of the Tarahumara could be considered extreme poverty, and that "[the Tarahumara] don't have anywhere to harvest absolutely anything" (Zabludobsky, 2012). A recurring message in the media coverage of the 2011 drought is that this climatic phenomenon is not only cyclical, but also relatively predictable. Yet, as each drought hits with increasing intensity, the government continues to handle it as a temporal crisis situation. Instead, a systematic improvement of the programs in place should be undertaken so that the preventable conditions that increase vulnerability to drought such as inadequate land and water management, and unsuitable agricultural practices are addressed prior to the onset of a food crisis.

2.3. Monitoring the 2011 Drought

The Mexican National Weather Service establishes four different types of droughts. The first is Abnormally Dry, which is not considered as a drought it is just a dryness condition. It usually appears in the start or at the end of a drought. It affects the growth of crops or grasslands, and leads to higher risk of fire and water deficit. The first level of drought is the Moderate Drought. In this level there is direct damage to crops and grasslands and low levels of water deposits. In Severe Drought there is a probability of losing crops and grasslands. There is a lack of water. The last two levels that happen rarely are Extreme Droughts and Exceptional Droughts. The former means a larger loss of crops and grasslands, higher risk of fire and general water shortage. The latter has a

Table 2. Timeline of key events 2011-2012

DATE	EVENT	DETAILS
May 2011	Government becomes aware of extreme drought	Government prepares to respond
July 2011	First national policy response	Establishment of the Strategy to Assist States Affected by Drought
Early November 2011	National meteorological service announces 70% of territory is affected by drought	Authorities qualify drought situation as "dramatic" and historically severe
November 2011	Food production falls by 40% compared to previous year's levels	Price increases of corn and beans predicted
2011	Over 50% of country's municipalities affected	1,200 municipalities across Mexico are affected by drought
End of 2011	New funds added to Natural Disaster Fund	18,700 MP added to FONDEN for a total of 21,400 MP available for disaster relief
January 2011	Ministry of Interior announces 7 natural disaster declarations are underway	Affected states include Aguascalientes, Coahuila, Chihuahua, Durango, Jalisco, Sonora, and Zacatecas
January 5, 2011	Ministry of Social Development continues to disburse water support	9 million liters of water are distributed to 2.5 million people most affected by drought
January 23, 2011	Disaster relief funds fail to reach beneficiaries	It is estimated that only 40.7% of funds have been received by beneficiaries in 19 states affected by extreme and severe drought
January 24, 2011	President Felipe Calderon announces emergency relief funding	33,000 MP are allocated to a comprehensive national program to address drought losses in 2012
February 4, 2012	Red Cross and DIF announce United against Drought	National cash and food collection programs runs from February 7-20
February 2012	Ministry of Health sends medical personnel to affected states	Over 10,000 doctors and 19 nurses sent to 5 most affected states
February 2012	CONAGUA continues to administer support	Over 3,000 MP are distributed in 596 municipalities in 21 states
February 20, 2012	Losses amount to 12,000 MP	Losses in productivity and land decapitalisation reach record high
April 2012		Mechanism to evaluate and measure impacts of drought is instituted within the Interministerial Commission for Sustainable Rural Development

Source: Own elaboration with information from El Universal

general and atypical loss of crops and grasslands and there are usually emergency situations due to water shortage.

The National Weather Service is part of the North American Drought Monitor which is a system created by Canada, Mexico and the United States that monitors drought across the continent. The analysis of the 2011 situation in Mexico can be found in the databases and maps of the system. Since December 2010, there have been abnormal conditions in Mexican temperatures and land indicators. It was in this month that the dryer conditions started and the first clues of extreme drought appeared. This was a consequence of the reduction of precipitation since fall of 2010. By the end of the month the levels of dryness in the country could be found in 40.1% of the territory. The conditions affected the spring-summer agricultural cycle and the growth of livestock directly.

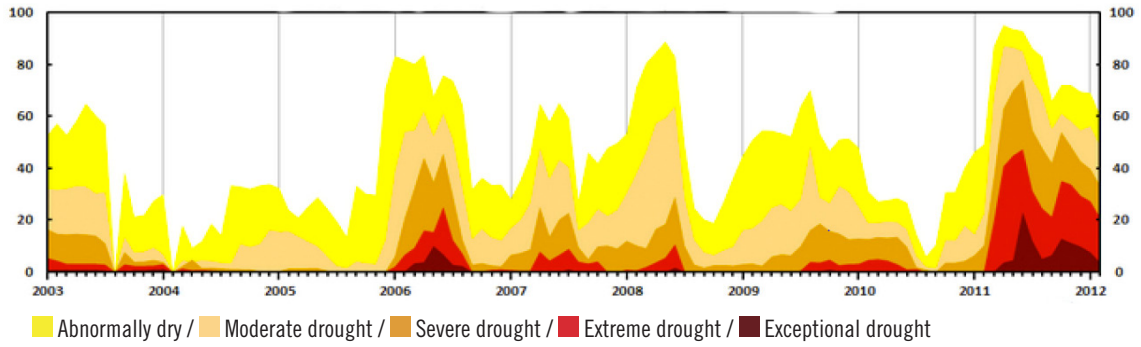
Despite the fact that the northern territory of Mexico is characterized by its dry conditions, 2011 was an atypical year due to the increase of extreme and exceptional droughts. Since 2006 these cases of droughts did not happen and it is considered the largest period of extreme and exceptional drought since 1941 (the year when the meteorological measurements started). The year 2011 was extreme because 95% of the territory was affected by droughts. There was a higher incidence of exceptional droughts, perhaps the natural dryness of the northern region of Mexico. According to the National Meteorological System during the agricultural cycle of 2011 only 53.4% of the agricultural lands were seeded.

3. MIGRATION PATTERNS OVER TIME

3.1. General patterns

Mexico shares a 3,100 kilometer border with the United States.. Historically, as neighbor countries, they have had a conflicting relationship, sharing enormous flows of people crossing illegally every year. Mexicans make up about 93% of these border crossers (Henderson, 2011). Currently, the Mexico-US corridor is said to be the most important migration nexus in the world (Castles y Miller, 1998). According to Durand and Massey, migration has been recorded since the Mexican American war of 1848. And is still, nowadays, one of the biggest foreign affairs issues that have to be dealt by both countries.

Figure 1. Percentage of areas by droughts in Mexico



Source: National Weather Service

The modern era of what is understood as Mexico-U.S. migration began after the end of the Bracero Program, which was a temporary labor program for the agricultural sector of the United States during World War II. It has been the only program that implemented a legal framework to cover the labor shortages in the United States. Currently, there has been a tremendous change; that started with the highest peak of Mexican-American migration in 1970-1980 (in the wake of Mexico's debt crisis). Aggregately, Mexico has sent 11% of their population and 18% of their labor to the United States (Alba, Castillo and Verduzco, 2010). In these last decades migration has increased in an unprecedented fashion in both countries history. It has increased from 30,000 migrants to 400,000 per year.

In the last 40 years, the migration flows have changed in size, intensity and demographic characteristics. They have passed from being temporary and circular, to being permanent and more stable. Most of the migrants used to be men, but currently one third of the migrant population is women (Verduzco, 2010: 168). According to the most commonly cited estimate, today there are almost 12 million Mexicans who have established themselves in United States (Alba, 2010).

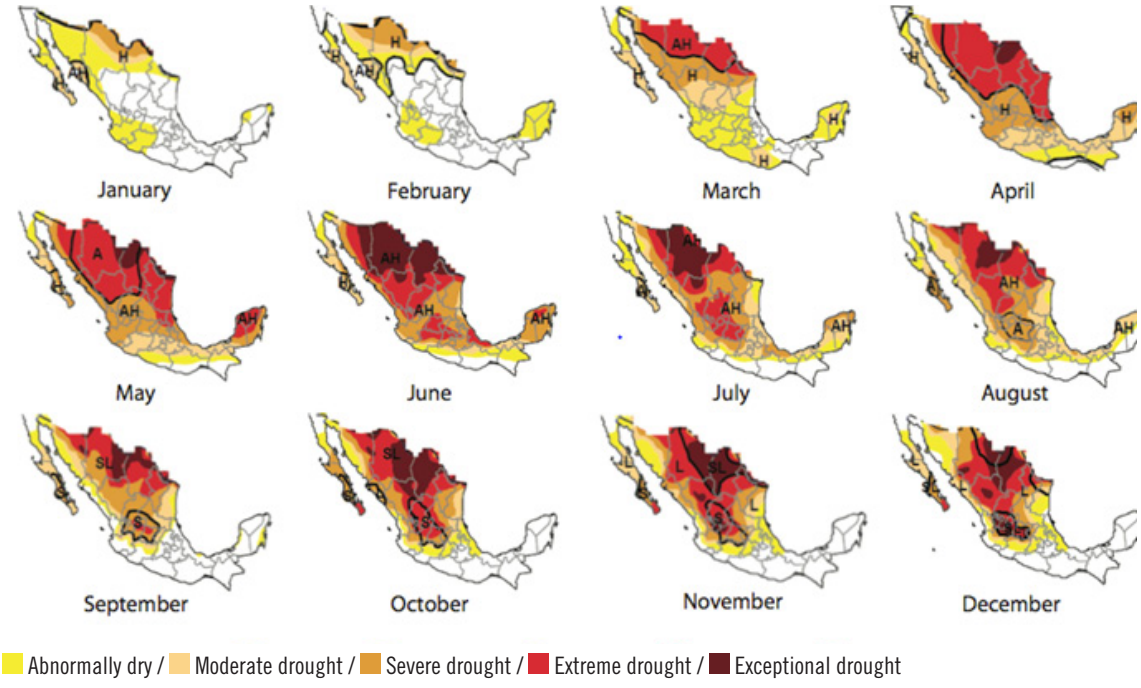
It is said that immigration involves push and pull factors that include economic, social, cultural and demographic characteristics. In addition to these factos the Mexico-United States migration deals with the vast asymmetries within both countries. Finally, the environment also has an important role in explaining the dynamic characteristics of the Mexican-American border. Especially for the impact in agricultural performance and its importance in the northern region of Mexico.

3.2. NAFTA and Mexican agriculture

In the late 1980s there were important economic reforms in Mexico. Miguel de la Madrid brought Mexico into the General Agreement on Tariffs and Trade (GATT) in 1986, showing the world Mexico's willingness to open up its economy (Henderson, 2011). In the following years, there was privatization, deregulation and liberalization of the Mexican economy. Under Carlos Salinas de Gortari's presidency, negotiations began for the North American Free Trade Agreement (NAFTA) or Tratado de Libre Comercio (TLC). He pursued the idea of Mexico as a "first world" country. NAFTA was seen as a long-term solution to the immigration problem between Mexico and the United States. As Carlos Salinas said: "Mexico will soon be exporting its goods instead of its people."Nevertheless, Mexico, the United States and Canada ignored the fact that Mexico was not in the same conditions to enter a trade agreement, especially as an equal partner. Not only was Mexico's economy smaller, poorer and more unequal, it was plagued by many other internal problems (Henderson, 2001: 121). The free trade agreement was never what it was thought to be; it has eased the regional disparities and has exacerbated the local inequalities. Job creation in Mexico has been slow, poverty has not decreased and the volume of migration to United States has increased, from 370,000 1994 per year to 575,000 in 2004 (Henderson, 2011: 137). The continuous flow of migrants along the border has shown that the benefits attributed to NAFTA have not been materialized.

According to Henderson, Mexico's agricultural policies continued to be heavily skewed in favor of larger agricultural business instead of local farmers. The harshest effect of NAFTA in the agricultural sector was felt in 2009, when the 15 years

Map 1. Maps of droughts in Mexico (January-December 2011)



Source: Own elaboration with information of National Weather Service

enactment that eliminated tariffs on corn imports from the United States and Canada was applied. Mexico's small-scale corn farmers would have to compete with the subsidies given to American farmers(the United States in 2008 had farm subsidies totaled $25 billion). Michael Pollan says that the US subsidized cheap corn is a plague impoverishing farmers in Mexico and in the countries to which they export (Oing Hing, 2010). The implementation of NAFTA in the Mexican context has had a direct significance in the income of agricultural farmers. This has a relation with the impact of droughts, because impoverished farmers are not able to reverse the environmental effects in their production.

