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# MASTERARBEIT

Titel der Masterarbeit

„Climate Change and Migration.  
The Impact of Climate Change on Migration and Conflict.  
– A Study on the Complex and Crucial Social Consequences of Climate Change.“

Verfasserin

Linda Wagner

angestrebter akademischer Grad

Master (MA)

Wien, 2014

Studienkennzahl lt. Studienblatt:

A 067 805

Studienrichtung lt. Studienblatt:

Individuelles Masterstudium:  
Global Studies – a European Perspective

Betreuerin / Betreuer:

ao. Univ.-Prof. Mag. Dr. Karl Husa

UNIVERSITÄT LEIPZIG



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## MASTERARBEIT / MASTER THESIS

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## ACKNOWLEDGMENTS

*Dear Pat,*

*You came upon me carving some kind of little figure out of wood and you said, “Why don’t you make something for me?”*

*I asked you what you wanted, and you said, “A box.”*

*“What for?”*

*“To put things in.”*

*“What kind of things?”*

*“Whatever you have,” you said.*

*Well, here’s your box. Nearly everything I have is in it, and it is not full. Pain and excitement are in it, and feeling good or bad and evil thoughts and good thoughts – the pleasure of design and some despair and the indescribable joy of creation.*

*And on top of these are all the gratitude and love I have for you.*

*And still the box is not full.*

*JOHN*

[East of Eden, by John Steinbeck]

I am indebted to the following people for putting up with me during the last year or so while I indulged in this madness: my mom and dad, Johann, Katharina, Franka, Leopold Kögler, Bettina, Alex and Chris.

Thank you for all that you have done for me. Your selfless time and care, your continuous support, your extraordinary patience and never ending motivation were sometimes all that kept me going. You rock. That is all.

Also a big thank you to Professor Karl Husa for supervising this thesis, Sandra Barthel for a lot of helpful literature hints and WFP Berlin for giving me more than just one inspirational place to think and write.

*“All across the world, in every kind of environment and region known to man, increasingly dangerous weather patterns and devastating storms are abruptly putting an end to the long-running debate over whether or not climate change is real. Not only is it real, it's here, and its effects are giving rise to a frighteningly new global phenomenon: the man-made natural disaster.”*

Barack Obama, April 3, 2006



Though the effects of climate and environmental change are somewhat intangible, we are becoming increasingly aware that they have serious and irreparable consequences on humanity. Migration as a demographic process is only one of those consequences, however, it is an issue that needs to be addressed with greater urgency and receive more attention from the region's decision makers. In this regard, this paper offers a synthesis of the work that has been done on the relationship between migration and climate change, with the hope that the synthesis can provide a foundation for future endeavors in this area.

## **ABSTRACT**

Despite a small number of critics continuing to deny that climate change exists or that humans are causing it, irrefutable evidence from around the world, including extreme weather events, all point to the fact that climate change is happening now and could pose serious challenges in terms of its effects on development and livelihoods, settlement options, food production and disease. These events and processes have also been predicted to have a potential impact on regional and international migration, whether forced or voluntary. Therefore, the topic has attracted considerable attention in recent years – among academics, but also in media coverage and on the political agenda – yet it still deserves more attention from international organizations, government representatives and climate and migration experts, especially as it may have an effect on existing or arising conflicts. Clearly, the relationship between climate change and migration is by no means straightforward. Climate change itself does not necessarily result in migration or displacement; instead, demographic, social, political or cultural factors such as poverty, rapid population growth, poor social welfare systems, poor governance, wars and violence and political persecution play a determining role in the decision to flee. Additionally, there is no reliable data on the number of people who already have been displaced as a result of the effects of climate change as there is still no internationally recognized definition for the phenomenon of environmentally-induced migration. Also, the question of how much migration might be stimulated by climate change in the future, let alone what might be the best policies responses to address these flows, remains largely unanswered.

In the spirit of promoting objective debate and improving the understanding of how grave the effects of this issue might be this paper offers a synthesis of the work that has been done on the relationship between migration and climate change. It starts with the attempt of defining environmentally-induced migration and the persons affected by it. Thereby the latter is of crucial importance with regard to the question of international obligation to protect or provide for such people. The paper then discusses the scope and scale of migration as a result of climate and environmental change, the role climate change plays in the context of migration and vulnerability and it also presents the case study of Mexico that in turn will enable to further strengthen the conceptual underpinnings and explain some of the nuances of the relationship between environmental, social, and human mobility factors. The final section summarizes the current debate concerning policy responses.

## **KURZBESCHREIBUNG**

Obwohl der Umfang und die langfristigen Auswirkungen von Klima- und Umweltveränderungen noch immer nicht genau geklärt sind und Klimawandel-Skeptiker versuchen, die Fakten zu relativieren, wird uns nach und nach bewusst, dass zunehmende Wetterextreme und der Einfluss des Klimawandels auf z.B. Gletscherschmelze, Meereseerwärmung, die Versalzung von Küstengebieten, etc. schwere und irreparable Folgen für die Menschheit haben könnten. In diesem Zusammenhang rückt auch der mögliche Einfluss auf regionale und internationale Wanderungsbewegungen, ob erzwungen oder freiwillig, in den Fokus. In der wissenschaftlichen Debattenkultur zwar immer noch stiefmütterlich behandelt, stellt Migration aufgrund von Umweltveränderungen und Klimawandel jedoch ein Problem dar, das mit größerer Dringlichkeit behandelt werden sollte und mehr Aufmerksamkeit von Seiten internationaler Organisationen, Regierungsvertretern sowie Klima- und Migrationsexperten verdient – auch oder vor allem vor dem Hintergrund, eines möglicherweise konfliktfördernden Einflusses des Klimawandels. Klar ist, Migration ist keineswegs monokausal; Migrationsentscheidungen sind immer komplexe Prozesse und Klimawandel kann in den seltensten Fällen als einziger Abwanderungsgrund gesehen werden. Meist spielen weitere gewichtige Ursachen demografischer, sozialer, politischer oder kultureller Natur, wie z.B. Armut, rasches Bevölkerungswachstum, schlechte soziale Sicherungssysteme, schlechte Regierungsführung, Kriege und Gewalt sowie politische Verfolgungen eine bestimmende Rolle in der Entscheidung zur Flucht. Zudem können nach wie vor keine verlässlichen Daten über die Zahl der klimabedingten Migranten erhoben werden, da es bisher keine international gültige Definition für das Phänomen der klimabedingten Migration bzw. für Klimamigranten gibt. Entsprechend unsicher ist der Grund, auf dem vor allem Mitigations- und Adaptionsmaßnahmen zum Umgang mit dem Phänomen gestaltet werden können.

Die vorliegende Arbeit soll nun eine Synthese der Versuche der Definition der klimabedingten Migration und der von ihr betroffenen Personen darstellen. Letzteres ist insofern von entscheidender Bedeutung, als die Kategorisierung als Migrant oder Flüchtling Folgen für die internationale Gemeinschaft hinsichtlich des Schutzes und der Gewährleistung der Rechte dieser Menschen hat. Darauf aufbauend wird sich eine Diskussion um den Umfang der weltweiten Migrationsbewegungen als Resultat des Klimawandels erstrecken. Insgesamt wird die Arbeit innerhalb der Vielzahl von Äußerungen zum Thema einen gewissen Grundbestand an mehr oder minder gesicherten Informationen identifizieren. Zudem werden kurz Instrumente diskutiert, die eine mögliche Handhabe bieten sollen, um aktuelle und

antizipierte Folgen dieser Migrationsbewegungen steuern zu können – mit dem Ziel, eine Grundlage für zukünftige Bemühungen in diesem Bereich zu schaffen.

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## **LIST OF ABBREVIATIONS**

CONAGUA	Comisión Nacional del Agua
FAO	Food and Agriculture Organization of the United Nations
GAIN	Global Adaption Institute
GHG	Greenhouse Gas
EACH-FOR	Environmental Change and Forced Migration Scenarios
EIA	U.S. Energy Information Administration
EU	European Union
IDMC	Internal Displacement Monitoring Centre
IDP	Internal Displaced Person
IFRC	International Federation of Red Cross and Red Crescent Societies
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
LDCs	Least Developed Countries
MDGs	Millennium Development Goals
NGO	Non-Governmental Organization
NRC	Norwegian Refugee Council
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
ODA	Official Development Assistance
PEMEX	Petróleos Mexicanos
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund

UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNISDR	United Nations International Strategy for Disaster Reduction
UNSC	United Nations Security Council
UNU- EHS	United Nations University – Institute for Environment and Human Security
U.S.	United States of America
USAID	United States Agency for International Development
USD	United States Dollar
WBGU	German Advisory Council on Global Change (Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen)
WFP	World Food Programme
WHO	World Health Organization

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## INTRODUCTION

*“We were farmers, but the rains have changed and our harvests are no longer reliable.*

*We had no way to feed our families, so we fled our village. If these problems with the weather and soil had not happened, we never would have left home. Now in the new place we migrated to, we are having the same problems. The desert is devouring our cropland and water is scarce. We will have to move again soon.*

*We have been forced to creep, bit by bit, in search of survival and our living.”<sup>1</sup>*

Massive population displacements triggered by extreme weather events constantly make headlines all around the world: The Asian tsunami at the end of 2004, Hurricane Katrina which flooded the city of New Orleans, Louisiana, in 2005, affecting millions of people and their assets, the 2007 floods in Burma and Bangladesh, the multiple hurricanes that struck Haiti in 2008, the 2010 devastating floods in Pakistan which, according to the government and United Nation’s (UN) estimates, affected more than twenty million people, the January 2011 floods and landslides in Rio de Janeiro, Brazil, or the large floods in early 2011 in eastern Australia which captured world attention as they inundated areas the size of France and Germany together, leaving many towns stranded for several weeks. Furthermore, as a new report by the Norwegian Refugee Council’s Internal Displacement Monitoring Centre says, another estimated 32.4 million people were forced to flee their homes during 2012 because of natural disasters – almost twice as many as in 2011. In northeast India and most of Nigeria massive floods displaced almost 13 million people collectively. In Pakistan well over a million people were displaced by floods for the third year running. In the Philippines, almost two million were left homeless by typhoons and floods. In Russia and Spain, floods and forest fires forced people out of their homes and in the U.S., Hurricane Sandy – the costliest tropical cyclone of the year – displaced more than 775,000 people; tens of thousands fled their homes to escape forest fires.<sup>2</sup> Not least, millions of people continue to need support to recover from the most severe food security crisis in Africa since the 1991/92 Somalia famine, according to the U.N. The major food crisis was already declared in 2011 due to a prolonged drought in the Horn of Africa. Malnutrition and death rates soared, hundreds of thousands of livestock died, harvests failed and food prices skyrocketed. As Oxfam International reported in July 2011,

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<sup>1</sup> Warner, Koko and UNU-EHS, “Environmental Change & Migration: The Evidence,” accessed July 8, 2011, <http://www.parliament.uk/documents/CPA/Conference%20Presentations/IPCCC3/1600%20Tues%2013%20July%20-%20Migration%20and%20Climate%20Change%20-%20Koko%20Warner.ppt>. (Interviews with migrants for an EACH-FOR project, 2007-2009.)

<sup>2</sup> Norwegian Refugee Council, “Global Estimates Report 2012: Highlights,” accessed May 20, 2013, [http://www.internal-displacement.org/8025708F004BE3B1/%28httpInfoFiles%29/7054BD160B92E264C1257B6A00397F72/\\$file/Highlights%20Global%20Estimates%20Report%202012.pdf](http://www.internal-displacement.org/8025708F004BE3B1/%28httpInfoFiles%29/7054BD160B92E264C1257B6A00397F72/$file/Highlights%20Global%20Estimates%20Report%202012.pdf).

across Ethiopia, Djibouti, Kenya, Somalia and Uganda, 13 million people were in dire need of life-saving assistance. – A disastrous situation which prompted the United Nations High Commissioner for Refugees, Antonio Guterres, to describe the crisis as the “worst humanitarian disaster so far”; a disaster that forced people to move and to risk losing their culture and sense of community. Nevertheless, the question of what role climate and environmental change actually plays in shaping decisions persists. Should migration due to climatic and environmental change be considered a growing crisis? In fact, there is no concrete evidence on how far the current conditions can be linked to climate change but beyond the debate on climate change’s role in the crisis in East Africa, one thing is clear: if nothing is done, climate change will continue to make an already bad situation worse. That is to say, Africa is already home to one-third of the 42 million people worldwide uprooted by ethnic slaughter, despots and war<sup>3</sup> but climate change could be quietly driving Africa’s displacement crisis to new heights. Moreover, as extreme weather events continue to grow more frequent and intense, they have great potential for generating processes that may uproot large numbers of people not only in Africa but in rich and poor countries alike. A number of scholars, multilateral agencies, and nongovernmental organizations even predict that these events will trigger waves of mass migration and thereby redraw the world maps of population. Estimates suggest that between 25 million to one billion people could be displaced by climate change over the next 40 years.<sup>4</sup> Norman Myers, an Oxford University professor and one of the first scholars to draw attention to the unfolding problem, took the middle road and estimated that there could be up to 200 million migrants attributable to climate change in the future which will replace war and persecution as the leading cause of global displacement.<sup>5</sup> Estimates that are also supported by the International Organization for Migration – the world’s leading migration agency – and other experts such as the economist Sir Nicholas Stern in his 2006 report on the economics of climate change commissioned by the UK government.<sup>6</sup> It is indeed an alarming prediction, yet, a serious global discussion about migration due to environmental changes has barely begun. A fact that is partly due to the complexity of both migration and environment. The vast body of literature on migration

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<sup>3</sup> Sanders, Edmund, “Changing Climate, changing lives. Fleeing drought in the Horn of Africa.” *LA Times*, October 25, 2009, accessed August 7, 2011, <http://articles.latimes.com/2009/oct/25/world/fg-climate-refugees25>.

<sup>4</sup> Christian Aid, *Human tide: The real migration crisis* (London: Christian Aid, 2007), 1.

<sup>5</sup> Myers, Norman, “Environmental refugees: A growing phenomenon of the 21st century,”

Phil. Trans. R. Soc. Lond. B 357 (2001): 609, accessed June 18, 2011, doi: 10.1098/rstb.2001.0953;

Myers, Norman, “Environmental refugees: An emergent security issue” (paper presented at the 13th Economic Forum, Prague, May 23-27, 2005).

<sup>6</sup> Nicholas Stern et al., *The Stern Review of the Economics of Climate Change* (Cambridge: University Press, 2006), 56.

already indicates that migration is an extremely complex issue with interpretations from different disciplinary perspectives. Earlier analyses of migration were rooted in economic theory, others, like the Marxist interpretation focus on how wider structures have perpetuated the exploitation of migrants by capitalists and intermediaries. However, recent research goes beyond structuralist and neoclassical economics interpretations. Migration – both temporary and permanent, internal and international – is gaining acceptance as an integral part to people’s coping, survival and livelihood strategies for dealing with environmental change. Moreover, as migration, forced or otherwise, is gaining acceptance as one of the most crucial consequences of environmental degradation and climate change, it also becomes evident how important it is to translate current knowledge about these social consequences into humanitarian policies and practices by building on and developing substantive partnerships among all stakeholders. In fact, we cannot totally reverse trends but we need to urgently prepare for the human consequences of climate change as a paper written by an interdisciplinary team at Columbia University’s Earth Institute for an issue of the leading scientific journal *Nature* and very recent articles in the online issues of *The Guardian*, *The Huffington Post*, *The Independent*, German newspaper *Der Spiegel* reflect. De facto, these reports make the case for destabilization and conflict caused by cyclical climatic changes. Thereby studies do not blame specific wars on climate phenomena such as El Niño, nor do they directly address the issue of long-term climate change. But analyses raise potent questions on how extreme weather events can appear to tip already less developed countries into chaos more easily and act as an accelerant of instability or conflict, placing a burden to respond on civilian institutions and militaries around the world. Nevertheless, the question remains of how exactly overall climate change might play out. A question we will probably never find an exact answer for, yet, what we can do, is make a contribution to improving the understanding of the effects of climate change on human migration so that environmental migration processes already under way as well as future migration flows due to these processes can be better managed and humanity to those people sorely in need of it can be restored.

### **Hypotheses & Research Question**

Throughout the millennia people have moved during periods of changes in their environment. For nomadic ethnicities and pastoralists, for example, such movement is part of their livelihood. They traditionally move from one area to another in search of pasture and in search of water for their livestock. However, with increasing frequency and severity of natural

disasters, people have been forced to migrate. A fact the international community has begun to slowly recognize only in the last 20 years or so. Most scientists agree that global warming affects ecological systems, but there is less certainty about the wider linkages and implications that a changing climate and environment has on human mobility. In fact, we are faced with one issue, but two different scenarios. Over the past years there has been little consensus among researchers about the relationship between climate change, the environment, and migration. As Suhrke (1993) points out, the research literature has tended to fall into two broad categories: the minimalists and the maximalists.<sup>7</sup> The minimalists generally see climate and environmental change only as a contextual variable in migration decisions whereas the later argue that environmental degradation has already forced millions of people to flee from their home regions. In other words, the prospect that increasing floods, droughts and storms could prompt many millions of people to migrate to safer areas is still highly controversial. Some recent reports on environmental migration even say that climate change is not expected to lead to mass migration at all wherefore fears of unprecedented migration flows caused by climate change are misplaced. But why the confused picture? Is it really confusion of conclusions or of terminologies? Clearly, seen in a nutshell, the effects of climate change on migration flows remain difficult to assess. Part of the problem between minimalists and maximalists derives from the above mentioned complex setting in which environmental and migration processes occur. That is to say, the linkages between environmental changes and mobility cannot be explained through a linear, deterministic relationship. Plus, the relatively high levels of uncertainty about the specific effects of climate change, the increasingly complex interplay of social, economic, political, cultural and psychological factors in the environment and the lack of comprehensive data on migration flows, especially movements within national boundaries and in particular for low-income countries that are likely to be most affected by climate change have shown that responses to environmental changes vary according to a wide set of factors and are context-specific. This makes it difficult – if not impossible – to design a general predictive model of climate-induced displacement. Nonetheless, despite the problems mentioned above, most scientists assume that parts of the earth are becoming less habitable due to climate change. According to joint reports by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and the Internal Displacement Monitoring Centre (IDMC), the number of natural

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<sup>7</sup> International Organization for Migration, *Migration, Environment and Climate Change: Assessing the Evidence* (Geneva: International Organization for Migration, 2009), 14; See also: Suhrke, Astri, “Pressure Points: Environmental Degradation, Migration and Conflict” (paper prepared for the workshop on “Environmental Change, Population Displacement, and Acute Conflict,” Ottawa, 1993), 4.

disasters has more than doubled over the last two decades, and more than 20 million people were displaced by sudden-onset climate-related natural disasters in 2008. In fact, environmental migration could become a growing crisis in the near future, which in turn will have consequences not only for the people who move, but also for the places of travel and destination. That is to say, despite the claims of some authors that there is no linear relationship between climate change, environmental degradation and migration, we can try to identify certain cases where changes in the environment play an important role as a contributor to population movements. On this basis, a series of questions derived which became the starting point of this work: What triggers people to move? When and where will they move? Can we already identify especially vulnerable populations or regions? What is the weight of environmental changes among the other contributing factors mentioned above? What will be the consequences of migration for the people who move, for those left behind and for the places of destination? Generally speaking, how will climate shifts affect migration trends and human security? – Questions which, assuming the complexity of the migration-environment-nexus, the varying estimates of the likely number of people on the move, but also the problem of terminology and definitional issues I will present in the following, are difficult to answer. Yet, up to now, research on these questions has been advancing well. There are many studies, and even more underway, to capture the impact of climate change on human migration so that some time in the near future we can stay ahead of it.

### **Research Objectives and Methods**

The knowledge gap presented above guides the overall goal of this master thesis: to make a contribution to developing a better understanding of the magnitude and implications of climate change on human migration. The idea behind this goal is that by improving the understanding, a first step can be made in estimating how grave the effects of this issue might be and ultimately helping communities at risk, governments, international humanitarian organizations and civil society worldwide addressing the processes studied. The paper does this by taking stock of the existing evidence on the effects of climate change and environmental degradation on migration. In other words, this work is primarily based on literature research – including the fields of geography, global environmental change, refugee studies, migration studies, studies of internal displacement and natural hazards research – and thereby pursues two main objectives. First, it aims to look into the complex topic of environmental migration by identifying key research themes, concepts and frameworks needed for more accurate data collection. Second, the paper will present the case study of

Mexico that should enable to further strengthen the conceptual underpinnings and explain some of the nuances of the relationship between environmental, social, and human mobility factors. Hence, the structure of this thesis is as follows: Chapter one will provide the theoretical background for this project by outlining the conceptual and research framework for environment and migration and shedding light on the debate and the evidence, taking into account that the nexus between climate change, environmental degradation, and migration in contemporary society has not been explored empirically in a way that generates conclusive results. Chapter two is then aimed to give a rather short insight into already existing patterns of population displacements due to climate change and environmental degradation and the consequences it has. As we will see, not all consequences of environmentally-induced migration are negative; however, the main impacts of displacement by climate change and environmental degradation, such as escalating humanitarian crises, rapid urbanization and potential resulting slum growth, or stalled development are overwhelmingly crucial. Further, chapter three will investigate Mexico as a possible case study to the problem this paper describes. Migration is already a reaction in Mexico to the 1980s agricultural crisis and economic liberalization. Especially since NAFTA lowered trade and investment barriers between Canada, Mexico, and the United States, the Mexico-U.S. migration has accelerated significantly. In fact, Mexico has a long tradition of emigration wherefore it is often cited in migration research. Yet, by examining the impact of environmental change on Mexican migration processes, this thesis touches an aspect which has been largely unexamined; Whilst Mexican migratory movements in general and Mexico-U.S. migration in particular have already been extensively discussed, changing environmental conditions as an additional factor to set Mexican people on the move has been widely neglected in scientific research. Therefore, this paper seeks to highlight the topic of seasonal or circular migration in Mexico as well as longer distance international migration to the United States as a component in the discourse of environmentally induced migration. Finally, chapter four will discuss climate change as a potential issue for human security. As I already stated in the introduction to this work, a number of reports recently published refer to cyclical climatic changes as enhancing the risk of civil wars. Whether this holds validity or not remains to be proven. De facto the history of migration is also a history of new forms of coexistence, of integration and assimilation and, more importantly, of non-violent relations. Thus, at first glance, there seem to be only few reasons to discuss an acute conflict potential of environmentally related population movements. However, evidence also points towards environmentally induced migration as becoming one of the major challenges of our century, with a predictable risk that

the scale of the problem will soon overwhelm existing capacities and financial resources. Given this, the paper will debate whether migration due to climatic changes and changes in the environment can have a radicalizing effect and therefore be critical for human security. As a last part, chapter five will examine policy responses, national actions and international cooperation to date which have been primarily focused on definitional issues, adaptation plans and resettlement. So far we can constitute a tendency to frame policy challenges in fairly negative terms with media reports of mass exoduses or even civil war as a consequence of the millions of people uprooted due to environmental degradation. A fact that creates more fear and provides little foundation for effective responses to the problem we are faced with. Consequently, as this paper will show, we need more empirical research, more nuanced case studies and a long-term policy framework that promotes dialogue among all stakeholders, expanded livelihood opportunities as well as adaptation strategies to meet the challenges ahead. In sum, the reasons for my interest in the topic of climate change and migration are the following: the changing climate could trigger large scale migrations which in turn could (i) cause incalculable suffering among the migrants; as well as (ii) exert great pressures on receiving societies; and (iii) even induce severe conflicts. Reasons worthwhile to raise more awareness of this crucial issue.

## **1. THEORETICAL FRAMEWORK: CONTEXTUALIZING THE MIGRATION AND CLIMATE CHANGE DEBATE**

The first chapter of this work elaborates a theoretical framework based on a debate that started almost four decades ago when the term ‘environmental refugee’ was first popularized by Lester Brown of Worldwatch Institute, the first research center devoted to the analysis of global environmental issues. Since then, theoretical reflections about the interplay between climate change, the environment and migration started to emerge as an issue of global importance and thereby attracted attention from policy-makers, researchers and news services declaring the rapidly increasing number of incidents that force people to leave their homes due to environmental problems. But that the link between environmental phenomena and migration is much more complex than many former publications about the likely number of people concerned suggest has only been noted very recently. As indicated above, the topic covers several disciplines and as such could be approached from a variety of angles. Consequently, this chapter as well as chapter two of this paper will take into account several considerations already touched on in the introductory section of this work, namely the

multiple ways in which climatic and environmental changes interact with migration flows as well as the multiplicity of social, economic and cultural dimensions within which those interactions take place. As a result, the following chapters should not be considered as a traditional climate impact assessment but instead, the focus is set on understanding and analyzing the links and processes between climate and human actions in a more general perspective in order to offer a more differentiated understanding of environmentally-induced migration.

### **1.1 Background to the Problem: The Influence of Climate Change on Migration**

The discussions dealing with the relations between environmental phenomena and human migration have been occupying the minds of environmentalists as well as scholars and advocacy groups concerned with refugees and migration since the middle of the 1980s, at latest, when a group of scientists such as Essam El-Hinnawi (1985), Norman Myers and Jennifer Kent (1995) or Steve Lonergan (1998)<sup>8</sup> concluded that in coming decades, the mass amount of people on the move due to climatic and environmental changes – natural or man-made, or a combination of both – will likely be staggering and surpass any historical antecedent.<sup>9</sup> – Estimates that, on the other hand, have been challenged by many scholars, e.g. McGregor (1994), Suhrke (1994), Kibreab (1997) or Black (2001),<sup>10</sup> not only because the precise number of people displaced is eluding science from time to time but also because figures of people who are predicted to become displaced, are based on estimates of numbers of inhabitants of certain regions where reliable population statistics rarely exist. However, considering that the expression of a link between climate change, the environment, and migration has entailed considerable coverage in newspaper and magazine articles as well as in policy papers of different NGOs, it becomes apparent that migration due to climatic and environmental changes is on the way to becoming one of the most pressing issues faced by the international community today. Of course this phenomenon is not new: human migration is an integral part of history and culture of many world nations for centuries and has helped humans to cope with profound climatic changes ever since. What appears to be different this time is the role of humans in contributing to the change;<sup>11</sup> the burning of coal, oil, and natural gas, as well as deforestation and various agricultural and industrial practices, are altering the

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<sup>8</sup> UNU-EHS, *Linking Environmental Change, Migration & Social Vulnerability*. (Bonn: UNU-EHS, 2009), 12.

<sup>9</sup> Warner et al., “In Search of Shelter: Mapping the Effects of Climate Change on Human Migration and Displacement.” (Care International, 2009), 1.

<sup>10</sup> UNU-EHS, *Linking Environmental Change, Migration & Social Vulnerability*, 12.

<sup>11</sup> Stal, Marc and Koko Warner et al., *The Way Forward. Researching the Environment and Migration Nexus*. (UNU-EHS, 2009), 3.

composition of the atmosphere and contributing to climate change, as the leading scientific forum for climate analysis, the Intergovernmental Panel on Climate Change (IPCC), concluded in its Fourth Assessment Report in 2007.<sup>12</sup>

“Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture.”<sup>13</sup>

Overall this report finds that it is *more likely* than not that human influence is one of the major causes of recent climate change. As scientific evidence shows, there is a trend towards increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level. Man-made environmental degradation – which includes everything from fuel emissions to deforestation – is accelerating this trend.<sup>14</sup> As a result, both natural and man-made environmental changes and degradation can heighten pressure on land, food, and water resources. In turn, these pressures can contribute to existing problems, including food insecurity, malnutrition, poverty, the spread of diseases, rapid urbanization, and political instability and as a result trigger forced migration especially in places like Bangladesh or Sub-Saharan Africa where demographers expect further population growth in the near future. That is to say, climatic changes will more and more affect how and where people live, and whether they can continue living in their traditional homelands. Currently, people in developing nations and countries in economic transition are the most vulnerable to climate stress and are bearing some of the worst effects of it: Millions live in dangerous places and most of them will not have the opportunity of relocating within their own country. Already suffering from high poverty rates, resource inequality, population growth, institutional constraints and economic insufficiency, people in so called Least Developed Countries (LDCs) are expected to face further shortages of water and food and greater risks to health and life as a result of climate change. For example, in some countries, yields from rain-fed agriculture could fall by 50 percent by 2020, says the world’s largest humanitarian agency the World Food Programme (WFP), risking hunger and malnutrition across the world with a disproportionate impact on vulnerable communities in the countries mentioned above. At the same time countries to be the most affected by climatic and environmental changes are almost

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<sup>12</sup> IPCC, *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. (Cambridge: Cambridge University Press, 2007).

<sup>13</sup> IPCC, Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. (Cambridge: Cambridge University Press, 2007), 2.

<sup>14</sup> IPCC, *Climate Change 2007: Synthesis Report*. (Cambridge: Cambridge University Press, 2007), 30.

solely responsible for the deterioration of the environment. As Stern (2006) highlighted: “The poorest developing countries will be hit earliest and hardest by climate change, even though they have contributed little to causing the problem. Their low incomes make it difficult to finance adaptation.”<sup>15</sup> Until recently, the international community had even largely ignored the problem of climate change and displacement, thinking that a significant reduction in greenhouse gas emissions would reduce the need for adaptation to the effects of climate change. However, extreme weather events have proved us wrong. That is to say, if environmental factors lead to migratory flows this would be a powerful reason for the international community to finally take action and foster a new and stronger sense of solidarity. – “Climate change reminds us of how everything is connected. The world may be divided and people categorized in many ways but we all share and are part of the same earth.”<sup>16</sup> Nevertheless, despite the fact that there is growing consensus of the linkages of climate and environmental change and migration and a broad scientific agreement on the importance of unifying these issues at all levels of policy dialogue and cooperation, we are still at the beginning of a challenging undertaking. In other words: we are in a desperate need of a better understanding of the size and characteristics of this issue. One of the challenges we are facing is that the use of climate information by various actors produces different data and information. While humanitarian actors (e.g. the World Food Programme) focus on the current situation, climate scientists are more interested in the future impacts of climate change. These different positions pose a major challenge for researching the influence of climate and environmental change on migration and make it difficult to meet the operational challenges of this nexus. The uncertainty and lack of confidence in climate change prediction data to answer questions relating to the likely scale and pattern of movement does add on to the challenges. These challenges then lead to the most unwieldy one, that of complexity resulting from non-linear, and therefore hard to pin down relationships. Briefly said, “Climate change, on its own, does not directly displace people or cause them to move but it produces environmental effects and exacerbates current vulnerabilities that make it difficult for people to survive where they are.”<sup>17</sup> So to say, climate *per se* is seldom found to be the primary driver of migration, but rather the decision to migrate or not is taken within a wide range of ethnic conditions, social, cultural, psychological and economic contexts, including financial capital, and conditions at home, as well as in the potential destination. That means climate and environmental change does not figure as a separate, singular variable in a person’s decision to migrate. For instance,

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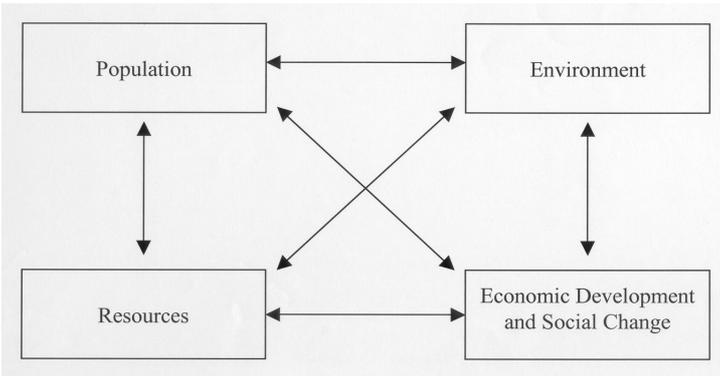
<sup>15</sup> Stern et al., *The Stern Review of the Economics of Climate Change*, Executive Summary.

