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The State of Environmental Migration 2016

A review of 2015

F. Gemenne, C. Zickgraf, D. Ionesco (eds.)

Presses Universitaires de Liège

The State of Environmental Migration 2016

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Women walking for water
Diffa region. Women walking along
National Highway, where makeshift
houses made out of plastic and seccos
(tressed straws) are ubiquitous because
of forced displacement.

François Gemenne
Caroline Zickgraf
Dina Ionesco

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Foreword

It is a great honour for me to be writing a foreword for *The State of Environmental Migration*, a publication that I consider as a stepping stone in my career in the field of environmental migration. Six years ago exactly I heard about "environmental migrants" for the first time. At that time, I was working for the UN in Russia on biodiversity conservation and climate change mitigation projects, and had relatively little awareness of the social consequences of environmental degradation and climate change. I was struck by the fact that millions of people and livelihoods were already directly experiencing extremely severe effects of environmental change, and yet so little was done to assist and protect them. I did not know much about environmental migration except that I wanted to learn more about it and to do something to support vulnerable people and communities who were at the frontline of climate change.

I was incredibly lucky to have the opportunity to study for a Masters degree in one of the only universities, at that time, where a course on Environment and Migration was taught; and to be among the first classes taught by Professor François Gemenne on that topic at Sciences Po Paris. I was also lucky to be there when *The State of Environmental Migration* was launched, giving our class a fantastic opportunity, hardly conceivable for Master-level students, to be published in an academic journal. I am to this day extremely grateful for that opportunity, and delighted to see a new issue of this series every year, with ever more excellent cases of environmental migration from all over the world documented by enthusiastic students who are passionate about this topic.

Since my time as a Masters student, many things have changed. On a personal note, I joined the International Organization for Migration, which over the last few years has become the leading intergovernmental agency to address environmental migration through a wide range of research, capacity building and operational activities—and the only one with a dedicated Division of Migration, Environment and Climate Change (MECC) created in 2015 by decision of its Member States. Together with François Gemenne and Dina Ionesco, Head of the MECC Division at IOM, we produced the first-ever illustrated publication synthesizing key issues around this topic—*The Atlas of Environmental Migration* (published with the Presses de Sciences Po and Routledge in 2016), which we hope can support evidence-based policy development. The publication owes a lot to the outstanding research work done by the students who have contributed to previous issues of *The State of Environmental Migration*.

At the global level, there has been considerable progress with regards to the recognition of environmental migration and displacement as a key concern to be addressed. This progress can to a large extent be attributed to the great efforts of a variety of actors from the academic community, intergovernmental organizations (including IOM, UNHCR and many others), specialized institutions such as IDMC-NRC, platforms such as the Nansen Initiative, and members of civil society. All these actors have greatly contributed to giving a voice and much needed visibility to the plight of millions of people displaced, or, on the contrary, trapped, in situations of great vulnerability as a result of climate change, natural disasters and environmental degradation. These actors have also worked tirelessly, and continue to do so, to improve the understanding of the links between environment, climate change and migration in all parts of the world, and to design and promote innovative frameworks, policies and solutions to address forced displacement, assist vulnerable people, and support adaptive migration.

2015 was a breakthrough year in terms of policy development and recognition of environmental migration concerns at a high political level, demonstrating the success of joint efforts by the international community to promote the integration of environmental migration into major multilateral processes. Key political agreements adopted in 2015, such as the Sendai Framework for Disaster Risk Reduction, the post-2015 Sustainable Development Goals, and, most importantly, the Paris Agreement adopted at the COP 21 in December 2015, recognized migrants as a vulnerable group, and provided promising points of reference for future policy development to address environmental migration and displacement.

Tragically, 2015 was also a year that witnessed a social and political catastrophe, as thousands of migrants lost their lives in the Mediterranean, in South Asia or in Central America while attempting to cross international borders in the hope of finding a better life elsewhere, while governments struggled to find solutions to resolve a major migration crisis. In parallel, natural disasters and gradual environmental processes such as the El Niño phenomenon continued to displace millions internally and across borders, potentially contributing, directly or indirectly, to migration crises unfolding in different regions of the world. This new issue of *The State of Environmental Migration* documents some of the key environmental events that took place in 2015 and that affected human mobility, and provides new invaluable case studies that can help us to better understand the complex links between environment, climate change, migration and displacement.