3.3. Rural emigration

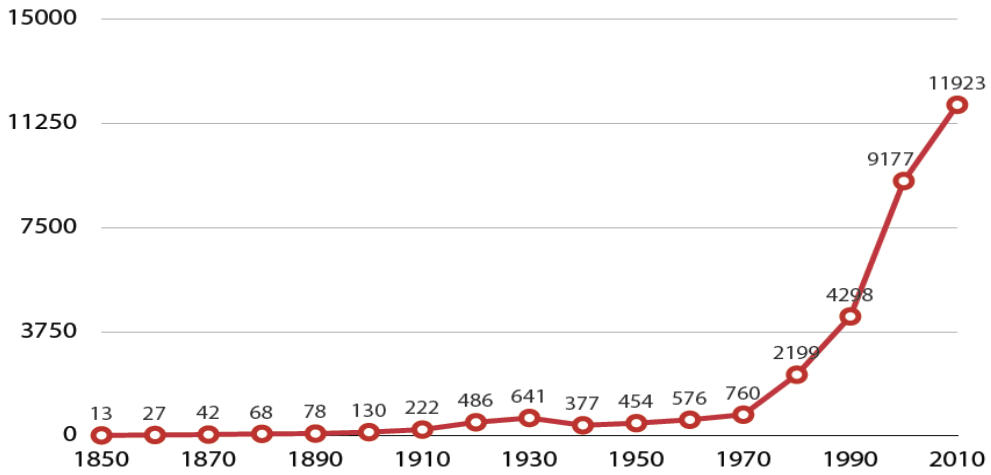
International migration has to be understood as a central process of economic globalization, especially for its influence and effects in the labor and remittances markets. Most of the time people emigrate to improve their quality of life or to reduce the effects of unequal economic development. That is why international migration flows usually involve developed and developing countries. This asymmetric relationship can be seen in the relationship between Mexican and American migration.

According to the National Survey of Rural Homes in Mexico 2007 (ENHRUM II) since the 1980s, the rate of rural emigration has increased considerably, especially toward the United States. During this period of time the median annual growth rate of rural emigration was 6.9%, while the urban migration was 4.7%. This means that since 2004, the number of rural migrants to the United States is larger than the urban ones (Yúñez and Mora, 2010).

Mexican migration is mostly attributed to the central-northern states of the country where rural areas predominate. According to the results of ENHRUM II, the largest number of migrants come from the central-western and northern part of Mexico, even though the region with the lowest development index is located in the southern states. In Mexico, migration has been concentrated in a traditional zone that includes the states of: Michoacán, Jalisco, Guanajuato, Zacatecas, San Luis Potosí, Durango and Chihuahua.

The 8.7% of Mexican households have a migrant relative in the United States. Nevertheless, this rate doubles to 20% in the central, western and northern regions of the country (Verduzco, 2010: 174). From the 2,443 municipalities in Mexico, at least 96% of them have a nexus with the migratory phenomenon. There are 97 municipalities that have a higher incidence of migration, 87% of these are rural municipalities with less than 20,000 inhabitants (Verduzco, 2010). Their economy is principally based in agricultural activities.

Figure 2. Mexican population living in the US (1850-2010, in thousands)



Source: Gibson and Jung, 2006. US Census Bureau, 2009.

Migration and desertification in Mexico have been both deeply studied. Nonetheless environmental migration has not been properly analyzed, nor has a link been found between these two topics. According to a study developed by Mora and Yúnez Naude in 2008, environmental variables might have a direct impact in rural emigration from Mexico. The authors measure the level of rural inhabitants who decide to emigrate either to the United States or domestically within Mexico as a result of climate change based on the demographic characteristics of the individual, their homes and their communities.

Using the average temperatures from 1971-2000, the results show that people living in communities with higher temperatures during spring and autumn are more likely to emigrate, especially to the United States. On the other hand, people living in communities with higher temperatures during the summer have a lower probability to be environmental migrants. The authors also use precipitation rates in the communities concluding that people living in communities with higher levels of precipitation during summer and winter have a lower probability to emigrate. The contrary effect appears in the communities with rain during autumn (Mora and Yúnez Naude, 2008).

In a chapter written for El Colegio de México, the authors explain that climate change affects rural migration. Nevertheless there are not many studies that seek to explain the effects of this variable. Yúnez says that the need to expand and deepen this type of studies is relevant, important and urgent (Yúnez Naude, 2010:152). For example, it would be instrumental to build a model that estimates the effect of climate change in the productive activities of rural households and the effect of the latter on migration (Yúnez Naude, 2010:152).

3.4. Internal migration

Internal migration has also been a characteristic of the Mexican population distribution since the second half of twentieth century. Rural-urban migration has been the primary type of movement, as a result of the implementation of the Import Substitution Industrialization Model (ISI). Internal migration has had a huge impact on urbanization and metropolization of the principal cities in Mexico such as Mexico City, Guadalajara, Monterrey, Puebla and León (López and Velarde, 2011). Even though economic factors are the main explanation of the migration tendencies in Mexico, there are other factors that might influence the domestic movements. For example, improved of quality of life; better education opportunities, security and natural disasters (Castillo, 2007:147; Rojas Wiesner, 2007: 26).

4. POLICY RESPONSES

4.1. Migration policy responses

The policy responses of the Mexican government are at a turning point looking for participation of both countries. The problem is that the economic crisis of 2008 and security reinforcement have increased anti-immigration policies in the United States. There has not been a direct Mexican response to reduce migration rates. According to

Table 3. Demographic characteristics of national and international rural emigration (2002-2007)

	2002		2007	
	National Immigrants	Immigrants to US	National Immigrants	Immigrants to US
Home demographics				
Head of family average age	52.68	58.49	53.36	55.63
Years of school	3.69	3.58	4.92	4.37
Individual demographics				
Average age	30.13	32.58	32.69	33.66
Years of school	7.43	6.64	8.47	7.38
Gender [percentage]				
Masculine	67.28	84.36	78.02	76.15
Feminine	32.72	15.64	21.98	23.85
Civil Status [percentage]				
Married	62.86	71.84	70.00	75.33
Single	37.14	28.16	30.00	24.77

Source: Yúnez Naude and Mora Rivera, 2010.

IOM, the mexican government has only focused on services for migrants and giving assistance in the United States by improving return procedures. Most of the migration-related programs try to take advantage of the remittances that are sent by the citizens living abroad. The most famous program related to migration is the one called "3 x 1" the goal of the program is that for each peso that a migrant invests in their communities the local and federal governments will invest three. In this way, the Mexican government increases the commitment of the Mexican migrants to their local communities.

4.2. Temporary Worker Programs

Temporary work programs aim to add workers to the labor force without adding permanent residents to the population. The largest temporary work program between United States and Mexico was the Bracero Program that took place from 1942 to 1964. In the 1990s some micro temporary work programs were implemented. Each of these programs had specific admission criteria, length of stay and change of immigrant status (Martin, 2006). All of these programs have different visas requirements depending of their goal.

In Martin's study (2006) for the United Nations, he says there are 20 non-immigrant programs that permit foreigners to work in the United States. The three major worker visa categories are H-1B for specialty workers, H-2A for agricultural workers and H-2B for nonfarm workers (Martin, 2006: 22). The first one allows employers to have foreign professionals to fill specialized jobs. Usually, workers are asked to have a university degree and a certain degree of experience. On the other hand, there are programs for unskilled workers. They focus on agricultural and non-agricultural employees. In the case of H-2A (Agricultural Visa) the employers must receive permission to recruit them, have to offer higher wages and provide free housing to migrants (Martin, 2006: 17).

The U.S. Department of State's Bureau of Consular Affairs says that in 2009, 55,693 Mexicans were employed with this type of visa and 55,921 were employed in 2010 (USDS, 2012). Nevertheless, the program has the problem that most of the employees do not respect the temporary request of the work. Usually, the migrants change work from farm to farm, staying permanently in the United States. The temporary working programs, specially the agricultural ones, represent a good and safe opportunity for Mexican farmers.

4.3. Desertification policy responses

There is a need of governmental responses, not only for reducing the consequences of droughts, but for preventing the imminent damages they can cause. The Federal Government has designed different programs that have a diversity of objectives. The main goals focus on prevention action, such as risk management or agricultural insurance, research, development and emergency natural disaster funds. The Mexican case demands the implementation of policies that can reverse the effects of droughts and desertification on national productivity.

4.3.1. CONAZA

In order to fight land degradation and desertification problems and to drive the development in the northern part of Mexico, the government created a decentralized public organism called CONAZA (National Commission of Arid Zones) in 1970. The

Map 2. Principal migration states in Mexico

Source: Own elaboration

commission works with a federal budget and it is in charge of studying the arid zones of the country to promote different economical activities that will improve their agricultural production. Currently, CONAZA is part of the Ministry of Agriculture (SAGARPA) and develops programs to combat desertification and droughts.

CONAZA is part of the National Action Plan for Combating Desertification (PACD-MÉXICO) whose main goal is to prevent and delay the advance of desertification in arid and semiarid zones and seeks to improve the quality of life for inhabitants in these regions. Moreover, it seeks to reinforce programs to fight poverty in arid zones. Lastly, its goal includes the creation of programs that will alleviate the effects of droughts in Mexico (PACD, 2004).

Three programs are developed by CONAZA as part of the Ministry of Agriculture's plan to fight desertification. The first program is for land conservation and sustainable use of water, the second is an alimentary program, and the third is the construction of hydraulic infrastructure in arid zones. Currently, all of these programs are part of the National Development Plan 2007-2012 impelled by the current Calderon administration.

The program of Land Conservation and Sustainable Use of Water (COUSSA) aims to improve the country's land management strategies and to warranty the sustainable use of soil, water and natural resources required for agriculture. It supports the construction, establishment and development of rural projects related to the collection, transmission, storage and filtration of rainwater. It also supports rural projects that develop strategies and mechanisms to prevent soil degradation. It works directly with local governments or implements direct programs in the communities (CONAZA, 2011).

A second program, the Transversal Project for the Development of Arid Zones (PRODEZA) not only attends farmers living in arid zones, but also seeks to improve the living standards of people living in high-poverty municipalities that depend on agricultural production. It is the only program that focuses not only on the agriculture, but also pays attention to its relationship with marginal zones. This is relevant because 70% of the people living in rural areas live in conditions of poverty or extreme poverty (INEGI, 2011). PRODEZA attends 686 municipalities in 19 different states, and almost 70% of the population attended live in semi-arid or arid zones.

In 2011, the situation of droughts and land degradation required a larger reaction by the government. The federal government has started to implement programs to alleviate the effects of droughts in affected states for 2011-2012 (Programa Nacional de Atención a la Sequía 2011-2012). The program seeks to support schemes of coordination between the federal, local and municipal levels with producers and civil society in projects related to health, temporary employment, water,

food markets and agricultural business. It is within these national goals that CONAZA, PRODEZA and COUSSA have played an important role as a government response against the effects of droughts.

The Secretary of Agriculture, Francisco Mayorga Castañeda, announced on March, 2012, that there are several emergency preventive measures and that the resources will be invested in conservation and sustainable use of soil and water, modernization of irrigation patterns and the change of cropping production (Sagarpa, 2012). In 2011, there was a budget of 2, 392 million pesos invested in CONAZA representing an increase of 113% compared with 2010. The Federal Government invested in 1,792 COUSSA projects through SAGARPA, to help improve the conditions of water availability. This benefited 48,000,201 producers from 28 states of the country. In the case of PRODEZA, there has been an investment of 684 million pesos ($26 million) in 308 different projects (Sagarpa, 2012).