<sup>16</sup> Kolmannskog, Vikram Odedra, “No Regrets,” *Forced Migration Review* 31 (2008): 46.

<sup>17</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 14.

as the eminent demographer Graeme Hugo concludes after observing migration in Indonesia: “Employment-related motives predominate in shaping how many people move, who moves, where they move from and where they move to.”<sup>18</sup> In fact, except in the case of extreme environmental events (such as hurricanes, tsunamis, tornados, etc.) which immediately displace those affected, it is nearly impossible to segregate environmental factors from other variables, such as poverty or demographics, in the decision to migrate. Especially when it comes to gradual changes in the environment, such as sea-level rise, desertification, costal and soil erosion or glacial melting, a population’s ability to cope with and adapt to the changes relies, in great part, on the financial and human resources available, as well as in the strength of government institutions to tackle these issues.<sup>19</sup> Thus, migration because of climatic or environmental change needs to be analyzed in the context of vulnerability and adaptability – characteristics I come to talk about in the following. As a result, the derivation of a simplistic relationship between climate change, the environment and migration can be considered somewhat wishful thinking, but instead it is of fundamental importance to recognize the multi-causal nature of migration – due to the combination of various “push” (factors related to the region or country of origin) and “pull” factors (factors related to the country of destination)<sup>20</sup> – and therefore to be aware of the fact that environmental change is an important concern for migration in many regions or countries, but again, as the highly simplified Figure 1 by Graeme Hugo, Professor of Geography at the University of Adelaide, shows, usually not the only reason why people migrate.

Figure 1 A Complex Interrelationship: Migration, Environment, Resources and Development



Source: Hugo, Graeme, “Migration, Development, and Environment” (draft paper for research workshop on Migration and the Environment: Developing a Global Research Agenda, Munich, Germany, April 16-18, 2008).

<sup>18</sup> Hugo, Graeme, “Population Movements in Indonesia” (paper presented at the International Conference on Migration, National University of Singapore, 1991).  
<sup>19</sup> “Migration Information Source,” last modified March 2010, <http://www.migrationinformation.org/feature/display.cfm?ID=773>.  
<sup>20</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 48.

Looking at the complexity of possible interactions in the relationship between environmental processes and migration in turn raises a number of questions: What role will mediating factors such as economic development and existing social, demographic and political contexts play in the relationship between climate change and population mobility? Could the effects of climate change be significant enough to cause migration directly, or at what level will climate change become the most important of several migration “push” factors? Additionally, we should ask if there is a direct relationship between the most critical climate-affected areas (so called ‘hot spots’ identified in Africa, especially in the Sahel region and the Horn of Africa, South-east Asia, Central America and the Western part of South America)<sup>21</sup> and increased migration, such that migration will necessarily be more significant in places where food and water scarcity already represents a major political, economic, and human rights issue? Moreover, will the possible increase in migration patterns due to changes in local and regional climatic conditions translate into more internal or to more international migration and what would be the implications of this dynamic? In particular, could the interrelation between environmental processes and migration threaten security interests and global stability caused by unmanaged migration? – Challenging social, political, and strategic questions to which we are still lacking the answers, however, at this point we can already draw a short conclusion: First, the chances of new or intensified migration patterns are likely to increase as environmental change can have significant impact on decision-making processes of potential migrants and therefore serve as an important “push” factor for migration. Second, environmental migration differs in scale, magnitude, and location depending on the social and economic conditions in which the community, households or individuals find themselves. So far we are dealing with contradictory findings due to the complex relationship between the environment and migration. For example, studies have shown that migration patterns

- increased with loss of harvest and livestock, but decreased following a severe earthquake in El Salvador;
- decreased in drought years in Burkina Faso and Mali;
- both increased and decreased with declining rainfall in Mexico.<sup>22</sup>

Consequently it is to state that we still know surprisingly little about the links between the environmental impacts of climate change and population mobility even though there is research and policy dialogue beginning to respond to this need and several organizations including the International Organization for Migration (IOM), the United Nations University

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<sup>21</sup> Jock Baker, Charles Ehrhart and David Stone, “Hotspots – predictions and action,” *Forced Migration Review* 31 (2008): 44.

<sup>22</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 72.

(UNU), the United Nations Commissioner for Refugees (UNHCR) and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) are already contributing scientific inquiry to the issue of climate change and migration. Third, the existing lack of data on the environment-migration nexus is undoubtedly due to the difficulty of operationalizing the phenomenon. In fact, there are several factors which make it difficult to measure current levels of environmental migration. As mentioned earlier, there are many estimates about the total number of people on the move due to climate variability and change, but these figures are often called into question as there is a lack of research capacity and reliable surveys especially in developing countries that are the most vulnerable to environmental changes. In addition, the ongoing debate over the terminology and an adequate definition to cover people affected by climate and environmental change, as well as the overall little consensus concerning this issue among researchers of separate fields over the years, are also presenting major challenges for statistic gathering. Nevertheless, in an attempt to gain some more clarity in this debate, the following sections will seek to find a way into current discussions about definitional issues as well as estimates & predictions concerning this topic.

## **1.2 Migration, Climate Change, and the Environment – Definitional Issues**

As it already became clear, links between climate change, the environment, and migration certainly appear to be an important theme, which has generated some heated debates among researchers, lawyers and policymakers of different fields. Apart from the terms and concepts used for the affected people one of the main problems is that **climate change** alone poses a daunting challenge. Even though there is widespread agreement that the changes now underway in the earth's climate system have no precedent in the history of human civilization<sup>23</sup>, there is still no scientific consensus about how the impacts of climate and environmental change are affecting humans. In most parts of the world, the effects of global climate change will be experienced through both changes in mean conditions over long timescales (such as temperature, sea-level, and annual precipitation), but also through increases in the frequency and intensity of heatwaves, fires, floods, droughts, storms and cyclones.<sup>24</sup> Outside of these short- and long-term changes, which are projected to occur with high levels of certainty, there also exist somewhat more unquantifiable risks which include

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<sup>23</sup> Michael E. Mann et al., *Northern Hemisphere Temperatures During the Past Millennium: Inferences, Uncertainties, and Limitations*. (Geophysical Research Letters, Vol. 26, Issue 6, 759–762, 15 March 1999); IPCC, *Climate Change 2007: Synthesis report. Contribution of Working Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. (Cambridge: Cambridge University Press, 2007); Stern et al., *The Stern Review of the Economics of Climate Change*, Executive Summary.

<sup>24</sup> Barnett, Jon and W. Neil Adger, *Climate change, human security and violent conflict*. (Political Geography 26, 639e 655, 2007).

permafrost and melting of glaciers. For example, glaciers in the Garhwal Himalaya in India are shrinking so fast that researchers believe that most central and eastern Himalayan glaciers could virtually disappear by 2035.<sup>25</sup> Although the IPCC already called the date inaccurate in 2010, saying that there is no real known date by which Himalayan glaciers are expected to disappear,<sup>26</sup> this publishing has drawn significant global attention because the glaciers provide water and power for roughly 1.5 billion people.<sup>27</sup> Moreover, there is also a great risk for glacial-lake outbursts for the Himalaya region. Of course, glacial-lake outbursts are no new phenomenon. They occur every time the natural dams of ice or accumulated rocky deposits that hold back glacial lakes give way because of seismic activity, erosion or simple water pressure. “But what is new is that the lakes are forming and growing much more quickly because the glaciers are melting faster than ever”<sup>28</sup> due to the Earth getting warmer – mostly because of the burning of fossil fuels and a resulting constant buildup in atmospheric concentrations of greenhouse gases (GHG).

Given the observations above, the warming of the climate is unequivocal. However, the cold start into spring 2013, for example, and the current suffering from one of the soggiest springs in memory with flooding that hit large parts of central Europe<sup>29</sup>, has made people in most of the Northern Hemisphere wonder if the climate is really changing. The key to making sense of what seems like contradictory evidence is to understand that just as the weather varies naturally, so too does climate. Even though the majority of scientists have no doubt that climate is warming, natural climate variability will always occur. In a nutshell, **climate change** occurs when long-term (long-term means at least many decades) weather patterns are altered, whether due to natural processes or human activity. Climate change is slow and gradual, and unlike a year-to-year variability is very difficult to perceive without scientific records.

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<sup>25</sup> Glick, Daniel, “Signs From Earth: The Big Thaw.” National Geographic, Global Climate Change, Melting Glaciers, accessed May 29, 2013, <http://environment.nationalgeographic.com/environment/global-warming/big-thaw/>.

<sup>26</sup> Walsh, Bryan, “Himalayan Melting: How a Climate Panel Got It Wrong.” TIME Magazine, January 21, 2010, accessed May 29, 2013, <http://www.time.com/time/health/article/0,8599,1955405,00.html>.

<sup>27</sup> Oskin, Becky, “Mount Everest’s Ice Is Melting.” Discovery News, May 15, 2013, accessed May 29, 2013, <http://news.discovery.com/earth/global-warming/mount-everest-glaciers-melting-130515.htm>.

<sup>28</sup> Perera, Amantha, “Fears Grow of a Himalayan Tsunami as Glaciers Melt.” TIME Magazine, May 27, 2013, accessed May 29, 2013, <http://world.time.com/2013/05/27/fears-grow-of-a-himalayan-tsunami-as-glaciers-melt/#ixzz2UgVtgdgz>.

<sup>29</sup> Annotation: Germany, the Czech Republic and Austria have been the worst affected so far, but there has also been high water in Slovakia, Hungary and Poland. According to estimates of Germany’s National Meteorological Service (DWD), May of 2013 brought 178 percent more rain in Germany than the year before.

In this paper, climate change is sometimes also interchangeably used with environmental change. **Environmental change**, according to WHO (2013) and UNESCO (2012), includes processes such as **climate change**, biodiversity loss, stratospheric ozone depletion, freshwater scarcity, land degradation, and stresses on food-producing systems. “Global environmental change is therefore a major contemporary driver of social transformation, and its effects are expected to grow through coming decades – possibly to the point of calling into question not just growth and prosperity but social inclusion and the realization of human rights. It thus gives rise to ethical challenges that need to be grasped within a framework of forward-looking critical thinking.”<sup>30</sup>

In academics, climate change is also used interchangeably with **global warming**, but strictly speaking, climate change is the more accurate phrase, not least because rising temperatures can cause a host of other climatic impacts, such as changes in rainfall patterns. On the other hand, **climate variability** is the way climate fluctuates yearly above or below a long-term average value. – But who keeps tab on those definitions? In fact, our understanding of climate change is largely the result of the Intergovernmental Panel on Climate Change (IPCC), the world’s most authoritative voice on the topic. Established by the United Nations, the IPCC assesses the scientific information relevant to climate change and also looks at the potential impacts of climate change, and options for slowing it down or adapting to it. In IPCC usage, **climate change** refers to

“a change in the state of the climate that can be identified (e.g., using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.”<sup>31</sup>

This definition differs in parts from that in the United Nations Framework Convention on Climate Change (UNFCCC), where climate change is defined as

“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 natural climate variability observed over comparable time periods.”<sup>32</sup>

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<sup>30</sup> UNESCO, “Global Environmental Change,” last modified in 2012, accessed May 20, 2013, <http://www.unesco.org/new/en/social-and-human-sciences/themes/global-environmental-change/>.

<sup>31</sup> “IPCC Fourth Assessment Report: Climate Change 2007, Glossary A-D,” accessed July 19, 2012, [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/annex1sglossary-a-d.html](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/annex1sglossary-a-d.html).

<sup>32</sup> “IPCC Fourth Assessment Report: Climate Change 2007, Glossary A-D.”

“The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes”<sup>33</sup> which is a fundamental difference even though the problems of climate change and climate variability are “intrinsically connected” and cannot be clearly separated.<sup>34</sup> That is to say, care must be taken not to confuse variability with change. **Climate variability** according to the IPCC,

“refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).”<sup>35</sup>

Perhaps the most well understood occurrence of climate variability is the naturally occurring phenomenon known as the El Niño-Southern Oscillation (ENSO) – a sequence of changes in circulations across the Pacific Ocean and Indonesian archipelago when warming is particularly strong; other examples of climate variability include droughts or floods that result from periodic El Niño (dry) and La Niña (wet) events but also earthquakes, storms and other extreme weather events, have affected people’s migratory behavior. But, as the World Meteorological Organization (WMO) listed on its website, some regions of the world experience greater variability than do others. So to say, what is ‘normal’ for some parts/ regions/ cities in the world would be ‘abnormal’ for others. Hence, any single event, such as a severe heatwave, a longer and more severe drought or a more intense hurricane, cannot be attributed to climate change due to human activity (direct or indirect). Only a persistent series of unusual events (usually events that recur within the next 30 years – the classical period of time as defined by the WMO) taken in the context of regional climate parameters can suggest a potential change in climate behavior has occurred.<sup>36</sup> In sum,

“the agreed process has been to define a change in climate as a significant shift in average climatic conditions. Although there has been general agreement about this definition it still presents problems for scientists working on the potential impacts of climate change. In the case of climate driven migration such a definition means that one can only ascribe the title ‘climate change induced weather events’ a number of years after the event once the period in which the event occurred is found to have been part of a different set of average climatic

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<sup>33</sup> “IPCC Fourth Assessment Report: Climate Change 2007, Glossary A-D.”

<sup>34</sup> Stal, Marc and Koko Warner et al., *The Way Forward. Researching the Environment and Migration Nexus*, 6.

<sup>35</sup> “IPCC Fourth Assessment Report: Climate Change 2007, Glossary A-D.”

<sup>36</sup> “WMO, Commission for Climatology, FAQs, What is the difference between climate variability and climate change?”, accessed July 19, 2012, <http://www.wmo.int/pages/prog/wcp/ccl/faqs.html#q3>.

conditions. Consequently, it will remain exceptionally difficult to identify an individual who has migrated in response to climatically induced environmental change.”<sup>37</sup>

As with climate change, migration in general – and forced migration as well as environmental migration in particular – have been issues of growing international attention and concern that add another layer of complexity to the scenario. **Migration**, according to the IOM is

“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.”<sup>38</sup>

**Forced Migration** in particular is described as<sup>39</sup>

“a migratory movement in which an element of coercion exists, including threats to life and livelihood, whether arising from natural or man-made causes (e.g. movements of refugees and internally displaced persons as well as people displaced by natural or environmental disasters, chemical or nuclear disasters, famine, or development projects).”<sup>40</sup>

That is to say, migration typologies often characterize population movements by the degree of choice involved in the decision to leave home (Petersen, 1958)<sup>41</sup>. On one end of the spectrum, “voluntary” migrants are people who can choose to move (most often they move for economic or social reasons) while at the other end, “involuntary” migrants exercise no choice when they are forced out of their homes. Over time, however, this bipolar view of population flows has been deemed overly simplistic. In reality, “few migrants are wholly voluntary or wholly involuntary. Almost all migration involves some kind of compulsion; at the same time almost all migration involves choices.”<sup>42</sup>

On the other hand, defining **environmental migration** is much more difficult because, as it is stated initially, there is currently no consensus in this field of study due to the problem of

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<sup>37</sup> Boano, Camillo et al., *Environmentally Displaced People. Understanding the Linkages between Environmental Change, Livelihoods and Forced Migration*. (Oxford: Refugees Studies Centre, Department of International Development, 2008), 15.

<sup>38</sup> “IOM, Key Migration Terms,” last modified in 2011, accessed May 30, 2013, <http://www.iom.int/cms/en/sites/iom/home/about-migration/key-migration-terms-1.html#Migration>.

<sup>39</sup> Annotation: This definition is based on a formulation by the two other organizations for migration and refugee related issues that are specialized in forced migration, namely Forced Migration Online (FMO) and the International Association for the Study of Forced Migration (IASFM).

<sup>40</sup> “IOM, Key Migration Terms.”

<sup>41</sup> See: Petersen, William, “A General Typology of Migration,” *American Sociological Review* 23, 3, (1958): 256-266.

<sup>42</sup> Van Hear, Nicholas, *New Diasporas: The Mass Exodus, Dispersal and Regrouping of Migrant Communities*. (London: UCL Press, 1998).

establishing straightforward links between migration, environmental degradation, and climate change. As said, people rarely move for a single reason, but the motivation to migrate is a complex one and component of equally complex economic, social, cultural, demographic, and political processes operating at the local, regional, national, and international level.<sup>43</sup> Another major problem mentioned above lies in the confusion over forced versus voluntary migration. Is environmental migration a form of forced migration? Can it take the form of voluntary relocation? Is it practical at all to draw a clear distinction between forced and voluntary motivation with regard to environmental migration? – In fact, the “mutual influence and overlapping of environmental factors with political, social and cultural aspects of migration means that it is not possible to differentiate clearly between forced and voluntary migration” (for example, environmental migration can be related to issues that make migration not only necessary, but also attractive, the so-called pull factors), which in turn also affects the definition and status of people migrating or displaced as a result of environmental drivers.<sup>44</sup> Or in other words: How do we call those displaced as a result of climate and environmental change? Are they refugees or are they migrants? Are they in need of legal protection or are they already adequately protected by existing instruments?

The definitions of environmental refugees or environmental migrants were and still are commented from many points of view. Usually, international organizations, civil society and media use the term that is the most appropriate to their particular agenda, however, the categorization of these people is of decisive importance with regard to the international obligation to protect or provide for such people. In contrast to migrants, refugees are granted rights by the 1951 Geneva Convention Relating to the Status of Refugees<sup>45</sup> concerning aid and services of the UNHCR and may not be deported by receiving states. As a result, some advocate for the expansion of the 1951 Convention in order to include those displaced as a result of climate and environmental change and provide them with protection. Others, such as relevant UN Agencies (e.g. UNHCR) or the IOM, believe that any expansion of the definition

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<sup>43</sup> Lonergan, Steve, “The Role of Environmental Degradation in Population Displacement.” Global Environmental Change and Security Project Report, Issue 4 (Spring 1998): 5-15, accessed May 5, 2013, <http://www.wilsoncenter.org/sites/default/files/ACF1493.pdf>.

<sup>44</sup> “Climate Change and Migration: The Debate on Causality and the Legal Position of Affected Persons,” Bundeszentrale für Politische Bildung, Focus Migration, 2009, accessed June 10, 2013, [http://focus-migration.hwwi.de/typo3\\_upload/groups/3/focus\\_Migration\\_Publikationen/Kurz dossiers/PB\\_15\\_ClimateChange.pdf](http://focus-migration.hwwi.de/typo3_upload/groups/3/focus_Migration_Publikationen/Kurz dossiers/PB_15_ClimateChange.pdf).

<sup>45</sup> Annotation: According to the Convention, a refugee “is someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion.” “UNHCR, Text of the 1951 Convention Relating to the Status of Refugees,” accessed May 5, 2013, <http://www.unhcr.org/3b66c2aa10.html>.

would lead to devaluation of the current protection for ‘Convention refugees’ because not all people displaced by climate and environmental change will be fleeing violence or crossing a national border. Governments also have a strong interest in keeping the definition narrow because of the obligation they have to refugees. There is “no consensus for extending the refugee regime” to ‘environmental refugees’ because most “receiving states want to restrict it further rather than improve it.”<sup>46</sup> A good example for that might be what the human rights organization Amnesty International has described as Fortress Europe. For more than two decades now, the European Union has been conducting an extensive and far-reaching border enforcement program largely in an attempt to prevent ‘illegal’ immigration – a category that generally refers to undocumented ‘economic migrants’ and refugees from poor countries. However, with climate change viewed as a threat multiplier which could exacerbate existing migration trends, it will be interesting to see if the European Union will continue on the path to a fortress society or if it will open up its borders to those parts of the populations that already suffer from poor health conditions, unemployment or social exclusion and therefore are rendered more vulnerable to the effects of climate and environmental change.

In the first instance, we need to define who we are talking about. Probably the first definition of environmental refugees was proposed by Essam El-Hinnawi in 1985. In a report released by the UN Environment Program (UNEP), El-Hinnawi defined **environmental refugees** as “those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life.”<sup>47</sup>

A subsequent paper by Jodi Jacobson (1988) on environmental refugees by the Worldwatch Institute then moved the debate forward. Like El-Hinnawi, Jacobson based her analysis on a very general notion of refugees and made no distinction between internally and internationally displaced persons. Nevertheless, the paper identified major types of unnatural disasters and the associated displacement of people, namely floods, droughts, toxification, deforestation and rising sea levels.<sup>48</sup>

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<sup>46</sup> Castles, Stephen, “Environmental Change and Forced Migration: Making Sense of the Debate.” UNHCR Issues in Refugee Research, Working Paper No. 70 (2002): 10, accessed June 7, 2013, <http://www.unhcr.org/research/RESEARCH/3de344fd9.pdf>.

<sup>47</sup> Essam El Hinnawi, *Environmental Refugees* (Nairobi: UNEP, 1985), 4.

<sup>48</sup> Suhrke, Astri, “Pressure Points: Environmental Degradation, Migration and Conflict.” Ottawa (1993): 6.

In 1994, British environmentalist Norman Myers, who has been one of the most prolific writers on climate change and population displacement and is also notable for predicting massive numbers of environmental refugees, scaling up Jodi Jacobson's (1988) figure of existing environmental refugees from 10 million in the late 1980s<sup>49</sup> to 25 million, offered another and one of the most cited definitions of environmental refugees. According to him,

“environmental refugees are people who can no longer gain a secure livelihood in their homelands because of drought, soil erosion, desertification and other environmental problems, together with the associated problems of population pressures and profound poverty. In their desperation, these people feel they have no alternative but to seek sanctuary elsewhere, however hazardous the attempt. Not all of them have fled their countries, many of them being internally displaced. But all have abandoned their homelands on a semi-permanent if not permanent basis, with little hope of a foreseeable return.”<sup>50</sup>

Yet, in recognition of the above mentioned restrictiveness of the refugee definition the UNHCR moved towards a definition of environmentally displaced persons, based on a definition of the Commission on Human Rights for **Internally Displaced Persons (IDPs)**, a category that encompasses a wider variety of the causal factors that contribute to flight. The United Nations defines IDPs as

“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.”<sup>51</sup>

Analogous to that term, the UNHCR – that has key responsibility for assisting and protecting refugees within the United Nations family and whose mandate is based on a very narrow legal definition of who refugees are (and are not) – describes **Environmentally Displaced Persons (EDPs)** as those “who are displaced from or who feel obliged to leave their usual place of residence, because their lives, livelihoods and welfare have been placed at serious risk as a result of adverse environmental, ecological or climatic processes and events.”<sup>52</sup> Similarly, the

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<sup>49</sup> Lonergan, Steve, “The Role of Environmental Degradation in Population Displacement.” Global Environmental Change and Security Project Report, Issue 4 (Spring 1998): 8.

<sup>50</sup> Myers, Norman, “Environmental refugees: An emergent security issue.” Paper presented at the 13<sup>th</sup> Economic Forum, Prague, May 23-27, 2005.

<sup>51</sup> Commission on Human Rights, “Further Promotion and Encouragement of Human Rights and Fundamental Freedoms, Including the Question of the Programme and Methods of Work of the Commission Human Rights, Mass Exoduses and Displaced Persons,” (Report of the Representative of the Secretary-General, Mr. Francis M. Deng, submitted pursuant to Commission resolution 1997/39, accessed June 7, 2013, <http://www.unhchr.ch/Huridocda/Huridoca.nsf/0/d2e008c61b70263ec125661e0036f36e>).

<sup>52</sup> Boano, Camillo et al., *Environmentally Displaced People. Understanding the Linkages between Environmental Change, Livelihoods and Forced Migration*, 8.

Norwegian Refugee Council (NRC) pleads for the use of the term environmentally displaced persons. Their description includes all persons “who are displaced within their own country of habitual residence or who have crossed an international border and for whom environmental degradation, deterioration or destruction is a major cause of their displacement, although not necessarily the sole one.”<sup>53</sup>

However, UNHCR and NRC do not consider the possibility of voluntary migration, such as is allowed for in the EACH-FOR (Environmental Change and Forced Migration Scenarios)<sup>54</sup> or the IOM working definition of **environmental migrants**, which was put forward by the IOM Council in 2007:

“Environmental migrants are persons or groups of persons who, for compelling reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad.”<sup>55</sup>

This definition encompasses people who are displaced by natural disasters as well as those who choose to move because of deteriorating environmental conditions. It also acknowledges that mobility due to climate and environmental change can be internal as well as across national borders and furthermore, can be both short-term and long-term. Therefore, the term environmental migrant is widely used for those displaced as a result of climate change or environmental change, including by IOM.

Others skeptical about the concept of environmental refugees are Homer-Dixon (1993) and Black (2001). Amongst McGregor (1993)<sup>56</sup> and Kibreab (1994)<sup>57</sup>, they criticize the term for

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<sup>53</sup> Norwegian Refugee Council, “Climate Change, the Environment and Displacement,” 2008, accessed June 7, 2013, [http://www.nrc.no/arch/\\_img/9411999.pdf](http://www.nrc.no/arch/_img/9411999.pdf)

<sup>54</sup> Annotation: Like the IOM, scientists involved in the European research project EACH-FOR pick up on the idea of voluntariness. They distinguish between **environmentally motivated migrants**, **environmentally forced migrants** and **environmental refugees**. “The environmentally motivated migrants differ from the latter two insofar as their change of location is voluntary. The difference between environmentally forced migrants and environmental refugees lies in the fact that forced migrants are subjected to a planned and long-foreseeable, but inevitable migration, whereas climate refugees are forced into sudden emergency migration by catastrophic scenarios.” “The EACH-FOR working definition does not consider whether in addition to the consequences of climate change there are also social, economic or political inducements to migration, whether the migration is temporary or permanent or whether the migration is only internal or also includes crossing state borders.” Source: “Climate Change and Migration: The Debate on Causality and the Legal Position of Affected Persons.”

<sup>55</sup> IOM, *Migration, Climate Change and the Environment*. (Geneva: International Organization for Migration, 2009), 23.

<sup>56</sup> McGregor (1993) notes, the legal definition of a refugee centers not on the speed of the onset of migration, nor primarily on whether it is ‘forced’, but on the crossing of an international boundary and consequent need for protection that cannot be, or is not, provided by the country of origin. Thus in circumstances where an individual satisfies the criteria for being labeled a ‘refugee’, the term ‘environmental’ becomes redundant. – Black, Richard, *Environmental Refugees: Myth or Reality?* UNHCR Working Paper No. 34, March 2001, 14.

being poorly defined and legally meaningless and confusing. Thomas Homer-Dixon, an author and professor at the Balsillie School of International Affairs in Waterloo, Ontario, believes that the term environmental refugee is misleading because it implies that environmental scarcity will be the direct and sole cause of refugee flows, though it is just one of a large number of interacting physical and social factors that together may force people to leave their homes. Homer-Dixon suggests using the term environmental refugee only when there is a sudden and large environmental change.<sup>58</sup> Equally opponent to the concept of environmental refugee is Richard Black, Head of the School of Global Studies, a new school of study established at Sussex in 2009. Black has held the post of Professor of Human Geography since 2003, and has also worked as a consultant for a number of organizations, including the United Nations Development Program, the United Nations High Commissioner for Refugees and the European Training Foundation. His work mainly focuses on the study of international migration and post-conflict return, and related social, economic and environmental transformations. Together with colleagues at Sussex and elsewhere, Black has been involved in developing new approaches to the understanding of climate change for migration patterns globally and has emerged as one of the foremost researcher on environmental refugees. In fact, Black questions the value of the very notion of environmental refugees. In “Environmental Refugees: Myth or Reality?” (2001) Black states:

“although environmental degradation and catastrophe may be important factors in the decision to migrate, and issues of concern in their own right, their conceptualization as a primary cause of forced displacement is unhelpful and unsound intellectually, and unnecessary in practical terms.”<sup>59</sup>

But taking the skeptics into account, what, for example, about the problem of sinking islands – one of the most dramatic scenarios of the impact of climate change where entire populations of low-lying States such as the Maldives, Tuvalu, Kiribati and the Marshall Islands may be obliged to leave their own country and populations of affected states could thus become stateless? The UNHCR vaguely points out that under some circumstances some persons affected by environmentally-induced migration would meet the conditions for the granting of the refugee status according to the Geneva Refugee Convention. Activist groups even argue that wealthy countries have a moral obligation towards people whose environment is being

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<sup>57</sup> Kibreab (1994) suggests that the term was “invented at least in part to depoliticize the causes of displacement, so enabling states to derogate their obligation to provide asylum.” – Boano, Camillo et al., *Environmentally Displaced People. Understanding the Linkages between Environmental Change, Livelihoods and Forced Migration*, 9.

<sup>58</sup> Stojanov, Robert, “Conceptualization of Environmentally Induced Migration”, 2008, accessed June 7, 2013, <http://www.ehs.unu.edu/file/get/3987>.

<sup>59</sup> Black, *Environmental Refugees: Myth or Reality*, 2.

damaged and destroyed, and who are losing their lives and livelihoods. They should be recompensed and protected by those responsible; that is to say, by those who produce the most greenhouse gas emissions, which most, but not all, scientists say causes global climate change. Pacific island nations contribute less than half a percent of global emissions, yet they are three times more vulnerable to climate change than other countries, according to the IPCC. Nevertheless, the granting of refugee status in the case of sinking island scenarios is disputed. Should the evacuation of an island community happen as soon as possible, before severe impacts of environmental changes are felt? Wouldn't this in turn enable migration to be properly planned and thus be associated with organized or intentional migration? – A fact that Black points out, too, when he refers to the problem of rising sea-levels and sinking islands. He says: “there are a range of adaptive responses by local populations, which include forecasting, the use of warning systems”, etc. “In general, calculating the population ‘at risk’ from sea level rise is a long way from predicting mass flight of a ‘refugee’ nature with its attendant need for international protection and assistance.”<sup>60</sup>

In reference to that, it could be interesting to look at a suggestion made by Frank Biermann and Ingrid Boas (2007) who propose a restrictive notion of the term ‘climate refugee’ in order to arrive at a conceptualization that is analytically valuable and politically acceptable. In brief, they propose to restrict the notion to the victims of a set of three direct, largely undisputed climate change impacts: sea-level rise, extreme weather events and drought and water scarcity. According to them, the problem of multi-causality of migration should not be resolved by the *a priori* exclusion of these people from the definition of climate refugees.<sup>61</sup>

To sum up, I would like to give the reader a rather brief insight into Astri Suhrke’s work (1993, 1994). Astri Suhrke is a political scientist who has worked on the social, political and humanitarian consequences of violent conflict, and strategies of response. She argues that while the literature on environmental change and population movements is quite limited, in general, two different and opposing perspectives can be discerned: the minimalist view and the maximalist view.<sup>62</sup> According to her, the minimalists are primarily found in migration studies and in one respect, they are indisputably correct: little substantial research has been produced on environmental change as a cause of migration. Minimalists agree that

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<sup>60</sup> Black, *Environmental Refugees: Myth or Reality*, 9.