At IOM, we are delighted to continue our support of *The State of Environmental Migration* every year, and to promote young researchers who play a key role in gathering evidence on environmental migration—evidence that is essential for international and governmental actors alike to be able to better respond to this challenge of the 21st century.

by Daria Mokhnacheva, Thematic Specialist at the Migration, Environment and Climate Change Division, International Organization for Migration

Introduction

We are proud to introduce the *The State of Environmental Migration 2016: Review of the Year 2015*, which is the sixth annual volume of the series. As in previous years, the *State of Environmental Migration* selects and compiles Masters students' work detailing and analyzing the year's environmental events that have affected various forms of migration. Each year, students in the MA course 'Environment and Migration' at the Paris School of International Affairs (PSIA) of Sciences Po, taught by François Gemenne and Caroline Zickgraf, are offered the opportunity to select topics and case studies of their own choosing for potential publication. This freedom, we believe, enhances the final publication through students' creativity and disciplinary and geographic diversity. The papers in this volume cover some of the most covered environmental events of 2015 as well as lesser-known cases of environmental migration that occurred over the year.

This year's edition is particular, because for the first time we have partnered with an academic publisher, Liège University Press (Presses Universitaires de Liège), to produce the volume. This marks the start of what we believe will be a long and fruitful collaboration that will further increase the visibility and academic reputation of *The State of Environmental Migration* series. We want to use this opportunity to thank the whole team of Liège University Press, who have worked very hard to ensure the timely publication of this volume.

The publication also coincides with the launch of The Hugo Observatory, a new research structure hosted at the University of Liège, and which shall be devoted to the study of the interactions between environmental changes, migration and politics. It is our hope that this unique research structure, named after the late Graeme Hugo, will soon become a hub for the quickly-expanding research community working on environmental migration.

This volume is once again a collaboration led by an the academic partner and students, with the collaboration of an inter-governmental organization, the International Organization for Migration (IOM). The intention of the partnership is to open up the access of IOM's field presence and expertise to students and create a bridge between the academic and international worlds. The year 2015 has been significant for the recognition of environmental and climate migration at IOM's level with the establishment of a new institutional Division dedicated to this thematic area.

A note on time

Each year that we the editors compile *The State of Environmental Migration*, we focus on the preceding year. Thus this volume emphasizes the calendar year 2015. However, we feel it is essential to encourage case studies that cannot be encapsulated by a single year, reflecting the long-term, cumulative impacts of natural disasters on human mobility as well as protracted displacement. It is often taken for granted that a natural disaster is something that occurs suddenly, whose immediate mobility aftermath is displacement of the people through the destruction of homes and infrastructure. This volume includes several important illustrations of such cases: landslides in Colombia, floods in India, an earthquake in Pakistan. Yet while people often use 'disaster' as shorthand for a rapid-onset event, as this year's *State of Environmental Migration* demonstrates, disasters can also be progressive.[1] Drought, desertification, sea-level rise and coastal erosion, for instance, are all slow-onset events that can have massive repercussions for human mobility over time. The mobility impacts, moreover, can be even more complicated and diverse than those of rapid-onset events. Coastal erosion can destroy seafront homes and settlements causing displacement, but the socio-economic impacts of these progressive environmental changes can also incite relatively 'voluntary' migration (e.g. by diminishing the viability of natural resource-based livelihoods). In some cases, the distinction between the effects of a rapid-onset event and progressive changes are far from clear: habitual flooding can slowly erode individual and household resources and local infrastructure year after year, increasing communities' vulnerability. Thus while a singular flood in 2015 may merely represent the tipping point that finally causes migration.

Therefore, the choices made for this edition are also a call for a long-term approach to disasters: a key research priority for the coming years should be the study of protracted displacement following disasters. How long does displacement last? This is one of the key questions asked this year, as the Internal Displacement Monitoring Center (IDMC) reported that 19.2 million new displacements were caused by disasters in 2015, twice as many new displacements as conflict and violence.

[1] For a brief and useful summary of the distinctions between slow-onset and rapid-onset disasters, see the UK Climate and Migration Coalition blog: http://climatemigration.org.uk/understanding-a-slow-disaster-getting-to-grips-with-slow-onset-disasters-and-what-they-mean-for-migration-and-displacement/

Policy developments

The year 2015 was also marked by two significant policy progress. First, the Nansen Initiative concluded in October with the adoption by 110 States of a Protection Agenda that outlines the rights of those displaced across borders by disasters. The Nansen Initiative was an intergovernmental process launched in 2012 by the governments of Norway and Switzerland, as an attempt to foster the protection of the rights of the displaced. For three years, the Nansen Initiative conducted regional consultations with governments, experts and the civil society—these consultations yielded a series of recommendations and good practices, which themselves shaped the Protection Agenda. In 2016, the governments of Germany and Bangladesh took over as the conveners of the Initiative, which transformed itself into the Platform on Disaster Displacement. The key task of the Platform for the years to come shall consist in the implementation of the Protection Agenda.