4.3.2. FONDEN (Natural Disasters National Fund)

The Natural Disasters National Fund (FONDEN) was created in 1996 with the goal of giving financial aid to states affected by a natural phenomenon whose magnitude overwhelms the operational and financial capacities of the state. The two main reasons for using the FONDEN are long-term or emergency natural disasters. Types of disasters include geological (earthquakes), hydrometeorological (which include droughts, floods, hurricanes and tornados) or fires.

The damaged states ask for financial assistance from the federal government. The federal dependencies corroborate the information and in the case of droughts the National Water Commission (CONAGUA) is in charge of this task. CONAGUA sends the evaluation and quantification of the damages to the Ministry of State (SEGOB) and the Ministry of Finance and Treasury (SHCP), which approve the necessary resources. Finally, these funds are allocated to the victims. At present, CONAGUA has confirmed droughts in 1,213 Mexican municipalities. In 90% of them the funds have been approved and are waiting to be allocated.

CONAGUA is the office responsible for corroborating the environmental status of affected areas and also aiding the population by sending drinking water pipes and the installation of storage tanks. In order to reduce the impact of droughts, it supports projects that make a more efficient use of water and temporary working programs. According to the director of CONAGUA José Luis Luege Tamargo, they will invest $5 million ($385,000 USD) to mitigate the effects of droughts across the country.

The FONDEN has been used in this atypical drought that has affected mostly the northern part of the country. According to José Antonio Meade, the Ministry of Treasury the Federal Government has allocated 23,800 million pesos from FONDEN's 33,8000 million peso budget for droughts (Notimex, 2012). The most affected states, Aguascalientes, Coahuila, Sonora, Sinaloa, Guanajuato, Durango, San Luis Potosí and Chihuahua, have requested the aid of FONDEN to alleviate the effects of the disaster. The Ministry of State, Alejandro Poiré, said that during 2011 there were 54 emergency statements, the resources from the FONDEN assigned helped 1,232,000 people affected in more than 400 communities in 17 of the 32 states (Notimex, 2012).

Even though there have been several changes in the operational rules to account for the exceptional droughts affecting Mexico, the relief is often not delivered on time to the affected communities. This has produced a lack of solutions or direct investment in infrastructure to mitigate the impact of the droughts in 40% of Mexican territory. Nevertheless, the resources are still there, waiting to be transferred from the federal government to the states and then to the municipalities.

4.3.3. Agricultural Insurance (AGROASEMEX)

Droughts have had a significant impact on the production capability of the rural sector in Mexico. In recent years, weather-indexed insurance has gained attention because it is considered to be an effective tool for providing coverage to farms against climatic shocks (Fuchs and Wolff, 2010:2). For that purpose, an agricultural insurance company known as AGROASEMEX was created to guarantee the protection of the crops and cattle.

AGROASEMEX is a public company that seeks to contribute to the formation of a national risk management system for the protection of the rural sector and to promote an insurance culture. AGROASEMEX hast two main objectives: work as a private insurance company and as a subsidy to the insurance premiums agricultural producers pay. It is related to environmental catastrophes; seeking to mitigate potential losses related to the natural disaster of environmental changes. The climate risks are measured with the precipitation and temperature levels that might cause a total loss in an agricultural cycle. A disaster takes place when precipitation is lower than expected or temperatures are higher or lower than a crop can handle. The insurance gives an indemnity of the total amount of crop covered.

Even though AGROSEMEX works as an insurance company it also works with federal resources that

are used to subsidize the insurance premium paid by the agricultural holders. The Federal Government allocated $397, 852, 016 pesos (29 million dollars) in 2002 to subsidize insurance premiums to the affected producers. Nevertheless the federal budget for AGROAESEMEX has increased reaching its highest peak in 2011. According to the Taxable Year Report $ 1,118,100,000 pesos (87 million dollars) have been allocated.

This federal insurance focuses on crops and cattle. The agricultural insurance subsidies cover the producer for environmental risks including droughts, excess of precipitation, frosts, low temperatures, floods, hail, fire, hurricane, tornadoes, and heat wave, among others and biological risks such asplagues. The program covers a total of $280 dollars premium subsidy per hectare. In 2011, 80.7% of the budget was allocated for agricultural purposes. The insurances covered 2,671,939 hectares protecting 503,895 beneficiaries. In the beginning of 2012 the federal government will allocate 2,000,785 million pesos, plus the contributions of the states estimated to be 550 million pesos, to cover 30 states and 10.6 million hectares with a subsidy for insurance premiums (Sagarpa, 2012).

> *"In 2003, the emergency insurance coverage began with just 95 000 hectares of crops in 2012 and aims to reach 10 million hectares in collaboration with state governments. In the case of cattle, in 2006 began with 261,000 animal units and by 2012 the goal is to reach almost six million." (Mayorga, 2012)*

The agricultural insurance might sound like a panacea to the risks agricultural producers face, nevertheless it has some deficiencies. On one hand, it has developed an "insurance culture" within the agricultural community. According to a historical analysis of the budget, the number of beneficiaries has increased from 2002 to 2011. "The insurance presence positively and significantly affects insured counties' maize yields with respect to uninsured counties" (Fuchs and Wolff, 2010:4).On the other hand,

according to design evaluations of the program applied by CONEVAL, it has several deficiencies. First, as it works as a subsidy, it only reduces the prime, and does not give a monetary transfer to producers. This gives the feeling to the beneficiaries that they are not receiving direct governmental help. Second, the majority of beneficiaries end up being larger agricultural producers and not small rural farmers, for whom agricultural losses have larger consequences on their budget and their development. This unequal allocation of resources is related to a larger risk management "culture" of commercial farmers and small holders. These agricultural risks that farmers are exposed to without insurance should be seen as a potential motivation to migrate. According to Fuchs and Wolff (2010) insurance has poverty traps because most investment decisions are conflicted with risk management decisions: risk-averse farmers tend to under invest and concentrate in the production of lower yielding yet safer crops.

5. POLICY RECOMMENDATIONS

1. A cross-sectional approach to enhance Mexico´s readiness to cope with the effects of droughts and desertification entails reframing the issue as an ongoing challenge rather than a natural disaster. Although the effects of drought are increasingly severe, the nature of this climatic shock is cyclical and the technology to predict the onset of drought exists. Improving the efficacy of Mexico´s current policies will require a long-term vision and abandoning the current "crisis" mentality. For example, shifting the focus to prevention through more sustainable land use practices, rather than simply providing emergency work and food relief programs, could alleviate the severity of drought losses for subsistence farmers.

2. The tightening of border controls on the part of the United States has significantly increased the number of undocumented Mexican immigrants. Although the increasing militarization of the border has not decreased the number of apprehensions of illegal migrants, it has increased the number of deaths at the border and has prevented Mexican workers from exercising their natural inclination to return to their home country. Shifting the focus toward an immigration policy based on enhanced guest worker programsi has the potential of regulating the risks of migration while giving workers the opportunity to derive the benefits of temporary labor migration. Specifically, enforcing employers' responsibility under the current guest worker program to provide workers with the means to return to Mexico after the end of the agricultural cycle would reduce illegal immigration. In the long-term, the United States could improve the functioning of its programs by emulating the highly successful temporary worker scheme between Canada and Mexico, by establishing a bilateral collaboration to be regulated by the Ministry of Labor of each respective country.

3. Regarding the AGROSAMEX weather-indexed agricultural insurance program, the Mexican government should undertake a two-pronged approach. First, the government should address farmers´ lack of familiarity with the benefits of agricultural insurance by pursuing a comprehensive

awareness campaign among smallholder farmers, particularly those most impoverished and food insecure. Secondly, the prices of the premiums should be regulated so they remain within the reach of those farmers who need them most, and to reduce the inequity in the distribution of benefits, which currently favors large agribusiness.

4. There is great untapped potential in the use of low-input, high-yield agricultural techniques such as conservation agriculture, and agroecology. The government subsidy and fiscal incentive programs should be revised so that the crops and techniques they advocate and promote are in line with the productive capacity and natural ecosystem of the soils. More specifically, overgrazing, mono-cropping, and inadequate irrigation systems should be controlled, and a more integrated vision that seeks to create synergies between the environment, livestock and the humans who derive a livelihood from them be applied in Mexico's agricultural sector.

5. The current national plan to combat desertification in Mexico is comprised of a fragmented network of programs divided among a variety of ministries and secretariats with different short-, medium-, and long-term objectives, as well as different fiscal and legal frameworks. An effective strategy should have a long-term vision, but should also be implemented at a program rather than a project level. This national program strategy should integrate, within the umbrella of a single organization, the goals of achieving adequate use of land, water, and other natural resources, as well as continued improvement and adaptation of agricultural techniques.

6. The drivers of drought and desertification are both natural, and anthropogenic. Hence, the legal and political provisions that contribute to the further degradation and marginalization of the country's agricultural lands should be assessed and revised to eliminate perverse incentives that lead to further soil degradation.

7. A final cross-cutting issue that affects the Mexican government's ability to plan and improve the efficacy of its programs is its lack of data-collection capacity and the dearth of comprehensive program evaluations. The design of the government's drought and desertification social safety net programs should include the development of measurable indicators, as well as credible short-, middle-, and long-term objectives, and include mechanisms that involve local beneficiaries in the decision-making process.

6. CONCLUSION

The case of droughts and Mexico-US migration demonstrates the complex relationship between the environment, humans, and the social and political frameworks that organize their interactions. As has been presented in this chapter, Mexico's experience with droughts dates back centuries, yet Mexico's preparedness in facing the cyclical crises that arise from extreme drought episodes has been aggressively developed only in the past decade. The lack of an effective safety net against droughts and desertification affects Mexico's most vulnerable, those who depend on their land for subsistence consumption. Often, this segment of the population has no other viable option but to migrate to the United States. While Mexican migrants have not been recognized as environmental migrants on either side of the border, the results from this case study have illuminated various areas of promise in the management of extreme poverty in arid and semi-arid areas, as well as coping with the increases in Mexico-US migration in the past decades.

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THE MODEL OF ALMERIA: TEMPORARY MIGRATION PROGRAMS AS A SOLUTION FOR ENVIRONMENTALLY-INDUCED MIGRATION?

SARA VIGIL*

INTRODUCTION

Within the European Union, Spain is the country most affected by desertification and by migration. Within Spain, Almeria is the only province with a desert in Europe. The transition from a traditional rural agricultural system to a technological agricultural system has permitted this poor region who expulsed its population to turn into a developed region that receives population (Garcia Lorca, 2006). Known as the "vegetable patch of Europe", the territory of Almeria has been transformed into thousands of hectares of plastic greenhouses, becoming a land of great agricultural expansion and large-scale immigration (Camacho Ferre, 2002).

From the 1970s onward, the agriculture of Almeria has known a radical revolution constituting one of the most interesting recent economic phenomenons of Spain. The semi-arid province of Almeria has been transformed into the widest greenhouse area in the world, with an area of 26,000 ha in 2007 (Campra, Garcia, Canton, Palacios, 2008). With this conversion, Almeria has become one of the world's areas that has experienced the most dramatic environmental changes in the last decades (UNEP, 2005). The incredible socio-economic change provided by this agro economic transformation has been of such extent that it is often referred to as "miraculous" (Sánchez, Aznar, Garcia, 2011).

The introduction of greenhouse agriculture came hand in hand with important flows of immigration since this type of agriculture is extremely dependent on manpower. The "model of Almeria" could be an exemplary model for adaptation to climate change in dry regions. In this chapter, we will analyse the negative and positive consequences of the implementation of intensive agriculture on both migration and the environment in this region in order to evaluate the pertinence of the model of Almeria as a model of adaptation to climate change in dry regions. On the other hand, migration caused by desertification is very often thought of as labour migration and mono-causal relationships are extremely difficult to establish. Nevertheless, we will see through this case study that the degradation of lands has contributed directly to migration through its impact on poverty.