<sup>61</sup> Biermann, Frank and Ingrid Boas, *Preparing for a Warmer World. Towards a Global Governance System to Protect Climate Refugees*. Global Governance Working Paper No. 33, November 2007, 4.

<sup>62</sup> See introductory section of this paper.

environmental degradation by itself is not important as a cause of migration. Instead, they point towards the complex set of factors thought to influence migration – see, for example, Stephen Castles and Steve Lonergan. Castles (2002) notes: “[environmental factors] are part of complex patterns of multiple causality in which natural and environmental factors are closely linked to economic, social and political ones.”<sup>63</sup> Lonergan (1998) sees the importance of multi-causality in any explanation of environmentally-induced migration confirmed in the cases of El Salvador, Haiti, the Sahel and Bangladesh. “A plethora of processes have been responsible for displacement in a complex mixture of social, economic and institutional factors.”<sup>64</sup> On the other hand, the maximalists tend to extract the environmental variable from a cluster of causes. “This is evident in the writings of El-Hinnawi 1985, Jacobson 1988, or the early publications by Myers (1991), and was echoed in popularized versions.”<sup>65</sup> Moreover, the maximalists argue that environmental degradation and disasters such as floods, droughts and earthquakes, have already displaced millions of people and will continue to displace ever larger numbers of people in the future. Myers is repeatedly cited in this context, but also aid organizations have a heavy influence on popular discourse referring the figures of people displaced by climate change. Primary examples of this include Christian Aid’s (2007) report ‘Human Tide: The real migration crisis’, which cites figures of up to one billion displaced by 2050 – as already mentioned in the introduction of this work. In addition to humanitarian charities, environmental groups also frequently produce large predictions of ‘environmental refugees’ in order to advocate greater environmental protection.<sup>66</sup>

In short, although the geography and scale of future movements (within national borders or across international borders) of people is difficult to predict, it is evident that a considerable number of people will be confronted in coming decades with such phenomena as rising sea-levels, lack of fresh water or expanding desert regions. “As a result, many of these people will migrate either voluntarily or in flight.”<sup>67</sup> Yet, there is little consensus concerning the proper legal characterization and appropriate terminology to be applied to those who will move. The terms interchangeably used by academics and policymakers prevent the most expected progress on the recognition and legal protection of environmental displacement. That is to

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<sup>63</sup> Stephen Castles, “Environmental Change and Forced Migration: Making Sense of the Debate.” UNHCR (2002): 5.

<sup>64</sup> Lonergan, Steve (1998), in: Boano, Camillo et al., *Environmentally Displaced People. Understanding the Linkages between Environmental Change, Livelihoods and Forced Migration*, 9, 10.

<sup>65</sup> Suhrke, Astri, “Pressure Points: Environmental Degradation, Migration and Conflict.” Ottawa (1993): 6.

<sup>66</sup> Morrissey, James, *Environmental Change and Forced Migration. – A State of the Art Review*. (Oxford: Refugee Studies Centre, 2009), 11.

<sup>67</sup> “Climate Change and Migration: The Debate on Causality and the Legal Position of Affected Persons.”

say, for the conceptualization of environmental migration, and the development of policy responses to address these flows, it is essential to formulate a comprehensive, accepted and concrete definition of environmentally-induced displacement. It makes a big difference whether people are perceived as refugees or migrants (forced or voluntary) for the purpose of legal protection. People who move cross-border due to environmental degradation and climate change, for example, “fall in the gap between the Guiding Principles on International Displacement (as they have crossed a border) and existing frameworks for protecting other international migrants or refugees, which do not specify environmental factors as a cause of migration.”<sup>68</sup> As said above, the Geneva Refugee Convention and its additional protocols only consider some persons affected by environmentally-induced migration under certain circumstances and therefore do not offer any comprehensive protection. In other words, using the term ‘environmental refugee’ is legally inaccurate and also, as Suhrke argues (and many academic commentators agree) “giving refugee status to environmental refugees would only distort the definition and strain the desperately scarce resources of the international refugee regime.”<sup>69</sup> But is it more compelling to use the term ‘environmental migrant’ instead as this paper will do in the following, encompassing all types of migrants moving internally or internationally for reasons related to climate change or environmental degradation? – Whatever they are termed, those who are moving due to environmental degradation and climate change will continue lacking legal status. Only “in a few cases, ad hoc responses have been developed to protect those who move across borders temporarily, while the needs of those who are forced to migrate permanently across national borders have yet to be addressed.” But why it appears so relatively little efforts are made to developing an understanding of the problem or generating the solutions to it? Is it arguable that there is little political will? So to ask, is there a need for a new organization with a specific mandate for this category of people? How should the international community protect the environmentally displaced? And who should fund the costs of protecting and assisting the environmentally displaced?<sup>70</sup> In fact, what is important now is that the debate remains on the right track, namely that the paramount objective is not a new refugee regime but a fundamental institutional change and with it genuine efforts for better accountability, international cooperation, environmental protection standards and good governance for the issue to be understood and addressed at local, national, and international levels.

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<sup>68</sup> World Migration Report, *Environmental Change*. (Geneva: IOM Publications, 2010), 80.

<sup>69</sup> Boano, Camillo et al., *Environmentally Displaced People. Understanding the Linkages between Environmental Change, Livelihoods and Forced Migration*, 10.

<sup>70</sup> Boano, Camillo et al., *Environmentally Displaced People. Understanding the Linkages between Environmental Change, Livelihoods and Forced Migration*, 24.

### 1.3 Estimates & Predictions

How many environmental migrants? Or to be more provocative: There were supposed to be 50 million people fleeing the effects of climate change by 2010, so where are they? – In 2005, the United Nations Environment Programme (UNEP) and the United Nations University's Institute for Environment and Human Security (UNU-EHS) declared that 50 million people could become environmental refugees by 2010 with a corresponding map appearing on their website, attempting to show where those migrants would come from.<sup>71</sup> In 2011, UNEP distanced itself from the forecast and has since been removed it from its website, saying that the map visitors were navigating by was maybe not fully up to date or that it might have an error in it. Yet, there were two problems with it: (1) UNEP helped fund the original story that came up with the data contained in the map and (2) this figure, the 50 million and others from that same study, have been widely quoted by other UN agencies, the IPCC and by governments around the world, for example it was also used in the Stern review on the Economics of Climate Change (2006).

In fact, estimates of the potential number of environmental migrants vary hugely. The problem is (as mentioned with the explanations above) that reliable statistical data cannot be collected as there is not an internationally recognized definition for the phenomenon of environmentally-induced migration. In addition, estimates are also hindered by the fact that an immediate connection between the consequences of climate change and migration cannot be clearly demonstrated. As a result, the figures vary depending on which climatic, demographic and social values the estimates are based on. UNESCO has attempted to fill in some of the knowledge gaps with its publication "Migration and Climate Change" (2011) – a book which presents the work of 26 experts who take a rather conservative approach to predictions. "Climate change is becoming an increasingly significant factor in migration," UNESCO said in announcing the publication, "even if nightmare scenarios predicting a human tide of 'environmental refugees' are unfounded and counter-productive."<sup>72</sup> That stance is different than the one that led to the controversial prediction of 50 million environmental migrants by 2010. "Migration and Climate Change" highlights the differences. For example, François Gemenne, an expert writing in the book, credits the environmentalist Norman Myers for

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<sup>71</sup> Brown, Oli, "The Numbers Game," *Forced Migration Review* 31 (2008): 8.

<sup>72</sup> "Migration and Climate Change. A UNESCO publication on one of the greatest challenges facing our time UNESCO," accessed September 2011, [http://www.unesco.org/new/en/social-and-human-sciences/themes/internationalmigration/sv11/news/migration\\_and\\_climate\\_change\\_a\\_unesco\\_publication\\_on\\_one\\_of\\_the\\_greatest\\_challenges\\_facing\\_our\\_time/](http://www.unesco.org/new/en/social-and-human-sciences/themes/internationalmigration/sv11/news/migration_and_climate_change_a_unesco_publication_on_one_of_the_greatest_challenges_facing_our_time/).

drawing attention to the migration issue but says that Myers's work is largely based on speculative common sense rather than on actual figures and estimates. Many sweeping and alarmist statements about those who had just been dubbed environmental migrants came out of the environmentalist agenda in the 1980s and 90s, Gemenne said.<sup>73</sup> Myers, a well-known environmental scientist with appointments at Oxford and Duke University, whose estimate of 200 million environmental migrants by 2050 has become a generally accepted figure, defends his prediction as very cautious, but he doesn't claim precision for it. In a BBC Radio interview he said that on an issue as important as climate migration, "in the long run I do believe very strongly that it will be better for us to find we have been roughly right than precisely wrong." (...) "I think it would be much harder to demonstrate that there aren't any of these environmental refugees than to demonstrate that there are environmental refugees."<sup>74</sup>

Other prominent estimates are as follows:

- Homer-Dixon (1994) concludes that Bangladeshi migrants have expanded the population of neighboring areas of India by 12 to 17 million over the last forty years, whilst the population of the state of Assam has been boosted by at least seven million.<sup>75</sup>
- The Almeria Statement on Desertification and Migration (1994) observed that 135 million people could be at risk of being displaced as a consequence of severe desertification.
- The International Federation of Red Cross and Red Crescent Societies stressed in 2001 that more people were forced to leave their homes because of environmental disasters than war.
- UNHCR (2002) estimated the number of people forced into migration as a result of floods, famine and other environmental factors at approximately 24 million people around the world and later the persons displaced internally as a result of natural catastrophes alone at 25 million.<sup>76</sup>
- Friends of the Earth Australia (2004) emphasized Myers' predictions and urged the Australian Government to take action against climate change.

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<sup>73</sup> Gemenne, François, "How they became the human face of climate change.

The emergence of 'climate refugees' in the public debate, and the policy responses it triggered." (UNESCO Publications, 2011), 8.

<sup>74</sup> BBC Radio interview with Myers Norman (2011), available on: <http://www.bbc.co.uk/programmes/b010xykh>.

<sup>75</sup> Black, *Environmental Refugees: Myth or Reality*, 3.

<sup>76</sup> Bundeszentrale für Politische Bildung, Focus Migration, 2009, accessed June 19, 2013, [http://focus-migration.hwwi.de/typo3\\_upload/groups/3/focus\\_Migration\\_Publikationen/Kurz dossiers/PB\\_15\\_ClimateChange.pdf](http://focus-migration.hwwi.de/typo3_upload/groups/3/focus_Migration_Publikationen/Kurz dossiers/PB_15_ClimateChange.pdf).

- Lester Brown, who was amongst the first to use the term ‘environmental refugee’ in 1976, noted that flows of ‘environmental refugees’ were just in their beginnings and were ‘yet another indicator that our modern civilization is out of sync with the earth’s natural support systems’ (2004).
- In a much-debated report, Christian Aid (2007) dramatically revised Myers’ forecasts, and postulated that up to one billion people could be permanently displaced by environmental disruption by 2050. Even though the report acknowledged that 600 million of the predicted one billion would actually be displaced because of development projects (e.g. dams), rather than actual environmental change, the estimate was still significantly higher than those made previously.<sup>77</sup>
- At a conference hosted by the International Organization for Migration in 2008 speakers underlined the following alarming projections: e.g. nine out of 10 extreme environmental events are argued to be related to climate change; developing countries might suffer 98 percent of the casualties resulting from natural disasters; within these countries, the most vulnerable groups of population, especially woman are affected; South and East Asia, Africa and small island states will be most severely affected; climate change in combination with the current demographic trends will intensify the already existing migration patterns; environmentally-induced migration will have adverse effects on the environment in countries of destination and will subsequently increase the potential for conflict; the consequences of environmental migration are likely to impede the achievement of the Millennium Development Goals (MDGs).<sup>78</sup>

Nevertheless, this widespread appetite for numbers and forecasts in the case of environmental migration has been questioned. Oli Brown, an independent consultant, affiliated with Chatham House (an independent policy institute based in London) and working closely with the UNEP, reviewed four cases for the International Organization for Migration in 2008: the Cartaret islands in Papua New Guinea, Lateu village in Vanuatu, the relocation of Shishmaref village on Sarichef island in Alaska, and the submergence of Lohachara island in India’s Hooghly river. In the case of the Cartaret Islands, about 1000 people were forced off the islands in 2005. Erosion and salt water intrusion had rendered the population almost entirely dependent on outside aid, whereby Brown found the islanders had sealed their own fate by dynamiting the coral reef that protected their atoll from erosion. He also found that the 10,000

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<sup>77</sup> Gemenne, François, *How they became the human face of climate change.*

*The emergence of ‘climate refugees’ in the public debate, and the policy responses it triggered*, 8.

<sup>78</sup> IOM, *Climate Change, Environmental Degradation and Migration* (Geneva: IOM Publications, 2009), 30.

people evacuated from a sand bar in the Hooghly delta in India were actually victims of shifting river currents, mangrove destruction and local subsidence.<sup>79</sup> More plausible candidates for the title of climate refugee were a group of about a hundred residents of a coral atoll in Vanuatu, and the inhabitants of Shishmaref village on Sarichef Island just north of the Bering Strait whose coastal village was raked by waves intensified by disappearing sea ice. In both cases, the refugees fled inland. For skeptics, however, these few hundred compare badly with the predictions I have listed here. And indeed, like Norman Myers commonly repeated prediction of 200 million environmental migrants by 2050, most of the estimates listed above tend to be more pessimistic – the so called alarmist perspective – forecasting impressive migration flows even though it remains unclear whether, and how many people at risk choose migration as the main strategy. Many scholars who adopted the alarmist perspective were initially interested in the environment-security nexus and deployed migration flows due to environmental degradation as an exploratory variable to justify a causal relationship between environmental change and conflict. With a distinctly neo-Malthusian approach<sup>80</sup> (as Black calls it) they opinion that waves of environmental migrants will spill across borders with destabilizing effects on host regions and international stability. As many, according to Myers, will try to obtain asylum in the developed countries of Western Europe and North America, “refugee camps and shantytowns could become ‘breeding grounds for civil disorder, social upheaval and even violence’. There may be ‘substantial outlays to counter pandemic diseases and deficits of food, water and energy’. The result could be threats to social cohesion and national identity, leading to ethnic tension and civil disorder.”<sup>81</sup> On the contrary, Black rejects this theory saying that it is based on dubious assumptions. He even goes so far to say that “the image is one of mis- or over-use of the environment leading to progressive decline in the resource base, and possibly contributing to further dramatic (and unintended) environmental collapse.”<sup>82</sup> What must be recognized is that the degradation of the environment is socially and spatially constructed; only through a structural understanding of the environment in the broader political and cultural context of a region or country can one begin to understand the role it plays as a factor in population displacement.<sup>83</sup>

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<sup>79</sup> Brown, Oli, *Migration and Climate Change* (Geneva: IOM Migration Research Series No. 31, 2008), 25, 26.

<sup>80</sup> Annotation: Malthusian [mæl'θju:ziən] *adj* (Economics) of or relating to the theory of the English economist Thomas Robert Malthus (1766-1834) stating that increases in population tend to exceed increases in the means of subsistence and that therefore sexual restraint should be exercised.

<sup>81</sup> Myers and Kent, 1995, in: Castles, Stephen, “Environmental Change and Forced Migration: Making Sense of the Debate.” UNHCR Issues in Refugee Research, Working Paper No. 70 (2002): 2, accessed June 19, 2013, <http://www.unhcr.org/research/RESEARCH/3de344fd9.pdf>.

<sup>82</sup> Black, *Environmental Refugees: Myth or Reality*, 3.

<sup>83</sup> Lonergan, Steve, “The Role of Environmental Degradation in Population Displacement.” Global Environmental Change and Security Project Report, Issue 4 (Spring 1998): 8.

Briefly, the estimates we have so far are weak and no real foundation for an appropriate response either. But as Brown says, dismissing Myers' numbers on these grounds would be too simple. There are almost certainly millions of people around the world who have been forced to move due to climate and environmental change especially in areas of Southern China, South Asia, and the Sahel-Region of sub-Saharan Africa. In his 2008 study he wrote that without any Kyoto emission reductions or serious attempts at adaptation "predictions of 200 million people displaced by climate change might well be exceeded."<sup>84</sup> The challenge now is to better understand how climate and environmental change could affect population distribution and then to develop effective ways to address the possible consequences of migration, such as social and economic dislocation, delayed development or political instability and ethnic conflict. Obviously, better data would move the debate forward, however, developing objective and empirically-based detailed numerical scenarios will require a lot of hard work, including the development of modeling techniques that account for the variability of future emissions and meteorological scenarios. That means there is still little consensus not only over the scope of future environmentally-induced migration but also over the scale on which climate change is expected to occur. The first aspect of the debate pertains to what has been called emission scenarios to project climate. According to the IPCC,

"future greenhouse gas (GHG) emissions are the product of very complex dynamic systems, determined by driving forces such as demographic development, socio-economic development, and technological change. Their future evolution is highly uncertain. Scenarios are alternative images of how the future might unfold and are an appropriate tool with which to analyze how driving forces may influence future emission outcomes and to assess the associated uncertainties. They assist in climate change analysis, including climate modeling and the assessment of impacts, adaptation, and mitigation. The possibility that any single emissions path will occur as described in scenarios is highly uncertain."<sup>85</sup>

In short, emission scenarios refer to the amount of GHG emissions which will be released into the atmosphere under different developmental pathways depending on technology, consumption patterns, transportation and urban infrastructure, urban planning, and rural-urban distribution of the population. As it is almost impossible to accurately predict which developmental pathway will be followed, it will remain exceptionally difficult to foresee the impacts of climate change, its scope and scale.<sup>86</sup> The second aspect pertains to the relationship between GHG emissions and changes in aggregate temperature. Scientific uncertainty about

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<sup>84</sup> Brown, *Migration and Climate Change*, 29.

<sup>85</sup> IPCC, *Emissions Scenarios – Summary for Policymakers* (Intergovernmental Panel on Climate Change, 2000), 3.

<sup>86</sup> Morrissey, *Environmental Change and Forced Migration. – A State of the Art Review*, 15.

this relationship in the global atmosphere results in different predicted impacts for the different emission scenarios. On top of these difficulties is the problem of modeling non-linear physical responses to climate change such as the rapid melt of the West Antarctic Ice Sheet or the shutting or slowing down of the North Atlantic Thermohaline Circulation, that part of the ocean circulation which is driven by sea density differences. The exact dynamics of these events remains unknown and therefore difficult to predict. “A result of these problems is that estimates on the size of populations likely to be affected tend to either cover large ranges, or be avoided altogether. In the case of migration, where the exact nature of the relationship between environmental change and social change is not well understood, the range of predictions can be very large.”<sup>87</sup>

## 2. MIGRATION AND CLIMATE CHANGE: RISK AND VULNERABILITY IN AN UNEQUAL WORLD

*“The countries most vulnerable are least able to protect themselves. They also contribute least to the global emissions of greenhouse gases. Without action they will pay a high price for the actions of others.” [Kofi Annan]*

Which role does climate change play in the context of migration and vulnerability? As the second chapter of this work will show, climate and environmental changes generate a distinctive set of risks which can give rise to migration. Droughts, floods, earthquakes, storms, hurricanes, and other events have the potential to disrupt people’s lives, leading to losses of income, assets and opportunities. While there are notable policy successes, vulnerability of poor, marginalized, and under-represented people remains widespread. In cases like Bangladesh – a country that already has half of its citizens living below the poverty line and which is the world’s third most vulnerable to sea-level rise<sup>88</sup> – women (whose economic disadvantage, limited access to resources, dependency on male family members, and lack of power in decision making are factors that commonly contribute to their vulnerability)<sup>89</sup>, minorities, and other marginalized groups are disproportionately and unacceptably vulnerable. When facing droughts in Northeast Argentina, industry-dependent tobacco growers are more vulnerable than independent agroecological farmers, whose farms are more bio-diverse, more technologically equipped, less exposed to external markets, and

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<sup>87</sup> Morrissey, *Environmental Change and Forced Migration. – A State of the Art Review*, 16.

<sup>88</sup> Pender, James, “Community-led adaption in Bangladesh,” *Forced Migration Review* 31 (2008): 54.

<sup>89</sup> Annotation: Statistically, natural disasters kill more women than men, or kill women at a younger age than men. In 1991, e.g., it was recorded that a cyclone in Bangladesh resulted in the death of five times more women than men. IOM, *Migration, Climate Change and the Environment*, 22; Additional information available at: <http://www.unfpa.org/public/site/global/lang/en/pid/4028>.

have greater political negotiating power.<sup>90</sup> In Kenya, where, the pastoralist community has been ravaged by droughts and floods for years, privatization of pasturelands has improved security of some while making the poorer and landless much more vulnerable.<sup>91</sup> Or, for example, people living in the Ganges Delta and lower Manhattan, New York; they share the flood risks associated with rising sea levels, however, they do not share the same vulnerabilities. The reason: the Ganges Delta is marked by high levels of poverty and low levels of infrastructural protection compared to the wealthy New York metropolitan region that has recently experienced devastating coastal flooding due to Superstorm Sandy, but is certainly more able to recover and rebuild in a way that enables infrastructural resilience to inevitable future storms by “hard” engineering interventions – like sea walls and innovative subway and tunnel closings – and “soft” approaches – like reconstructed wetlands and smart designs for coastal communities.<sup>92</sup> Generally speaking, climate risks are not “equally distributed”. Some of the people or regions of the world are and will continue to be disproportionately affected by these risks, many of them in the developing world. It seems clear that vulnerability to climate change is closely related to poverty, as the poor, their institutions, economies and societies are least able to respond to present day risks from climate variability to future changes in climate due to limited resources. For this reason, there exist provisions in the United Nations Framework Convention on Climate Change (UNFCCC) to assist those countries that are thought to be most vulnerable and least able to adapt, yet, there is still a long way to go in building the resilience of the world’s poor to a problem largely created by the world’s richest nations.<sup>93</sup>

## 2.1 The Concept of Vulnerability

The study of migration in the context of climate and environmental change is often approached by using the concept of vulnerability. At the beginning of the 1980s, Amartya Sen introduced the concept of vulnerability to development politics and the social sciences. In his essay *Poverty and Famines* (1981), the Indian-born economist and Nobel laureate had studied five famines: the Great Bengal famine of 1943, the Ethiopian famines of 1973 and 1974, the

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<sup>90</sup> Kasperson et al., 2005, in: Mearns, Robin and Andrew Norton, eds., *The Social Dimensions of Climate Change* (Washington, DC: The World Bank, 2010), 49.

<sup>91</sup> Smucker and Wisner, 2008, in: Mearns, Robin and Andrew Norton, eds., *The Social Dimensions of Climate Change*, 49.

<sup>92</sup> New York Times, “Rising Sea Levels Are Serious,” last modified November 2, 2012. <http://www.nytimes.com/roomfordebate/2012/11/01/should-new-york-build-sea-gates/we-must-take-rising-sea-levels-seriously>.

<sup>93</sup> “Human Development Report,” UNDP 2007/2008, accessed June 20, 2013, [http://hdr.undp.org/en/media/HDR\\_20072008\\_EN\\_Chapter2.pdf](http://hdr.undp.org/en/media/HDR_20072008_EN_Chapter2.pdf).

Bangladesh famine of 1974, and the Sahel famines of the 1970s. He discovered that vulnerability did not just stem from the capricious moods of Mother Nature alone, but that natural disasters were more often than not able to unleash their full destructive force due to social institutions being either non-existent or poorly functioning. For example, crop failures only turn into famines, if there are no compensatory safeguard mechanisms for the farmers and agricultural workers and if political institutions are either unwilling or incapable of intervening on behalf of the people concerned.<sup>94</sup>

Originally, the term ‘vulnerability’ was defined in the climate change literature by the IPCC as “the extent to which climate change may damage or harm a system.” The IPCC adds that vulnerability “depends not only on a system’s sensitivity but also on its ability to adapt to new conditions.”<sup>95</sup> More recently, the concept of vulnerability has been extended to include social vulnerability. For example, Kelly and Adger (2000), define vulnerability in terms of “the ability of individuals and social groupings to respond to, in the sense of cope with, recover from and adapt to, any external stress placed on their livelihoods and well-being.”<sup>96</sup> Their approach adopts the ‘wounded soldier’ perspective in focusing attention on existing socio-economic and institutional constraints, “wounds” or prior damage, which might limit capacity to respond to stresses and are independent of future threats.<sup>97</sup>

In fact, there are many different definitions/theories of vulnerability, and it is not the purpose of this paper to review them all. Nonetheless, it is essential to stress that vulnerability analysis is often polarized into risk-hazard and social constructivist frameworks. In other words, definitions of vulnerability tend to fall into two categories, viewing vulnerability either (i) in terms of the amount of damage caused to a system by a particular climate-related event or hazard (biophysical vulnerability), or (ii) as a state that exists within a system before it encounters a hazard event (social vulnerability). The former view has arisen from an approach “based on assessments of hazards and their impacts, in which the role of human systems in

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<sup>94</sup> “The Concept of Vulnerability – A Theory for the Problems of Tomorrow,” Goethe Institute (2010), accessed June 23, 2013, <http://www.goethe.de/ges/umw/prj/kuk/the/kul/en6332210.htm>.

<sup>95</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 56.

IPCC, *Climate Change 1995: Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. (Cambridge: Cambridge University Press, 1995), Preface.

<sup>96</sup> Kelly, Mick and Neil Adger, “Assessing Vulnerability to Climate Change and Facilitating Adaptation.” Centre for Social and Economic Research on the Global Environment, Working Paper GEC 99-07 (2000): 4, accessed June 26, 2013, [http://www.cserge.ac.uk/sites/default/files/gec\\_1999\\_07.pdf](http://www.cserge.ac.uk/sites/default/files/gec_1999_07.pdf).

<sup>97</sup> Ibid.

mediating the outcomes of hazard events is downplayed or neglected.”<sup>98</sup> It locates the risk in the hazard itself and measures vulnerability by “indicators such as monetary cost, human mortality, production costs, [or] ecosystem damage,”<sup>99</sup> while the second view places the burden of explanation of vulnerability within the social system; it locates risk within society.<sup>100</sup>

These two views are linked by integrative frameworks which tend to be extensions of social constructivist models, rather than of risk-hazard approaches. Integrative frameworks view vulnerability as depending on both biophysical and human factors. That means, vulnerability is having “an external dimension, which is represented by the exposure of a system to climate variations, as well as an internal dimension, which comprises its sensitivity and its adaptive capacity to these stressors.”<sup>101</sup> Or as Anthony Oliver-Smith who holds the Munich Re Foundation Chair on Social Vulnerability at UNU-EHS in Bonn puts it:

“Vulnerability describes the degree to which a socio-ecological system is either susceptible or resilient to the impact of natural hazards. It is the outcome of various factors, including awareness of hazards, settlement and infrastructural patterns, public policy and administration, the level of societal development and institutional capacities in disaster and risk management. Vulnerability and risk refer to the relationships between people and the environment including the physical setting and the sociopolitical structures that frame the conditions in which people live. The concept of vulnerability is fundamentally a political ecological concept, integrating not only political economic, but environmental forces in terms of both biophysical and socially constructed risk. Vulnerability links the relationship that people have with their environment with social forces and institutions and the cultural values that sustain or contest them. Therefore, it links general political economic conditions to very particular environmental forces to understand how basic conditions such as poverty or racism produce susceptibilities to specific environmental hazards. In so far as vulnerability is socially produced, risk is therefore not evenly distributed across the social spectrum [...]. High levels of vulnerability reflect a lack of or inappropriate adaptations and therefore low levels of resilience. Vulnerability thus explicitly links environmental issues, such as hazards, with the structure and organization of society, and the rights associated with membership.”<sup>102</sup>

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<sup>98</sup> Brooks, Nick, “Vulnerability, risk and adaptation: A conceptual framework.” Tyndall Centre for Climate Change Research, Working Paper 38 (2003): 3-4, accessed June 26, 2013, <http://www.tyndall.ac.uk/sites/default/files/wp38.pdf>.

<sup>99</sup> Jones and Boer, 2003, in: Brooks, Nick, “Vulnerability, risk and adaptation: A conceptual framework.”

<sup>100</sup> Ribot, Jesse C., 2009, “Vulnerability does not just Fall from the Sky: Toward Multi-scale Pro-poor Climate Policy,” pp. 5-6, in: Mearns, Robin and Andrew Norton, eds., *The Social Dimensions of Climate Change*.

<sup>101</sup> Füssel and Klein, 2006, in: Mearns, Robin and Andrew Norton, eds., *The Social Dimensions of Climate Change*, 53.

<sup>102</sup> Oliver-Smith, Anthony, *Sea Level Rise and the Vulnerability of Coastal Peoples. Responding to the Local Challenges of Global Climate Change in the 21<sup>st</sup> Century* (Bonn: InterSecTions, ‘Interdisciplinary Security

From the above explanations we can note that vulnerability is a phenomenon which is determined by three factors: exposure to the impacts of climate change, the sensitivity of communities or socioeconomic systems to such impacts, and the capacity of those exposed to adapt. Thereby, exposure is defined as the degree of climate stress upon a particular region; it may be represented as either long-term changes in climate conditions, or by changes in climate variability, including the magnitude and frequency of extreme events. Sensitivity, on the other hand, is the degree to which a system will respond to a change in climatic conditions; to illustrate this category, sensitivity will be high where the system in question includes, for example, settlements built on flood plains, hill slopes or low-lying coastal areas. Finally, adaptive capacity refers to the potential or capability of a system to adjust to climate change, including climate variability and extremes, so as to moderate potential damages, to take advantage of opportunities, or to cope with consequences. As the name suggests, adaptive capacity is the capability of a system to adapt to impacts of climate change. In general, societies which have the ability to respond to and cope with changes instantaneously are easily considered to have a high adaptive capacity. According to Smit and Pilifosova (2001), determinants of adaptive capacity are thought to include economic wealth, technology and information, infrastructure, institutions, social capital, and education.<sup>103</sup> In terms of action, adaptation may take the form of “reducing dependence on vulnerable systems such as diversifying food production away from a limited number of drought-prone crops, of decreasing sensitivity by avoiding building settlements and infrastructure in high-risk locations, or by strengthening existing systems so that they are less likely to be damaged by unusual events.”<sup>104</sup> However, if it comes to particular *in situ* adaptation strategies, it might be more difficult to identify effective activities and needs even though the effectiveness of *in situ* adaptation plays an important role in determining whether and when individuals will move in response to climate and environmental change. For instance, in the case of the communities and ecologies in the pastoral areas, some authors argue that “the root causes of pastoralists’ vulnerability to climate stressors lie in their marginalization in decision-making and in the unfavorable government policies, and therefore their inability to adapt, as well as their

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Connections’ Publication Series of UNU-EHS, No.7, 2009), 15, accessed July 1, 2013, <http://www.ehs.unu.edu/file/get/4097>.

<sup>103</sup> Smit, Barry and Olga Pilifosova, 2001, “Adaptation to Climate Change in the Context of Sustainable Development and Equity,” pp. 1-20, in: J.J. McCarthy, O.F. Canziani, N.A. Leary, D.J. Dokken and K.S. White, eds., *Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2001).