And of course, the adoption of the Paris Agreement at the COP21 in December was the key policy event of the year. The first universal agreement on climate change is mostly focused on greenhouse gas emissions reductions, but also addresses migration and displacement, as it created a task-force to advise the UNFCCC bodies on these issues. The task-force is expected to serve as a hub for the integration of research and policy on climate change and migration in the UNFCCC negotiations, and should be established as part of the Warsaw International Mechanism on Loss & Damage.

Overall, 2015 has thus been a key year with regard to policy developments. This new edition of The State of Environmental Migration will hopefully serve as a reminder of the magnitude of the challenges to address.

Caroline Zickgraf, François Gemenne and Dina Ionesco

Europe

Immobility as a coping strategy?

A case study of the 2015-2016 winter floods, Northern England

Solenn Anquetin

Image 1. Todmorden Community dealing with after-flood

Source: Tony Greenwood, December 2015

We usually think of flooding as this disastrous sudden event that washes away everything on its path. There is a crisis, households are evacuated, properties get damaged. Eventually water recedes, people can come back to their home and everyone lives happily ever after. This picture is even stronger as we think of England as a developed country with infrastructural, material and financial means to successfully cope with flooding both in emergency management and recovery. This narrative is very soothing but unfortunately also quite far from the reality. Flooding constitutes, and increasingly so with climate change, a long-term issue reinforcing the vulnerability of successively displaced households who have to cope with it on a daily basis.

Scholars usually distinguish between two kinds of contexts for environmental migration: sudden-onset changes encompass natural disasters such as flooding, tsunamis, and hurricanes, whereas slow-onset changes produce incremental and continuous modifications, such as water scarcity or soil degradation, to an environment (Lonergan, 1998). Sudden-onset changes are visible and brutal, and thus get more talked about in the media. Conversely slow-onset changes produce steady effects, desensitising policymakers. How has this binary theoretical framework shaped flood risk governance regarding population displacement in the 2015-2016 winter floods of Northern England? This paper scrutinises displacement patterns in both emergency and recovery to better understand the impacts on the overarching flood risk governance based on the framing of flooding as a punctual, sudden-onset event.

The first section depicts the flood risk governance in the Northern England winter floods, both in emergency management and in recovery. It shows that governance has endowed a norm of immobility, both by adopting the quantitative and qualitative language of immobility in emergency management, and by adopting a technocratic recovery strategy which does not address displacement. The second section focuses on the adequacy of immobility in the context of climate change. It argues that the governance of immobility is based on the understanding of flooding as a punctual, sudden event, a classification which is becoming misleading with climate change. The third and last section dissects the impacts of this inadequate framing on displacement. It looks at the emergency management to show that conceiving flooding as a punctual event led to a messy evacuation managed by informal networks. It finally turns to recovery management to highlight how the governance of immobility has created cumulative vulnerability born by successively displaced and trapped populations.

Taking Immobility As a Norm: Flood Risk Governance in 2015-2016

What does English flood risk governance look like regarding displacement? This section examines how the norm of immobility has infused flood management in 2015-2016, both in the discourse produced to describe the emergency situation, and in the policy measures implemented for the recovery phase.

This paper examines immobility and its impact on successively displaced and trapped populations's cumulative vulnerability by both reviewing grey literature of government reports, agency reports and press articles, and drawing on email and phone interviews with the Met Office, the Yorkshire Office of the Environment Agency (EA), local authorities of Todmorden and Calderdale and flooded households. It draws its theoretical framework from academic literature on environmental migration.

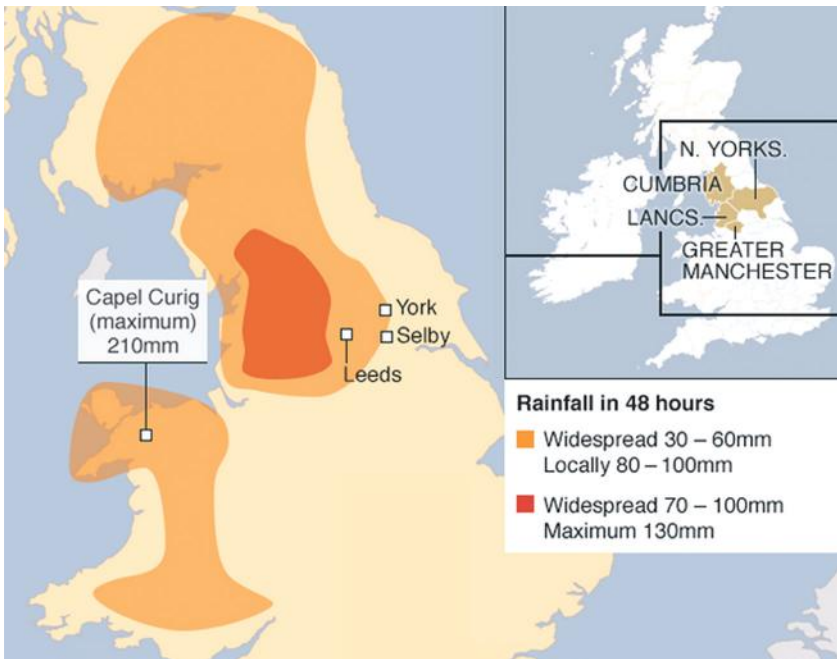
Language Of Immobility At The Heart of Emergency Management