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1. BACKGROUND AND CONTEXT

1.1. Geographic and climatic contexts

Situated in the south east of the Iberian Peninsula, Almeria, province of the autonomous community of Andalusia, is one of the most arid regions in the

Map 1. Almeria's geographical location

Source: Universidad de Almeria

Mediterranean basin, with a sub desert environment. Aridity, linked to high insolation, is the most characteristic climatic factor of the territory and has brought limitations, but also opportunities, for the economic growth of the region (Sánchez Picón, 2005).

Climatically, the area suffers from a very severe pluviometric deficit with periods of extreme drought. In most of the region precipitations are lower than 350mm per year and many areas have less than 250mm per year. Precipitation is scarce and irregular, coming, when it does, in torrential downpours (Sanchez, Aznar, Garcia, 2011)[1]. The average temperature is mild with variations from 17°C to 21°C and winds are reasonably constant throughout the year. Solar radiation is very high with approximately 3,200 sun hours per year (Garcia Lorca, 2010).

1.2. Perspectives of climate change and desertification

An important amount of the surface of Almeria is at risk of desertification. Projections that have been made on climate change in the Mediterranean region suggest that climate change will aggravate the existing problems of salinization and erosion. Desertification is still perceived in the developed world as a far away problem but we will see in this case study that it has been an integral constituting factor in the history of a region of a European country, Spain.

According to climate change indicators, average temperatures in Andalusia have incremented in 1,2°C since 1915 and rainfall has decreased in 18% since the 1960s (*Informe sobre el cambio climático en España*, 2007). Furthermore, extreme weather events will become more frequent with drought as the most distressing phenomenon. These studies conclude that drought crises in the region could become structural and permanent problems if the projections of the climate change models are met (*Informe sobre el cambio climático en España*, 2007).

The last estimations of the Delegation of Environment in Spain indicate that inherited desertification covers more than 17% of the regional area and that most of the areas suffering from desertification are concentrated in Almeria (Montero, 2007). These estimations also indicate that "man-made" desertification is already affecting 28% of the territory (Montero, 2007). Water shortage and drought have always been a recurring problem in the region. This problem is now intensified as a result of global climate change. In the 1990s the five-year drought became one of the main catastrophes in Spain and affected 6 million people (Terra Actualidad, 2007). The current drought of 2012, accompanied by frosts, is being described as the worst drought in 50 years (COAG, 2012).

As we will see, the model of intensive agriculture in Almeria has been an important model for economic development in an area suffering from such climate change and desertification problems.

1.3. Desertification in the history of the region

The formation of the semi-deserted landscape took place mainly during the 19th century as result of the mining activities that were accompanied by large wood consumption, agricultural expansion, and demographic growth. The mining activities linked to population growth led to an exhaustion of natural resources in Almeria causing desertification (Fermin, 2009). Between 1822 and 1857 the growth of the population in Almeria accelerated in an unprecedented manner. This major anthropogenic pressure over a fragile environment, like the one that characterizes this region, was the main cause of the desertification process (Sánchez Picón, 1996). The expansion of irrigated agricultural land, in order to nourish the incoming workers, caused the depletion of surface water. From 1880 onwards, the fall in the prices of mineral and traditional agricultural products and the crisis this generated, forced populations to migrate (Sánchez Picón, 1996).

We can see that in the history of the region, land degradation was not only caused by climatic conditions but in a very important way, by human activities. In the Mediterranean region, climatic drying took place at the same time as agricultural development and rapid population growth. Desertification has been acting as a push factor for centuries in this region. In the past, agricultural production was scarce and difficult in this underdeveloped land and poverty situations were traditionally combated through emigration (Garcia Lorca, 2010). The region of Almeria has shown numerous examples of important changes in the rhythm of human occupation and the intensity of the exploitation of natural resources depending on the different economic models of each period (Sánchez Picón, Aznar Sanchez, Garcia Latorre, 2011).

1. The translations in this chapter (french-english, spanish-english) were done by the author.

2. A CHRONOLOGY OF MIGRATION IN THE REGION

2.1. Historical land of migration

Migration implies complex models of multi variability and economic development. Institutional and political factors have had a very important role in migratory patterns but environmental factors have also played a significant role.

Almeria was one of the case studies chosen by the EACH-FOR Project (Environmental Change and Forced Migration Scenarios) which was the first large-scale empirical research project on environmentally induced migration, financed by the European Commission from 2007 to 2009. Spain was selected as a case study because it is severely affected by two environmental issues that are expected to become of increasing importance in the Mediterranean region: water shortage and drought. Within Spain, Almeria was selected due to the relevance of the relationship between environment and migration (2009: 15). This study underlines the fact that the semi-arid climate of this province has played an important role as a push factor exerting considerable influence on migration (Fermin, 2009: 16). Despite the lack of relevant research and data on the link between environment and migration it is possible to acknowledge the way in which the environmental factors have impacted migration flows.

The isolated position of Almeria relative to the most developed regions in Spain and its lack of infrastructures increased the dependence of the population on natural resources, causing deforestation and erosion. This situation linked with the underdevelopment of the region was one of the push factors for internal and cross border emigration (Sánchez Picón, 1996). In fact, the mining activities during the late 18th century and the beginning of the 19th century that provoked soil degradation and that eroded agricultural production, pushed thousands of farmers to migrate to areas with better job opportunities (Bknerr, 2004). People abandoned arable lands and marginal areas, leading also to further erosion. The loss of forests caused an alteration in the hydrologic balance accelerating erosion.

The economists Aznar and Sánchez Picón, agree that the keys to understand the great migratory vague of the beginning of the 20th Century are the decline of the mining and agricultural sectors (Aznar, Sánchez Picón, 2000). The development of traditional agriculture in this arid region was very difficult due to the lack of precipitation and the bad quality of the ground. Gomez Diaz, who analysed migratory movements in Almeria until the beginning of the 20th century, also mentions the fact that meteorological catastrophes like floods and droughts had an important impact on production acting as an important push factor for migration (Cruz Moya, 2005). According to Garcia Latorre and Aznar Sanchez, exceeding disturbances in a short period led not only to extreme environmental changes, but also to the economic and demographic stagnation of Almeria until the 1960s. "By 1910, Almeria had become largely desert and one of the poorest provinces in Spain. People began emigrating" (Garcia, Sanchez, 2001).

Nevertheless, it would be too simplistic to relate the high emigration of the late 19th Century and most of the 20th Century only to environmental factors that restricted agricultural production (Fermin, 2009). This is because institutional and social factors also played a significant role. However, there are good reasons to believe that environmental change did have an important influence on the other traditional socio-economic drivers of migration.

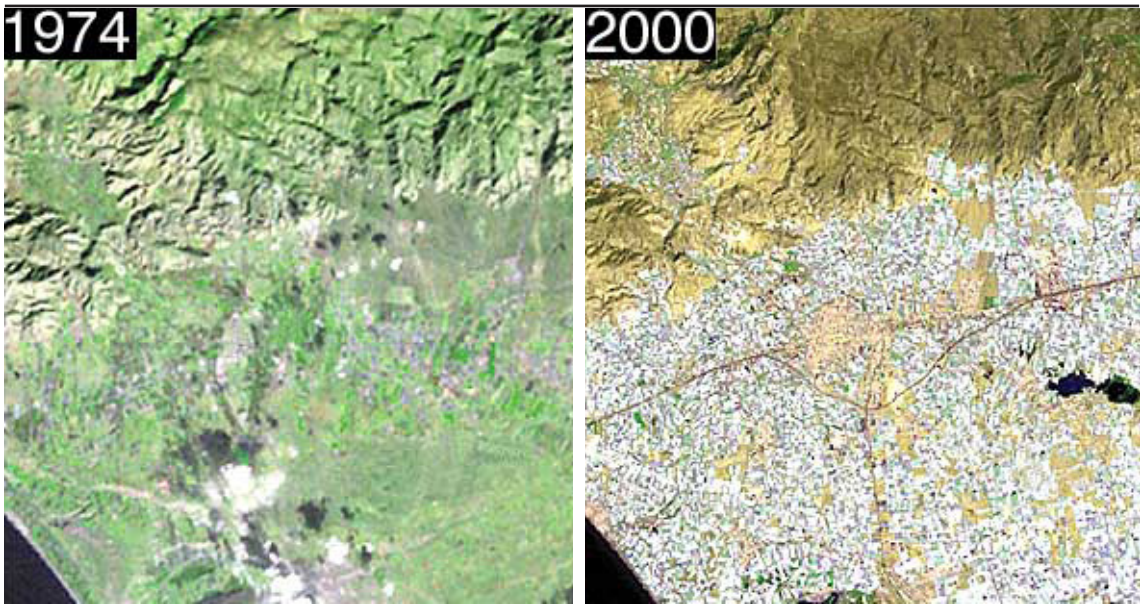
Table 1. Migratory balance in the 20th century in Almeria

Period	Natural Growth of the Population	Actual Population Changes	Net Migratory Balance
1900-10	36,460	32,000	-4,460
1910-20	39,000	-24,300	-63,300
1920-30	59,500	-14,000	-73,500
1930-40	44,500	8,400	-36,100
1940-50	44,000	-10,200	-54,200
1950-60	60,600	6,000	-54,600
1960-70	56,800	12,000	-44,800
1970-80	46,500	27,500	-23,000
1980-90	34,500	45,000	10,500
1990-2000	21,300	49,500	28,200

Source: IEA in Rodríguez Vaquero, 2008.

As we can observe in Table 1, the most important emigration wave took place just before the Spanish Civil War (1936-39). Economic problems in the province linked to the industrialisation and urbanisation of other Spanish regions such as Catalonia, and the facilities to migrate to some American countries that were in need of work force (Argentina, Brasil, Cuba or the United States), explain the great migratory wave. The decrease in the migratory wave in the 1930s is linked to the economic crisis of the host regions after the crash of 1929. After the Civil War, emigration continued to Catalonia, Switzerland, Germany, France and Belgium (Sánchez Picón, 2005). The migratory balance in the region stayed negative until the implementation of intensive agriculture in the 1970s (Sánchez Picón, 2005).

Map 2. The territorial transformation of Almeria (1974-2000)



Source: UNEP, 2005.

2.2. The miracle of Almeria

The situation in South-Eastern Spain has changed radically over the last five decades. This Spanish province, suffering from desertification and erosion and with a lack of infrastructure, has had a dramatic change in status in the last 50 years. Almeria has passed from being one of the poorest provinces in Spain to becoming one of the richest. Until the late 1960s, Almeria was the penultimate Spanish province in terms of GDP and has now passed to being the first province in Andalusia occupying an intermediate position at a national level (INE, in Aznar, Galdeano, Pérez, 2011).

This agro-economic transformation was implemented after the Spanish Civil War with the creation of the National Institute for Colonisation and Agricultural Reform (INCRA). The aim of this institution was to transform traditional agriculture into irrigated agriculture (Garcia Lorca, 2010). With the perforation of wells, to exploit salty water, the introduction of the sand plot technique and the development of vegetable production using plastic greenhouses, the region became suitable for intensive agricultural activity (Sanchez, Aznar, Garcia, p.1364, 2011).

The most developed areas in intensive agriculture today are the Campo Dalias and the Campo de Nijar. Before the 1960s, these areas were barren shrublands used for grazing (Garcia Lorca, 2010). Although water is essential for irrigated agriculture, the low level of rainfall, the high average sun hours and the mild winters are favourable for greenhouse agriculture production (Fermin, 2009). These suitable conditions that allow the production of vegetables out of season give farmers in this region an important competitive advantage over the rest of Spain and Europe (Sanchez, Galdeano, 2011).

Other factors like the increase in demand of agricultural products, the economic integration of Spain into the European Union in 1986 and important technological development in production, transport and commercialisation also played a decisive role (Garcia Lorca, 2010). Furthermore, European regulations have had a positive effect, guaranteeing free access to the European market as well as limiting imports of non-European products. Subsidies have also been granted to farmers to help offset the costs of structural reform related to traceability in agricultural products[2], certification and waste tracking (Galdeano-Gómez, Aznar-Sánchez, Pérez-Mesa, 2011). In several years, this land was transformed from a desert into the "vegetable patch of Europe" (Sanchez, Aznar, Garcia, 2011).