<sup>104</sup> Adger, Neil et al., “Adaptation to Climate Change in the Developing World.” *Progress in Development Studies* 3, 3 (2003): 181.

adaptation methods, cannot be understood by focusing only on the technical adaptation to climate change.’’<sup>105</sup>

Among the range of possible ways by which people may adapt to adverse impacts of climate and environmental change migration plays another important role. As said before, certain types of socioeconomic systems are inherently more sensitive to climate and environmental changes and are therefore more likely to engender adaptive migration. These include systems characterized by agricultural and natural resource-dependence and those within drylands, low-elevation coastal zones, small island states, mountain regions that have faced above-average warming in recent decades, and other settings where exposure to climate-related risks is high and human livelihood possibilities are limited. Classical examples of environmentally-induced migration would be, for instance, the dry-season migration in the West African Sahel, hurricane-related migration in the Caribbean region or the 1930s ‘Dust Bowl’ migration in many areas of North America’s Great Plains, where combined impacts of economic recession, falling commodity prices, and prolonged droughts stimulated large-scale migrations of hundreds of thousands of residents of Arkansas, Kansas, Oklahoma, Texas, Colorado and Missouri to California and other Pacific coast states; hundreds of thousands more relocated within the Great Plains.<sup>106</sup> That is to say, in the field of climate change research, interactions between climate and migration are increasingly situated within the context of human vulnerability to climate change, which in turn is identified as being a function of exposure, sensitivity, and adaptive capacity. Still, to be vulnerable does not make someone a potential climate migrant as migration is not just an expression of vulnerability, but of capabilities. The poorest and most vulnerable people will often find it impossible to move, as they lack the necessary funds and social support. “In other words, like vulnerability, the potential for environmentally-induced migration can be considered to be a function of exposure and adaptive capacity. This in turn raises a range of questions that merit exploration.” Some might include: What conditions lead to migration instead of alternative adaptation options? Are all members of a ‘vulnerable’ population likely to have the same ability to migrate? Under what conditions do migration decisions cease to be made voluntarily? – Questions that have yet to be investigated in a comprehensive manner in the climate change research community.<sup>107</sup>

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<sup>105</sup> GebreMichael et al., 2011, in: Afifi, Tamer et al., “Climate Change, Vulnerability and Human Mobility: Perspectives of Refugees from the East and Horn of Africa.” UNU-EHS Report No. 1, June 2012, 31.

<sup>106</sup> McLeman, Robert and Lori Hunter, “Migration in the context of vulnerability and adaptation to climate change: insights from analogues,” *Wiley Interdiscip Rev Clim Change* Vol. 1 (May/June 2010): 450-461.

<sup>107</sup> Smit, Barry and R. McLeman, “Migration as an Adaptation to Climate Change,” *Climatic Change* 76 (2006): 31-53.

## 2.2 Potential Environmental Hotspots and Locations at Risk

The 2012 World Disasters Report projected that there are currently an estimated 214 million international and 740 million internal migrants and these numbers have grown significantly over the past 50 years, an increase the Red Cross attributes to climate change affecting the frequency, intensity and patterns of events.<sup>108</sup> The report focuses on those forced to leave their homes due to events beyond their control. Only about 15 million of these are counted as refugees by the UN. Almost a million more are asylum seekers awaiting determination of status. About 26.4 million are internally displaced by conflict; 15 million by development projects such as the construction of river dams, the mining (extracting) of natural resources or urbanization; and another 15 million by hazards and disasters, such as storms, hurricanes, floods, earthquakes and droughts.<sup>109</sup> Thereby, the intensity, frequency, duration and extend of those hazards are projected to increase in many parts of the world during the next 20 to 30 years.<sup>110</sup> As the world could experience temperature increases of 3-6 degrees Celsius over the next eight or nine decades,<sup>111</sup> many of the countries and regions that currently suffer from climate-related disasters can expect conditions to worsen in the short-term. Similarly, examining the impact of temperatures on ocean currents and the rates in thawing of the Greenland and Antarctic ice sheets, scientists have suggested that sea-level could rise by 1.3 meters in the same period, and hence could have a particular impact on islands and their communities around the globe.<sup>112</sup> – A topic that has also become hot among ice experts as new observations of ice melt continue to outstrip projections from just a few years ago. As *The Guardian* reported in June this year, Arctic sea ice is now 60 years ahead of worst-case projections from the last report by the Intergovernmental Panel on Climate Change in 2007. Based on a scientific study by Greenland expert Jason Box in 2012, the article states that “while mass loss of the enormous Greenland sheet is difficult to measure, satellite data indicate it has doubled in the last decade.” “If this acceleration continues, sea level rise could be even higher this century than the one or two meters that mainstream scientists now project – possibly much higher.”<sup>113</sup>

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<sup>108</sup> World Disasters Report, *Focus on Forced Migration and Displacement* (The International Federation of Red Cross and Red Crescent Societies 2012), 16.

<sup>109</sup> World Disasters Report, *Focus on Forced Migration and Displacement*, 14.

<sup>110</sup> Baker, Jock et al., “Hotspots – Predictions and Action,” *Forced Migration Review* 31 (2008): 44.

<sup>111</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 323.

<sup>112</sup> Ibid.

<sup>113</sup> “Why Greenland’s darkening ice has become a hot topic in climate science,” *The Guardian*, June 12, 2013, accessed July 3, 2013, <http://www.guardian.co.uk/environment/climate-consensus-97-percent/2013/jun/12/greenland-darkening-ice-climate-science>.

Overall, climate-related exposures most commonly associated with migration fall into two general categories: *sudden-onset events* and *slow-onset changes* in environmental conditions. *Sudden-onset events* take place over short periods of time and include phenomena such as tornadoes, hurricanes, floods, glacial lake outburst floods, wildfires and extreme wind, rain or snow events, earthquakes, landslides, volcanic eruptions. These force people off their land much more quickly and dramatically. Hurricane Katrina and Rita, for example, which lashed the Gulf Coast of the United States in August and September 2005 left an estimated two million people homeless.<sup>114</sup> In fact, sudden-onset events have the potential to cause considerable damage to infrastructure and property, as well as resulting in loss of life, and are therefore often associated with distress migration. On the other hand, slow-onset changes are, in general, natural processes existing at a lower rate which are advanced by human activity. These include salinization of agricultural land, desertification, droughts, growing water scarcity and food insecurity or sea-level rise.<sup>115</sup> However, in the case of slow-onset changes, the nexus between climate and environmental changes, on the one side, and migration on the other, is much more indirect as in the case of sudden-onset events. “In most cases, one or more of the factors such as the rapid population growth, economic decline, inequitable distribution of resources, lack of institutional support and political repression are also presented.”<sup>116</sup>

Numerically and geographically, some regions, areas, communities and people are more affected by climate and environmental changes than others, which in turn leads us to identify so called hotspots and locations at risk, especially in Sub-Saharan Africa, North Africa, the Middle East, Asia and the Pacific. For example, South and East Asia are particularly vulnerable to large-scale forced migration because **sea level rise** will have a disproportionate effect on their large populations living in low-lying areas. Thereby, Bangladesh might be the most potential impact hotspot of the region, due to its predominant location on a flood plain, low elevation, high population density, high levels of poverty and the direct dependency of its population on natural resources. “Extreme climatic events have historically claimed millions of lives and destroyed livelihoods, but Bangladesh has also been able to prove to the rest of the world that with proper investment in Disaster Risk Reduction, it is possible to drastically

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<sup>114</sup> Hsu, Spencer, “2 Million Displaced By Storms.” Washington Post, January 16, 2006, accessed July 5, 2013, <http://www.washingtonpost.com/wp-dyn/content/article/2006/01/12/AR2006011201912.html>.

<sup>115</sup> Stojanov, Robert, “Conceptualization of Environmentally Induced Migration”, 2008, accessed July 05, 2013, <http://www.ehs.unu.edu/file/get/3987>.

<sup>116</sup> Ibid.

cut down the death toll.”<sup>117</sup> However, data from 11 Bangladeshi monitoring stations shows an average sea-level rise of 5mm per year over the last 30 years, with climate models forecasting further rises which will soon require new designs for embankments, only realizable with massive funding by the richest nations. Briefly, in terms of overall vulnerability to climate change, Dhaka, Bangladesh, fares the worst among Asian cities, according to a study by the World Wide Fund for Nature (WWF). Yet, other mostly coastal cities in Asia are also in danger of future sea-level rise continuing to impact all sectors, from national and economic security to human health, food production, infrastructure, water availability and ecosystems. Six of Asia’s ten megacities are located on the coast: Jakarta, Shanghai, Tokyo, Manila, Bangkok and Mumbai; while socio-economic sensitivity is moderate for the cities surveyed, threats to sustainable development and natural resource management due to climate and environmental changes are still high.<sup>118</sup> China, meanwhile, has 41 percent of its population, 60 percent of its wealth and 70 percent of its megacities in coastal areas.<sup>119</sup> Other cities and areas at risk by sea-level rise include Buenos Aires, St Petersburg, New York, Miami and London, African countries like Egypt (especially along the northern coastal zone that is characterized by the low-lying delta of the Nile), Gambia, Mozambique, Senegal and Suriname as well as the already mentioned number of islands, such as Kiribati, Maldives, Tuvalu, the Marshalls and some small islands in the Caribbean, and the Indian and Pacific Oceans, e.g. Micronesia and French Polynesia.

“The warming of the ocean surface, which has already been detected around the small island states, is predicted to be accompanied by an increase in heavy rainfall and more intense and frequent storms and typhoons, exacerbated by the geographical location of the islands in the typhoon belt. Furthermore, coral reefs and mangroves will be threatened by rising sea temperatures and acidification, adversely affecting fisheries and degrading the natural protective barriers of the islands against extreme weather conditions. Agriculture will also suffer, as water resources and arable land become depleted.”<sup>120</sup>

The Stern Report concluded, “Currently more than 200 million people live in coastal floodplains around the world, with two million square kilometers of land and one trillion dollar worth of assets less than one-meter elevation above current sea-level.”<sup>121</sup> Consequently, it can be said that the potential for migration when linked to sea-level rise is considerable.

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<sup>117</sup> IOM, *Migration, Climate Change and the Environment*, 192.

<sup>118</sup> WWF, *Mega-Stress for Mega-Cities – A Climate Vulnerability Ranking of Major Coastal Cities in Asia* (Gland: WWF International, 2009).

<sup>119</sup> Human Development Report, “Fighting climate change: Human solidarity in a divided world,” UNDP 2007, accessed July 6, 2013, [http://hdr.undp.org/en/reports/global/hdr2007-8/papers/brown\\_oli.pdf](http://hdr.undp.org/en/reports/global/hdr2007-8/papers/brown_oli.pdf).

<sup>120</sup> IOM, *Migration, Climate Change and the Environment*, 275.

<sup>121</sup> Stern et al., *The Stern Review of the Economics of Climate Change*, 76-77.

Contrarily to hurricanes, rains and droughts, this phenomenon is “virtually irreversible and manifests itself over a long period of time. This could make migration the only possible option for the population affected.”<sup>122</sup> It can become permanent and require relocation of affected populations, either internally or in another country. For the Pacific region, Australia and New Zealand are usually suggested as the most likely candidates to provide land. Other possibilities could be Indonesia, the Philippines, the Solomon Islands, Vanuatu, the U.S. or Japan.<sup>123</sup>

Additionally, millions are vulnerable in **drought-risk hotspots** which are mainly located in Egypt, Sudan (where the degrading environment is contributing to the already complex conflict situation, esp. in Darfur) and Sub-Saharan Africa, but also in South Asia (predominantly Afghanistan, Pakistan and parts of India), South-east Asia (notably Burma, Indonesia and Vietnam), the Americas (Argentine, Brazil, Mexico) and the Middle East with Iran, Saudi Arabia and Syria in particular, where devastating droughts left vast areas of this “once-rich food basket with very scarce water resources for use in agriculture.”<sup>124</sup> In the case of sub-Saharan Africa, changed patterns of rainfall would also have particularly serious impacts for food security – as we have seen in Somalia that was affected by severe food insecurity and famine during 2010-2012 – a crisis that claimed the lives of about 258,000 people, including 133,000 children under 5, according to a recent study jointly funded and commissioned by the United Nations Food and Agriculture Organization’s (FAO), Food Security and Nutrition Analysis Unit for Somalia (FSNAU) and the USAID-funded Famine Early Warning Systems Network (FEWS NET).<sup>125</sup> In fact, referring to UNDP, up to 90 million hectares of drylands in sub-Saharan Africa could experience drought that can have devastating effects on most of the continent’s rural people who subsist off the land and have little or no access to stored water supply for irrigation.<sup>126</sup> Research on droughts in Niger illustrates this point. Niger is one of the poorest countries in the world. It ranks second last in the UN’s Human Development Index (HDI), with a life expectancy of nearly 56 years, 40 percent of children having low weight for their age in an average year, and more than one in five children dying before their fifth birthday. Vulnerability to climate shocks in Niger is linked to several factors, including widespread poverty, high levels of malnutrition, and low

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<sup>122</sup> Piguet, Etienne, “Climate Change, Environment and Migration Research” (paper presented at the 2<sup>nd</sup> Expert Workshop on Climate Change, Environment, and Migration, Munich, Germany, July 24-24, 2009).

<sup>123</sup> Kelman, Ilan, “Island Evacuation,” *Forced Migration Review* 31 (2008): 20.

<sup>124</sup> IOM, *Migration, Climate Change and the Environment*, 300.

<sup>125</sup> “Study suggests 258,000 Somalis died due to severe food insecurity and famine,” FAO, May 3, 2013, accessed July 7, 2013, <http://www.fao.org/emergencies/fao-in-action/stories/stories-detail/en/c/175468/>.

<sup>126</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 323.

levels of education, limited health coverage and agricultural production systems that have to cope with uncertain rainfall. During 2004-2005, 2008 as well as in 2011, the implications of these underlying vulnerabilities were powerfully demonstrated by a climate shock, with an early end to rains, noticeably affecting the harvests in some regions of the country and resulting in widespread food security risks.<sup>127</sup> Furthermore, as the European Commission declares, 2012 also saw cholera outbreaks, floods, a 33 percent increase in malaria cases and the influx of some 60,000 refugees from northern Mali. Given the impoverishment of vulnerable households as a result of continued high prices, nutritional needs will remain extremely high in 2013.<sup>128</sup>

Nevertheless, the impact of droughts and desertification on migration is not yet clear. Even though research in sub-Saharan Africa in the 1990s indicated that some seven million people out of 80 million considered to be food insecure, used migration as a coping strategy during drought,<sup>129</sup> many researchers still emphasize that migration due to droughts and desertification only is the last resort when all other survival strategies have been exhausted. This, for example, becomes evident in Mustang, a northern district of Nepal, bordered by the two enormous mountains, Dhaulagiri and Annapurna, “which act as a massive moisture barrier, separating one of the wettest from one of the driest regions of Nepal.” “Without irrigation, agriculture would be impossible in this arid region where rainfall averages barely 200 millimeters per year.”<sup>130</sup> Yet, the lack of water is already so serious that villagers think whether they have to relocate. They cannot rely on state support, as government institutions hardly have a bearing on their remote valley. As a result, residents will ultimately be pushed to the brink of their existence and thus will have to relocate to lower situated places where the water resources will not be depleted so quickly.<sup>131</sup>

Generally speaking, most migration in consequence of drought and desertification tends to be seasonal or temporary migration, meaning that migrants will be returning to their

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<sup>127</sup> Human Development Report, “Climate Shocks: Risk and Vulnerability in An Unequal World,” UNDP 2007/2008, accessed July 6, 2013, [hdr.undp.org/en/media/HDR\\_20072008\\_EN\\_Chapter2.pdf](http://hdr.undp.org/en/media/HDR_20072008_EN_Chapter2.pdf).

<sup>128</sup> European Commission, Humanitarian Aid & Civil Protection, “Aid in Action – Niger,” last modified April 16, 2013, [http://ec.europa.eu/echo/aid/sub\\_saharian/niger\\_en.htm](http://ec.europa.eu/echo/aid/sub_saharian/niger_en.htm).

<sup>129</sup> OCHA, IDMC, NRC, “Monitoring Disaster Displacement in the Context of Climate Change. Findings of a Study by the United Nations Office for the Coordination of Humanitarian Affairs and the Internal Displacement Monitoring Centre” (2009): 12, accessed July 9, 2013, [http://www.internaldisplacement.org/8025708F004BE3B1/%28httpInfoFiles%29/12E8C7224C2A6A9EC125763900315AD4/\\$file/monitoring-disaster-displacement.pdf](http://www.internaldisplacement.org/8025708F004BE3B1/%28httpInfoFiles%29/12E8C7224C2A6A9EC125763900315AD4/$file/monitoring-disaster-displacement.pdf).

<sup>130</sup> Bernet, Daniel, “Fleeing Drought,” *D+C Development and Cooperation*, Volume 40 (2013): 214.

<sup>131</sup> *Ibid.*

countries/communities of origin. This type of migration has been documented, for instance, in Burkina Faso, Ethiopia, Mali and Senegal among others in sub-Saharan Africa. Studies have also documented that while most migration occurs within national boundaries, migrants may cross nearby borders in response to recurrent drought, as particularly demonstrated in countries of the Sahel where borders are porous. Though much fewer in number, there are studies that report the influence of drought on longer distance or overseas migration.<sup>132</sup> Nevertheless, the general conclusion to be drawn here is “that forecasts of increased migrations linked to drought related phenomena remain hazardous.” Consequently, it would be difficult to put a figure on the magnitude of populations at risk and the eventual migration arising from climate and environmental change induced droughts.<sup>133</sup>

The increase in the frequency of **tropical hurricanes, heavy rains and flooding** are probably among the easiest to identify. In 1989, for example, the “Big Wet” in eastern Australia brought torrential downpours and the worst flooding in two centuries. Many people in England will remember the Great Storm of October 1987 when hurricane-force winds swept across southern England overnight and tore down 15 million trees and cut the power supply to millions of people.<sup>134</sup> Central America was devastated by Hurricane Mitch during the 1998 hurricane season; many people were uprooted by the 2004 Asian tsunami or the 2005 U.S. Gulf Coast hurricanes with Hurricane Katrina in particular that breached the levees of New Orleans, one of the world’s high-risk hurricane zones. As the flood waters receded, they revealed acute vulnerabilities associated with high levels of pre-existing social inequality. “Flood damage was superimposed on a divided city, just as climate and environmental change damage will be superimposed on a divided world.” Years after the tragedy, inequalities continue to hamper recovery.<sup>135</sup> Other flood-risk, hurricane- and cyclone-risk hotspots include Angola, Ethiopia, Madagascar, Mali and Mozambique in Africa, Bolivia, Haiti, Mexico, Trinidad and Tobago in the Americas as well as Indonesia, Myanmar, Nepal, Pakistan, the Philippines, parts of India and Vietnam in Asia and the Pacific region.

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<sup>132</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 331.

<sup>133</sup> Pigué, Etienne, “Climate Change and Forced Migration.” UNHCR Issues in Refugee Research, Working Paper No. 153 (2008): 7, accessed July 9, 2013, <http://www.unhcr.org/47a316182.html>.

<sup>134</sup> “The Great Storm of 1987,” *The Guardian*, October 15, 2012, accessed July 9, 2013, <http://www.guardian.co.uk/environment/interactive/2012/oct/15/great-storm-1987-interactive-map>.

<sup>135</sup> Perry et al. 2006, Rowland 2007, Turner and Zedlewski 2006, Urban Institute 2005, in: Human Development Report, “Climate Shocks: Risk and Vulnerability in An Unequal World,” UNDP 2007/2008, accessed July 11, 2013, [hdr.undp.org/en/media/HDR\\_20072008\\_EN\\_Chapter2.pdf](http://hdr.undp.org/en/media/HDR_20072008_EN_Chapter2.pdf).

Taking the case of Mozambique, for instance, we can state that flooding is a recurring theme there. In 2000, Mozambique suffered the worst flood in its recent history. The country once again experienced flooding a year later, affecting an even larger geographical area, “but only about half of the number of people due to the low population density in the regions hardest hit and relocation of some populations from the previous year,” according to UNICEF. In 2007, 285,000 people were affected by the floods, with over 107,000 people sheltered in temporary accommodation centers. In 2008, “over 110,000 people were newly displaced when the center of the country was hit by major flooding, particularly along the Zambezi River in central Mozambique.”<sup>136</sup> Moreover, repeated catastrophic flooding in 2012 and January 2013 destroyed houses and schools, people lost their harvests and access to medical facilities, sanitation and drinking water. According to the American Red Cross, these floods have affected more than 230,000 people, displaced 180,000 and killed more than 100 people since the beginning of the rainy season in October 2012.<sup>137</sup> As a result, the government – supported by international organizations – encouraged the construction of permanent shelters for vulnerable households and the provision of basic sanitation, but also resettlement away from dangerous flood plains to preserve goods, food and livestock in secure zones.

Nonetheless, studies carried out after events such as heavy rains, hurricanes, cyclones and flooding tend to relativize their effects in terms of migration in general, and long-term migration in particular. Living mainly in developing countries, the victims of such events have usually little mobility and the majority of the displaced return as soon as possible to reconstruct their homes in the disaster zone. On a global level therefore, the general conclusion is that the potential of hurricanes and torrential rains to provoke long-term and long-distance migrations remains limited.<sup>138</sup> Apart from that, the problem is that no climate model is able to predict with accuracy whether or not the damage in zones severely affected by tropical hurricanes, heavy rains and flooding will have tragic consequences. As with other areas at risk, high incidences of hazards need not necessarily result in similarly high levels of human vulnerability.<sup>139</sup> However, areas at risk from more than one climate-related hazard warrant special concern. These areas include much of Sub-Saharan Africa and much of South Asia. Additionally, some areas are at-risk hotspots for all three of the above mentioned

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<sup>136</sup> “UNICEF history in Mozambique,” UNICEF, accessed July 9, 2013, [http://www.unicef.org/mozambique/overview\\_1587.html](http://www.unicef.org/mozambique/overview_1587.html).

<sup>137</sup> “Disaster Alert: Flooding in Mozambique,” American Red Cross, accessed July 9, 2013, <http://newsroom.redcross.org/2013/02/21/disaster-alert-flooding-in-mozambique/>.

<sup>138</sup> Piguet, Etienne, “Climate Change and Forced Migration.” UNHCR Issues in Refugee Research, Working Paper No. 153 (2008): 6, accessed July 9, 2013, <http://www.unhcr.org/47a316182.html>.

<sup>139</sup> Jock Baker et al., “Hotspots – predictions and action,” *Forced Migration Review* 31 (2008): 45.

hazards – sea level rise, droughts and desertification as well as tropical storms, heavy rains and flooding. These include South-East Africa and parts of South and South-East Asia,<sup>140</sup> but also countries like Mexico. – Indeed, sea level rise is primarily affecting the country’s Caribbean coastlines, and an increased frequency of hurricanes is putting the Mexican population, the infrastructure and coastal ecosystems at greatest risk. Moreover, severe drought and soil degradation is progressively impacting the country, especially affecting poor rural populations, but also areas that traditionally have had plenty of water like Chiapas.<sup>141</sup> As we will see in chapter three of this work, these events will have an increasing impact on migration patterns and can potentially result in mass movements of people.

### **2.3 Development Implications: Hollowed Economies, Health Challenges, Political Instability and Ethnic Conflict**

The following part of this paper – mainly based on the work by Oli Brown for IOM (2008) – will be kept short in order to avoid reiterations in the next chapters of this thesis. Principally, migration due to climate and environmental change has consequences on development in several ways: by increasing pressure on urban infrastructure and public service provision, undermining economic growth, increasing the risk for national and international security and leading to new health-risks, educational and social challenges among migrants themselves. There is irony in the fact that it is the wealthier countries of the North that are still responsible for the greatest environmental problems (through indulging in excessive consumption and energy use, resulting in extreme levels of carbon emissions), yet, the developing countries will be the most affected by climate and environmental change and resulting development implications. “If the situation with refugees from war and political persecution is any indication they will also bear the greatest burden of providing for environmental migrants.”<sup>142</sup>

Regarding the problem of the so called ‘**hollowed economies**’ one can generally say that the development of poorer countries is being severely hampered by the strains and costs of climate and environmental change. As previously indicated, the countries that suffer most from climate change are those on the lower levels of global economic hierarchies, mostly economies that are heavily dependent on their primary sectors – notably agriculture, fisheries and forest – and those tropical countries which depend heavily on tourism and fisheries – notably the small-island developing states. At the same time, climate and environmental

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<sup>140</sup> Ibid.

<sup>141</sup> IOM, *Migration, Climate Change and the Environment*, 175, 176.

<sup>142</sup> Brown, *Migration and Climate Change*, 31.

change prevents these countries from climbing out of poverty. The effects of this for the people of poorer countries are often felt at the economic level, however, it is not easy to assess the meaning of this new barrier to development. It would be simplistic to assume that poverty would automatically lead to more migration since migration research has shown that it is not the poorest of the poor who can migrate, but those who can find the means to migrate, e.g. better educated people with somewhat higher incomes, who have the resources needed for mobility, especially when it comes to international migration.<sup>143</sup> This loss of “human capital” thus can undermine economic growth. – The so called “brain drain effect” from developing countries is already a serious problem. One of the legacies of the 1930s Dust Bowl case was that those who fled the drought “were young, skilled families with some money and strong social networks – the very kind of people that are essential components of successful communities.”<sup>144</sup> “The places they left behind”, says Ottawa University’s Robert McLeman, “became increasingly polarized between affluent property owners and an impoverished underclass, a downward spiral from which some communities never recovered. Future climate-migration holds a similar potential to have negative long-term consequences for socio-economic stability in affected areas.”<sup>145</sup> For instance, the IOM estimates that disasters due to climate and environmental change could exacerbate the brain drain in developing countries characterized by the migration of highly skilled people just when those countries are at their most vulnerable and need greater support from skilled workers to deliver key public services, drive economic growth, articulate calls for greater democracy and development and deal with the damage associated with natural disasters by contributing the technological knowledge and capacity to cope with climate and environmental change. Generally speaking, the departure of the most skilled in response to environmental degradation (among other factors) not only hampers economic development, but will increase the Global South’s vulnerability to climate and environmental change, which in turn can exacerbate environmental degradation, conflict and migration; in other words: a vicious circle.

Concerning the **health challenges** related to environmentally-induced migration, it can be said that population displacement undermines the provision of medical care and vaccination programs, making infectious diseases harder to deal with and more deadly. As Brown states, “it is well documented that refugee populations suffer worse health outcomes than settled

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<sup>143</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 328.

<sup>144</sup> Brown, *Migration and Climate Change*, 33.

<sup>145</sup> McLeman, Robert and Barry Smit, 2006, in: Brown, *Migration and Climate Change*, 33.

populations.”<sup>146</sup> Among the most likely diseases are climate-sensitive killers, including cholera, but also mosquito-borne diseases such as malaria, dengue and yellow fever, which together are responsible for several million deaths and hundreds of millions of cases every year.<sup>147</sup>

“Malaria and dengue have always moved with people, and in some countries the circular labor movement of people between the countryside and cities has given birth to new urban reservoirs of both these diseases. Dengue fever in Rio de Janeiro has been linked to rural-urban migration as well as to urban environmental degradation.”<sup>148</sup>

Among the diseases that will plague health services and economies in an era of changing water distribution patterns in the wake of repeated flooding, together with an increase in temperature and the forced mass movement of people, will also be infectious water-related diseases such as schistosomiasis and the diarrhoeal diseases. Schistosomiasis, for example, is acquired when people come into contact with fresh water infested with the larval forms (cercariae) of parasitic blood flukes, known as schistosomes. As the WHO states, the disease “affects almost 240 million people worldwide, and more than 700 million people live in endemic areas. The infection is prevalent in tropical and sub-tropical areas, in poor communities without potable water and adequate sanitation.”<sup>149</sup> Similarly, viruses and bacteria transmitted through water can cause severe diarrhoea; especially in children, often locking them into a brutal cycle of undernourishment, susceptibility to other infectious diseases, and eventually death. As WHO notes, higher temperatures and too much or too little water can each facilitate transmission of this disease. In countries with inadequate water and sanitation services, diarrhoea is much more common when temperatures are high. – That is to say, many of the health implications of environmentally-induced displacement will probably be felt in the Global South (esp. in sub-Saharan Africa and South Asia), even though, North America and Europe could well experience further growth in the number of new refugees and migrants and, if so, could face new public health challenges, e.g. new patterns of tuberculosis or another increased prevalence of hepatitis A and B.<sup>150</sup> Displacement due to climate and environmental change also presents high-risk situations for the spread of HIV and other sexually-transmitted diseases which can be attributed to overcrowding, poverty, disruption of family and social structures, increased sexual violence, and limited access to barrier

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<sup>146</sup> Brown, *Migration and Climate Change*, 34.

<sup>147</sup> “Insect-borne diseases,” WHO 2013, accessed July 10, 2013, [http://www.who.int/whr/1996/media\\_centre/executive\\_summary1/en/index9.html](http://www.who.int/whr/1996/media_centre/executive_summary1/en/index9.html).

<sup>148</sup> Carballo, Manuel et al., “Health Challenges,” *Forced Migration Review* 31 (2008): 32.

<sup>149</sup> “Schistosomiasis - A major public health problem,” WHO 2013, accessed July 10, 2013, <http://www.who.int/schistosomiasis/en/>.

<sup>150</sup> Carballo, “Health Challenges,” 32.

contraceptives and health services and education. Moreover, women on the move due to climate and environmental change could face additional health risks: elevated risks of maternal mortality, unmet needs for family planning, complications after unsafe abortions as well as limited access to health care services since refugees and migrants in general rarely have the same type of access to health care services as non-migrants and often remain on the margins of access to care that could help them.

Introducing briefly the issue of **political instability and ethnic conflict** (as the topic is going to be explained in more detail in chapter four of this work), it generally can be said that the attention to the link between displacement and migration induced by environmental factors – including climate change – and political instability and conflict has increased. A 2009 report of the United Nations Secretary-General defines migration as one of the channels through which climate change works as a threat multiplier for existing threats to security, exacerbating economic, political and social problems.<sup>151</sup> Besides Africa that is often seen as the continent where climate and environmental change could potentially intensify or trigger conflict due to the continent's reliance on climate-dependent factors (such as rain-fed agriculture), recent ethnic and political conflict, and fragile states as well as Africa's extremely rapid urbanization and population growth,<sup>152</sup> India might be today's most prominent example linking the climate change – conflict debate. "Imagine India in 2033. It has overtaken China as the most populous nation. Yet with 1.5 billion citizens to feed, it's been three years since the last monsoon. Without rain, crops die and people starve; the seeds of conflict take root."<sup>153</sup> – A scenario which Joachim Schellnhuber, director of the Potsdam Institute for Climate Impact Research, presented to members of the United Nations Security Council in New York at the beginning of this year. "Either rich nations will find a way to supply needy nations suffering from damaging climate effects or you will have all kinds of unrest and revolutions, with the export of angry and hungry people to the industrialized countries," Schellnhuber said in an interview in February 2013.<sup>154</sup> However, empirical evidence to draw conclusions on this nexus is not yet sufficient, which in turn does not mean that we should ignore the possible channels through which implications of climate change for human or national security might occur, what form they could take, and what combinations of actions could avert them.