Flooding in Northern England was the result of three successive storms throughout December 2015. These resulted in localised flooding events in the area shown on *Map 1.*, making the headlines and the top priority in parliament throughout December 2015 and January 2016. However, the discourse produced, both by the media and by government reports in one of immobility. Displacement is excluded as an outcome of flooding, both quantitatively and qualitatively. On the quantitative side, numbers on displaced individuals are really hard to find. On the qualitative side, the very word "displacement" rarely appears in any official documents.

While the government report *Winter floods 2015-16* provided shortly after the flooding an assessment of the disaster (Priestley, 2016), numbers on displaced populations are hard to find and often imprecise. Official quantitative assessment focuses on damaged properties and losses estimated in financial terms, with very few information on human-beings tied to these property items (House of Commons, 2016). On the contrary, media articles focus on dramatic narrative of individual stories, as they tell the story of this one family being evacuated and still being displaced seven months after the flood, without giving general information on the number of the displaced by the floods (McKie, 2016). However, literature makes clear that each successive storms triggered its own wave of evacuation and displacement.

Storm Desmond, 5 December 2015*:* The storm hit the county of Cumbria, as more than a month's rain fell in that day and its main rivers all exceeded the highest levels ever recorded. The government reported that 5, 200 homes

Map 1. English counties hit by flooding



Source: BBC, December 2015

Image 2.Volunteers mapping evacuation

Source: Tony Greenwood, December 2015

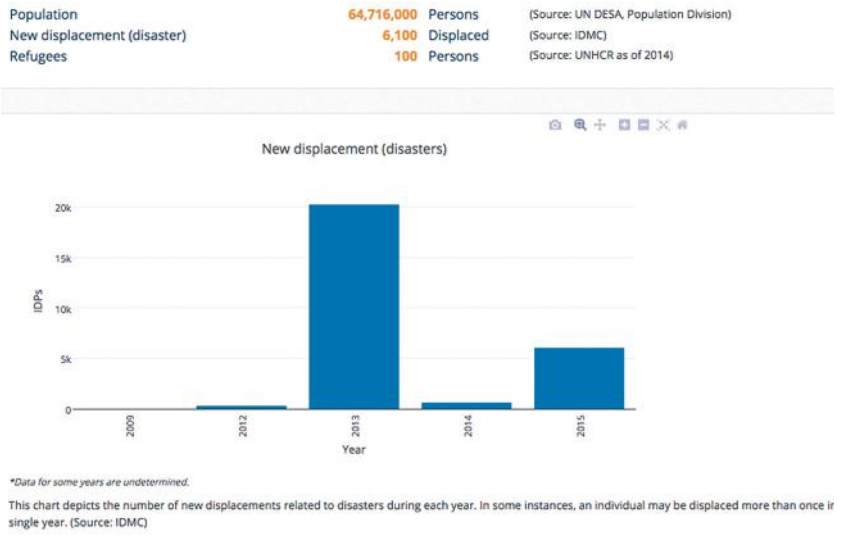
had been affected by flooding and one casualty was recorded by the police (Priestley, 2016). It is not clear whether the totality of affected houses were evacuated but it seems that they have, as The Guardian recorded 6000 households being homeless and 3000 just in the city of Appleby (Glover, 2015). Many roads closed across the county, displacing temporarily people who could not get home. The Cumbria police informed that five rescue centres had been open. Accommodation for those left homeless by the flood during clean-up was meant to be provided by insurance companies, local authority or landlords (Taylor, Quinn & Vidal, 2015). In total, approximately 7, 000 households were affected.

Storm Eva, 24-26 December 2015: On Boxing Day, residents of West Yorkshire and Lancashire were evacuated from their homes after rivers burst their banks as flooding hit Leeds, Greater Manchester and York. The following day 500 were evacuated from their homes in York when the Foss barrier was raised due to flooding of its electrical controls. Police in West Yorkshire said more than 2,000 homes were affected by flooding in Calderdale. The Department of Environment, Flood and Rural Affairs (DEFRA) stated that 9, 000 properties had been flooded. Local councils were "pulling out all the stops" to find accommodation for those forced to leave their homes amid flooding (BBC, 2015). The newspapers talked about "thousands of families facing Christmas out of their homes (Glover, 2015).