The model from the point of view of landowner structure has reduced poverty and contributed to the creation of successful economic and social communities. The researcher Giognocavo points out that what is rare about the model of Almeria is the fact that it has grown into a highly specialized agricultural sector, heavily empowered by

2. "Each stage in the supply chain from farm to consumer can be traced so that the quality of the food can be guaranteed" (Agriculture Dictionary).

technological improvements but always maintaining its cooperative business form. The role of the cooperatives has been very significant since a high proportion of the farms are small and family managed (Giognocavo, 2012). The 27, 000 hectares of green house agriculture are distributed within more than 13,500 small owners. The fact that the exploitations are small and family managed has allowed a pretty equitable distribution of wealth between the locals (Aznar, 2011). Almeria is not only the main fruit and vegetable-growing province in Spain, but also the largest cooperative vegetable growing area in Europe. In the current economic crisis, the agricultural cooperative sector is the only sector generating employment with a large distribution of the benefits (Giagnocavo, 2012).

Furthermore, there has been a large extension and diversification of activities around the agricultural sector creating an important agro industrial cluster. The emergence of this agro industrial cluster has played an essential role in the development of the model and is considered as an outstanding exponent of endogenous development. From the 1990s there has been a substantial growth of local businesses dedicated to activities such as: biological production, crop substratum, environmental control, watering and fertilization, seeds, financial services, transport machinery, cartons and packaging, etc. (Galdeano, Aznar, Pérez, 2011). This productive system around the horticultural sector has created significant interrelations and cooperation within the businesses, which give strength and integration to the cluster (Aznar, 2011).

2.3. The "boom" of recent immigration

The development of intensive agriculture has been closely linked to demographic growth. The increase in agrarian production would not have been possible without immediate and sizable migration flows since this type of agriculture is extremely dependent on manpower (Sanchez, Aznar, Garcia, 2011). We can distinguish three periods of immigration in Almeria. The first period (1954-1970) was characterized by the establishment of new farms in new population centers that were accompanied by inter-municipal movements. During the second period (1971-1989) migratory movements came from other regions of Spain that were attracted by the "Almerian miracle". However, it was not until the third migratory period that began in the 1990s that international migration occurred. (Garcia Lorca, 2010). The full integration of Spain in the European Union in 1993 brought a spectacular growth in the horticultural sector that attracted foreign populations (Garcia Torrente, 2002).

In the last 30 years, Almeria has become a well-developed province with prosperous agricultural, touristic and construction sectors. The arid climate conditions no longer act as a push factor but as a pull factor attracting migrants from all over the world (Fermin, 2009). The appropriate manipulation of climatic factors was one of the keys of the development process (Garcia Lorca, p. 923, 2010).

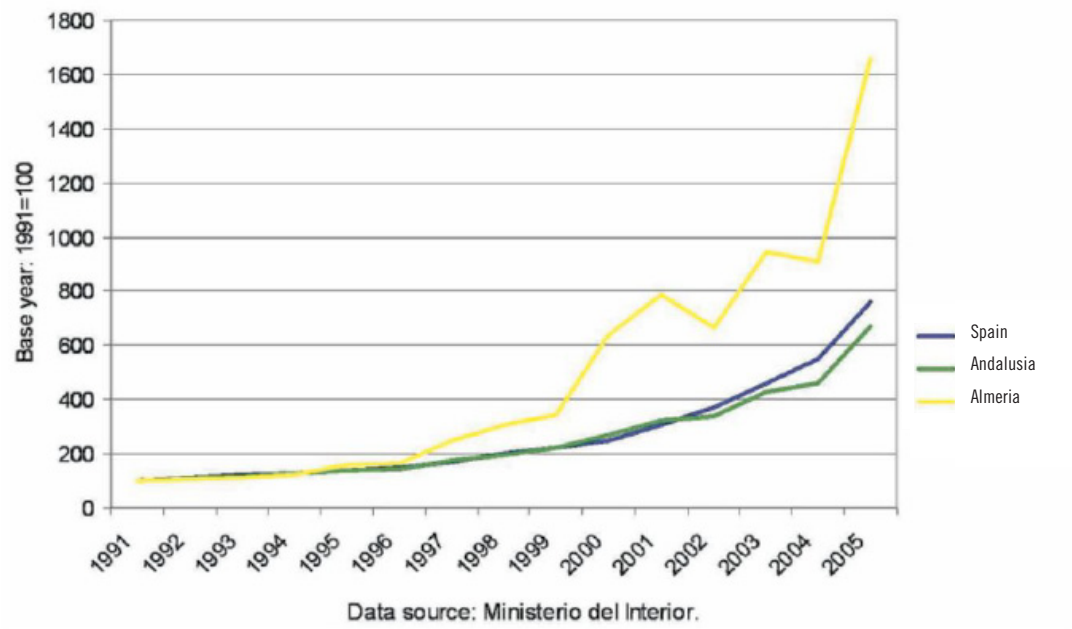
Information from the Ministry of Interior reflected on Figure 2 shows that from the mid 1990s the increase of international residents in Almeria became much greater than in the rest of Andalusia and the rest of Spain (going from approximately 1000 in 1991 to over 16,000 in 2005). These numbers provide evidence of a net population gain due to migration. The significant increase of population in recent years has made Almeria the second highest province in Spain in terms of population growth and the first in terms of immigration (Aznar, Galdeano, Perez, 2011).

More than 150 nationalities are represented in Almeria. The most represented nations are those shown in Figure 3. The geographical proximity with Northern Africa has been determinant to explain the important migratory flows coming from the Maghreb. These migrants find in Almeria a space of transit, regularization and posterior diffusion to other territories. Cultural and linguistic proximity has also facilitated the settlement of Latin American migrants and the fall of the Iron Curtain enabled the entrance of migrants from Eastern Europe (Garcia Lorca, 2009).

In 2011, the total population of Almeria was 190,349. Of this population 20,160 were foreigners. According to recent data from the Subdelegation of Government in Almeria, the most significant nationalities represented in Almeria in 2011 were: Morocco (46,340), Rumania (35,884), United Kingdom (11,052), Ecuador (7,500), Bulgaria (4,295), Lithuania (3,632), Colombia (2,979), Russia (2,868), Senegal (2,542) and Argentina (2,470). The largest numbers of immigrants are in working age and 60% of them are between 15 and 39 years old. The development of agriculture has been the main pull factor for immigrant populations to this region.

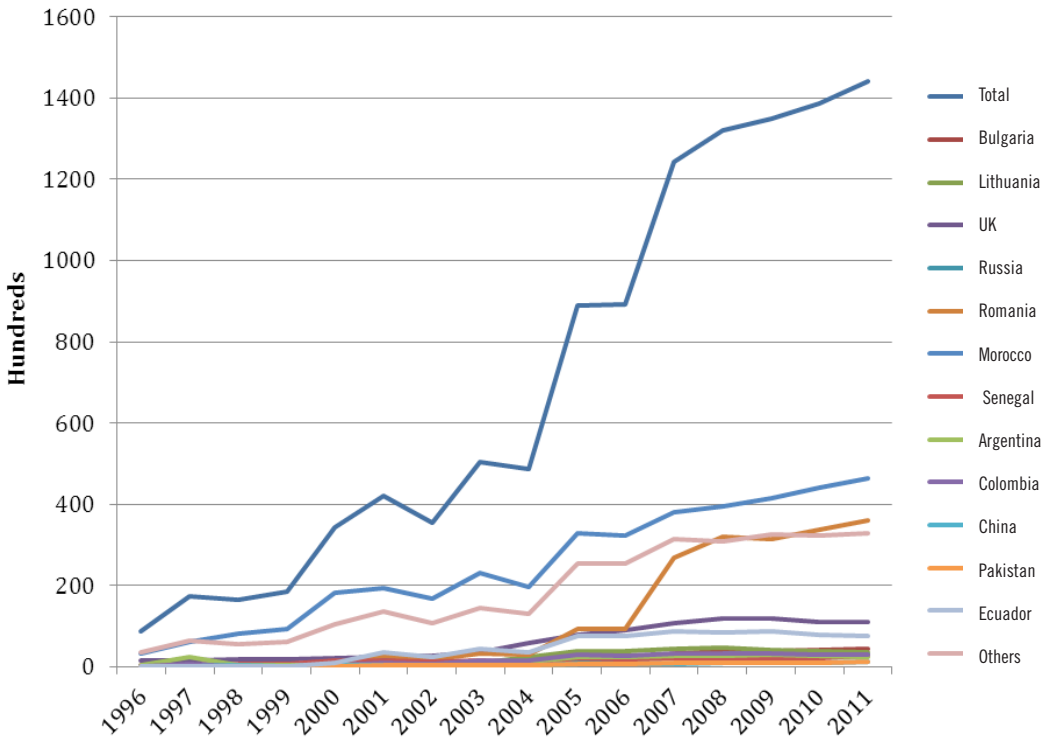
Keeping in mind the significance of irregular migration, foreign immigrants in Almeria represent 15% of the members of the Social Security System and are occupied as follows: 60% in agriculture, 10% in construction, 9% in the hotel industry, 7% in commercial activities and the rest do not have a fixed occupation (Rodriguez Vaquero, 2008). The most important occupation of immigrant men continues to be agriculture, whilst women are

Figure 1. Increase of international residents



Source: Garcia Lorca, 2010.

Figure 2. Foreigners by country of origin with residence and work permit in Almeria (1996-2011)



Source: Author. Data: Subdelagation of Government in Almeria

occupied in domestic services, taking care of the elderly, catering and, sadly, prostitution. Within the group of the over 60 year olds, European citizens represent more than 80% showing that Almeria is a place chosen for retirement due to the mild climate of the region (Garcia Lorca, 2009).

2.4. The environment-migration nexus

According to the Subdelegate of the Government in Almeria, the discussion on environmentally induced migration as such is not present in the political discourse. Migrations are addressed from a socio-economic point of view in the context of a broader global change, but not of an environmental change in particular. (Interview Garcia Lorca, 2012). The only type of environmental migration that has been suggested is that of migrants arriving to Almeria in search of milder weather conditions. The fact of referring to immigrants from developed northern European countries as environmental migrants is very interesting and not often addressed in literature. These migrants normally look to settle in the countryside in houses offering luxurious living conditions. These populations cause further environmental tensions for the repartition of land and water resources. Most of these migrants come from the UK and represent 10% of foreign immigrants in Almeria (Garcia Lorca, 2010: 931).

The links between desertification and migration are only addressed from a technical point of view by specialized organisms like the United Nations Convention to Combat Desertification. This convention was established in 1994 and signed by 194 parties. The UNCCD is the only legally binding international agreement on desertification issues and addresses the link between desertification and migration in its article 17.1 (e) as follows: the parties have agreed to "take into account, where relevant, the relationship between poverty, migration caused by environmental factors, and desertification" (UNCCD). According to the UNCCD, the root causes of migrations in dry lands have often been mistaken. Migrants tend to explain the reasons for mobility in terms of poverty, often overlooking the fact that the real cause of this poverty is due to the deterioration of their lands of origin and the loss in productivity. Migration does have an environmental dimension (UNCCD, 2009). There is still a lack of information concerning the impact of desertification in the regions of origin of the immigrants that come to Almeria. Recent data shows that most African migrants come to Almeria from urban centers (Garcia Lorca, 2012). However, studies have not been undertaken to show the impact of drought and desertification on their regions of origin and the way in which desertification could have led them to migrate to the city in the first place. Since most of the migrants come from Africa, which is the continent that is most deeply affected by desertification, studies to show the relationship between desertification in Africa and migration towards Almeria may provide resourceful information.

This relationship between desertification and migration was nevertheless referred to in both of the international symposiums that took place in Almeria in 1996 and 2004 concerning forced migration in arid and semi-arid regions. The departure point for these meetings was that large demographic movements do not only occur as a consequence of political conflict and economic crisis but also as a cause of environmental change in general, and desertification in particular. These symposiums concluded that desertification is the consequence of bad policies and non-sustainable activities. One of the conclusions of these symposiums was that the example of greenhouse agriculture in Almeria is showing to be a productive alternative for depressed areas (II International Symposium, 2006). We will analyse these assumptions in the following sections.