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<sup>151</sup> United Nations General Assembly, "Climate Change and its Possible Security Implications," accessed July 10, 2013, <http://www.refworld.org/docid/4ad5e6380.html>.

<sup>152</sup> Ibid.

<sup>153</sup> Krause-Jackson, Flavia, "Climate Change's Link to Conflict Draws UN Attention." Bloomberg, February 15, 2013, accessed July 10, 2013, <http://www.bloomberg.com/news/2013-02-15/climate-change-s-links-to-conflict-draws-un-attention.html>.

<sup>154</sup> Ibid.

### 3. CASE STUDY MEXICO – MIGRATION IN RESPONSE TO DROUGHT AND OTHER DISASTERS

“Luis Brito walks briskly over the stony soil of a rural village near Guanajuato, Mexico. For 20 years Brito, a community development organizer and former Jesuit seminarian, has helped agricultural communities improve their living conditions. He impatiently dismisses the assumption that Mexican migrants are attracted northward by economic bright lights. It is less the pull of U.S. jobs, he insists, than the push of local environments, where depleted soils and declining aquifers often evict villagers from traditional homes. ‘The degraded ecology has expelled them,’ he says, accenting the verb *expulsar*.”<sup>155</sup>

In the light of the increasing frequency and severity of extreme climatic events in Mexico, along with the lack of affordable instruments to hedge most farmers from disaster risk, Mexico stands out as an exemplary potential hotspot for environmentally-induced migration in Latin America, and therefore has been selected as a case study for this paper. Although the subject has been studied only slightly, there is some evidence to indicate that climate and environmental change have been factors that encourage people to leave their communities and move either to larger urban zones within Mexico, or to emigrate abroad. And indeed, Mexico is still a large migrant-sending country. According to the International Migration Outlook by the Organization for Economic Co-operation and Development (OECD) in 2013, Mexico is mostly a country of emigration and transit migration. Many Mexicans have emigrated to the United States in the past 25 years whereby environmental degradation related to unsustainable land and water use can be considered as one of the potential root causes of certain migration from Mexico to the United States. In 2010, around 11.7 million Mexican-born were living in the United States. Annual outflows, though, have been declining since 2006, due to the recession and increased border controls.<sup>156</sup> Additionally, two different forms of climate variability can be observed within country: the North and Central regions are drought-prone areas, whereas the coast of the Gulf of Mexico is frequently hit by tropical storms and floods. Over the years, the National Civil Protection System has improved its institutional and operational preparedness to manage these disruptive events, in partnership with federal states and municipal stakeholders, however, the national legislation and above all the implementation of laws on environmental protection still show some serious deficiencies. In other words, more can be done to avoid future losses and at the same time support sustainable economic development.

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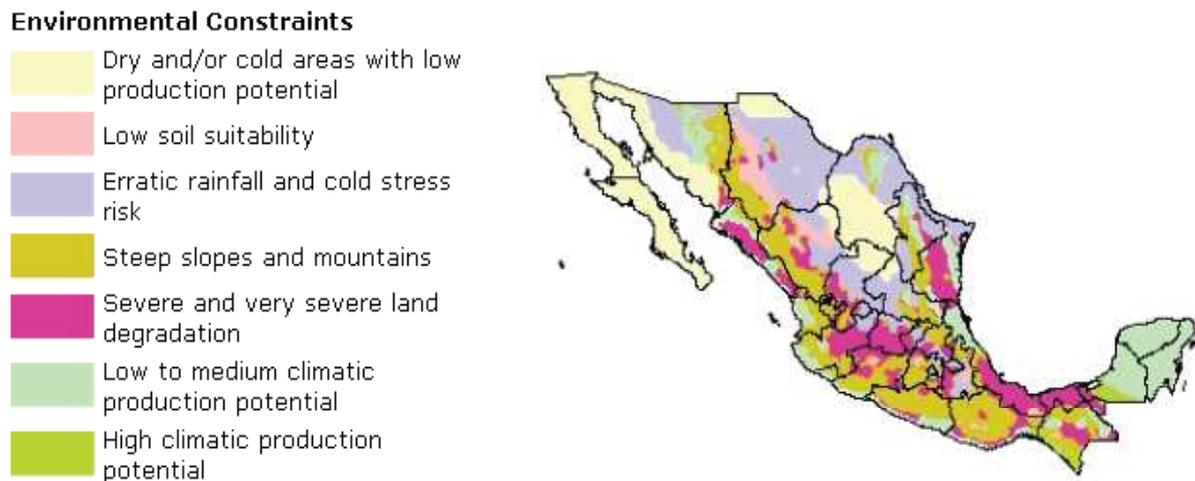
<sup>155</sup> EACH-FOR, “Environmental Change and Forced Migration Scenarios” (D.2.7.1 State of the Art Review, 31.01.2008), 66.

<sup>156</sup> “Mexico Country Notes: Recent Changes in Migration Movements and Policies,” OECD 2013, accessed July 15, 2013, <http://www.oecd.org/els/mig/MEXICO.pdf>.

### 3.1 General Overview

Mexico is the third largest and second most populous country in Latin America with a total population of 120,847,477, according to the World Bank (2013).<sup>157</sup> It also has the second-largest economy and is a major oil producer and exporter. Two-thirds of the country's poor people are farmers and farm workers. Three quarters of those most impoverished live in rural areas, many as subsistence farmers who are especially vulnerable to the exposures of a wide range of natural and man-made hazards.<sup>158</sup> The country's geographical and topographical characteristics as well as its social-economic status generate a variety of severe exposure to earthquakes, volcanic eruptions, tsunamis, landslides, floods, hurricanes, torrential rain, forest fires, droughts, heatwaves, freezes, etc. and in addition, significant disparities amongst the population in wealth, income and education, create the conditions for elevated social and economic vulnerability to these exposures.<sup>159</sup>

Figure 2 Current Major Environmental Constrains for Agricultural Production in Mexico



Source: FAO Country Profiles, "Mexico – Major Environmental Constraints for Agricultural Production Project" (based on FAOCLIM database, ARTEMIS NDVI imagery, and soil and terrain data provided by Soil Resources Management and Conservation Service, FAO 2013)

See more at: <http://www.fao.org/countryprofiles/Maps/noaa/en/?iso3=MEX&mapID=604#sthash.owR0ThoS.dpuf>.

<sup>157</sup> "Data Mexico," The World Bank 2013, accessed July 15, 2013, <http://data.worldbank.org/country/mexico>.

<sup>158</sup> "Desertification and Migration: Mexico and the United States," Leighton Schwartz, Michelle and Jessica Notini, Research Paper for the U.S. Commission Immigration Reform 1994, accessed July 15, 2013, <http://www.utexas.edu/lbj/uscir/respapers/dam-f94.pdf>.

<sup>159</sup> "OECD Reviews of Risk Management Policies: Mexico 2013 – Review of the Mexican National Civil Protection System," OECD Publishing 2013, accessed July 5, 2013, [http://www.keepeek.com/Digital-Asset-Management/oecd/governance/review-of-the-mexican-national-civil-protection-system\\_9789264192294-en](http://www.keepeek.com/Digital-Asset-Management/oecd/governance/review-of-the-mexican-national-civil-protection-system_9789264192294-en).

Overall, the southern states of Mexico appear to be the most vulnerable to climatic events in the entire country. Many municipalities in the southern states of Guerrero, Oaxaca and Chiapas display the highest levels of vulnerability due to high poverty rates.

“In 2010, more than 60 percent of the population in these states lived in poor conditions. The marginalization rate of this region is also very high, gathering the most marginalized areas in the country and suffering from high socio-demographic vulnerabilities. This marginalization process is linked to rurality; while the rural populations account for 23 percent of the Mexican population, it compounds more than 40 percent of the southern states’ communities and reaches 54 percent in Chiapas and a third in Guerrero and Oaxaca.”<sup>160</sup>

By contrast, the tourist areas on the Yucatan Peninsula have a high capacity to adapt to climate change. The tourist industry has led to higher incomes, lower poverty rates, and accordingly less sensitivity and higher adaptive capacity. Again the northern states such as Nuevo León, display higher resilience than elsewhere, and this could be due to their better socio-economic development and higher access to remittances.<sup>161</sup> In general, states with the lowest level of vulnerability are Baja California Sur, Durango, Zacatecas, Colima, and Yucatán, since the prevalence of infectious diseases, increases in water consumption per inhabitant and population growth tend to be lower compared with the rest of the states.<sup>162</sup>

Speaking of population growth, it must be added that high levels of vulnerability to climate and environmental change in Mexico can also be observed in states and cities with significant population concentrations, including such large cities as Mexico City, Guadalajara, Aguascalientes, Xalapa, Veracruz, Puebla, Cuernavaca and Morelia.<sup>163</sup> According to OECD statistics, the urban population increased three-fold between 1970 and 2005, and by 2010 a full 62 percent of the population lived in the 56 largest metropolitan areas.<sup>164</sup> But the trend of rapid Mexican urbanization in recent decades was not accompanied by the appropriate development of infrastructure and land-use policies. As a result, the urban poor often live in

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<sup>160</sup> “OECD Reviews of Risk Management Policies: Mexico 2013 – Review of the Mexican National Civil Protection System,” OECD Publishing 2013, accessed July 22, 2013, [http://www.keepeek.com/Digital-Asset-Management/oecd/governance/review-of-the-mexican-national-civil-protection-system\\_9789264192294-en](http://www.keepeek.com/Digital-Asset-Management/oecd/governance/review-of-the-mexican-national-civil-protection-system_9789264192294-en).

<sup>161</sup> “Municipal Vulnerability to Climate Change and Climate-Related Events in Mexico,” The World Bank Social Development Department, April 2013, accessed July 18, 2013, [http://www-wds.worldbank.org/external/default/WDSContentServer/TW3P/IB/2013/04/22/000158349\\_20130422154749/Rendered/PDF/wps6417.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/TW3P/IB/2013/04/22/000158349_20130422154749/Rendered/PDF/wps6417.pdf).

<sup>162</sup> Aguilar (1995), Conde and Gay (1999), in: “Migration and Climate Change: The Mexican Case.”

<sup>163</sup> “Migration and Climate Change: The Mexican Case,” Albo, Adolfo and Juan Luis Ordaz Díaz, BBVA Research Working Paper, August 2011, accessed July 18, 2013, [http://www.bbvarsearch.com/KETD/fbin/mult/WP\\_1128\\_Mexico\\_tcm348-267328.pdf?ts=1872013](http://www.bbvarsearch.com/KETD/fbin/mult/WP_1128_Mexico_tcm348-267328.pdf?ts=1872013).

<sup>164</sup> “OECD Reviews of Risk Management Policies: Mexico 2013 – Review of the Mexican National Civil Protection System.”

low quality houses or illegal settlements in flood zones, hills prone to landslides and building structures unable to withstand a significant earthquake.<sup>165</sup>

Mexico is one of the few countries in the world exposed to tropical storms originating from two oceans basins: the North Atlantic where the hurricane season starts on June 1 and ends November 30 and the North Pacific where the season lasts from May 15 till the end of November. Over the past years, severe hurricane and tropical storm events such as Hurricane Pauline in 1997, Hurricane Gilbert in 1998, Hurricane Emily, Stan and Wilma in September and October of 2005 or tropical storm Noel at the end of 2007 have had great effects on the Mexican population, the infrastructure and coastal ecosystems, causing both human and economic loss as well as displaced populations every year.<sup>166</sup> Based on data from 1970 to 2011, “23 percent of the Mexican territory is exposed to a high or a very high risk of being hit by a tropical cyclone [...], 17 percent is at a medium risk [...], and 60 percent is at a low or very low risk.<sup>167</sup> Moreover, several coastal regions in Mexico will face sea level rise, particularly low lying areas of the Gulf Coast and the Caribbean. As a result of these observations, climate and environmental change poses a very serious risk for Mexico, with 60 percent of the population and sixty of Mexico’s seventy largest cities being located on the coast.<sup>168</sup> Figures from the World Bank show that between 1997 and 2006, economic losses from storms and floods averaged 0.17 percent of GDP and 3.5 million people were directly affected by hurricanes in this period.<sup>169</sup> More recent data show that in 2010, a total of more than 1.4 million people were affected by natural disasters in Mexico.<sup>170</sup>

Of particular concern, however, is the likelihood that some parts of Mexico will see persistent declines in precipitation over the course of this century. For example, empirical research in the Mexican states of Zacatecas – situated in the Centre-North region of Mexico – shows that the big majority of people asked think that rainfall has become scarcer and patterns of

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<sup>165</sup> Ibid.

<sup>166</sup> IOM, *Migration, Climate Change and the Environment*, 175.

<sup>167</sup> “OECD Reviews of Risk Management Policies: Mexico 2013 – Review of the Mexican National Civil Protection System.”

<sup>168</sup> BBVA Fundación Bancomer, ‘Mexico: Situación Migración’, November 2010, in: “Climate Change, Migration and Security. Best-Practice Policy and Operational Options for Mexico,” Deheza, Elizabeth and Jorge Mora, The Royal United Services Institute for Defence and Security Studies 2013, accessed July 18, 2013, [http://www.rusi.org/downloads/assets/WHR\\_1-13\\_web.pdf](http://www.rusi.org/downloads/assets/WHR_1-13_web.pdf).

<sup>169</sup> “Climate Change Aspects in Agriculture – Mexico Country Note,” World Bank 2009, [http://siteresources.worldbank.org/INTLAC/Resources/257803-1235077152356/Country\\_Note\\_Mexico.pdf](http://siteresources.worldbank.org/INTLAC/Resources/257803-1235077152356/Country_Note_Mexico.pdf).

<sup>170</sup> “Desastres y Desarrollo: El Impacto en 2010,” CEPAL (Comisión Económica para América Latina y el Caribe) 2010, accessed July 18, 2013, [http://www.eird.org/esp/revista/no\\_17\\_2010/art4.html](http://www.eird.org/esp/revista/no_17_2010/art4.html).

temperature and rainfall over the year have changed during the last decades.<sup>171</sup> This, along with the tradition of migrating that exists in many rural communities, has resulted in the emigration in a large number of men of working age towards cities, other states in Mexico or the US. For instance, EACH-FOR studies that were conducted in Tlaxcala, a highly desertified state in Central Mexico which is very vulnerable to the effects of climate change, particularly in combination with deforestation, erosion, and underlying poverty and social vulnerability, shows that migration is already a common response to changing environmental conditions. In the case of Western Tlaxcala, a preferred option is temporary migration to the U.S. or Canada, working half a year abroad and half a year at home.<sup>172</sup> As explained by two interviewees:

*“...when our harvest is bad, we have to rely on ourselves. Many of us had to leave, to Canada or the United States... the money I made there... was a big help for my family. Without that income, it would have become extremely difficult.”*

*“My grandfather, father and I have worked these lands. But times have changed... the rain is coming later now, so that we produce less. The only solution is to go away, at least for a while [to the United States]. But leaving my village forever? No. I was raised here and here I will stay.”<sup>173</sup>*

That means, many rural families find it necessary to undertake migration in order to cope with diminished incomes. In some cases people migrate directly from their rural town to a destination in the United States where they have a family member or a strong social network already established.<sup>174</sup>

Aside from the North-Central Mexican region, droughts and soil degradation will mainly affect rural populations and the agriculture and livestock sectors in the South of the country. As indicated above, this region is especially vulnerable to extreme weather events because of its geographic exposure, low incomes, and greater reliance on climate sensitive sectors such as agriculture. Given the region’s mountainous topography, extensive irrigation is only

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<sup>171</sup> Schmidt-Verkerk, Kerstin, “The Potential Influence of Climate Variability on Migratory Behavior – A study of Drought, Hurricanes and Migration in Mexico” (paper prepared for the third Summer Academy on Social Vulnerability: ‘Environmental Change, Migration, and Social Vulnerability’, Hohenkammer Castle, Germany, July 27 – August 2, 2008).

<sup>172</sup> EACH-FOR, “Environmental Change and Forced Migration Scenarios” (D.3.4 Final Synthesis Report, 31.03.2009), 59.

<sup>173</sup> Warner, Koko et al., “In Search Of Shelter – Mapping the Effects of Climate Change on Human Migration and Displacement” (paper prepared for the 2009 Climate Negotiations. Bonn, Germany: United Nations University, CARE, and CIESIN-Columbia University and in close collaboration with the European Commission “Environmental Change and Forced Migration Scenarios Project”, the UNHCR, and the World Bank).

<sup>174</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 331.

practicable in the coastal plains that are dominated by wealthy landowners. Most smallholder farmers will remain heavily dependent on rain-fed agriculture.<sup>175</sup>

### **3.2 Mexico: Latin America's Major Emigration Country – A Short Historical Foray into Past Patterns of Mexican Migration**

As the country's history has shown, Mexico is a country of immigration, transmigration but most of all emigration, mostly to the United States. In other words: migration flows from and through Mexico are not new, yet the push and pull factors controlling these movements are becoming increasingly complex. The migration of people may occur during periods of economic crisis, violence, persecutions, natural disasters and the depletion of natural resources resulting in the loss of fertile lands and the livelihoods of entire communities.<sup>176</sup>

As said before, the resources needed for any migration are often considerable. As a consequence, Mexico has and continues to experience major internal migration. People, families and entire communities move from rural to urban areas in search of a better quality of life, more job opportunities, social stability and improved security. In particular large cities have been a magnet for migration for much of the 20<sup>th</sup> century, receiving large numbers of migrants from other parts of Mexico and other countries in Central and South America, contributing to significant demographic changes.<sup>177</sup> Nevertheless, for the past century, Mexican emigration has far outweighed other forms of international migration, not least because of the fact that Mexico shares a 3200-kilometer border with the United States. The difficulty of policing such a long border, and the exposure that it implies between the two countries, are two reasons why Mexican migration has been so significant. Data from the US Census Bureau (2012) shows that in 2010, approximately 11.7 million Mexican immigrants resided in the United States.<sup>178</sup> Over the past five decades, the Mexican born were the single largest origin group of Latin American immigrants in the United States. Indeed, the number of Mexican immigrants living in the United States rose rapidly from 1960 to 2000 – nearly tripling during the 1970s and doubling during both the 1980s and 1990s. The Mexican-born share of the U.S. immigrant population has steadily increased since 1960, topping out at 30

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<sup>175</sup> Ibid.

<sup>176</sup> "Climate Change, Migration and Security. Best-Practice Policy and Operational Options for Mexico," Deheza, Elizabeth and Jorge Mora, The Royal United Services Institute for Defence and Security Studies 2013, accessed July 24, 2013, [http://www.rusi.org/downloads/assets/WHR\\_1-13\\_web.pdf](http://www.rusi.org/downloads/assets/WHR_1-13_web.pdf).

<sup>177</sup> Human Development Report, "Fighting climate change: Human solidarity in a divided world," UNDP 2007, accessed July 24, 2013, [http://hdr.undp.org/en/reports/global/hdr2007-8/papers/brown\\_oli.pdf](http://hdr.undp.org/en/reports/global/hdr2007-8/papers/brown_oli.pdf).

<sup>178</sup> "The Foreign-Born Population in the United States: 2010" U.S. Census Bureau, May 2012, accessed July 24, 2013, <http://www.census.gov/prod/2012pubs/acs-19.pdf>.

percent by 2000.<sup>179</sup> Therefore, the need to understand Mexico-U.S. migration is greater today than at any time in its long history. Its volume and complexity are greater than most observers might have imagined even a decade ago; and it operates in a context charged with serious new human, political, and security challenges.

Historically, Mexico-U.S. migration has been rooted in economic trends on both sides of the border. It already began with the Spanish colonial dominion 1535 to 1821, however, the first massive influx of Mexican migrants into the United States took place during the Mexican Revolution 1910 to 1917. It was the 20<sup>th</sup> century's first modern social revolution, destined to change Mexico's society and economy but, the turmoil of the war, the danger, the economic catastrophe and social chaos surrounding the revolution pushed Mexican natives north.

“The 1910 revolution, a period of great violence and confusion in Mexican history, directly affected the Southwest. An estimated one million Mexicans lost their lives in the decade of fighting, and a large-scale displacement of people took place. Thousands fled from the countryside into the larger cities of Mexico, while at the same time other thousands fled from the central portions of Mexico northward to the United States. No one knows precisely how many Mexicans were involved in this great exodus; one estimate holds that more than one million Mexicans crossed over into the United States between 1910 and 1920.”<sup>180</sup>

In fact, the Revolution had created a state of turmoil to the south, and Mexicans sought the peace of the north. As a result of this revolution and the therewith involved flood of Mexican migrants to the United States, the U.S.-government approved recruitment of about five million Mexican workers between 1917 and 1920, whereby the railroads hired a bulk of the Mexicans for construction and maintenance. Moreover, during World War II and with the growing demand for manual labor, thousands of Mexican workers became a legal alternative for temporary employment in the US. The so-called “Bracero Program” of 1942 brought in a few hundred experienced Mexican agricultural laborers to harvest the sugar beet crop in California. The program soon spread to cover most of the United States and provided workers for the agriculture labor market. By 1945, the quota for the Bracero Program was more than 50,000 ‘braceros’ working in the U.S. railroad system and almost the same number of ‘braceros’ working in U.S. agriculture at any one time.<sup>181</sup> At the behest of U.S. growers, who

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<sup>179</sup> Parnreiter 2007, in: Kraler, Albert et al., *Migrationen – Globale Entwicklungen seit 1850* (Wien: Mandelbaum Verlag, 2007): 58ff.

<sup>180</sup> Meier, Matt and Feliciano Rivera, *The Chicanos. A History of Mexican Americans* (New York: Hill And Wang, 1972), 123.

<sup>181</sup> “The 10% Solution – Bracero Program Savings Account Controversy,” *Harvard Review of Latin America*, 2003, accessed July 24, 2013, <http://www.drclas.harvard.edu/publications/revistaonline/fall-2003/10-solution>.

claimed ongoing labor shortages, the program was extended under a number of acts of Congress until 1948. Between 1948 and 1951, the migration of Mexican agricultural laborers continued under negotiated administrative agreements between growers and the Mexican Government. In sum, until 1964, the numbers of Mexicans migrating to the U.S. grew immensely and only stopped with the formal end of the agricultural program. Afterwards, there were agreements covering a much smaller number of contracts until 1967, before no more 'braceros' were granted and illegal immigration began to increase rapidly. During the 1980s, the United States saw a significant increase in illegal immigrants from Mexico. The immigration influx was not limited to Mexicans from one specific region but rather from communities all throughout Mexico. Consequently, in 1986, the United States enacted the Immigration Reform and Control Act (IRCA), whose purpose was to reduce illegal immigration by imposing sanctions on U.S. employers who knowingly hired unauthorized immigrants. Notwithstanding, the Immigration and Naturalization Service estimated that five million persons were illegally present in the United States in 1996 and that the net flow of illegal immigrants was on the order of 275,000 persons per year.<sup>182</sup>

The Mexican and U.S. governments have taken several steps to reduce Mexico-U.S. migration ever since. The North American Free Trade Agreement (NAFTA) lowered trade and investment barriers between Canada, Mexico, and the United States, yet, it is to note that the hopes of economists, that entering into the free trade area would result in sustainable economic growth and in consequence reduce illegal immigration from Mexico to the United States did not hold true. The United States is the largest economy in the world, in which corporations and other private firms make the vast majority of economic decisions, relying on a strong international currency as well as an increasing liberalization of all economic sectors. Education, technology innovation, infrastructures and labor costs are relatively high and well developed in the U.S. compared to developing countries. On the other hand, Mexico only recently entered into the age of a free market economy, still balancing between modern and outdated industries and agriculture. The country relies on its cheap labor costs and weak currency in order to attract foreign FDI and wants its exports to be competitive. However, in less developed areas of Mexico the struggle to fight poverty continues and the gap between rich and poor is becoming larger wherefore, the U.S. remains an attractive destination of Mexican migration, especially labor migration. Hence, NAFTA was supposed to be the

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<sup>182</sup> Borjas, George, *The Mexican Immigration to the United States* (Chicago, London: The University of Chicago Press, 2007), 2f.

'magic wand' that took care of immigration. When NAFTA became effective on January 1, 1994 the agreement between the United States, Canada and Mexico was seen as a comprehensive, multi-layered document that would institute numerous structures, guidelines, and rules relative to trade between all three countries. The objectives of NAFTA included the elimination of trade barriers, heightened investment opportunities, and the promotion of fair competition. Moreover, "the North American Free Trade Agreement was to make Mexico rich and create enough employment incentives to keep its people at home." "It has been anything but."<sup>183</sup> Since NAFTA's signing there has been a rise in Mexican migration to the U.S.,<sup>184</sup> not least because of the fact that NAFTA caused more landless and jobless people in Mexico than ever before. "Some critics [even] claim that NAFTA has become a tool used by the United States to drive poor farmers off the land, thereby producing a steady stream of cheap labor for U.S. agribusiness."<sup>185</sup> In fact, NAFTA improved the economic situation in Mexico very little. Key issues affecting migration such as the gap between Mexican and U.S. wages, as well as the number of available positions in the Mexican labor market even deteriorated. More severely, NAFTA aptly demonstrates that the U.S. economy in parts has developed enormously, creating a demand for a low-wage "flexible" labor force whereas economic growth has been anemic in Mexico, "averaging less than 3.5 percent per year or less than two percent on a per capita basis since 2000."<sup>186</sup> "Also unemployment is higher than what it was when the treaty was signed; and half of the labor force must eke out a living in invented jobs in the informal economy, a figure ten percent higher than in the pre-NAFTA years."<sup>187</sup> "Meanwhile, jobs in the runaway maquiladora industry that left the United States to profit from free trade and cheap labor commonly pay close to the Mexican minimum wage of U.S. \$7.00 per day, an amount so small in the now "open" Mexican market as to force people into informal jobs or across the border."<sup>188</sup>

For sure, NAFTA has produced winners, mostly multinational corporations, but it has also produced a long list of losers, which includes farmers. For example, Mexican farmers who grow corn, beans and wheat for food and some extra cash are among those hit hardest by

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<sup>183</sup> Portes, Alejandro, "NAFTA and Mexican Immigration." *Border Battles – The U.S. Immigration Debates*, July 31, 2006, accessed July 24, 2013, <http://borderbattles.ssrc.org/Portes/>.

<sup>184</sup> Annotation: Of course, it is to note that greater Mexican emigration was partly consequence of the 1995 peso crisis and efforts to reform the Mexican rural land tenure system, but nevertheless NAFTA caused a new era with unforeseeable consequences for both the United States and Mexico with regard to migration patterns.

<sup>185</sup> Flynn, Michael, "Global Migration Coursing Through Mexico." *Global Politician* 2005, accessed July 24, 2013, <http://www.globalpolitician.com/21503-mexico>.

<sup>186</sup> "NAFTA and Mexican Immigration."

<sup>187</sup> *Ibid.*

<sup>188</sup> *Ibid.*

NAFTA because they have been unable to compete with large U.S. grain producers who are government-subsidized. Thus, the response of peasants and workers once displaced has been clear and consistent: they have headed north in ever greater absolute numbers which in turn lead to the growth of the Mexican migrant population in the U.S., much of it undocumented. As a matter of fact, many Mexicans need to work in the United States to support their families south of the border. The National Population Council of Mexico estimates that one in 10 Mexican families is dependent upon remittances as their primary source of income. Remittances from the U.S. influence the Mexican economy deeply. As the *TIME Magazine* has shown, about U.S. \$25 billion were sent home to Mexico from workers in the United States in 2007; “money that plays a large role in the economies of developing nations.”<sup>189</sup> For that reason, people will keep coming, wherefore for now a decline in illegal border crossings is not conceivable.

Moreover, against the background of massive migration flows, negative stereotypes and racism against Mexican migrants in the U.S. paved the way in recent years. American media and policy pundits attack the migrants themselves for their presence and greater visibility. They are considered lawbreakers and accused of taking jobs away from Americans. But, those truly responsible for the situation are the shortsighted authorities who embraced free markets without looking at the negative outcomes for workers, Americans and Mexicans alike. As a consequence, it is time to revisit NAFTA and analyze it in the globalized context. How can NAFTA work for Mexican as well as for American workers? How can the xenophobic rhetoric be eliminated when dealing with the realities of a global economy? These are the questions that we must ponder when thinking of “free trade” agreements. In addition, and besides a re-examination of NAFTA, Mexico’s own ability to generate respectable growth is important in order to reduce massive migration flows to the north. In recent decades, the government enacted a number of reforms but, says James Gerber, an economics professor at San Diego State University, it needs to do more: “dismantle oligopolies, beef up tax collection or increase oil production.”<sup>190</sup> In fact, Mexico should combine a solid economy with a labor force that gains fewer workers each year, and thus, the pressure to emigrate is likely to wane. Of course, many Mexicans will continue to feel the urge to move north regardless of economic changes, but of the many (historical) ties that connect the two countries, and first

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<sup>189</sup> “The Flow of Money – Mapping World Remittances,” *TIME Magazine* 2010, accessed July 24, 2013, <http://www.time.com/time/interactive/0,31813,1737566,00.html>.

<sup>190</sup> Gerber, James, “Don’t Fence Them In.” *The Daily Beast*, in *Newsweek Magazine*, May 27, 2010, accessed July 24, 2013, <http://www.thedailybeast.com/newsweek/2010/05/28/don-t-fence-them-in.html>.

and foremost, because of the historically rare period of drought in much of Mexico after 1994 and the resulting reduction in crop yields that could spur even more migration from south to north, as new analyses find.

### 3.3 Climate and Non-Climate Drivers of Migration in Mexico

As already indicated above, migration is a defining characteristic of modern Mexico and strongly affects its stability, prosperity and political relations with its neighbors. Internal and international migration patterns are well established here and it is hard to project what effects e.g. drying trends associated with climate variations may have on these patterns. It is clear though that **climate-drivers** like slow-onset changes (such as sea-level rise, salinization of agricultural land, desertification, growing water scarcity and food insecurity) as well as sudden and dramatic hazards (such as floods, storms, hurricanes and cyclones) “already contribute to the regions’ complex pattern of human mobility.” “The opportunity for some people to migrate seasonally, send remittances, and return home is an example of migration as an adaptation strategy to deteriorating environmental conditions in Mexico.”<sup>191</sup>

As known from past patterns of Mexican migration, migration for economic opportunities has been a strong trend in Mexican culture. However, the EACH-FOR study “Environmental Change and Forced Migration Scenarios Project” (2009) found that environmental problems have factored into many Mexicans’ decisions to leave.<sup>192</sup> In an interview, a Mexican man in his 50s explains that his family farm in Chiapas – an environmental hotspot, located on the route of many tropical storms – would no longer produce. “Long ago, we were able to plant more, but now the corn doesn’t grow as much. [...] The plant doesn’t provide as much as it used to,” he said. The man left Mexico to find work in the US. Today, he’s working a cleaning job at a movie theater and sending money home to his family members, who still live in Chiapas.<sup>193</sup>

In other words, Mexicans’ decisions to migrate are becoming more heavily influenced by environmental factors as co-author and Research Fellow on the Climate Change and Security Programme at the Royal United Services Institute, Elizabeth Deheza, confirmed in a report

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<sup>191</sup> Warner et al., “In Search of Shelter: Mapping the Effects of Climate Change on Human Migration and Displacement.” (Care International, 2009), 7.