Storm Frank, 29 December 2015: The storm brought intense rainfall to West-Northern England, leading to "many homes" being evacuated, with no more precise quantitative information (BBC, 2015). On 27 December, police in York had advised hundreds of people to evacuate their homes. The BBC reported that one person died as a result of these floods.

As this summary shows, there is little information on human impact in Government reports, and media provides only vague estimates of displaced populations. In an interview I conducted, Louise Rice, member of the EA Yorkshire Team, indicated that the Environment Agency did not produce precise numbers, but that local authorities might do. However, Mohammed Amjid, engineer of the Calderdale Council, also declared that exact numbers were not available, in another interview I conducted. In the case of 2015 English floods, the difficulty stems from the necessity of aggregating numbers from three successive floods while considering potential overlaps. It is particularly challenging to understand the evolution of displacement on the medium-term. Black et al. states: "displacement figures refer to the peak of displacement at the height of the emergency phase of a disaster, rather than to any longer-term phenomenon, as systems are rarely in place

Figure 1. Number of new displaced persons by disasters



Source: Internal Displacement Monitoring Centre, 2016

to monitor return, or to calculate numbers still displaced after a number of months or years" (Black, 2013, 34). Several months after the flooding, the Internal Displacement Monitoring Centre published the numbers for displacement caused by disasters in the United Kingdom, displayed in Figure 1. It is uncertain whether the 6,100 new displaced persons have all been displaced by the 2015 flooding. However both peaks, in 2013 and 2015, are consistent with the two major English winter flood events.

The discourse of immobility is not only about numbers, it is also about words. There are cognitive obstacles to a good assessment of displaced people. First, government reports assess human impact with the indicator 'households affected' instead of 'household displaced', blurring the different categories of migration. This mistake had already been pointed out by the Pitt Review. Second, the attention tends to focus on property instead of human-beings, therefore not taking into account individuals who were temporarily displaced by flooded roads. The word 'displacement' is absent from all official reports, as if it had not occurred and flooding remained an unproblematic, temporally bounded event.

Both the media and government reports tend to mix categories, not differentiating between those who were trapped in their flooded houses, those who were evacuated, those who were displaced for a few days, and those who are still displaced now. This fuzziness impedes the production of solid estimates. Black et al. (2013) identifies three outcomes of natural disasters: populations can be displaced (up to three months), migrate (above three months), or be trapped. It is key to disentangle evacuated, displaced and trapped populations from each other, as these categories are often blurred in press articles.

Regarding evacuation, Priestley's governmental report underlines that 16, 000 properties were flooded throughout December, 7, 000 in Storm Desmond and 9, 000 in Storms Eva and Frank. This assessment in terms of properties only allows an approximate guess of how many individuals were evacuated, especially since it is not given that every affected household was evacuated. However, the press underlines "tens of thousands of people" being evacuated throughout December (Carbon Brief, 2016).

Concerning displacement, Black et al. underlines that a smaller proportion of affected people are eventually displaced. Counting the number of displaced individuals is also challenging, as they were not concentrated in rest centres, but also staying with relatives or hotels paid by insurance companies. Empty housing association properties, community centres and army barracks were used as temporary accommodation for families unable to return to their homes. For sanitary reasons, residents of flooded households must technically remain displaced as long as their house has not dried up. The BBC mentioned the three rest centres in Chorley, Salford and Bury run by Red Cross volunteers (2015). The Red Cross underlined its role in dealing with the evacuation and temporary accommodation. A spokeswoman said there were more than fifty people at the centre in Bury. The website *Inside Housing* pointed attention to its hundreds of social housing tenants still living in temporary accommodation as of January 2016, including 430 social households in Greater Manchester alone.

On the short to medium-term, information on what happened to these displaced populations is even more sporadic, and it remains unclear how many are still displaced today. Back in December 2015, The Newspapers *The Sun* had vaguely assessed that the worst affected were "not expected to move back in for a year". *The Guardian* underlined that many households were still unable to return home at the end of December 2015. As of February 2016, it stated that some inhabitants of York were still displaced. A news release of the EA Team of Yorkshire of April 2016 pointed out

that many residents were not back yet in their properties a hundred days after the flooding. Long-term migration is not to exclude: the Pitt Review showed that in May 2008, 4,750 households were still out of their homes as a result of the 2007 floods (2008, xxxix).