3. VIABILITY AND SUSTAINABILITY OF THE MODEL OF ALMERIA

3.1. Environmental aspects

3.1.1. Main Problems

Despite great economic performance, the future prospects of this model seem uncertain due to the social and environmental consequences, which are often negative. The expansion of intensive agriculture can be both a source of wealth and a general problem regarding sustainable development and desertification. This industrial agriculture implies a strong environmental impact provoking the pollution of the scarce water resources, land erosion, loss of ecological diversity, deforestation and the consumption of fossil fuels and the release of greenhouse gases. Desertification in this region has not only been accelerated by intensive agriculture but also by a growing touristic sector. Poor agricultural practices (pesticides, irrigation, and invasive plant species) together with modern economic development have damaged the land.

In the beginning, this new agricultural model was entirely dependent on subterranean water sources. The continued growth of greenhouses

between the 1980s and 1990s placed an enormous demand on water supplies and its impact became noticeable when the quality of the underground water began to deteriorate and salinize (Sanchez, Aznar, Garcia, 2011). The process of exhaustion of aquifers and unsustainable water management is the process that is most closely linked to desertification in Spain. There is an important risk of desertification in this region due to this overexploitation of surface and groundwater resources (Puigedefábregas, Mendizábal, 2006).

3.1.2. Policy Responses

Nevertheless, action has been taken since the mid 1990s to fight the negative externalities of the model and authorities seem to have an increased awareness of the environmental issues involved. The irrigation system of southeastern Spain is now the most efficient in the country. The AGUA program in 2004 replaced the Hydrological Plan of 2001 that was based on large inter-basin water transfers. The new program is now committed to desalinization as a way to address water deficits (Downward, Taylor, 2007). Desalinization plants and reservoirs have been constructed to increase the water supply and regulatory frameworks have been implemented to control aquifer overexploitation. Measures have also been taken to improve the collection and use of rainwater (Gómez-Orea, 2003). All of these measures have significantly decreased water needs and the pressure exerted on aquifers (Picón, Aznar, Latorre, p.6, 2011). The scarce water resources are now being used in a much more efficient manner. In the 1970s for the production of 60,000 kg/ha/year more than 8000 cubic metres of water/ha/year were used. With the implementation of the measures mentioned above, in 2008 the average production was between 120,000 and 160,000 kg/ha/year, with a consumption of between 3,500 and 6,000 cubic metres/ha/year (Garcia Lorca, 2010). The productive efficiency of the model has been therefore significantly improved with constant technological innovation. (Interview Garcia Lorca, 2012). However, Almeria will have to balance the projections of agricultural development and the environmental consequences of a future supported on desalinated water (Downward, Taylor, 2007).

Measures that will permit adaptation to climate change include an adequate management of cultivation techniques, better irrigation systems and reforestation. The European Strategy for the Conservation of Plants, the Common Agricultural Policy with its agro-environmental measures and the Spanish Forest Plan and the regulation of land use are instruments that should allow the conservation of edaphic resources of the ecosystems (*Informe sobre el cambio climático en España*, 2007).

Regarding desertification, the ratification of the Spanish government of the United Nations Convention to Combat Desertification (UNCCD) in 1994 came along with the creation of a National Program to Combat Desertification (PAND). The objective of the PAND is to determinate the contributing factors to desertification and the measures needed to combat and mitigate the consequences of droughts. The LUCDEME Project (Fight Against Desertification in the Mediterranean) was established by the Ministry of Agriculture in 1995 in the context of the PAND. This project is a reference in the research and creation of mitigation policies to combat desertification. For many years, it was the only program that funded desertification research in Spain (Ministerio de Agricultura, Alimentación y Medioambiente). However, although important scientific knowledge on the causes and effects of desertification has been obtained, little efforts have been made to implement an efficient way for the agro industrial sector to fight desertification. Certain researchers such as Martinez Fernandez, are surprised by the fact that intensive green house agriculture is not considered or referred to in the National Plan to Combat Desertification. The measures to protect the soil in Spain should rapidly take into account the spread of greenhouses in Almeria (Martinez, 2005). The confederation of ecological oriented groups of Ecologists in Action is also worried that measures against erosion created by the great proliferation of greenhouses in Almeria have not been undertaken by the PAND (Ecologistas en Accion, 2008).

3.2. Immigration

3.2.1. Main Problems

The impacts of growing immigration on the environment in this region should also be taken seriously into account. The significant growth in population density exerts a growing pressure over land uses and natural resources. Environmental disruption can in fact be both a cause and a consequence of population movements. Growing human demand on the land causes, in many cases, the depletion of natural resources (Scherr, Satya, 1996). The spectacular growth of immigration, together with the already existing water demanding sectors, agriculture and tourism, has added pressure on natural resources. According to a report on climate change prepared for the presidency of Spain in 2007, current migratory flows are attracted to vulnerable areas that are already

the most exposed to environmental hazards and climate change such as Almeria (*Informe sobre el cambio climático en España*, 2007). If high population growth persists, great social and institutional efforts will need to be made not only to assure a sustainable use of natural ressources but also to reduce social conflict.

There is also an important problem regarding irregular migration. The Subdelegation of Government in Almeria indicates that there are approximatively 30,000 irregular migrants in the region. These immigrants do not always enter the territory in *pateras* (small boats used for illegal migration), but also by the airport entering as tourists. Andrés Garcia Lorca explains that it is has become increasingly difficult to control illegal migration, and that many of these illegal migrants do not have any kind of documentation with them, creating problems to determine their country of origin (Interview Garcia Lorca, 2012). One of the reasons that explains their will to lie about their nationality is the hope of obtaining the refugee status. This is why , many of them claim to be natives of countries such as Liberia, Syria or Mali (Barros, 2006).

Furthermore, the social integration of immigrants has not come without problems and conflicts. An intense outbreak of racist violence against Moroccan immigrants took place in February 2000, when a Moroccan with mental problems murdered a young woman from the town of El Ejido in Almeria. This isolated incident generalized a racist wave of violence against the immigrant community. The mosque, butcheries, bars, restaurants and cars of immigrants were object of violence from the rest of the population in El Ejido. According to SOS Racism, for discrimination to be abolished there is a great need to combat labour exploitation and to fight for the rights of the immigrant community. Spatial segregation and labour exploitation are the basic elements to understand what occurred in El Ejido in 2000 (SOS Racismo, 2001). Housing for the agricultural workers continues to be a social and environmental problem that requires attention. Shantytowns in Almeria are widespread and more than 4000 migrants are currently living in them. Most of the shantytowns are situated in El Ejido and occupied by Moroccans. Many of their inhabitants are undocumented migrants and live under extreme poverty conditions (Cabrera, 2010).

In 2011, an investigation from *The Guardian* claimed that the working conditions of illegal workers in Almeria met the UN's definition of modern slavery (Lawrence, 2011). These conditions seem to have deteriorated since the economic crisis that drove an increasing amount of migrants to search for work in the agricultural sector after the collapse of the construction sector. According to this report, African migrant workers live in shacks made of boxes and plastic and have no acces to sanitation or drinking water. Their salaries are half of the legal established minimum wage, and illegal workers are threatened to be reported to the police if they complain about their living conditions (IOMC, 2011). Competitiveness in the agro industrial sector is achieved by reducing labour costs and by augmenting productivity. On the other hand, Moroccan and Spanish producers now compete for the same potential markets in agriculture and this increases considerably racist and anti Arab reactions within the agriculturalists of Almeria. The vulnerability, in the case of undocumented migrants, is total since their situation does not allow them to denounce to the police. Their only mean of expression is rebellion and this rebellion is used against them to reinforce the stereotypes of conflictive workers that are laid upon them (SOS Racismo, 2001). These outbreaks of violence in El Ejido in 2000 showed the unsustainability of the model and trade unions and associations such as the Association for Human Rights of Andalusia, the Association of Moroccan Emigrants in Spain and the National Confederation of Workers, pressured the sector to improve working conditions for immigrant workers asking for broader regularization processes (Cabrera, 2000).

3.2.2. Solutions

The importance of the migratory phenomenon in the region of Almeria and the necessity to control migration flows have required the implementation of migration policies. National policies on immigration establish specific legal regulations for foreigners to have access to the labor market. In general, the principal objective of these policies is to satisfy the needs of the national labor market. In 1985, the law on the rights and liberties of foreign immigrants was published and new measures have been taken. Extraordinary regularization processes have taken place in 1985, 1990, 1996, 2000, 2001 and 2005 in order to decrease the number of irregular migrants. Those of 2000 and 2001 were of particular importance. Firstly, foreign immigrants in legal situation doubled and regular contracts rose. Another consequence of this was the growth of *family regroupation, which involves further challenges and leads to the congregation of new illegal immigrants.* (Pumares Fernandez, 2004). Social services like education, health care and administration have also been significantly modified as a consequence of this high population growth and need to adapt in order to answer to a growing demand (Rodriguez Vaquero, 2008).

Even if at the beginning there was a poor management of the incorporation of large amounts of immigrant workers, measures have been taken to correct the situation by making greenhouse labor more attractive (fixation of salaries according to production, mechanization of the most difficult tasks) and by the regularization processes. Additionally, the agriculturalists associations are encouraging contracts with the immigrant workers' countries of origin to manage the arrival and adaptation of immigrants in a more efficient manner (Aznar, Galdeano, 2011). Furthermore, plans have been approved since 2001 to coordinate public policies concerning immigration in Andalusia. Policies have also been implemented to foster the integration of immigrant populations. [3] The main objective of these measures has been to decrease social conflict, increase relationships between different cultures and to promote tolerance between the migrant and local populations (Junta de Andalucia). Additionally, Almeria presented in July 2011 the Second Municipal Plan for Immigration (2011-2013) focused on favouring access to resources, employment and integration of immigrant populations. Another aim of this plan is to raise consciousness of society as a whole of the positive values of immigration in order to avoid racism and xenophobia (Integra Local, 2011). An element that proves the growing integration of migrants is the fact that an increasing number of them are becoming shareholders in agricultural cooperatives within few years (Garcia Lorca, 2006). However, the social conflict between communities remains high in the context of the current economic crisis and many more efforts will be needed in order to combat racism.

From the 1990s annual quotas for foreign workers have been established with the hope that these quotas would be a mechanism to select workers in function of the labor needs and that clandestine migration would be discouraged. Nevertheless, a new problem has emerged since there is a tendency from the part of the regularized migrants to change of destination and sector once they are in legal situation. There is an extended idea between the immigrant community that better salaries and conditions can be earned in other sectors and provinces of Spain. The loss of these workers leaves a constant need for new immigrant labour and leads to question the sustainability and capability of the model to better the working conditions in order to increase the attractiveness of greenhouse labor to immigrants (Pumares, 2003).

3. Plan Piloto de Actuación Integral en Zonas Sensibles con presencia significativa de población inmigrante.

4. INTENSIVE GREENHOUSE FARMING: A MODEL OF ADAPATION TO CLIMATE CHANGE?

According to a scientific study published in the Journal of Geophysical Research, the high concentration of greenhouses in Almeria has a positive effect in the fight against climate change by offsetting global warming through the generation of local microclimates. Investigators recorded a significant air-cooling trend of -0,3°C/decade in the area covered by greenhouses during the years of greenhouse expansion, between 1983 and 2006. This cooling trend has no correlation with the regional warming trend of +0,4°C/decade that matches the warming in the rest of the Mediterranean area in the same period. The explanation of this cooling trend would be the negative radiative force exerced by the greenhouses that reduces the net incoming shortwave energy diminishing the energy emitted as long wave radiation (Campra, Garcia, Canton, Palacios-Orueta, 2008). This study shows the important benefit of high albedo surfaces as adaptation measures to climate change at local scales and should be further developed and researched as a strategy for both mitigation and adaptation. This type of geo-engineering consisting in augmenting albedo surfaces is not yet considered as a mitigation or adaptation strategy in international protocols (Campra, 2011). Policies aimed at quantifying the human influence on climate are still largely focused on changes in atmospheric composition. Nonetheless, there is a vast variety of scientific work that has proved that land-cover changes also have a significant influence on climate by changing the physical properties of the land surface. According to the IPCC, the local radiative-forcing change caused by surface albedo in regions of intensive land use such as Europe may be greater than that due to all the anthropogenic greenhouses together (Pielke, Marlan, Betts, Chase, Eastman, Niles, Niyogi, Running, 2002).