<sup>192</sup> EACH-FOR, “Environmental Change and Forced Migration Scenarios” (D 2.6.2.4 Mexico Case Study Report, 0.01.2009), 24.

<sup>193</sup> “A New Natural World: Climate Change Forces Mexican Farmers to Migrate,” last modified May 10, 2013, <http://www.alleghefront.org/story/new-natural-world-climate-change-forces-mexican-farmers-migrate#sthash.xe6NmB0w.xoR8hi8Z.dpuf>.

published in January 2013.<sup>194</sup> “The environmental changes continue to affect Mexico. The average temperature is expected to rise up to four degrees [Celsius] by the end of the century,” she said in February this year at a panel discussion at The Woodrow Wilson Center in Washington, D.C. Furthermore, average precipitation is expected to decrease by 11 percent<sup>195</sup> which in turn will lead to longer periods of droughts especially in the North of the country as well as in the central regions and regions in the South, which historically have been more humid. The decreases in overall precipitation will further impact crop yields, exerting additional migratory pressures on the population.

As the OECD reviewed in 2013, already 70 percent of the Mexican territory is subject to droughts, impacting severely on the agricultural sector and crop yields.<sup>196</sup> As a consequence, as many as seven million Mexicans may be forced to emigrate to the U.S. over the next 70 years, according to a research published in July 2010 in the *Proceedings of the National Academy of Sciences*.<sup>197</sup> The study focused on Mexico because

“it is one of the biggest migrant-source countries, because there exists state-level data on emigration, and because it has undergone diverse degrees of climate variability across regions. In addition, Mexico is unique in that the relative ease of migration to the United States allows us to better capture the full potential emigration response to changes in crop yields than in many other cases.”<sup>198</sup>

“Using state-level data from Mexico, we find a significant effect of climate-driven changes in crop yields on the rate of emigration to the United States,” Michael Oppenheimer, Professor of Geosciences and International Affairs in the Woodrow Wilson School and the Department of Geosciences at Princeton University, and his economist colleagues further state. “Climate changes predicted by the global circulation models would cause several percent of the Mexican population to move north [if] all other factors are held constant.”<sup>199</sup> Experts say these findings are also relevant to other regions around the world, from Africa to Australia.<sup>200</sup>

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<sup>194</sup> “Climate Change, Migration and Security. Best-Practice Policy and Operational Options for Mexico,” Deheza, Elizabeth and Jorge Mora, The Royal United Services Institute for Defence and Security Studies 2013, accessed July 30, 2013, [http://www.rusi.org/downloads/assets/WHR\\_1-13\\_web.pdf](http://www.rusi.org/downloads/assets/WHR_1-13_web.pdf).

<sup>195</sup> “A New Natural World: Climate Change Forces Mexican Farmers to Migrate.”

See also: “Climate Change and Migration in Mexico: A Report Launch,” last modified February 15, 2013, <http://www.wilsoncenter.org/event/climate-change-and-migration-mexico-report-launch>.

<sup>196</sup> “OECD Reviews of Risk Management Policies: Mexico 2013 – Review of the Mexican National Civil Protection System.”

<sup>197</sup> “Linkages among Climate Change, Crop Yields and Mexico-US Cross-Border Migration,” accessed July 24, 2013, <http://www.pnas.org/content/107/32/14257.full.pdf+html>.

<sup>198</sup> Ibid.

<sup>199</sup> “Climate Change May Mean More Mexican Immigration,” last modified July 26, 2010, <http://www.scientificamerican.com/article.cfm?id=climate-change-may-mean-more-mexican-immigration>.

<sup>200</sup> “Linkages among Climate Change, Crop Yields and Mexico-US Cross-Border Migration.”

Research conducted by Kerstin Schmidt-Verkerk, currently working as Science Officer for the Regional Office for Latin America and the Caribbean of the International Council for Science in Mexico City and expert on the topic of climate change and its possible influence on Mexican migration, only seems to prove this. The results of her research are based on empirical fieldwork in the Mexican state of Zacatecas which is labeled as a classical migration state of Mexico because the first migrants were contracted by the U.S. to build railways and to work in agriculture and mining more than a century ago. Until today, Zacatecas is still one of the most important migrant-sending states in Mexico. According to the Instituto Nacional de Estadística, Geografía e Informática (INEGI), in 2000, 4.9 percent of the population in Zacatecas migrated to the U.S., which is the highest rate of all states. Results of the ‘Encuesta sobre Migración en la Frontera Norte de México’ (EMIF), as shown in Table 1, indicate that after a decline in the absolute number of migrants between 1995 and 2001, migration from Zacatecas to the United States increased again between 2002 and 2005, a fact that she also explains by the exceptional droughts which continue to affect the state until today and which serve as an additional push-factor for emigration.<sup>201</sup>

*Table 1 Flow of Migrants from the State of Zacatecas into the USA by Year*

<b>1995</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
25,487	20,415	15,956	12,014	18,722	17,757	17,778	19,663

*Source: Data elaborated by the USEG of ‘El Colegio de la Frontera Norte’ based on the longitudinal study ‘Encuesta sobre Migración en la Frontera Norte de México. SEGOB: INAMI and CONAPO, STPS, SRE and El Colegio de la Frontera Norte.’<sup>202</sup>*

Nevertheless, other experts strongly disagree with the results of the study by Oppenheimer and his colleagues, saying that the given number of Mexico’s population that could surge north to escape climate-triggered crop failures could be misused as another affront against immigrants. Since a few years, the major policy discussion in the U.S. (and elsewhere) is focused on immigration control. There is wide agreement that illegal immigration should be stopped and legal immigration should be tightly controlled. Since the U.S. government under the Clinton administration launched “Operation Gatekeeper” and thereby increased the budget of the Immigration and Naturalization Service (INS) to \$1.6 billion in 2005, accompanied by

<sup>201</sup> Schmidt-Verkerk, “The Potential Influence of Climate Variability on Migratory Behavior – A study of Drought, Hurricanes and Migration in Mexico.”

<sup>202</sup> Data elaborated by the USEG of ‘El Colegio de la Frontera Norte, in: Schmidt-Verkerk, “The Potential Influence of Climate Variability on Migratory Behavior – A study of Drought, Hurricanes and Migration in Mexico.”

a tripling of the number of Border Patrol Agents from previously 3,389 to 8,200 in 1999, various other measures to militarize the U.S.-Mexican border came into being which in turn have led to a sharp decline in the number of immigrants entering the United States illegally in the past five years. According to the Pew Hispanic Center, the number of illegal immigrants entering the United States plunged by almost two-thirds between 2005 and 2009 – a dramatic shift after years of growth in the population. In the first half of the decade, an average of 850,000 people a year entered the United States without authorization. As the economy plunged into recession between 2007 and 2009, this number fell to 300,000. The drop has contributed to an eight percent decrease in the estimated number of illegal immigrants living in the United States, from a peak of 12 million in 2007 to 11.1 million in 2009, the report said. Besides, these figures came along with a heated debate over efforts by Arizona to identify people who are there illegally and push to have them deported. In fact, the Arizona Immigration Law (enacted in 2010) screens for illegal immigrants and is thereby watched closely in order to see “whether it’s even possible for the state to arrest and deport anticipated large numbers of immigrants in a cost-effective, legal and human way.”<sup>203</sup> Yet, the Arizona law, forced on the state by Republicans, is unlikely to result in increased deportations. The more probable outcome will be to deepen the climate of hostility for Hispanics, legal and illegal. The state’s ‘show me your papers’ provision so far only created an environment of racial profiling that has encouraged private citizens to discriminate and abuse people they regard as foreign.

To my mind, the social and political reality underlines the impossibility to control migration flows “effectively”. An exclusive focus on border control as in the case of the U.S.-Mexican border rather supports powerful lobbies such as the weapons industry than to promote social justice or even human rights. Migration control in the long run must be about regulating North-South relationships especially with regard to inequality. As transnational networks will more and more undermine migration control, many migration policies will achieve almost the opposite of their original intentions as to see in the problem of illegal Mexican migration to the United States. As a consequence, regimes must be facing the forces driving international migration and better rethinking established concepts of migration control under conditions of globalization.

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<sup>203</sup> “Unwanted Immigrants: America’s Deportation Dilemma,” Yale Global Online, last modified July 27, 2010, <http://yaleglobal.yale.edu/content/unwanted-immigrants-americas-deportation-dilemma>.

Other experts even state that it is wrong to make Mexican immigration to the United States the focus of the climate-change problem and that the study lacks context. For example, Neil Adger, an expert in the areas of environmental geography, ecological and institutional economics, and global environmental change, said that the study does not consider the possibility that crop yields in the United States could also be drastically reduced by climate change.<sup>204</sup> According to Bloomberg News (2012), about 71 percent of the U.S. Midwest is experiencing “drier-than-normal conditions,” and temperatures are projected to be above 90 degrees [Fahrenheit] in large swaths of key corn/soy-growing states Missouri, Illinois, and Indiana.<sup>205</sup>

Furthermore, Douglas Massey, a sociologist at Princeton, says that he thinks some of the migration attributed by the study to climate change could actually be the result of structural changes in the Mexican economy. “Over the same period of the study (1995–2005), Mexico’s economy underwent a wrenching change as agricultural subsidies were ended, price supports eliminated, and communal lands privatized.”<sup>206</sup>

That is to say, existing studies about the relationship between climate change and migration have not led to conclusive results yet. Gaps in data collection, analysis and methodology make it difficult to generalize on the extent to which environmental factors play a key role in the Mexican decision to migrate. As Schmidt-Verkerk showed in her paper “Migration flows in Mexico and their sensitivity to climate change” (2011), research by Munshi (2003) found a negative relationship between rainfall and migration in the south west of Mexico because more people move to the U.S. – particularly where they have a family member or strong social networks already established – when a decrease in rainfall endangers their harvests. However, an analysis of migration and precipitation data for the Mexican states of Zacatecas and Durango showed a positive relationship between rainfall and migration in the two states, indicating that the number of U.S. migrants decreases in times of dryer weather.<sup>207</sup> This latter result may suggest that financing such longer-distance migration after periods of low agricultural returns may not always be possible. Increased food prices may force people to

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<sup>204</sup> “Mexican ‘climate migrants’ predicted to flood US,” *Nature* – International Weekly Journal of Science, last modified, July 26, 2010, <http://www.nature.com/news/2010/100726/full/news.2010.375.html>.

<sup>205</sup> “Corn Surges as U.S. Farmers Contend With Hot, Dry Spell,” *Bloomberg*, last modified July 2, 2012, <http://www.bloomberg.com/news/2012-07-02/corn-surges-as-u-s-farmers-contend-with-hot-dry-spell.html>.

<sup>206</sup> “Mexican ‘climate migrants’ predicted to flood US.”

<sup>207</sup> Schmidt-Verkerk, Kerstin, “Migration flows in Mexico and their sensitivity to climate change” (paper presented at the IV Congreso de la Red Internacional de Migración y Desarrollo, Quito, Ecuador, May 18-20, 2011).

spend more money on their basic needs rather than on longer-distance migration. In turn, temporary or seasonal migration becomes a more feasible choice.<sup>208</sup> “Perhaps the key point here is that the effects of declining rainfall and drought on migration depend on the socio-economic situation/ networks and financial means of the people concerned,”<sup>209</sup> wherefore migration from rural to rural and rural to urban areas within Mexico is likely to be more affected by climate and environmental change than other (longer-distance) migration flows. Generally speaking, environmental migrants prefer to remain inside their own countries rather than crossing borders. Their movement usually involves just part of a family moving to look for work, often to places where relatives or friends could provide leads on jobs and other assistance. That means, “all scores hint to a medium impact that is likely to be felt but that will likely not lead to the massive migration flows” to the United States predicted by some researchers. “Thus, the impacts of climate change on illegal international moves should not be overestimated. Policies should concentrate more on the needs of internal migrants who move seasonally to areas in which they look for work in commercial agriculture.”<sup>210</sup>

Equally important as the climate-drivers are the **non-climate drivers**. In Mexico as elsewhere, the largest amount of environmentally-induced migration is most likely to be concentrated in areas where ‘non-environmental’ factors, such as poor governance (arbitrary policy making, unaccountable bureaucracies, unenforced or unjust legal systems, the abuse of executive power, widespread corruption, etc.), poverty, population growth, and political persecution, are already present and exercise migratory pressures on the local populations. Even though latest research shows that interest in heading to the United States for the first time had fallen to its lowest level since at least the 1950s due to expanding economic and educational opportunities in Mexico, rising border crime and shrinking Mexican families, according to the Pew Hispanic Center and World Bank figures (2011), the two countries still see one of the largest cross-border flows of people anywhere.<sup>211</sup> Primarily this is because of Mexico’s location on the globe’s main North-South divides and the apparent economic inequalities at various scales. As said above, taking the GDP as an indicator, Mexico is the second-largest economy in Latin America, however, the economic growth did not lead to a significant improvement of life conditions for huge parts of the Mexican population. On the

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<sup>208</sup> IOM, *Migration, Environment and Climate Change: Assessing the Evidence*, 331.

<sup>209</sup> Richard Black et al., *Demographics and Climate Change: Future Trends and their Policy Implications for Migration*. Development Research Centre on Migration, Globalisation and Poverty, University of Sussex, Working Paper T-27, June 2008, 17.

<sup>210</sup> Schmidt-Verkerk, “Migration flows in Mexico and their sensitivity to climate change.”

<sup>211</sup> “Better Lives for Mexicans Cut Allure of Going North,” *The New York Times*, last modified July 6, 2011, accessed August 5, 2013, <http://www.nytimes.com/interactive/2011/07/06/world/americas/immigration.html>.

one hand, free market policies and increasing participation in the global market is taking place, while on the other hand poverty and inequality in broad sectors of the Mexican society prevail, leading to a state of insecurity and making migration a seemingly attractive option for large parts of the population – especially when there is such a strong association between migrant networks and migration as in the Mexican setting, which facilitates mobility enormously and makes international migration also more accessible to those with lower incomes.

Another big challenge Mexico is facing is the rapid population growth. As Table 2 shows, the population is likely to grow by between four to five million every five years out to 2025.

Table 2 Projected Population Growth for Mexico

2010	2015	2020	2025
110,056,000	115,288,000	119,808,000	123,784,000

Source: Centro Latinoamericano y Caribeño de Demografica, División de Población, 2009.<sup>212</sup>

From 1950 to 2005 the population of Mexico quadrupled,<sup>213</sup> and will be most likely to eclipse Japan’s total population in the coming years to take the tenth most populous place on earth. “This will add further pressure to already scarce resources and employment opportunities, widening socio-economic divisions across the population” with migration often seen to be the most likely consequence of it.<sup>214</sup>

In addition, in view of the strategic importance of migration, the Mexican government continues to openly encourage emigration. Since the mid-1990s economic crisis in Mexico and the economic boom in the United States in the late 1990s, the Mexican government made the improvement of conditions for Mexicans in the United States its top foreign policy priority in order to maximize remittance flows and to boost the positive development impact of migration. Calling Mexican migrants “heroes” for their remittances, former Mexican President Fox even asked the U.S. government to approve broad immigration reform in 2001: the legalization of unauthorized Mexicans, a new and large-scale guest worker program,

<sup>212</sup> Centro Latinoamericano y Caribeño de Demografica, División de Población, 2009, in: “Climate-related Impacts on National Security in Mexico and Central America,” Feakin, Tobias and Duncan Depledge, The Royal United Services Institute for Defence and Security Studies 2010, accessed August 19, 2013, <http://m-csn.org/wp-content/uploads/2011/03/Mesoamerica-Final-Report-2010.pdf>.

<sup>213</sup> Ibid.

<sup>214</sup> Ibid.

cooperation to reduce border violence, and an exemption for Mexico from the U.S. cap on the number of immigrant visas available for each country.<sup>215</sup> That is to say, the value of remittances to poorer countries like Mexico is enormous. In 2011 alone, Mexicans received an estimated \$24 billion from friends and family working abroad, mainly in the United States, with which Mexico forms the world's busiest remittance corridor, according to *The Economist*.<sup>216</sup>

Finally, many Mexican households engage in migration of some family members as part of an income diversification and insurance strategy, with remittances flowing in response to shocks, mainly benefiting rural areas through the investment in agricultural intensification and improved farming methods. In other words, sending some family members away to find work could also be one of the most effective ways of dealing with environmental stresses. As Richard Black states in the UK government's 2011 Foresight project, which explored the potential impact of climate change on migration, among other issues: "migration is (often) about minimizing risks rather than maximizing income and can help deal with shocks of all kinds,"<sup>217</sup> in particular when governmental support is lacking. For example, a study of communities in Mexico affected by Hurricane Stan in 2005 revealed frustration with state authorities at their perceived failure to contribute to reconstruction.<sup>218</sup> In Chiapas and several other areas that were cut off by flooding and mudslides in the aftermath of Hurricane Stan, most villagers expressed their critique towards the state institutions.

*"Actually, the authorities are not present over here, they don't care about us. They don't come, they don't check the situation over here – and they don't see that we are living in an area of risks."* (Yolanda, 34 years, Belisario Domínguez)

*"Over here nothing is happening. Just look, we already have been there [with the authorities] in order to move something – then they told us that they would repair the sewage system, but until today nobody came."* (Francesca, 32 years, Tapachula)

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<sup>215</sup> Martin, Philip and Gottfried Zürcher, "Managing Migration: The Global Challenge," *Population Bulletin* Vol. 63, No. 1 (2008): 10.

<sup>216</sup> "Remittance Corridors – New Rivers of Gold," *The Economist*, last modified April 28, 2012, <http://www.economist.com/node/21553458>.

<sup>217</sup> "Climate Migrant Remittances Could Help Adaptation," Thomson Reuters Foundation, last modified September 24, 2012, accessed August 12, 2013, <http://www.trust.org/item/?map=climate-migrant-remittances-could-help-adaptation-experts>.

See also: Black, Richard et al., *Foresight: Migration and Global Environmental Change* (London: The Government Office for Science, 2011), Final Project Report.

<sup>218</sup> *Ibid.*

*“The government only comes when the disaster has already happened. They come and see how the situation is, that’s all. They don’t do anything for prevention. We wanted a protection wall for the river – and the government tells us that the project is there, but nothing has happened. [...] We did not even get electricity and potable water from the government. The water which we use here comes from the finca over there, the tenant gave us permission to use it, otherwise we would not have anything.”* (Manuel, 40 years, Belisario Domínguez)<sup>219</sup>

In sum, in the case of Mexican migration, a variety of climate and non-climate drivers of migration can be identified which in turn makes it difficult to deliver any kind of number for the future on Mexican migration directly linked to climate and environmental change. As we have seen, studies such as the EU-funded EACH-FOR project or research conducted by Kerstin Schmidt-Verkerk as well as Michael Oppenheimer et al. claim to have found strong linkages between environmental degradation and human migration in Mexico; nevertheless, we need to ask: Where in the causal chain can environmental factors be located? As an independent variable, dependent variable or as intermittent? In fact, as we have seen, there are a number of pressures contributing to the Mexicans’ decision to move – including economic, social, but also environmental – which make it hard to identify a sole cause. “Changes in the climate do have an impact in the decision to migrate, but it’s not clear how big that is,” says Elizabeth Deheza. That point is important, she said, because many governments – including Mexico’s – are pushing hard to understand climate migration as a problem separate from “normal” migration, saying “they need to isolate (the problem) to tackle it.” But seeing climate-related migration in isolation won’t give an accurate view of it. That was the major problem we had, trying to make them understand they had to see the bigger picture” she added.<sup>220</sup>

### **3.4 Linking Climate Change Migration and Conflict in the Mexican Case**

*How will climate change impact Mexican migratory patterns and associated security issues?* Mexico is an important case study for examining the implications of climate change for security. Temperatures in Mexico are rising, precipitation levels are falling, and the increasing frequency and intensity of droughts and floods could pose serious threats to agriculture and food, water, and energy security. Moreover, the country is currently involved in a particularly challenging situation relating to serious organized crime violence, corruption, human-

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<sup>219</sup> EACH-FOR, “Environmental Change and Forced Migration Scenarios” (D 2.6.2.4 Mexico Case Study Report, 0.01.2009), 22.

<sup>220</sup> “Climate Migrant Remittances Could Help Adaptation.”

trafficking trade and drug trafficking which is beginning to undermine governance structures, especially in the border regions of both the north and south of the country. Approximately more than 28,000 people have been killed since former Mexican President Felipe Calderón launched an army-led crackdown on the drug trade in late 2006.<sup>221</sup> During his tenure, altogether more than 47,500 drug-related deaths were reported before the government stopped releasing updated figures in early 2012. Human Rights Watch estimates the figure to be more than 60,000 deaths.<sup>222</sup> Until today, under the presidency of Enrique Peña Nieto, who took office on December 1, 2012, Mexico is clearly in a precarious position both politically and economically as a result of the so called ‘Drug Wars’. Even though, before taking office in December last year, Nieto made clear that he saw the drug war as his predecessor’s problem – wherefore the current government has basically stopped speaking about security matters, preferring to talk up Mexico’s economic potential, along with the prospect of achieving long-pending changes to the state-run energy sector – crime and violence remain a grisly reality in the region and continue to change the face of Mexican society: people are afraid, government is mired in corruption and seems to be unable to solve this problem.

Significant environmental and climatic changes over the coming century and the resulting movement of people could now add to Mexico’s already existing threats to national security. Of course it is to note that climate change does not always necessarily have consequences for the security of a country nor becomes a catalyst for conflict; the impacts that climate change has on a certain country and its social groups, on livelihoods and conflict, depend on the regional vulnerability to climate change and in particular on the capacity to adapt.<sup>223</sup> But as to conclude from the explanations given above, Mexico is a country that even without additional stress from environmental and climate change has already multiple risk factors for instability. “As climate change intensifies these dynamics, challenges must be handled so as to avoid aggravating current tensions and contributing to an already deteriorating security environment,” a report by the British Climate Change and Security Programme (2010) on how climate change in Mexico and Central America can reinforce drivers of insecurity such as increasing poverty, weakening governance capacity, or greater social divisions and polarization says.<sup>224</sup> Therefore, the Mexican government is right to consider climate change a

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<sup>221</sup> “Drug War Puts Mexican Oil Industry on Defensive,” Reuters, last modified August 4, 2010, <http://www.reuters.com/article/idUSN0417574420100804>.

<sup>222</sup> “Mexican Security Forces Responsible for Disappearances,” CNN, last modified February 21, 2013, <http://edition.cnn.com/2013/02/21/world/americas/mexico-human-rights>.

<sup>223</sup> “Climate-related Impacts on National Security in Mexico and Central America.”

<sup>224</sup> Ibid.

growing problem. On the one hand, because most of the Mexican territory has semi-arid weather, changes in rain patterns could generate severe droughts followed by a decrease in agriculture productivity, with adverse effects for food security and exports; on the other hand, intense precipitation in some regions could be the cause of floods and mudslides (especially along the highways and in high zones) which would threaten the lives and livelihoods of many people. Further, Mexico has 11,122 km of coasts – partly densely populated. The flooding of these coastal zones could mean the displacement of millions of people with direct adverse effects on economic activities such as tourism.<sup>225</sup> In turn, the effects described here could increase vulnerability in several ways:

Table 3 Expected Effects of Climate Change in Mexico

Economic Vulnerability	Social Vulnerability	Political Vulnerability and National Security
<ul style="list-style-type: none"> <li>• Disruption of economic activity in general, mainly agriculture, fishing, livestock, forestry and tourism.</li> <li>• Disruption of production chains.</li> <li>• Food scarcity and water shortage for human consumption as consequences of the changes in the cycles of harvest, production and water.</li> <li>• Loss of infrastructure, mainly in the oil industry located in the coasts.</li> </ul>	<ul style="list-style-type: none"> <li>• Disruption of the millions of Mexicans who inhabit coastal cities and areas with a risk of flooding, which will require a relocation of the population.</li> <li>• Greater impoverishment of the rural population because their source of income will be affected by climate change.</li> <li>• Displacement of the rural population to the city, which will increase pressure on the urban system through an increase in urban poverty.</li> <li>• Public health emergencies such as the dengue fever and malaria cases.</li> </ul>	<ul style="list-style-type: none"> <li>• Conflicts over the control of water and other resources.</li> <li>• Weakness of the state (due to a lack of resources) to help and relocate the victims of natural disasters.</li> <li>• Increase in subversive groups as a result of the intensification of poverty and competition for natural resources.</li> <li>• Authoritarian practices to control the situation and implement necessary adaptive and mitigating measures.</li> </ul>

Source: “Climate Change Impacts on Socio-environmental Conflicts: Vulnerability in Facing Climate Change and Social Conflicts in Mexico,” EU Initiative for Peacebuilding, 2011.<sup>226</sup>

Mexican officials view their nation as particularly vulnerable to the effects of climate change. As President Enrique Peña Nieto informed during a Mexico City speech commemorating World Water Day in April this year, climate disasters already affected 30 million Mexicans, or more than one-quarter of the country’s population.<sup>227</sup> Thereby the key focus is upon the impact of climate change on the agricultural sector, the natural water supplies and the energy

<sup>225</sup> “Climate Change Impacts on Socio-environmental Conflicts: Vulnerability in Facing Climate Change and Social Conflicts in Mexico,” Initiative for Peacebuilding funded by the European Union, last modified June 2011, <http://www.ifp-ew.eu/pdf/1111mexico.pdf>.

<sup>226</sup> Ibid.

<sup>227</sup> “Climate Change Exacerbates Mexico’s Growing Water Crises,” last modified April 8, 2013, accessed August 21, 2013, <http://www.mexidata.info/id3586.html>.

infrastructure and the interconnections with migratory dynamics and the security landscape of Mexico.

### 3.4.1 Agriculture and Food Security

With the world facing continued population growth and the specter of climate change, food prices and food security are issues of growing global concern. The 2007-2008 and 2010-2011 food price crises (when droughts again hit food production hard, sending prices to record highs) have had lasting impacts on the face of the global food security environment. As the FAO (Food and Agriculture Organization of the United Nations) Initiative on Soaring Food Prices states on its website:

“By 2009, the total number of hungry people in the world had topped one billion. [...]. From July to September 2010, wheat prices had surged by 60 to 80 percent in response to drought-fuelled crop losses in Russia and a subsequent export ban by the Russian Federation. Rice and maize prices also rose during that period. By December 2010, the FAO Food Price Index had topped its 2008 peak, with sugar, oils and fats increasing the most. In March 2011, the index dropped for the first time after eight months of continuous price spikes. The index dropped to an 11-month low in October 2011, but food prices still remain very volatile.”<sup>228</sup>

Half a decade after the price spike of 2007-2008, food price volatility has become the new norm: people have come to expect food prices to rapidly rise and fall, though nobody knows by how much or when. Mexico, for example, suffered a popular backlash after corn prices surged in 2007, making tortillas – the staple food product in Mexico and the main source of calories for many poor Mexicans – more expensive, and threatening nutrition and livelihoods of many people with the consequence of public demonstrations like the large-scale protests on the streets of Mexico City in early 2007. A major factor behind this scale of price hikes in maize and Mexico’s corn tortilla was of course food speculation and the still rising demand for corn to make environmentally-friendly biofuels in the United States. But it is also the extreme weather events under climate change that are particularly harmful. As it was said, for many of Mexico’s poorest people the tortilla is a staple of their diet, with a high proportion of their income being spent on the bread in order to feed themselves and their families. With climate change now having an adverse overall effect on agricultural production in the country, food will be more expensive and uncertain. For Mexico this means that there is already a three percent rise in the population without adequate access to food since the 2008 food crisis, as

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<sup>228</sup> “FAO Initiative on Soaring Food Prices,” last modified in 2013, accessed September 2, 2013, <http://www.fao.org/isfp/about/en/>.

government statistics say. In fact, the number of food insecure Mexicans reached 20 million in 2010, up from 18 million in 2008.<sup>229</sup> The number of child malnutrition is also predicted to increase.

Food availability is a major source of concern in Latin America as a whole. Mexico currently imports about half of the food it consumes, despite itself being a major agricultural producer once. In 2012, Mexico paid a bill abroad of \$ 2.878 million to import corn. The value of these imports quadrupled the amount recorded 10 years ago, which was \$ 644.3 million, according to data from the National Institute of Statistics and Geography (INEGI).<sup>230</sup> At first sight, the flood of U.S. corn imports could be held responsible for that. After NAFTA eliminated Mexican quotas for corn, artificially-priced U.S. corn flooded the market. As a result, millions of small family corn farmers have been left without a source of income, and have been forced to abandon their communities in search of a way to feed their families. This has created a massive farmers' migration to big Mexican cities but also worsened illegal migration especially to the U.S., according to some experts.<sup>231</sup> Second, most agriculture in Mexico is rain-fed subsistence agriculture, which is highly vulnerable to changing weather patterns, including drought and more intense rainfall events.<sup>232</sup> Unfortunately, the Mexican government is not offering farmers enough support to actually protect the crops already in the field through climate adaptation strategies – protection that would not only help protect farmers' incomes, but also food security for everyone. In an interview in advance of the G-20 meeting in Los Cabos, Mexico, in 2012, a Mexican farmer from the state of Oaxaca was asked if the Mexican government provided any support when his crops failed. He gave a resolute “No.” “Not only would he be without the income that the crop would provide, but his community would have to adjust to a sharp decrease in food availability.”<sup>233</sup> Moreover, individuals who lack adequate insurance coverage or security measures will become more vulnerable to climate change over time, and may eventually be forced to migrate. As the report “Climate Change, Migration and Security – Best-Practice Policy and Operational Options for Mexico” by Deheza and Mora (2013) found, only 0.68 percent of Mexican producers have insurance

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<sup>229</sup> “Climate Change, Migration and Security. Best-Practice Policy and Operational Options for Mexico.”

<sup>230</sup> “Mexico corn imports increased 400% in a decade - La Jornada,” last modified January 27, 2013, accessed September 2, 2013, <http://americasmexico.blogspot.de/2013/01/mexico-corn-imports-increased-400-in.html>.

<sup>231</sup> “Food Security, Farming, and the WTO and CAFTA,” last modified 2011, accessed September 2, 2013, <http://www.globalexchange.org/resources/wto/agriculture>.

<sup>232</sup> “Climate-related Impacts on National Security in Mexico and Central America,” Feakin, Tobias and Duncan Depledge, The Royal United Services Institute for Defence and Security Studies 2010, accessed September 2, 2013, <http://m-csn.org/wp-content/uploads/2011/03/Mesoamerica-Final-Report-2010.pdf>.