Eventually the question of trapped populations remains largely unaddressed. There is no mention of individuals stuck in their flooded house, but it is likely that a significant number of households lacking insurance or relative had no other option than returning to their damp houses after a temporal stay in rest centres. However, there are individual stories of trapped populations. In an interview I conducted, Kathleen Simpson, head of a flooded household, declared that her and her neighbours have had to come back to houses wet and filthy from water which just had receded, as there was no medium-term accommodation provided for displaced persons.

"As a developed country, the United Kingdom is seen, almost automatically, to be high on resistance and low on vulnerability" (Brown, 2014, 192), making a discussion around displacement-induced vulnerability almost impossible. The language created by these numbers and words is one of immobility. Both policymakers and human rights activists (Black et al., 2013) create the narrative of displacement "as a failure of adaptation, a humanitarian catastrophe in the making" (Gemenne, 2011).

A Recovery Strategy Reinforcing the Norm of Immobility

The report *Winter floods 2015-16*, also provides a neat summary of the different funding and policy measures implemented as a response to flooding. These different strategies favour a technocratic approach to the flood, eclipsing any other kind of recovery strategy. Such narrow focus propagates the norm of immobility. Recovery strategy is primarily based on re-enforcing flood defences. The main response by the government to the flooding of December 2015 has been to increase substantially the budget for building new flood defences to GBP £2/3 billion in a six-year program (Priestley, 2016). The funding is meant to both repair the damages of the 2015-16 flooding, as well as building new infrastructure. In an interview I conducted, Louise Rice and Alexandra Wales pointed out to the £115 million commitment to increase flood resilience across the Calder Valley, Leeds and York. Louise Rice stressed that the main tasks of the Environment Agency were to improve flood defences—especially the Leeds and York schemes for the Yorkshire team—and provide information to local authorities.

The parliament has also committed to protect the flood defence maintenance spending in real terms for its duration. Management fund will go

both to a fund for dealing with emergency crises, such as dispatch troops in flooded areas, and for maintenance of the already existing flood defences (Taylor, Goodley, Syal, 2016). Policymakers mainly invest in engineering solutions ensuring populations do not have to move. However, this technocratic focus has proved extremely costly and financially inefficient, according to Helme (2016). The KPMG confirmed this analysis, showing that the costs of flooding are estimated around £5.8 billion. The highest costs concern the defence repair and replacement themselves, estimated at £2 billion. Moreover, Professor Richard Chiverrell underlines that flood defences have not failed, but rather were overwhelmed (2016). He insists on the need to completely shift policies away from keeping on building new flood defences, as long as it is not clear what to prepare flood defences for.. Focus on flood defences prevents them from discussing migration as an adaptive strategy. Considerations to the communities affected by flooding are solely based on a logic of repairing and insuring to insure immobility. The Bellwin Scheme was announced to help the people directly affected by the floods. This includes the access to GBP £200 million to aid recovery from the flooding (DEFRA, 2015). This scheme, inspired by the ones available after the 2013-14 winter floods, target households, but also businesses and farmers. It finances reparations to ensure that people can get back into their homes as soon as possible, according to Elisabeth Truss, Secretary of the Environment. As of January 2016, the government had claimed that first payments had already been made to local authorities. Moreover, the government will match any funding raised by charities for affected communities. The government has also implemented a new insurance policy. From April 2016, there will be more insurers able to offer households flood insurance, as firms will be able to use the Flood Re scheme. Insurers will be able to pass on the flood risk element of eligible home insurance policies to Flood Re, which will charge the insurers a premium for each policy. The goal is to develop a wider variety and a better affordability of insurance policies for households.This policy is controversial because more accessible insurance schemes could act as an incentive to live in areas at risk. While both set of measures provide short-term ways for households to cope with flooding, they do not provide money for migration strategies. To Helme, this short-term "sticking-plasters" approach creates inefficient, and even counterproductive, responses to flooding, especially in terms of land use and land management. They do not take into accounts deep and fast evolutions in demographics and intensity of extreme events (2016).

Debates have hardly dwelled on limits on future development, which could be very efficient in avoiding to increase the area's vulnerability.

To Peter Helme, limits on future development is one main solution, but Elizabeth Truss has made no real commitment on the subject, remaining very vague whenever asked about development in floodplains. Beyond avoiding incoming migration to flood plains, the option of resettlement is not even raised. The general discourse, both from the media and authorities, has bee to try "get displaced people back to their homes as soon as possible" without considering mobility as a positive adaptation strategy.