Another issue that the model of Almeria raises and that should be carefully analysed, is the debate between land sharing and land spreading. In land sparing, concentrated areas of farming are managed to maximize yields, while separate reserves target biodiversity conservation. Agricultural yields on farmland are maximised so that other areas can be "spared for nature". In land sharing or wildlife-friendly farming, conservation and production are integrated in more heterogeneous landscapes (Fischer et al. 2008). Each of these techniques has positive and negative effects depending on the richness and concentration of biodiversity in each territory.

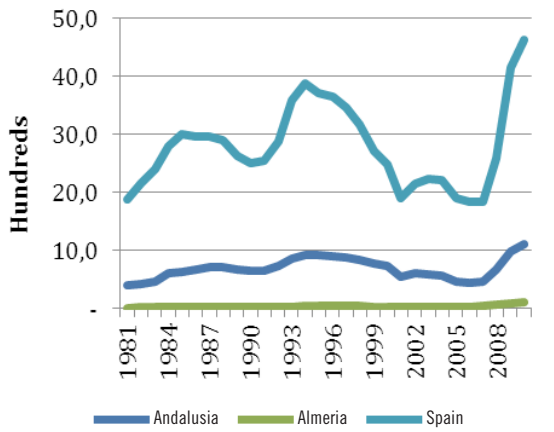
In the case of Almeria, the shift from extensive dry crops to intensive greenhouse farming has decreased the pressure on an area that is 10 times larger than the one used for intensive farming enabling the recovery of natural vegetation and allowing forestry plans to develop in the abandoned lands. The 30,000 ha used for intensive greenhouse farming represent only 3% of the total area in the province. Some of the protected areas in Almeria include: the Natural Parks of Cabo de Gata-Nijar, Sierra Nevada and Sierra Maria, the Natural Sites of the Tabernas Desert, the river of Aguas, the Punta Entinas-Sabinal, the Mountain Range of Alhamilla and the Nature Reserve of the Albufera de Adra. These areas together with the other protected areas in the province sum up to more than 300,000 ha of protected land (Consejeria de Medioambiente, 2012). The protection of these areas was made in order to establish limits and prohibitions to the extension of greenhouses and touristic urbanisation (Valcuerdo, Quintero, Cortés, 2011).

The researcher Pablo Campra, indicates that very important carbon sinks in soil and biomass have been recorded and that these sinks should be taken seriously into account when analysing the environmental consequences of greenhouse farming in the province of Almeria as they prove to be huge in terms of climate change mitigation (Campra, 2011). Moreover, historical erosion has been significantly reduced in the mountains and hinterlands that were traditionally exploited for esparto grass production (Interview Garcia Lorca, 2012). This "high yield" conservation approach that enables to reconciliate human land use of the Earth with the conservation and recovery of natural habitats deserves much wider consideration by policy makers (Campra, 2011). This approach may become an increasingly important way of using the Earth in a more sustainable manner whilst enabling to feed the 9 billion people that are estimated to inhabitate our planet by 2050.

5. AGRICULTURE IN THE CURRENT CONTEXT

The agricultural sector of Almeria is showing vigour despite the economic and financial crisis. The Delegate of Agriculture in Almeria (José Antonio Salibas) explains that exports are continuing to grow. The strength of the agricultural sector is maintaining the economy of the province during the current economic crisis. The results of the horticultural campaign in 2011 show the importance of the sector as a creator of employment. During 2011 an average of 216,500 employments were created. This supposed only a small decrease in agricultural contracting of 6% in comparison to 2010. During the last three years the number of affiliations to the Social Security System has barely changed (Esteban Ruiz, 2011). In all the other sectors unemployment has grown dramatically since 2007, with the construction and industrial sectors being most affected (Ministerio de Empleo y Seguridad Social, 2012). Unemployment in Almeria at the end of 2011 was of 33.3% compared to 10.2% in 2007 (IEA, 2012).

Figure 3. Unemployment in Almeria (1981-2011)



Source: The author. Data Source: IEA

Agriculture is the only sector that has known a growth in contract labour. Nevertheless, with the importance of the agricultural sector as a refuge for employment, unemployment of the immigrant community has grown since the start of the economic crisis with the incorporation of nationals to the agricultural sector. This has caused some Latin-American migrants to return to their country of origin helped by the voluntary return plans implemented by the Spanish government (Garcia Lorca, 2012).

Population growth in Almeria still remains positive although it has decreased since 2007. Even if the increase in population in 2011 has barely passed 1%, it still remains greater than the national average of 0.36%. Migrant population has been preeminent with an annual variation of 2.75%, representing 22.1% of the total population whilst in Spain they represent 12.19% and in Andalusia 8.67% (Ministerio de Empleo y Seguridad Social, 2012).

The year 2011 was a difficult year especially due to the E.Coli sanitarian crisis coming from Germany but whose speculation had significant economic and social consequences on the agriculture of the region. The latest free trade agreement (2012) between the European Union and Morocco could affect negatively Spanish agriculture and labour

providing cheaper products due to the inexpensive manpower and fewer environmental regulations of Morocco (Ministerio de Empleo y Seguridad Social, 2012).

Agriculture will face important challenges in the coming years due to international competition, population decline and climate change. According to regulations the Regional Departement of Environment, the following measures in Almeria should be taken: irrigation design and planning, introduction of more resistant species to drought and high temperatures, control of plagues and illnesses, establishment of systems to analyse the evolution of agriculture in the context of climate change, education of agriculturalists for the introduction of adaptation techniques, further implementation of ecological agriculture and erosion control measures (Consejería del Medioambiente, Junta de Andalucía). Many farmers are trying to find a differentiation of their products, by advancing towards a more environmentally sustainable agriculture. Ecological greenhouse agriculture in Almeria started in the 1990s and by 2008 already 700 hectares were being used for this type of agriculture (Salvador, 2008).

6. THE MODEL OF ALMERIA: A REFERENCE FOR OTHER COUNTRIES?

The supporters of this model argue that most of the negative externalities of the model have been corrected and that the model of Almeria, based on technology-based intensive farming represents an economic and social development alternative for depressed areas within dry regions (Garcia Lorca, 2010). In fact, if we compare the different scenarios from the 1960s to present, we can see the spectacular capacity of territorial transformation of this area. This is, in their opinion, a paradigm that should be applied to other deserted areas suffering from the same problems to achieve a similar development and to regulate migratory movements from the regions of origin.

The model of Almeria has become a referent for many countries in the world. Many countries with different levels of development have an active interest in the growth and development model of Almeria. Latin-American countries including Chili, Mexico, Ecuador, Peru, Bolivia and Colombia have started to show their interest and public and private institutions from all over the world are studying and trying to imitate the model (Garcia Lorca, 1999). Very important knowledge exchanges have also been established with Latin American and African countries (Interview Garcia Lorca, 2012). Projects like the Moproalh project between Alhucemas (Morocco) and the University of Almeria are being developed in order to transfer technology and knowledge to regions interested in copying the model (MOPROALH). Another example is the "éburnée 1" project between the University of Almeria and the Ivory Coast (EBURNEE 1). There is also a great interest from the Chinese government in the technical aspects of the model that they wish to implement in the area of Peking. Furthermore, the model of Almeria was recently presented in the United Nations during the discussion on the role of cooperatives in poverty eradication in February 2012 in New York (UN, 2012).

According to the credit cooperative Cajamar, the interest of these countries for this model comes from the fact that they have detected in it, an endogenous development model (Instituto Cajamar, 2004). This model has permitted a rapid development mainly based on the labour factor by high performing agricultural cooperatives. The model of Almeria could constitute a paradigm and an economic development opportunity for countries with very specialised productive structures, with an important underdevelopment in the services industry, and with poor agricultural performance (Instituto Cajamar, 2004).

Nevertheless, a direct transposition of the model to areas suffering from desertification seems difficult for various reasons. The first limitation is an economic one since many of the countries where a transposition could be an interesting and practical experience do not have the necessary economic resources or infrastructures needed to carry out a similar development. Furthermore, they do not always have access to a large solvent market like the European Union, with relevant purchasing power and enough public and private infrastructures to allow transportation and access of products in a profitable and easy manner. Other limitations to the transposition of the model include: productive limitations, of transport and communication, of technological transfer, of funding, etc. Even if the validation and transposition of the model of Almeria to countries that have not undertaken the industrial transition could eventually constitute an agrarian alternative, the particular circumstances of each of them should not be underestimated (Instituto Cajamar, 2004).

CONCLUSION

The model of Almeria has permitted a radical socio-economic transformation of one of the most arid regions in Europe. This region that expulsed its population is now a major attraction pole for immigrants from all over the world. The

efficient manipulation of the climatic factors has been crucial for the economic development of the region. Nevertheless, the agro-industrial sector in Almeria is now facing and will continue to face further challenges in the future.

Concerning immigration, the exponential growth of migrants in a short period of time has not allowed a convenient consolidation of institutions and social networks. The integration of immigrants remains one of the fundamental challenges of the province since there is still a big gap between the economic growth, which has proved to be spectacular, and the development of an integrated civil society. A continued social disintegration will slow down the socioeconomic development of Almeria. As we have observed, populations from very diverse horizons and cultural backgrounds arrive to Almeria. These populations do not always have the same ambitions or needs, and policy responses must therefore be adapted to each particular group. Almeria needs to become not only a land of opportunity but also a multicultural, cosmopolitan and tolerant region that can make the best out of its cultural richness and diversity. Education must play a key role in the reinforcement of a culture of trust between the different communities without forgetting that immigrants have played an essential role in the economic development of the region.

More generally, this case study helps illustrate the complex relationship between desertificaction, poverty and migration. There is a lack of data regarding the nexus between desertification, underdevelopement in Africa and migration towards Almeria. Further research is needed on the links between desertification, migration and intensive agriculture in a region that is deeply affected by both environmental changes and migratory movements. The model of Almeria has proved to be an efficient solution to fight againts the environmental emigrants that had once abandoned the poor, underdeveloped province and could obtain similar results in other desertified regions.

On the other hand, even if great progresses have been made, the negative environmental externalities that the agricultural model provokes should not bee overlooked. Water scarcity remains the fundamental environmental challenge for an economy that is based on irrigated agriculture. We have seen that water resources are now being used in a much more efficient manner but greenhouse surface is continuingly growing and water resources will be scarcer in the context of climate change. The AGUA programme that is currently being used, tries to solve the problem of water scarcity by the means of desalinization instead of by an augmented water price. Furthermore, the environmental impacts of desilinisation should not be underestimated (OECD, 2008). The objective of satisfying demand whilst ensuring a sustainable exploitation of the system could be achieved by the distribution of new water resources between users, prioritizing urban demand, and compensating the expenses for agriculture between all consumers of the products (Downward, Taylor, 2007). There is a need of policies to treat water as the scarce resource that it is. Furthermore, policy makers must urgently take intensive agriculture and its effects on desertification into account. A sector that does not prove to be respectful of the environment will not only endommage the land in an irreversible manner that could stop development all in all, but will also have rising difficulties to sell products to consummers that are growingly environmentally conscient (Pérez, Rodriguez, 2010). A greater added value of products must also be achived in a context of growing international competition. Further development of ecological agriculture would not only aliviate the environmental pressure of the sector over the land but would also considerably increase the added value of the products.