<sup>233</sup> “Mexico: Climate Change and Food Security,” last modified June 20, 2012, accessed September 4, 2013, <http://lab.org.uk/mexico-climate-change-and-food-security>.

for production. Considered that insurance is one of the most important instruments for agricultural development in any country which protects against adverse climate losses, stabilizes incomes, controls government spending and stimulates employment this is a great problem and the probability of migration will be even greater once again.<sup>234</sup>

In sum, market liberalization in the 1990s and changing weather patterns will continue to lower farm incomes in Mexico, pushing some individuals to migrate. Yet, migration itself is not a security problem in the region, but depending on how migrants are received in destination areas, social tensions could emerge. If food insecurity generates temporary or permanent migration, illegal migrants may accept lower salaries. This may produce social tensions between the incoming populations and locals.<sup>235</sup> So far, this kind of thinking hasn't really played much in security circles in Mexico or the United States, nevertheless, if we want to keep small Mexican farmers on the land, address hunger in the country and create a real global food security in order to not spike regional tensions, our governments must begin to better address food security challenges and recognize that introducing topics like sustainability in agriculture and food production as well as migration into security discussions isn't just an option over the long-term, but it is our only option.

### **3.4.2 Water Security**

“The consequences for humanity are grave. Water scarcity threatens economic and social gains and is a potential fuel for wars and conflict.” [Ban Ki Moon, December 2007]<sup>236</sup>

Whether water is considered to be scarce in a given region is determined by the amount of available water resources and by the population's demand for water. Water demand depends on many factors that may differ from region to region, such as economic structure and land-use patterns, available technology and infrastructure, and lifestyles. Most importantly, it depends directly on the size of the regional population – more people need more water. As FAO reported in 2012, human demand for water increases and competition between water-using sectors intensifies wherefore water scarcity becomes apparent in a variety of forms. Thereby, agriculture is the sector where water scarcity has the greatest relevance.

“Currently, agriculture accounts for 70 percent of global freshwater withdrawals, and more than 90 percent of its consumptive use. Under the joint pressure of population growth and changes in dietary habits, food consumption is increasing in most regions of the world. It is

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<sup>234</sup> “Climate Change, Migration and Security. Best-Practice Policy and Operational Options for Mexico.”

<sup>235</sup> “Climate-related Impacts on National Security in Mexico and Central America.”

<sup>236</sup> Ban Ki Moon, 2007, in: *Forced Migration Review* 31 (2008): 26.

expected that by 2050 an additional billion tonne of cereals and 200 million tonnes of meat will need to be produced annually to satisfy growing food demand.<sup>237</sup>

Needless to say that climate change will only exacerbate these problems by intensifying drought trends and reducing the amount of water available for agriculture. Of course, the exact impact of climate change on water resources and water demand is uncertain, but what is clear is that more frequent and severe droughts and floods will hurt local production, especially in subsistence sectors at low latitudes and in key food-insecure areas dominated by rain-fed agriculture such as Mexico.<sup>238</sup> As a result, this could lead to competition between water users, for example, between industry, export agriculture and subsistence agriculture.<sup>239</sup>

In Mexico, water – as a crosscutting resource that is essential for social wellbeing, economic development and environmental security – is one of the most important resources and is strongly connected to other key resources such as food and energy. However, as Mexico's population continues to grow, water availability is diminishing – mainly due to the immense overexploitation of available water resources not just in Mexico City but across the country, but especially because of decreasing precipitation due to climatic changes. The National Institute of Statistics, Geography and Informatics recently estimated that per capita water availability will decline by 6.72 percent during the next 17 years.<sup>240</sup> Particularly in the Tula Valley near Mexico City as well as in Mexico City itself water problems are already well known, still, a decrease in precipitation and an increase in temperature may modify the Mexico City water balance further “by increasing the evapotranspiration rate, decreasing the precipitation runoff and aquifer recharge rates, and decreasing, overall, the water available for Mexico City.”<sup>241</sup> Other areas are suffering, too. In the agricultural state of Guanajuato, the water table is falling by six feet or more a year. In the north-western wheat-growing state of Sonora, farmers once pumped water from the Hermosillo aquifer at a depth of 40 feet. Today

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<sup>237</sup> FAO, *Coping with water scarcity – An action framework for agriculture and food security*. (Rome: FAO Publications, FAO Water Reports 38, 2012).

<sup>238</sup> “A finite resource, pushed to the brink,” FAO 2013, accessed September 5, 2013, <http://www.fao.org/news/story/en/item/154882/icode/>.

<sup>239</sup> “Climate-Related Impacts on National Security in Mexico and Central America,” prepared by Shiloh Fetzek, The Royal United Services Institute for Defence and Security Studies 2009, accessed September 5, 2013, [http://www.rusi.org/downloads/assets/Mexico\\_CC\\_Text\\_-\\_English.pdf](http://www.rusi.org/downloads/assets/Mexico_CC_Text_-_English.pdf).

<sup>240</sup> “Climate Change Wallops Mexico,” last modified April 2, 2013, accessed September 5, 2013, <http://fnsnews.nmsu.edu/climate-change-wallops-mexico/>.

<sup>241</sup> Human Development Report, “Fighting climate change: Human solidarity in a divided world. – Adapting to Impacts of Climate Change on Water Supply in Mexico City.” UNDP 2007, accessed September 5, 2013, [http://hdr.undp.org/en/reports/global/hdr2007-8/papers/Arredondo%20Brun\\_Juan%20Carlos.pdf](http://hdr.undp.org/en/reports/global/hdr2007-8/papers/Arredondo%20Brun_Juan%20Carlos.pdf).

they pump from over 400 feet.<sup>242</sup> In the northern state of Chihuahua, the latest report from CONAGUA (Mexico's National Water Commission) assessed the state's reservoirs as having an average 33 percent of stored water capacity. The most critical situation was reported in the northwestern municipalities of Namiquipa and Buenaventura, where reservoirs held merely 18 and 21 percent of their water capacity, respectively.<sup>243</sup> In the big central farming region where pecans, vegetables and feed crops are cultivated, Las Virgenes Reservoir near Delicias was reported at 34 percent capacity while La Boquilla Reservoir in San Francisco de Conchos was rated at 31 percent capacity.<sup>244</sup>

In fact, Mexico may be near peak water use, as Lester Brown reported for *The Guardian* in July this year.<sup>245</sup> Consequently, this could generate new conflicts between industries and local communities and worsen already existing conflicts like the illegal water withdrawals already taking place in some rural areas in Mexico.<sup>246</sup> In other words: the impacts of climate change on water resources could be a clear threat to national security as the changes or reductions in water availability may cause, bring back or prolong social conflicts between countries, states, or groups, between municipalities or between people and authorities over an access to both freshwater and saltwater. Three main reasons have been identified in Mexico as critical factors on the occurrence of water related social conflicts: (1) aggravation of water shortages, a trigger that strains the competition for the resource; (2) public rejection to government decisions that may be perceived as unpopular, e.g. subsidies reduction, increase in tariffs, scheduled reductions in water supply; and (3) additional causes related to local circumstances, e.g. recurrent drought periods affecting local agricultural activities, lack of infrastructure, or inequitable supply.<sup>247</sup> For that reason, authorities must strongly urge for a careful utilization of Mexican water resources in the future. Conagua, which is responsible for ensuring correct management and preservation of natural water resources, is already actively engaged in many programs and initiatives for the improvement of water efficiency, the increase of waste-water treatment and its re-use in urban areas.<sup>248</sup> With its 2030 Water Agenda, Conagua also

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<sup>242</sup> Brown, Lester, "The real threat to our future is peak water." *The Guardian*, July 6, 2013, accessed September 5, 2013, <http://www.theguardian.com/global-development/2013/jul/06/water-supplies-shrinking-threat-to-food>.

<sup>243</sup> "Climate Change Wallops Mexico."

<sup>244</sup> *Ibid.*

<sup>245</sup> "The real threat to our future is peak water."

<sup>246</sup> "Climate-Related Impacts on National Security in Mexico and Central America."

<sup>247</sup> "Fighting climate change: Human solidarity in a divided world. – Adapting to Impacts of Climate Change on Water Supply in Mexico City."

<sup>248</sup> "Climate Change, Migration and Security. Best-Practice Policy and Operational Options for Mexico."

promotes a long-term vision for the future of water resources in Mexico: “achieving a country in a period of twenty years with clean water bodies, balanced supply and demand for water, universal access to drinking water and sanitation services, and settlements safe from catastrophic floods.”<sup>249</sup> Conagua has also been active in responding to the severe droughts and floods that Mexico has experienced over the last years by largely calling for investments in flood prevention and water storage. Yet as long as all of these efforts are not coupled with activities that tackle not only symptoms but the actual root causes of the problem – pollution and overexploitation, due to bad planning at national and local level – Mexico will be ill-prepared to face future water related impacts to climate change.

### 3.4.3 Energy Security

The key problems of the Mexican energy sector are associated with the decline in oil reserves and production, the financial standing of one of the world’s largest oil companies, state-owned *Petróleos Mexicanos* (PEMEX), the growing dependence on imported fuels, as well as climate change as an important risk factor affecting energy as a resource.

Mexico is one of the ten largest oil producers in the world, the third-largest in the Western Hemisphere. However, according to the U.S. Energy Information Administration (EIA), the amount of oil produced in Mexico (especially at the giant Cantarell Field)<sup>250</sup> has steadily decreased since 2004 and is estimated to further decrease by 50,000-100,000 bbl/d between 2012 and 2013<sup>251</sup> due to an intensive resource exploitation, but also because the government oil monopoly, Pemex, does not have the money or expertise to extract fossil fuels from deepwater wells and shale formations. As the EIA states, the oil sector is a crucial component of Mexico’s economy: “[it] generated 16 percent of the country’s export earnings in 2011, according to Mexico’s central bank, a proportion that has declined over time. More significantly, earnings from the oil industry (including taxes and direct payments from PEMEX) accounted for 34 percent of total government revenues in 2011.”<sup>252</sup> – ‘The golden goose’, ‘the cash cow’, and a range of other expressions have all been used to describe what

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See also: “2030 Water Agenda – National Water Commission of Mexico,” CONAGUA Comisión Nacional del Agua (National Water Commission), March 2011, accessed September 17, 2013, [http://www.conagua.gob.mx/english07/publications/2030\\_water\\_agenda.pdf](http://www.conagua.gob.mx/english07/publications/2030_water_agenda.pdf).

<sup>249</sup> “2030 Water Agenda – National Water Commission of Mexico.”

<sup>250</sup> Annotation: The Cantarell Field is the largest oil field in Mexico and one of the largest in the world. It was discovered in 1976 by Rudesindo Cantarell and is located 80 kilometers (50 miles) offshore in the Bay of Campeche, the southern bight of the Gulf of Mexico.

<sup>251</sup> EIA, last modified October 17, 2012, accessed September 18, 2013, <http://www.eia.gov/countries/cab.cfm?fips=MX>.

<sup>252</sup> *Ibid.*

oil and Pemex are for Mexico, and indeed, Pemex oil is the economic life line for the federal budget of Mexico, however, the oil infrastructure cannot be provided adequately. Since the nationalization of the oil industry in 1938, reform bills to ease entry of private oil companies have encountered stiff resistance in Congress which in turn hindered investment in oil extraction, refining and distribution. In other words: The state-owned Pemex has almost monopolized the exploration, production and transportation of oil and gas, however, its efficiency is being questioned since production from Mexico's huge Cantarell field is collapsing, and productions from new fields are not making up the difference. Although Pemex invests twice as much as its Venezuelan counterpart, it is far from reaching levels that would allow the necessary increases in production. Moreover, corruption represents a great obstacle to development – e.g. funds belonging to Pemex have paid in recent years for a presidential candidate's campaign, contracts with firms facing legal action, and the whims of trade union leaders who are not required to account for their expenses. In fact, "billions of dollars are lost to corruption which, according to observers, is deeply rooted in an opaque administration choked with red tape, and in political and economic vested interests."<sup>253</sup> – A deeply embedded mentality that cannot be changed within a few years, however, the struggle to change Pemex from the top, and from within the union, may save the oil giant from the slow decline that many foresee.

In short, access to reliable and affordable energy supplies is fundamental not only to Mexican national security, but also to economic growth and political stability as threats to a nation's energy infrastructure could have far reaching implications for the entire socioeconomic system.<sup>254</sup> Therefore, President Enrique Peña Nieto hopes to revolutionize the country's energy policies with the reform bill he proposed in August this year. – A bill that would allow limited participation in oil and gas projects on Mexican soil and offshore (including drilling in the deep waters of the Gulf of Mexico and extracting gas and oil from shale-rock) by oil giants such as Exxon Mobil, Chevron and BP for the first time in 75 years.<sup>255</sup> On the other hand, all the talk about the production of oil and natural gas seems to contradict one of Mexico's strongest national climate-change laws passed in April 2012, which calls for a 30 percent reduction of greenhouse gas emissions by 2020 and a 50 percent reduction by 2050,

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<sup>253</sup> "Mexico: Pemex Oozes Corruption," last modified May 7, 2008, accessed September 19, 2013, <http://www.ipsnews.net/2008/05/mexico-pemex-oozes-corruption/>.

<sup>254</sup> "Energy Security In Mexico: Problems and Implications," last modified October 18, 2008, accessed September 18, 2013, <http://www.petroleumworld.com/sati08101801.htm>.

<sup>255</sup> "Foreign Investment in Mexican Oil," New York Times, last modified August 17, 2013, accessed September 19, 2013, [http://www.nytimes.com/2013/08/18/opinion/sunday/foreign-investment-in-mexican-oil.html?\\_r=2&](http://www.nytimes.com/2013/08/18/opinion/sunday/foreign-investment-in-mexican-oil.html?_r=2&).

even though Mexico's two major state-owned enterprises – the Comisión Federal de Electricidad (CFE) and Pemex – are also the country's largest source of emissions. In addition, Mexico has committed to using renewable energy sources to provide 35 percent of its electricity by 2024.<sup>256</sup>

“Mexico is aware this is the end of the oil era, so we need to implement this fiscal reform, and if we go through it, we'll be able to do without this oil. Power for the US is based on the army and energy and oil. In 1989 you had [George] Bush senior coming into office from an oil background; if you go through Clinton and Obama, they serve the oil interest first. We're talking about the politics of neo-liberalism here which is based on oil interests and indebtedness - this is why so many in the US don't accept climate change, even though it's based on scientific evidence.”<sup>257</sup>

But as this year's proposed energy reform bill goes to Congress, you might wonder how it might affect the nation's carbon emissions and renewable energy goals? “Though Pemex has hydraulically fractured a few wells, the potential for natural gas under the country's surface has yet to be tapped. If the energy reform bill is passed, fracking<sup>258</sup> could open up a slew of environmental concerns for Mexico's citizens.”<sup>259</sup>

Additionally, conflict is closing in on Mexico's invaluable energy industry because of climate change itself. Already the Mexican energy supply chain is significantly vulnerable to climate variability and extreme weather events that can affect energy resources and supplies as well as seasonal demand; the projected changes will increase this vulnerability, and thus the need to develop resilience to the effects of climate change and adapt to changing conditions. For example, the production of hydroelectric energy is at risk due to reduced river flows; also there is a threat of power cuts due to the destruction of energy infrastructure along the coast because of rising sea levels, increasing intensity of storms, and flooding, potentially disrupting electricity generation and distribution, as well as oil and gas production, refining, and distribution. For instance, there are over 150 operating oil exploration platforms in the

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<sup>256</sup> “Will Mexico's Energy Reform Hamper its Climate Change Legislation?” last modified August 29, 2013, accessed September 19, 2013, <http://breakingenergy.com/2013/08/29/will-mexicos-energy-reform-hamper-its-climate-change-legislation/>.

<sup>257</sup> Munoz Ledo of the Democratic Revolution Party and head of the Foreign Affairs Commission (April 2012), in: “Mexico Unanimously Passes New Climate & Energy Law,” last modified April 23, 2012, accessed September 20, 2013, <http://www.treehugger.com/environmental-policy/mexico-new-climate-energy-law.html>.

<sup>258</sup> Annotation: What is fracking? “Fracking is the process of drilling down into the earth before a high-pressure water mixture is directed at the rock to release the gas inside. Water, sand and chemicals are injected into the rock at high pressure which allows the gas to flow out to the head of the well. The process is carried out vertically or, more commonly, by drilling horizontally to the rock layer. The process can create new pathways to release gas or can be used to extend existing channels.” Source: BBC News UK, June 2013, “What is fracking and why is it controversial?” accessed September 19, 2013, <http://www.bbc.co.uk/news/uk-14432401>.

<sup>259</sup> Ibid.

Gulf of Mexico which will face some of the greatest risks of climate change: already, hurricane winds and intense waves commonly halt operations and force the evacuation of personnel, resulting in great economic loss.<sup>260</sup> According to a World Bank study (2011), the hurricanes in the Gulf of Mexico in 2004 and 2005 resulted in a large number of destroyed and damaged offshore oil and gas structures: more than 124 platforms were destroyed and over 660 structures were extensively damaged.<sup>261</sup>

Other risks to the Mexican energy industry from climate change could include the impact on fuel transportation and the availability of existing and emerging renewable energy sources (e.g. hydroelectric, biomass, wind and solar) since renewable energy is more vulnerable to alterations in climate. Also, climate change could affect the ability of the country to produce and transmit electricity from fossil and nuclear<sup>262</sup> energy sources. These changes are also projected to affect the nation's demand for energy and its ability to access, produce, and distribute oil and natural gas. Yet, while there is a will to participate in the international climate change regime – with the recent pledges to reduce greenhouse gas emissions and a climate change strategy in progress which seeks to promote adaptation measures, such as: increased electricity generation from renewable sources, energy savings, integrated water resources management programs, sustainable housing solutions, integrated mass transport corridors in at least the 10 largest cities in the country and incorporation of 2.9 million additional hectares of forest to sustainable management and 2.1 million hectares to payment for environmental services schemes,<sup>263</sup> the problem has not been accorded the status of an energy security issue, nor of a national priority. Currently, Mexico contributes three percent of the greenhouse gases that are causing global climate change and ranks 12 among the top emitting nations. But still there is a constant quest for cheap oil and the use of coal in the future power generation mix that could limit the achievements of strategies to combat climate change and result in conflict over the resource and trigger further environmentally-induced migration. As a consequence, the future energy security of Mexico is uncertain. With severe economic implications coupled to political and social systems, detailed adaptive and

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<sup>260</sup> “Climate Change, Migration and Security. Best-Practice Policy and Operational Options for Mexico.”

<sup>261</sup> World Bank, *Climate Impacts on Energy Systems. Key Issues for Energy Sector Adaptation*. (Washington, DC: The International Bank for Reconstruction and Development/The World Bank, 2011).

<sup>262</sup> Annotation: Mexico has one nuclear facility: Laguna Verde, in Veracruz. The location of the plant has raised considerable public concern in the past as the area is particularly prone to earthquakes.

<sup>263</sup> “Mexico Leading the Agenda on Mitigation and Adaptation to Climate Change,” World Bank 2013, <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/LACEXT/EXTLACPROJECTSRESULTS/0,,contentMDK:22754331~pagePK:51456561~piPK:51456127~theSitePK:3177341,00.html>.

preventative plans rather than the current reactive policies are a necessity to address the topic of energy security.

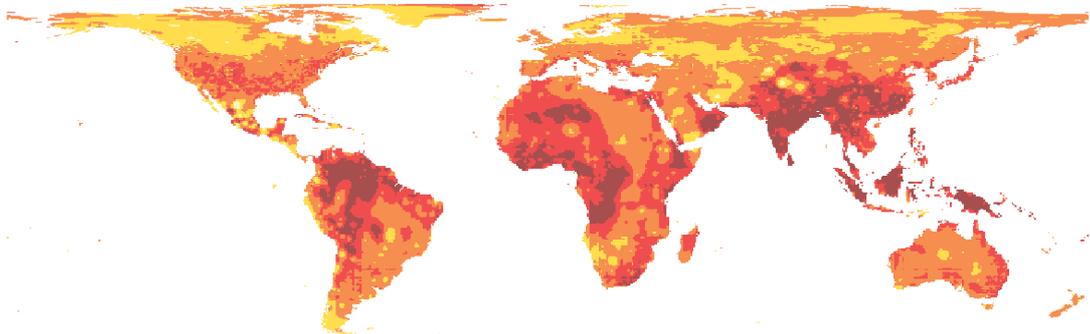
#### 4. CLIMATE CHANGE: A HUMAN SECURITY ISSUE? OR: THE SOCIAL DIMENSIONS OF CLIMATE CHANGE

Climate change increases the risk of wars and even fuels conflicts between individuals: This is the conclusion of the study “Quantifying the Influence of Climate on Human Conflict” published in the journal *Science* in August 2013.<sup>264</sup> The paper by Solomon Hsiang, Marshall Burke and Edward Miguel from Princeton University and UC Berkeley analyzes 60 quantitative historic and modern studies gathered from around the world and thereby finds strong causal evidence linking climatic events to human conflict.

“The magnitude of climate’s influence is substantial: for each 1 standard deviation<sup>265</sup> ( $1\sigma$ ) change in climate towards warmer temperatures or more extreme rainfall, median estimates indicate that the frequency of interpersonal violence rises 4 percent and the frequency of intergroup conflict rises 14 percent.”<sup>266</sup>

Further, the study predicts that conflicts may increase between now and 2050. It also predicts that the warmer a region becomes, the more violent it will be. In the following map, Hsiang and his colleagues produced, it is shown which parts of the world are warming up, i.e. which areas will become more violent.

Figure 3 Projected Temperature Change by 2050 as a Multiple of the Local Historical Standard Deviation ( $\sigma$ ) of Temperature



Source: Solomon M. Hsiang et al., “Quantifying the Influence of Climate on Human Conflict,” *Science* 341, (2013), DOI: 10.1126/science.1235367.

<sup>264</sup> Hsiang, Solomon et al., “Quantifying the Influence of Climate on Human Conflict,” *Science* 341, 1235367 (2013).

<sup>265</sup> Annotation: “A standard deviation is achieved when the temperature remains three degrees above the long term average in a month in a district of the United States.” Source: “Study On Climate-Wars Met With Fierce Criticism,” Spiegel Online August 2, 2013, accessed August 2, 2013, <http://www.thegwpf.org/study-climate-wars-met-fierce-criticism-2/>.

<sup>266</sup> Ibid.

As scientist Thomas Homer-Dixon – who once already claimed that we are on the threshold of an era in which traditional security concerns such as armed conflicts will come frequently, if not primarily, as a result of environmental change – said, “the paper is remarkably strong.” “[It means] the world will be a very violent place by mid-century if climate change continues as projected.”<sup>267</sup> However, despite representing the collective efforts of more than 190 researchers working across varied disciplines, from climatology, archaeology and economics to political science and psychology, there is to note that the paper focuses only on studies that provided the strongest evidence for a causal connection between climate change and conflict. The researchers ignored any studies that compared levels of conflict between different countries, and instead focused on data that revealed how violence rises and falls in a single place as climate changes.<sup>268</sup> Examples that support their theory among others are: crime statistics in the United States that reveal that the number of rapes, murders, or assaults increases on a hot day; land conflicts in Brazil where farmers are more likely to invade each other’s land if they have a particularly wet or dry year; civil conflicts throughout the tropics; historical events such as the collapse of Chinese dynasties during long dry periods or the collapse of the Maya civilization due to substantial multiyear droughts. As the finding of alluvial sediments from the Cariaco Basin (which lies off the north central coast of Venezuela) suggests, a century-scale decline in rainfall put a general strain on resources in the region, which was then exacerbated by abrupt drought events, contributing to the social stresses that led to the Maya demise. Another study linked the 14<sup>th</sup>-century collapse of Cambodia’s ancient Khmer civilization to decades of drought interspersed with intense monsoon rains.

Yet, the paper has met with unusually strong criticism. As indicated above, experts accuse the authors of questionable statistical methods, incorrect conclusions, and more importantly of ignoring certain data in the evaluation of studies. “Even more worrying is that they apparently cherry-picked data which give the strongest effect,” says the Oslo economist Halvard Buhaug.<sup>269</sup> And indeed, while long-term historical studies suggest a coincidence between climate variability and armed conflict, empirical findings are less conclusive for recent periods, according to Jürgen Scheffran, Professor of Climate Change and Security at the

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<sup>267</sup> Homer-Dixon, Thomas, August 2013, in: “Climate Change and Violence. – An analysis of 60 studies finds that warmer temperatures and extreme rainfall lead to a rise in violence,” last modified August 1, 2013, accessed August 2, 2013, <http://www.the-scientist.com/?articles.view/articleNo/36822/title/Climate-Change-and-Violence/>.

<sup>268</sup> Ibid.

<sup>269</sup> Buhaug, Halvard, August 2013, in: “Study On Climate-Wars Met With Fierce Criticism.”

University of Hamburg, and his colleagues. In “Disentangling the Climate-conflict Nexus: Empirical and Theoretical Assessment of Vulnerabilities and Pathways” (2012), Scheffran and his co-authors analyze various studies, reaching differing conclusions about the influence of climate variables on armed conflict.<sup>270</sup> “16 studies concluded that global warming increased the likelihood of violent conflict” Scheffran says. However, 11 of the studies Scheffran and his researchers analyzed found that climate change could increase the risk of conflict in some cases, but lower them in others – or have no demonstrable effect. “Of these eleven studies, Hsiang and his colleagues ignored eight.”<sup>271</sup> Scheffran and his team therefore conclude that there is no consensus yet in the literature about the nature and extent of the relationship between climate change and violent conflict. Instead, empirical findings indicate that climate-conflict linkages vary significantly between the world’s regions. For example, countries with low human development are particularly vulnerable to the double exposure of natural disasters and armed conflict. This in turn highlights the point “that climate change is not the only important parameter of future violence. Other factors such as human development, effective institutions, and governance also affect the likelihood of violent conflict.”<sup>272</sup>

That is to say, despite raising the specter of a new source of instability and conflict, we should be skeptical about the robustness of the general results of the study by Hsiang and his team. The same applies for their hypothesis that there is a causal link between migration induced by environmental factors and political instability and conflict. According to Hsiang and his colleagues, environmentally-induced migration and urbanization can be implicated in conflict. “If climatic events cause large population displacements or rapid urbanization, this might lead to conflicts over geographically stationary resources;”<sup>273</sup> it could also give rise to tensions across ethnic identities, competition for and limitations on access to land as well as political and legal restrictions. In the judgment of Hsiang and his colleagues, this link receives strong empirical support in existing analyses. Nevertheless, as briefly mentioned in chapter two of this work, empirical findings reach no consensus whether environmentally-induced migration can act as a precursor for violence. Due to data limitations and lack of conceptual clarity, no empirical study has been able to explore the general consequences of environmentally-

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<sup>270</sup> Scheffran, Jürgen et al., “Disentangling the Climate-conflict Nexus: Empirical and Theoretical Assessment of Vulnerabilities and Pathways,” *Review of European Studies* Vol. 4, No. 5, (2012).

<sup>271</sup> Scheffran, Jürgen, August 2013, in: “Study On Climate-Wars Met With Fierce Criticism.”

<sup>272</sup> Scheffran, Jürgen et al., “Disentangling the Climate-conflict Nexus: Empirical and Theoretical Assessment of Vulnerabilities and Pathways,” 2.

<sup>273</sup> Hsiang et al, “Quantifying the Influence of Climate on Human Conflict,” 1235367-11.

induced migration across cases. Recent studies rather suggest to treat migration as an important adaptation measure to climate change.

To sort out the conflict potential of environmentally-induced migration, we shall have a closer look at a number of cases that show both environmental degradation and population flows, but have different social consequences, as Astri Suhrke states in her paper “Pressure Points: Environmental Degradation, Migration and Conflict.”<sup>274</sup> For instance, the conflict in the Sudanese province of **Darfur** which has been driven, at least in part, by climate change and environmental degradation and has therefore increasingly been mentioned as the first of the future ‘climate change wars’. First speculated about by Michael Byers and Nick Dragojlovic in the *Human Security Bulletin* (2004), this idea has frequently popped up in the popular press ever since.<sup>275</sup> And indeed, with rainfall down by up to 30 percent over 40 years and the Sahara advancing by well over a mile every year,<sup>276</sup> tensions between farmers and herders over further disappearing pasture and evaporating water holes threaten to reignite the war between north and south Sudan, which broke out in 2003 as a regional rebellion. In 2003, two Darfuri rebel movements – the Sudan Liberation Army (SLA) and the Justice and Equality Movement (JEM) who are also largely divided among ethnic lines – took up arms against the Sudanese government, complaining about the marginalization of the area and the failure to protect sedentary people from attacks by nomads. The government of Sudan responded by unleashing Arab militias, the Janjaweed, and authorized them to attack hundreds of villages throughout Darfur and to slaughter and drive out members of the Zaghawa, Masalit and Fur tribes. Since then the conflict in Darfur has claimed over 400,000 lives and displaced over two million people into hundreds of IDP camps and gatherings.<sup>277</sup> But while the violence in Darfur is usually attributed to ethnic hatred, an UNEP study of 2007 indicates that among the root causes of decades of social strife and conflict is the fighting between settled farmers and nomadic herders over failing lands because of dramatic declines in rainfall. This is particularly the case in some north-south border zones. In the Nuba mountains region in Southern Kordofan, for example, the indigenous Nuba tribe expressed concern over the damaging of trees and other vegetation due to the recent presence of the camel-herding

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<sup>274</sup> Suhrke, Astri, “Pressure Points: Environmental Degradation, Migration and Conflict” (paper prepared for the workshop on “Environmental Change, Population Displacement, and Acute Conflict,” Ottawa, 1993), 16.

<sup>275</sup> Nordås, Ragnhild and Nils Petter Gleditsch, “Climate Conflict: Common Sense or Nonsense?” *Political Geography*, No.6 (Fall 2007): 3.

<sup>276</sup> “Darfur conflict heralds era of wars triggered by climate change, UN report warns,” *The Guardian*, last modified June 23, 2007, accessed September 28, 2013, <http://www.theguardian.com/environment/2007/jun/23/sudan.climatechange>.

<sup>277</sup> IOM, *Migration, Climate Change and the Environment*, 129.

Shanabla tribe. Like many pastoralist communities, the Shanabla have been forced to migrate south in search of greener pastures lost in the north to agricultural expansion and drought; resource conflict was therefore inevitable.

The problem of environmental degradation as a root cause of the Darfur crisis is also confirmed by the UN secretary-general Ban Ki Moon who wrote in an editorial published in the *Washington Post* in 2007:

“Almost invariably, we discuss Darfur in a convenient military and political shorthand – an ethnic conflict pitting Arab militias against black rebels and farmers. Look to its roots, though, and you discover a more complex dynamic. Amid the diverse social and political causes, the Darfur conflict began as an ecological crisis, arising at least in part from climate change.”<sup>278</sup>

As UNEP said in their assessment, “Sudan is unlikely to see a lasting peace unless widespread and rapidly accelerating environmental degradation is urgently addressed.”<sup>279</sup> Among the most serious concerns are land degradation linked with overgrazing of fragile soils and the potential spread of deserts southwards by an average of 100 kilometers over the past 40 years. Thereby, areas on the fringes of the Sahara are acutely vulnerable including conflict- and drought-stricken parts of Darfur, Northern Kordofan, Khartoum state and Kassala state. Many sensitive areas are also experiencing a “deforestation crisis” which has led to a loss of almost 12 percent of Sudan’s forest cover in just 15 years. Moreover, declining and highly irregular patterns of rainfall in parts of the country (particularly in Kordofan where climate models indicate that temperatures are set to rise by 0.5 degrees Celsius to 1.5 degrees Celsius by 2030 and 2060 with an average rainfall decline of five percent) provides mounting evidence of long-term regional climate change.<sup>280</sup> And climate change not only forces migration but could also trigger conflict. However, it is to say that climate change and corresponding migration in Darfur were not sufficient conditions for conflict. What we need to recognize is that climate change is as a major player in the conflict but not solely responsible for the crisis. Instead, it is safer to argue that the conflict is rather the result of environmental degradation and the overwhelming of local resources together with social degradation and the inability or unavailability of local dispute reconciliation mechanisms to handle environmentally-induced

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<sup>278</sup> Ban Ki Moon, “A Climate Culprit in Darfur,” *Washington Post*, last modified June 16, 2007, accessed September 28, 2013,

<http://www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html>.