The Distinction Sudden/Slow Onset: an Inadequate Framing to Grasp Vulnerability

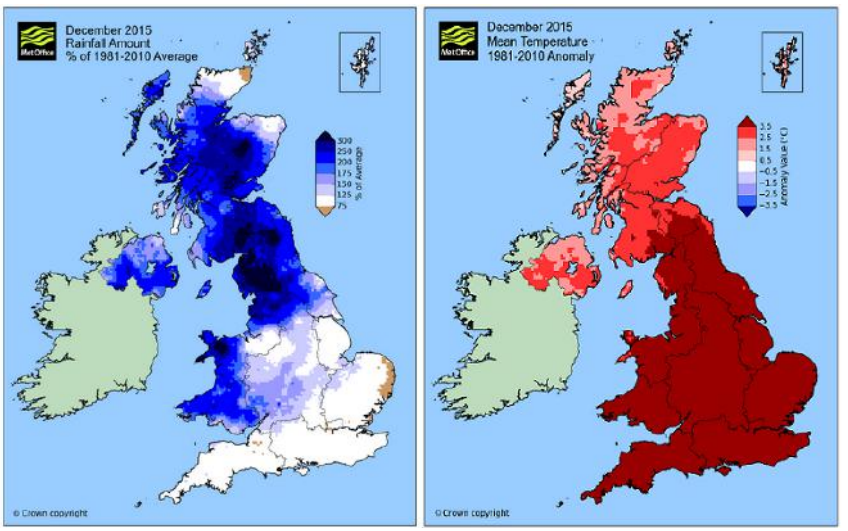
Why is immobility inadequate in the context of the 2015-16 winter floods? This section links flood risk governance based on immobility with the understanding of flooding as a punctual-sudden onset event, in the context of climate change.

A Misleading Flood Risk Governance

England's technocratic response to the 2015-16 flooding is based on the understanding of flood as a temporally bounded event, which consequences are only punctual and short-term. Policy measures do not assume continuity between this flood and the next. This thinking promotes a status quo, in which investment in technology is enough and immobility is a norm. Framing flooding as a sudden-onset event creates the trap of thinking the flood cut from its past and its future. Most people I interviewed point out to the lack of long-term holistic view on floods' consequences. It seems that the suddenness of flooding events forces response policies to act within a very narrow timeframe. Such policies, although organised and rational, focuses on the emergency and crisis. Longer-term measures solely focus on building more flood defences. This approach downplays populations' cumulative vulnerability. But, as Kathleen Simpson, head of a flooded household, underlines, "I don't think people understanding how far-reaching the consequences are".

It is necessary to look beyond the frame of flooding as a sudden-onset event to re-situate the 2015-16 flooding in its temporal context. Widening the frame of analysis allows to understand flooding not as a punctual event but rather as a series of events upstream and downstream of the flooding itself, shaped by anticipation and response measures. Looking to flooding as a process, environmental but also political and social, rather than a point in time, allows to better grasp populations' vulnerability. Professor Richard

Maps 2. & 3. Rainfall and Temperature anomalies of December 2015, compared to 1981-2010 Averages



Source: Met Office, 7 January 2016

Chiverell, teaching at University of Liverpool, calls for a more integrated understanding of flooding. "Hopefully the events of December 2015 will act as a catalyst for change that results in better landscapes for our environment and more connected approaches to flood risk management—not just bigger flood defences" (2016). Already underlined in the Pitt Review, it is about regeneration rather than normalisation (2008), following Carlisle's flood slogan "let's get back to normal... but better".

A Changing Context With Climate Change

First, floods' recurrence is increasing. Tony Greenwood, mayor of Todmorden, in the county of Cumbria, underlines that his municipality, before being flooded in December 2015, had already been flooded both in 2012 and 2013. Mohammed Amjid also suggests that the flooding pattern has intensified. The recurrence of the event debunks the concept of flooding as a punctual point in time. It is impossible to attribute specifically the floods of December 2015 to climate change, however the likelihood of such event has increased. Professor Myles Allen stressed that climate change has made the flooding of December 2015 40% more likely (Carrington, 2016).

Climate change also makes flooding more extreme (IPCC, 2013). The 2015 flooding has made the headlines as the "worst on record" (Scott, 2016). The MET Office confirmed that December 2015 was the wettest December month since 1910, as shown in Map 4. The UK mean temperature for December is record breaking at 7.9 °C, which is 4.1 °C above the long-term average, as shown in Map 5 (Met, 2016). The temperatures for December 2015 were closer to those normally experienced during April or May. Tony Greenwood underlines the extreme feature of the flooding of December 2015 by comparing it to the Niagara Falls. He has been affected by flooding repeatedly but "has never seen it so bad".