Finally, the positive effects of greenhouse farming for mitigation and adaptation in the context of climate change should be further researched since this case study seems to provide innovative steps forward. Important scientific and economic efforts should be made in order to further combat the negative externalities of a model that could eventually solve many current environmental, social and economic problems in marginal and depressed areas of the planet.

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CLIMATE, ENVIRONMENTAL CHANGE AND MIGRATION TERMINOLOGY

A GLOSSARY

Adaptation: Preparing for and coping with the impacts of climate changes, to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change (Intergovernmental Panel on Climate Change).

Climate change: A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to other natural climate variability that has been observed over comparable time periods (UN Framework Convention on Climate Change, Article 1, p. 4. 1992).

Displacement: A forced removal of a person from his or her home or country, often due to armed conflict or natural disasters.

Environmental migrants: While no internationally accepted definition for persons moving for environmental reasons exists to date, IOM put forward a working definition of "environmental migrant" in an attempt to capture the complexity of the issue. It was presented to IOM's membership at 94th Council Session, it appears in the IOM World Migration Report 2008 and various other publications but it does not provide any legal dimension. "Environmental migrants are persons or groups of persons who, for reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to have to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their territory or abroad.

Evacuee: A person who has been removed from a dangerous place; a person who has been evacuated (Merriam-Webster).

Global Environmental Change (GEC): includes changes in the physical and biogeochemical environment, either caused naturally or influenced by human activities such as deforestation, fossil fuel consumption, urbanisation, land reclamation, agricultural intensification, freshwater extraction, fisheries over-exploitation and waste production (Global Environmental Change and Food Systems (GECAFS) http://www.gecafs.org/about/index.html).

Internally-Displaced People (IDP): Persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized state border (Guiding Principles on Internal Displacement).

Migration: The movement of a person or a group of persons, either across an international border or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification.

Refugee: A person who owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country of his nationality, and is unable to or, owing to such fear, is unwilling to avail himself of the protection of that country (The United Nations Convention Relating to the Status of Refugees of 1951 Article 1A). Note: The concept of refugee was expanded by regional conventions in Africa and Latin America to include persons who had fled war or other violence in their home country.

Relocation: A process whereby a community's housing, assets, and public infrastructure are rebuilt in another location. Relocation is sometimes perceived to be the best option after a disaster for one or more of the following reasons: (1) people have already been displaced by the disaster; (2) their current location is judged to be uninhabitable; or (3) relocation is considered to be the best option to reduce vulnerability to the risk of future disasters. In fact, relocation may be appropriate when the disaster is the result of site-specific vulnerabilities. Relocation can be planned in areas that are expected to become uninhabitable to avoid a crisis situation and to ensure sustainability" (Global Facility for Disaster Reduction and Recovery 2011 http://www.gfdrr.org/gfdrr/).

Resettlement: The relocation and integration of people (refugees, internally-displaced persons, etc.) into another geographical area and environment, usually in a third country. In the refugee context, the transfer of refugees from the country in which they have sought refuge to another State that has agreed to admit them. The refugees will usually be granted asylum or some other form of long-term resident rights and, in many cases, will have the opportunity to become naturalized.

Source: Unless otherwise cited, *IOM Glossary on Migration,* 2nd Ed., IOM 2011.

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A political scientist by training, he was first educated at the University of Liège (Belgium) and holds a joint PhD from Sciences Po and the University of Liège, as well as a Master of Research in Political Science from the London School of Economics and a Master of Sciences in Environmental Studies from the University of Louvain.

Pauline Brücker, IDDRI

Pauline Brücker is Migration research fellow at the Institute for Sustainable Development and International Relations (IDDRI). Her PhD research will question the impact of environmental changes, especially drought and desertification, on migration patterns in the Middle East and the Horn of Africa.

Her current research focuses on: the linkages between environment and migration, in the Middle East and the Horn of Africa; the normative protection gaps of environmentally displaced persons; and the correlation between human rights and disasters. She also researches on migration governances' gaps at large, on the externalization of migration control and the management of mixed migration flows. She pursued field researches on environmental migration related policy and legal challenges in Bangladesh.

Graduated from a Master of International Public Management at Paris School of International Affairs of Sciences Po Paris, she specialized in Public International law and Transitional Justice related to migration and refugee issues, especially in the Middle East. She has extensive experience with internal and protracted displacement situation in the region.

Dina Ionesco, International Organization for Migration

Dina Ionesco is Migration policy officer for the International Organization for Migration (IOM) in Geneva (Switzerland). She is responsible for the «Migration, Environment and Climate Change» portfolio. Dina joined IOM in 2004 to work on migration and development, particularly on policies towards diaspora. As a researcher she has developed many projects and training as well as coordinated and written several publications by the IOM. Dina was also administrator for the Organization for Economic Cooperation and Development (OECD) from 1998 to 2004, on issues of local development, entrepreneurship, employment and gender. She also worked for an organization for the defense of human rights, as teaching assistant and as an independent consultant. Dina was trained in political science, international relations and economics at the Institut d'études politiques in Paris (France), at Sussex University and the London School of Economics (United Kingdom).

CONTRIBUTORS

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Mehdi Achour is a recent graduate currently in International Affairs-Environment, Sustainable Development and Risks Management at the Paris School of International Affairs (PSIA, Sciences Po Paris). After studying French literature, history and geography in a preparatory class, then sociology and political sciences (MA of International Relations and Public Affairs at Lille 2), he did a research paper on "Environmental journalists". Eager to promote green topics and sustainable development, he got involved in the PowerShift European Movement. In 2011 he took part to the COP Rewind simulation of negotiations in the NGOs delegation and has contributed to create the CliMates Research Network, a student association aiming at promoting young involvement for research on climate change. His internship at the French Ministry of Ecology led him to specialize on the concertation and risk management topics.

Mónica Colunga

Mónica Colunga is an Alice Freeman Palmer Fellow and a candidate of the Master's in Development Practice from the Paris School of International Affairs (PSIA, Sciences Po Paris). She is currently pursuing concentrations in Energy and Environment. Her main areas of interest are education, food security, and environmental migration. She received her Bachelor's degree from Wellesley College (United States), where she graduated with majors in Political Science and French.

She has had diverse experiences in the public and private sectors in the United States and Latin America including serving as the assistant to the national coordinator of the Code of Conduct project in Costa Rica. She is currently managing a randomized controlled trial (RCT) to study the determinants of low continuation rates to high school among indigenous communities in Chiapas, in her native Mexico.

Clara Crimella

Clara Crimella holds a Bachelor's degree in Political Philosophy at La Sapienza University of Rome (Italy) and a Professional Master's degree on International Security at the Paris School of International Affairs (PSIA, Sciences Po Paris). She is specialized in Migration Studies and European Studies. She has worked on a research project focusing on the impact of women immigrants on the total fertility rate of receiving countries and gained further experience on gender issues working at FAO as a gender mainstreaming stock-taking intern.

Her interest lies mainly in international migration and gender issues; she hopes to enhance her expertise in these fields through further studies and professional experiences in research institutions, NGOs and international organizations.

Claire-Sophie Dagnan

After working for a French public radio station (France Inter), Claire-Sophie Dagnan spent one year filming a documentary between São Paulo and Tokyo, about the Japanese-Brazilian migrants, including those who experienced the disasters of March 2011 in Japan.

She is pursuing her Master's on International Public Management at the Paris School of International Affairs (PSIA, Sciences Po Paris), specialized in migration and the Asian region. While studying, she volunteers for an association providing French classes to foreign adult workers. Currently, she is working as an intern for the microfinance non-governmental organization PlaNet Finance in Brazil, on an agricultural 'value chain' project for the Surui tribe in Amazonia. She considers of particular interest the position of developing countries regarding the environment, especially Brazil.

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Nadja Jelenkovic is a Hong Kong student attending first year Master's program in human rights and humanitarian actions at the Paris School of International Affairs (PSIA, Sciences Po Paris). She holds a Bachelor's degree from the Chinese University of Hong Kong and has completed a year of academic exchange in Northern France. She is interested in environment and human rights issues and is exploring the link between the two. She believes these issues to be the biggest challenge to the fast-rising China.

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Nina Lacan is a French student, currently in the first year of her Masters' degree on International Development at the Paris School of International Affairs (PSIA, Sciences Po Paris), with a specialization on international migrations. She holds a Bachelor's degree in

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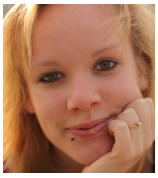
His interests include international politics, human rights, sustainable development and humanitarianism. Additionally, he is particularly interested in the government and politics of Thailand and the wider Southeast Asian region. In the future, Patrick would like to work in the fields of development and humanitarianism.

Martin Quencez

Martin Quencez is a French Master's graduate in International Security at the Paris School of International Affairs (PSIA, Sciences Po Paris). He obtained his Bachelor's degree at Sciences Po Paris, and after studying International Relations at Uppsala University (Sweden), he has specialized in contemporary Asian politics and the use of force in the 21st century. He gained experience working on the topic of New Forms of Migrations with Prof. Catherine Wihtol de Wenden (CERI, Sciences Po) and published an article on the issue. He also worked at the Institute for Defence Studies and Analysis (IDSA) in New Delhi (India). His work at IDSA dealt with French and Indian strategic cultures, as well as diverse issues of South Asian geopolitics.

Tatiana Rinke



As a French-German student holding a Bachelor's degree from the French-German campus of Sciences Po in Nancy, Tatiana Rinke is currently pursuing her Master›s degree in Environmental Policy at the Paris School of International Affairs (PSIA, Sciences Po Paris). She has had diverse professional experience in European public institutions, NGOs active in Africa and international organizations such as the IOM, in offices based in Latin America. She would like to pursue a career in international organizations focusing especially on migration and climate change. She is particularly interested in the challenges Latin America is facing in this matter.

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Maria Fernanda Rivera Flores is a Mexican student with a Bachelor's degree in Politics and Public Administration at El Colegio de México. She studied her semester abroad at the Paris School of International Affairs (PSIA, Sciences Po Paris). She is interested in topics related to urbanism, sustainability, social mobility and environment. She is part of an organization called Walk the City, that encourages the implementation of a better urban design in Mexico City. Concerned in these issues, she would like to pursue a Master's degree related to urban planning or environmental change policies.

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Joshua Vermette is a Master's of Public Policy student at the University of Michigan's Gerald R. Ford School of Public Policy. His interests relate to international economic development, particularly as it relates to migration and environmental policy. He has prior experience working in the field of refugee resettlement in the United States as well as working as a writer and editor in the private sector. Joshua is currently the Co-Editor-In-Chief of the University of Michigan's Journal of Public Affairs. He holds a B.A. in Political Science and Psychology from Syracuse University. Joshua copy-edited and proofread the different chapters of the *State of Environmental Migration 2011*.

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Sara Vigil is a political scientist specialized in international relations (University of Madrid, Spain). She also holds a Master 2 of Research in European Construction and Social Sciences at the University Paris Descartes Sorbonne where she did her thesis on environmentally-induced migration. Her main interests include climate change, displacement and the impact of agro-industrial systems on the environment and on human mobility. She is currently working as a scientific assistant for two research programmes: "Democracy in front of environmental stakes" (ANR) and "Territories, environment and citizenship in Europe" (CNRS) at Paris Descartes Sorbonne. She hopes to enhance her experience in these fields through further scientific research in academia and work in IGOs or NGOs in France or abroad.

The State of Environmental Migration 2011

Edited by
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Pauline Brücker (IDDRI)
Dina Ionesco (IOM)

This volume is the second of an annual series, which aims to provide the reader with regularly-updated assessments on the changing nature and dynamics of environmental migration throughout the world. The idea for it stemmed from the course "Environment and Migration", taught at the Paris School of International Affairs (PSIA) of Sciences Po. The course, which is thought to be the first of its kind in the world, examines the complex relationship between environmental change and migration flows. The best of these papers have been selected and edited, and are presented in this volume. Most of them constitute the first detailed analyses of the migration flows that were induced by some of the most dramatic events of 2011, paving the way for future scholarly works.

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