<sup>279</sup> “Environmental Degradation Triggering Tensions and Conflict in Sudan,” UNEP 2007, accessed September 28, 2013, <http://www.unep.org/Documents.Multilingual/Default.asp?ArticleID=5621&DocumentID=512&l=en>

<sup>280</sup> *Ibid.*

migration.<sup>281</sup> In other words: significant violence only erupted because of social and political factors, particularly the propensity of the Sudan government to respond to local problems by supporting militia groups as proxies to suppress any signs of resistance. As Alex de Waal – executive director of the World Peace Foundation at the Fletcher School of Law and one of the foremost experts on Sudan and the Horn of Africa whose scholarly work and practice focuses on documenting human rights abuses, HIV/AIDS and governance in Africa, and conflict and peace-building – says:

“The most important culprit for violence in Darfur is the government, which not only failed to utilize local and central institutions to address the problems of environmental stress in Darfur, but actually worsened the situation through its militarized, crisis management interventions whenever political disputes have arisen.”<sup>282</sup>

So what is needed is a new governance of Darfur, as scientists like de Waal argue. For instance, the international community could offer a real chance to deliver a different future for the people of Sudan. A big part of that future and central to keeping the peace will be the way in which Sudan’s environment is rehabilitated and managed, for instance through sustained economic development, possibly involving new irrigation and water storage techniques and efforts to improve health, education and roads. As Ban Ki Moon said in the *Washington Post*, “the international community needs to help organize these efforts, teaming with the Sudanese government as well as the international aid agencies and nongovernmental organizations working so heroically on the ground.”<sup>283</sup>

The tragedy of Sudan can be seen as a window to a wider world underlining how issues such as declining resources allied to the displacement of people, who move seeking improved life conditions in other regions, can destabilize communities. As we have seen, there is no straightforward link between environmentally-induced migration and conflict but still a significant one. For instance, William A. V. Clark, a professor in the Department of Geography at the University of California, Los Angeles, provides us with the example of West Africa.<sup>284</sup> In **Senegal** and **Mauritania**, dams were built along the Senegal River in order to regulate river flow, generate hydropower, enable expansion of irrigated agriculture and allow navigation in the Senegal valley (which demarcates the border between Senegal and Mauritania) as well as provide river transport from the Atlantic Ocean to Mali. The dam’s

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<sup>281</sup> Edwards, Scott, “Social Breakdown in Darfur,” *Forced Migration Review* 31 (2008): 24.

<sup>282</sup> “Is Climate Change the Culprit for Darfur?” Alex de Waal, last modified June 25, 2007, accessed September 28, 2013, <http://africanarguments.org/2007/06/25/is-climate-change-the-culprit-for-darfur/>.

<sup>283</sup> “A Climate Culprit in Darfur.”

<sup>284</sup> Clark, William, “Social and Political Contexts of Conflict,” *Forced Migration Review* 31 (2008): 22.

implementation, however, had mostly negative effects on the basin's population and natural resources. On the one hand, it led to sharply increased land values along the river in areas where high-intensity agriculture would become feasible, and on the other, it led to a struggle between power elites for the control of these lands. The more powerful elites then changed property rights and resource distribution in their own favor, which produced a sudden decline in resources for the ethnic minority since they weren't able to continue farming, herding, and fishing along the Mauritanian riverbank. Yet another serious problem the basin had to face was the impact of the dams on public health. As UNESCO states, there has been not only a rapid increase in the prevalence of water-borne diseases that were already known in the area (such as malaria, urinary schistosomiasis, diarrhoea), but also the appearance of intestinal schistosomiasis, a much more dangerous form of the disease.<sup>285</sup> As a consequence of the degradation of the whole ecosystem, leading to the proliferation of water-borne diseases, 20,000 marginalized Mauritians were expelled to Senegal from where they then launched raids to retrieve expropriated cattle.<sup>286</sup>

Even though the cases of Senegal and Mauretania illustrate the potential for conflict resulting from environmental degradation or environmental change, the conflicts themselves are embedded in social and political contexts, including patterns of land distribution, family and community structure, and economic and legal incentives, e.g. systems of property rights.<sup>287</sup> – A problem which is also observed by other studies of communities displaced by dam-building in **India**. In general, then, the resource competition between powerful and less powerful groups (usually numerically small and socially marginal peoples with no resources for social mobilization or political resistance) “typically causes oppression rather than manifest conflict,” as Suhrke describes it.<sup>288</sup>

What I intend to argue here is that, while climate change is clearly a major threat to human security – to food, water, housing and to livelihoods – it is unlikely to be a major cause of violent conflict. This is why the European Union is wrong in currently drawing wide public attention to the potential links between climate change and violent conflict by using, for instance, satellites, surveillance planes, naval vessels, and border fences to hinder people who move because of environmental degradation and climate change from entering their territory.

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<sup>285</sup> UNESCO, “World Water Development Report,” accessed September 29, 2013, [http://webworld.unesco.org/water/wwap/case\\_studies/senegal\\_river/senegal\\_river.pdf](http://webworld.unesco.org/water/wwap/case_studies/senegal_river/senegal_river.pdf).

<sup>286</sup> Clark, “Social and Political Contexts of Conflict,” 22.

<sup>287</sup> Ibid.

<sup>288</sup> Suhrke, “Pressure Points: Environmental Degradation, Migration and Conflict.”

In other words: tightening border controls in form of the so called **Fortress Europe** against migration due to climate change is not an appropriate response to this humanitarian crisis. Yet, the control over migration movements and mobility is a thoroughly historical phenomenon which continues to be highly prominent in times of globalization and climate change. In Europe, this has recently been exemplified by the occurrence of the flight of many Libyan refugees to the borders of the EU, especially to the Italian island of Lampedusa, and the Maghreb uprisings. While the uprisings throughout North Africa have generated hope for change in the political and cultural practices of the Islamic nations of North Africa, they also pose a new existential threat to Europe as waves of migrants flood toward Europe via the Mediterranean Sea. The spillover from these upheavals is having an effect on Europe similar to that on the U.S. as a result of Mexico's social and economic problems: With the emergence of so many refugees, the European Union's fundamental values involving the freedom of movement of people and the abolishment of internal border controls, stirred much unrest in the EU. Many countries were afraid of being "overrun" by the mass-influx of people, especially from Tunisia and Libya which is why in 2011 a number of European countries called for a reform of Schengen rules to make it easier to reimpose border controls. This reaction of the EU to this situation illustrates that the EU is primarily concerned about its own security rather than prioritizing the protection of human rights.

In its half-century history, the EU has absorbed waves of immigrants – political migrants fleeing communism to Western Europe throughout the cold war, the guest workers who poured into Europe in the 1950s and 60s, the hundreds of thousands who escaped the Balkan wars of the 90s and the millions of economic migrants of the past decade seeking a better life. Today, Europe needs to prepare itself for a new wave of migration with a very different cause: climate and environmental change. As Javier Solana predicted in a report to the European Council in March 2008, within a decade "there will be millions of environmental migrants, with climate change as one of the major drivers of this phenomenon." "Europe must expect substantially increased migratory pressure."<sup>289</sup> His remarks were prompted by a report from the German Advisory Council on Global Change (WBGU), which warned of the impact of climate change as a security risk. Similarly, UK envoy Rear Admiral Neil Morisetti, senior military commander who was appointed as William Hague's climate envoy this year, said that

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<sup>289</sup> Solana, Javier, "Climate Change and International Security" (paper presented to the European Council, Brussels, March 14, 2008).

climate change was one of the greatest risks we face in the 21<sup>st</sup> century with Europe ultimately bearing the consequences.<sup>290</sup>

The picture painted by the former High Representative Solana and other security and foreign policy actors is largely negative: Migration resulting from environmental change would lead to resource pressures and then to conflict as groups fight over water and other essential resources. Most security assessments by European governments and institutions share such concerns, placing climate change high on their list of risk variables that are associated with increasing instability. The European policy response to these challenges for the most part has been defensive and is broadly aimed at reinforcing efforts to reduce immigration to Europe. In fact, the EU is raising an iron wall along its borders as the U.S. does with its border to Mexico: No one is able to enter without a visa. “Fortress Europe is a reality,” commented Irene Khan, the seventh Secretary General of Amnesty International until her resignation on 31 December 2009, in 2008. “Access to Europe is very difficult and the initial border of the European Union is being pushed further and further away,”<sup>291</sup> she said, pointing to the rescue operations of migrants in the Mediterranean Sea, patrols in Senegal and increasing cooperation with transit countries.<sup>292</sup> The problem is that none of the major powers are capable or willing to make common efforts to resolve problems of climate change and their social consequences. The EU’s solution to the crisis is more repression even though research so far offers limited support for viewing environmentally-induced migration to Europe as an important influence on conflict.

In sum, as we have seen, the potential connection between environmental factors and conflict is a highly contested one, and the literature contains evidence both supporting and denying such a connection. Despite that research in this area has made considerable progress and more attention is being paid to the specific causal mechanisms linking climate change to conflict, most writings on the relationship between climate change and security are highly speculative, and there is some confusion whether it is the effect of ‘climate’ or ‘weather’ that is being tested. Moreover, the IPCC assessment reports to date, which have largely set the agenda for

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<sup>290</sup> “Climate change poses grave threat to security,” *The Guardian*, last modified June 30, 2013, accessed September 29, 2013, <http://www.theguardian.com/environment/2013/jun/30/climate-change-security-threat-envoy>.

<sup>291</sup> “Amnesty Denounces ‘Fortress Europe,’” *Amnesty International*, last modified April 15, 2008, accessed September 29, 2013, <http://www.unhcr.org/cgi-bin/texis/vtx/refdaily?pass=463ef21123&id=48059a178>.

<sup>292</sup> *Ibid.*

the debate on climate change, also offer little if any guidance on this issue. As Jürgen Scheffran et al. states in “Climate Change, Human Security and Violent Conflict” (2011):

“The overall impression from the IPCC reports is that the link between climate change and conflict is unclear. Where such a link is mentioned, it is weakly substantiated with evidence. The *Stern Review* on the economics of climate change invites the same characterization. Its references to how conflict “may” occur as a result of climate change are mostly based on second-hand sources of the same nature as those used by the IPCC.”<sup>293</sup>

Briefly said, the link between climate change, migration, and conflict remains speculative and firm conclusions cannot always be drawn. For instance, Richard Black reviewed some major refugee-producing conflicts of the 1990s and concludes that while several of them are precisely about control of valuable resources, especially oil, e.g. the Gulf War, Sudan, Azerbaijan and Kazakhstan, in other cases, like the Great Lakes Region, Somalia and Sierra Leone, environmental factors do play a role, but seem far less important than ethnic conflicts and political power struggles. A more comprehensive study of conflicts between 1980 and 1992 comes from Hauge and Ellingsen (1988)<sup>294</sup> who established strong relationships between land degradation, freshwater scarcity, population density, deforestation and conflict. “However, the magnitude of the effect was very small, raising the probability of conflict by only around 1 percent. The causal effects of other risk factors such as poverty, regime type and current and prior political instability were far greater.”<sup>295</sup>

In short, whether or not environmentally-induced migration produces conflict depends on a lot of factors which to identify is a much needed endeavor. Of course, “the potential for social tensions stemming from environmentally-induced migration should not be dismissed, but the likelihood of sustained armed conflict is low. Moreover, effective immigrant integration and incorporation can greatly reduce social friction.”<sup>296</sup> However, as I already stated in chapter two of this paper, given that unprecedented climatic conditions are expected to place severe stresses on the availability and distribution of resources, the potential for climate-related human conflict emerges as a risk which deserves further research.

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<sup>293</sup> Scheffran, Jürgen et al., “Climate Change, Human Security and Violent Conflict – Challenges for Societal Stability.” (Hexagon Series on Human and Environmental Security and Peace, Volume 8, Springer Verlag, 2011).

<sup>294</sup> Wenche Hauge and Tanja Ellingsen, “Beyond Environmental Scarcity – Causal Pathways to Conflict,” *Journal of Peace Research*, Vol. 35, No. 3, Special Issue on Environmental Conflict (May, 1998): 299-317.

<sup>295</sup> Castles, Stephen, “Environmental Change and Forced Migration: Making Sense of the Debate.” UNHCR Issues in Refugee Research, Working Paper No. 70 (2002): 6.

<sup>296</sup> Astri Suhrke in: Nordås, Ragnhild and Nils Petter Gleditsch, “Climate Conflict: Common Sense or Nonsense,” 7.

## 5. CONCLUSIONS & FUTURE POLICY PROSPECTS: NATIONAL ACTION AND INTERNATIONAL COOPERATION

“There are three ways to deal with climate change. You can mitigate it. You can adapt to it. Or you can suffer.” [David Burwell, Director of the Energy and Climate Program at the Carnegie Endowment for International Peace, March 2012]

Scientists of the UN’s climate panel recently issued their starkest warning yet about the mounting dangers of global warming. In a report handed to political leaders in Stockholm on Monday, September 30<sup>th</sup>, 2013, they said that the burning of fossil fuels and deforestation have now led to a warming of the entire globe, including land surfaces, oceans and the atmosphere. “Warming of the climate system is unequivocal”, the report explained, and “most aspects of climate change will persist for many centuries even if emissions of CO<sub>2</sub> are stopped.”<sup>297</sup> That in turn would have serious consequences for every continent and in every sector, including frequency and/ or duration increases of warm spells/ heat waves in large parts of Europe, Asia and Australia, increases in the frequency, intensity, and/or amount of heavy precipitation, increases in intensity and/or duration of drought, increases in intense tropical cyclone activity and increased incidence and/or magnitude of extreme high sea level.<sup>298</sup> The worst-case scenario features widespread floods, severe droughts, famine and migration as the latest report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics (launched in June 2013) points out.<sup>299</sup>

The most recent example for a ‘worst-case scenario’ might be the severe drought that is devastating Namibia right now. Namibia is normally very dry, yet, what the country is currently facing could be its most severe drought in thirty years. “There is nothing and if the rains don’t come, it is going to be a catastrophe,” Jack Ndemena, water and sanitation officer with the International Federation of Red Cross and Red Crescent Societies (IFRC), told Al Jazeera this month.<sup>300</sup> According to the article, almost one million people out of Namibia’s 2.3 million population face moderate to serious levels of food insecurity with many households employing coping strategies to mitigate the impact of the drought,<sup>301</sup> including

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<sup>297</sup> IPCC, “Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis – Summary for Policymakers,” September 27, 2013, accessed September 30, 2013, [http://www.climatechange2013.org/images/uploads/WGIAR5-SPM\\_Approved27Sep2013.pdf](http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf).

<sup>298</sup> Ibid.

<sup>299</sup> World Bank, *Turn Down the Heat – Climate Extremes, Regional Impacts, and the Case for Resilience* (Washington, DC: The World Bank, 2013).

<sup>300</sup> “Namibia battles worst drought in decades,” Al Jazeera, accessed October 11, 2013, <http://www.aljazeera.com/indepth/features/2013/10/namibia-battles-worst-drought-decades-201310851010116562.html>.

<sup>301</sup> Ibid.

reducing the number of meals consumed or migrating to cities to find work. Angola has also been affected by the drought. With migrants from both Angola and Namibia flooding into nearby countries in search of food, the crisis is beginning to take on a regional dimension not least by putting pressure on resources in neighboring countries. Following drought conditions during the 2012/13 cropping season (November-June), production forecasts, from an assessment conducted by the Namibian Government, already estimated in February that this year's harvest would yield about 42 percent less than 2012. As FAO reported in May, the poor rains were more pronounced in southern and western parts of the country. For instance, in the northwestern Omusait Region, cumulative rains between January and March were approximately one-third of the average. In addition, the region was also affected by an outbreak of armyworms and is expected to record the sharpest decline in cereal production, about 50 percent below the average.<sup>302</sup> In response, the Government declared a national emergency. As Namibia's president, Hifikepunye Pohamba, concluded: "It has now been established that climate change is here to stay and humanity must find ways and means of mitigating its effect" as well as adapting to its impact, including displacement.<sup>303</sup>

That is to say, it will be impossible to lift the poorest on the planet out of poverty if climate change proceeds unchecked. Strong and decisive action must be taken to avoid further climatic change and to build resilience to temperatures and other climate impacts, impacting livelihoods around the world, however, disproportionately affecting developing countries as they are the most vulnerable to climate and environmental changes due to their socio-economic, political, and physical landscapes. According to the GAIN Index 2012, a project of the Global Adaption Institute (GAIN) – which helps policymakers prepare for these changes by comparing a country's vulnerability to climate-related hazards and its readiness to adapt to the challenges posed by climate change – Denmark, Switzerland and Australia rank 1, 2 and 3 in terms of resiliency to climate change, whereas North Korea was rated as the most vulnerable country overall, and Africa and South Asia are the regions most at risk. Recent disasters seem to bear these rankings out: Heavy rains and flooding in North Korea in Summer 2012 when Tropical Storm Khanun affected parts of the country, left hundreds of thousands displaced, while West and East Africa have both seen record-breaking droughts and

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<sup>302</sup> "FAO/ GIEWS Country Briefs," reference date May 27, 2013, accessed October 11, 2013, <http://www.fao.org/giews/countrybrief/country.jsp?code=NAM>.

<sup>303</sup> "Namibia drought: one in three at risk of malnutrition," The Guardian, last modified August 14, 2013, accessed October 11, 2013, <http://www.theguardian.com/global-development/2013/aug/14/namibia-drought-malnutrition-state-emergency>.

famines in the last two years with Namibia only been the latest example.<sup>304</sup> Especially for these countries, climate and environmental change is not just a threat for the future, it is a condition of every day.

Therefore, we need to work to create awareness on climate change through **mitigation policies** and **adaptation**. That is to say, societies can respond to climate change by reducing GHG emissions and enhancing sinks and reservoirs. Thereby, efforts to mitigate greenhouse gases typically involve changes in lifestyle and behavior patterns and management practices, increasing energy efficiency, new technologies, or the use of renewable energies. In fact, this is considered the best long-term solution to fighting climate change and its consequences. However, as the IPCC states in its latest report, mitigating the effects of climate change will require “substantial and sustained reductions of greenhouse gas emissions”<sup>305</sup> which in turn has a clear implication for our fossil fuel consumption, meaning that humans cannot burn all of the coal, oil and gas reserves that countries and companies possess, according to a statement by the former Irish president and UN high commissioner for human rights, Mary Robinson, ahead of the publishing of the IPCC report at the end of last month. Robinson told *The Guardian* that governments would have “to confront the harsh reality that much of their fossil fuel reserves, and accompanying economic value, would have to be left behind if runaway emissions were not to threaten the climate.”<sup>306</sup> – With the current millennium development goals expiring in 2015 and sustainable development goals in the offing, “this is a key point a time, such a very important year.”<sup>307</sup>

Adaptation, on the other hand, typically refers to measures and behaviors put in place to prevent, moderate, cope with and take advantage of the consequences of climate change. Or as the IPCC puts it: Adaptation is an “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits

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<sup>304</sup> “Vulnerability View: GAIN Index Rates Climate Change Preparedness,” Environmental Change and Security Program, Woodrow Wilson International Center for Scholars, last modified July 31, 2013, accessed October 11, 2013, [http://www.newsecuritybeat.org/2013/07/vulnerabilty-view-gain-index-rates-climate-change-preparedness/#.Uma\\_1HOAqSp](http://www.newsecuritybeat.org/2013/07/vulnerabilty-view-gain-index-rates-climate-change-preparedness/#.Uma_1HOAqSp).

<sup>305</sup> “Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis – Summary for Policymakers.”

<sup>306</sup> “Major fossil fuel reserves must be left in the ground, senior diplomat warns,” *The Guardian*, last modified September 23, 2013, accessed October 15, 2013, <http://www.theguardian.com/environment/2013/sep/23/fossil-fuel-reserves-left-in-ground>.

<sup>307</sup> *Ibid.*

beneficial opportunities.”<sup>308</sup> Adaptation measures can take a variety of forms, including for instance better education, training and awareness, investment in “the empowerment of women and other marginalized social groups to overcome the additional barriers they face to adaptation,”<sup>309</sup> community-based natural resource management, and natural disaster risk management. In other words: we have to invest in resilience. Furthermore, we need to establish mechanisms and binding commitments to ensure that adaptation funding reaches the people that need it most. For example, how funds will be channeled so that they reach the people who need them most. Also, we need to recognize and facilitate the role that **migration** will inevitably play in individual, household and national **adaptation strategies**. In fact, millions of people are already using migration as a way of improving their livelihoods, to join family members, to escape persecution, and increasingly people are using migration as a way of responding to the impacts of climate and environmental change, often temporarily. Yet, not everyone is able to migrate. There may be socio-political factors, such as in Somalia where armed conflict restricts the movement of people suffering from drought and famine, or in New Orleans, Louisiana, where the evacuation plan for Hurricane Katrina assumed that everyone had access to a car. In fact, many people who did not evacuate reported not having a car, not having money to pay for gas, and not having money to pay for a hotel outside of the city as reasons for not leaving.<sup>310</sup> Besides that even if everyone were able to leave, the roads out of the city could not have handled them all. In short: Migration is often expensive, and those most vulnerable to environmental change are usually the poor who do not have the resources needed for migration, whether local or international. There is thus an alarming need to make channels for voluntary migration available. On a national level, this implies removing arbitrary restrictions on movement; identifying alternative locations and acquiring suitable land; ensuring financial support for resettlement; and supporting reconstruction of livelihoods, social networks, and infrastructure. Internationally, this might include the extension of regional economic communities to cover the free movement of people as well as money and goods.<sup>311</sup>

Thus, human mobility must be incorporated into rather than excluded from national and international adaptation plans. Already in 1990, the First IPCC Assessment Report noted that

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<sup>308</sup> “IPCC Fourth Assessment Report: Climate Change 2007, Glossary A-D,” accessed October 17, 2013, [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg2/en/annexessglossary-a-d.html](http://www.ipcc.ch/publications_and_data/ar4/wg2/en/annexessglossary-a-d.html).

<sup>309</sup> Warner et al., “In Search of Shelter: Mapping the Effects of Climate Change on Human Migration and Displacement.” (Care International, 2009), 34.

<sup>310</sup> Black, Richard et al., “Migration as Adaptation,” *Nature* Vol. 478 (27 October 2011): 448.

<sup>311</sup> Ibid.

the greatest single impact of climate change might be on human migration. Despite the warnings and statistics that followed and the huge number of people already affected and even greater numbers potentially involved in the future, little has been done to deal with environmentally-induced migration. But, as said earlier, environmentally-induced migration can only be successfully addressed if it is seen as a global process rather than a local crisis. The burden of assisting and protecting displaced populations cannot be allowed to fall on the shoulders of most affected states alone. An additional responsibility lies on the western World that is the acknowledged major cause of climate change and has the technology and resources to respond. As we have seen, the U.S. and Europe are not immune to climate change and environmentally-induced migration, either. The U.S. is increasingly feeling the pressure from people fleeing deteriorating climate conditions in Central America, while Europe is experiencing the pressure from climate change victims of North Africa. In addition, as the IPCC concludes, continued emissions of greenhouse gases will cause further warming, negatively affecting North America as well as nearly all European regions. Warming in western mountains of North America is very likely to reduce snowpack, bringing more floods in winter and reduced water supplies in summer. Cities with a history of heat waves are likely to experience many more, with potential health impacts, especially for the elderly. Increasing flood risk is likely to be seen in most areas of Europe and health risks due to heatwaves, especially in Southern European countries, are expected to increase. However, industrialized countries have higher capacities to adapt, which makes environmentally induced migration for these countries less problematic. Also, the adaptation costs are acceptable. In The Netherlands, for instance, where climate change is expected to increase the probability of flooding, different flood management strategies were explored by the government which mainly focus on limiting the probability of flooding through the use of flood defences, such as dikes, beach nourishment, and storm surge barriers. The total costs for adaptation vary between 9 billion and over 80 billion euro. The costs expressed as a percentage of GDP are expected to be limited to 0.1 percent to 0.2 percent assuming a maximum sea level rise of 85 cm in 2100, according to the Dutch adaptation research program 'Climate changes Spatial Planning'.<sup>312</sup> Compared to Bangladesh, one of the most vulnerable countries in the world to climate risks, the size of the country, its huge delta system, high population density, high levels of poverty, and overwhelming dependence on nature, its (financial) resources and services hamper to implement likely high levels of protection as in the Netherlands. As a

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<sup>312</sup> Aerts, Jeroen, *Adaptation cost in the Netherlands: Climate Change and flood risk management* (Amsterdam: Dutch Climate changes Spatial Planning Programme, 2009), 44.

result, climate-related disasters continue to result in large economic losses, reducing economic growth and slowing progress in reducing poverty.

In sum, the displacement of people due to environmental degradation and climate change could become a major field of conflict in international politics in the future. For that reason, understanding the challenges over time is a primary and urgent need. Ultimately, the better we understand, the better is our chance to plan and respond to the challenge effectively. (1) We need to deeper address the question of how climate change will affect human migration and displacement and what we will do about it. As climate change is happening with greater speed and intensity and emissions reductions efforts have been too little, too late – according to the latest IPCC report – empirical research, underpinned by longitudinal data on migration flows, is now considered to be more urgent. (2) The scope and scale of migration due to environmental degradation and climate change may still be unprecedented, there is, however, a need to protect the dignity and basic rights of persons already threatened by displacement from environmental change. Therefore, researchers in the fields of development, climate and environmental science, and climate adaptation need to solve the dilemma of definitions and lack of recognition of the status and rights of people displaced by climate and environmental change. (3) The reasons why people migrate are complex but frequently reflect a combination of environmental, social, economic and political forces. This complex relationship makes it difficult for policy makers to identify and formulate policy responses. Nevertheless, we need serious efforts to unblock today’s political inaction and to provide insights into what outcomes can be expected and how we react to them. So far, sensationalist headlines have created more fear than providing evidence on the topic. Therefore, the onus is equally on national and international policy makers to show leadership and to consult, research, and prepare for displacement before it occurs on a wide scale and contribute to further environmental degradation and security challenges in countries of destination. (4) People’s vulnerability to environmental change reflects a combination of their exposure, sensitivity and adaptive capacity. As we have seen, poor people’s exposure to the impacts of climate change is often higher than others because economic and political forces confine them to living in high-risk landscapes.<sup>313</sup> For these people, temporary or circular migration schemes might be an option. By allowing those in environmentally vulnerable areas to work seasonally or on a temporary basis in countries where their skills are in demand, it could help a community to

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<sup>313</sup> Warner et al., “In Search of Shelter: Mapping the Effects of Climate Change on Human Migration and Displacement.” (Care International, 2009), 21.

remain viable in the long run, for example by sending back remittances or developing skills needed to reduce negative impacts of human activity on vulnerable environments and to improve environmental protection in areas of origin.<sup>314</sup>

Briefly said, a policy intervention and an adaptation intervention are absolutely essential. As they say in America, ‘Mother Nature bats last.’ It would indeed be tragic if we defaulted on the opportunity for preparation that those predictions from the IPCC and other research organizations present “because of a lack of clarity in the way we conceptualize the threats.”<sup>315</sup>

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<sup>314</sup> Black, Richard et al., “Migration as Adaptation,” 449.

See also: Parliamentary Assembly, Council of Europe, “The need for international recognition and protection of environmentally induced migrants,” (preliminary draft report, 7 October 2008): 9.

<sup>315</sup> Oliver-Smith, Anthony Nature, *Society, and Population Displacement. Toward an Understanding of Environmental Migration and Social Vulnerability* (Bonn: InterSecTions, ‘Interdisciplinary Security Connections’ Publication Series of UNU-EHS, No.8, 2009), 15, accessed October 16, 2013, <http://www.ehs.unu.edu/file/get/5130>.

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# CURRICULUM VITAE

LINDA WAGNER

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## PERSONAL DATA

Date of Birth 03.09.1981  
Location of Birth Berlin, Germany  
Adress Pappelallee 55, 10437 Berlin  
  
Mobile +49 179 81 49 136  
E-Mail wagnerlinda@gmx.de

## EDUCATION

10/2009 – 10/2013 Master of Global Studies at University of Leipzig, University of California/ Santa Barbara, University of Vienna  
  
04/2004 – 06/2008 Bachelor of Cultural Sciences at European University Viadrina/ Frankfurt (Oder) and University of Salamanca (Spain)  
Majors: Social Sciences, History, International Law  
Bachelor Thesis: "Carl Schmitt's Revolution of Space and the European Perspective on World-History"  
Final Degree Awarded: Bachelor of Arts, Grade: 1.8 (B+)  
  
10/2002 – 04/2004 Business Administration at European University Viadrina/ Frankfurt (Oder)  
  
08/1994 – 06/2001 Nelly-Sachs-Gymnasium, Berlin; High School Diploma 2001

## PRACTICAL TRAINING & WORKING EXPERIENCES

12/2008 – 08/2009 Student Assistant for the International Alumni Programme at Technical University Berlin – Department of Foreign Relations  
Editorial Assistant for the Alumni Magazine "TU International"  
Tasks Included:

- Editing of Scientific Articles,
- Correspondence with International Authors,
- Writing my own Articles for the "Interview, News and Biographical Notes" Section of the Magazine

Assistant for the Alumni Programme's Database-Management; Organisation of Interational Alumni Seminars (i.e. Seminar in Istanbul, April/ May 2009)

08/2008 – 11/2008 Internship at Technical University Berlin – Department of Foreign Relations

Tasks Included:

- Supporting the Editorial Staff of the International Alumni Magazine “TU International”,
- Conducting Interviews,
- Assisting Official Academic Events

06/2007 – 08/2007 Internship at Multiart Event Concept Equipment GmbH

Tasks Included:

- Assisting the Planning Process of an Open Air Festival (“Ost Rock Klassik”),
- Realization and Monitoring of Event Conceptions (Customer Service; Artist Hospitality and Support; Public Press Relations)

07/2003 – 09/2005 Student Assistant at Eventplus Marketing & Concept GmbH

Tasks Included:

- Office Support, Customer Acquisition, Assistance at Events

#### EXTRA – CURRICULAR ACTIVITIES

04/2007 – 07/2007 Seminar ‘Press and Public Relations’ at European University Viadrina

10/2004 – 04/2005 Seminar ‘Writing as a Cultural and Scientific Communication Method’ at European University Viadrina

#### LANGUAGE SKILLS

	Reading	Writing	Speaking
English	Fluent	Fluent	Fluent
Spanish	Fluent	Good	Good
French	Basic	Basic	Basic

#### ADDITIONAL INFORMATION

Personal Interests: Detective Fiction; Intercultural Communication; Knowledge Transfer

IT-Skills: Extensive Knowledge of the MS-Office Software Package Including Experience with Database Design, Basic Knowledge of TYPO 3