In this uncertain context, Mohammed Amjid, engineer of the Calderdale Council, points out to the challenge of a technocratic management. Unprecedented rainfall has outdated the models in place—computed with 100 year flood events, rainfall intensity, ground conditions, river levels, models of extreme events based on historical data extrapolated to predict future flood risk. To the engineer, the solution cam only be simultaneously financial, environmental and social. According to the Committee on Climate Change (CCC), advisors to the British government, residual flood risk—the flooding resulting from extreme weather events that cannot be prevented by normal flood defences—is increasing. It states that the number of people in the high risk flooding category will increase by 45,000 by 2050. "Plans and policies, or progress in addressing vulnerabilities, are lacking" and governmental approach to build and protect is becoming insufficient" (Carrington & Wintour, 9 December 2015).

As flooding's likelihood and intensity are increasing, framing it as a punctual event prevents from grasping its effects on cumulative vulnerability. The sudden/slow onset dichotomy stops working as flooding becomes a transversal change, made of a continuous series of punctuated crises, where vulnerability is played out before and after the actual event.

Theoretical Framework on the Ground: Impacts on Evacuation and Recovery

Flood Without a Past: A Messy Evacuation Led by Informal Networks

Treating floods as sudden-onset events justifies the emergency and unpreparedness of actors to deal with the event. However, its recurrence gives many opportunities to improve resilience through adaptation strategies. The

2015 flooding has a past of technocratic focus leaving aside human resilience. Technocracy has left communities unprepared when technology has failed. Flooding was not a natural disaster but rather a failure to adopt successful adaptation strategies. In a governance of immobility, informal networks had to fill in the gaps to evacuate affected populations. 'Repair rather than prepare' is the (reversed) proverb that best describes crisis management in December 2015: in the forecasting phase of the flood, warnings from experts were not taken into account. Several members of the Parliament have raised the issue that the emergency situation could have been avoided, had authorities taken warnings from the experts into account. Both the CCC and the Association of Drainage Authorities had issued clear warnings that the Government needed a new strategy for the increasing number of homes at flood risk (Carrington & Wintour). Kerry McCarthy, shadow Secretary of State for DEFRA, points to the fact that the national flood resilience review—initiated *after* the flood by the Environment Agency—should have been instigated *before*.

Criticisms focus on the discontinuity of funding in flood management, because of cuts in the budget for barrier maintenance and short-term commitments. "Governments are widely regarded as incapable of making credible long-term commitments to future funding" (Helme, 2016, 7). This short-term view leads to huge gaps of funding between each flood: after each event, there is a flow of funding, but it soon dries out and flooding is 'forgotten' until next time. But next time is becoming increasingly *sooner*. Weakly committed authorities fail to prioritise flood prevention: emergency acts as a wake-up call, but it is not enough. Mayor Tony Greenwood stresses that, after each flood, lessons are learnt, but they are also quickly forgotten, and authorities have to take up the learning curve again, consuming time and energy. Flooding has to be dealt with on a more continuous basis, not punctually with each flooding.

If prevention and anticipation were downplayed, authorities insist that the emergency evacuation was dealt with successfully. Flooding minister Rory Stewart insisted that the necessity of "think[ing] big and think[ing] early" (in Priestley, 2016, PPP) was decisive in the British government's strategy. Concerning Storm Eva, the decision led to an immediate "Cobra" meeting with the Environment Agency on 23 December. The military was deployed "immediately", leading to an additional 600 soldiers in support of the operations. The Environment Agency, emergency services and the Army worked through the night deploying temporary defences, rescue boats and pumps, and evacuating residents. Minister Rory Stewart concludes: "this country has responded very well to the emergency nature of the floods". However,

newspapers describes evacuation with surprise and panic. Mountain Rescue teams evacuated individuals with little warning, allowed to take nothing else than what they were wearing. Evacuation got hectic in York, due to the decision of raising the Foss Barrier, on the major flood defences of the city. This caused entire streets to be submerged. 200 people had to be rescued by boat in two days (Scott, 2016). The crisis was not inherent. As the crisis happened, volunteers organised in informal networks took a leading role. Through the different interviews, I realised the extent of volunteers' involvement in the evacuation. Tony Greenwood's testimony focused on the informal networks of help and cooperation that developed spontaneously to deal with the evacuation emergency. He describes a "complete lack of organisation" from centralised authorities authorities. Todmorden Town Council is indeed a subordinate authority that has no authority or power in case of flooding. They depend on Calderdale Council's centralised authorities. Tony Greenwood and his coworkers were involved on a voluntary basis. Todmorden had flooded the night before Boxing Day and the Mayor had opened the town hall because people could not get home. Temporarily displaced individuals had to take shelter in the town-hall because their house had been flooded, but also because flooded roads made them unable to access their houses. Nobody was in charge or in control of the evacuation. There was no particular organisation and no one was appointed. The network of help organised spontaneously but got "more and more sophisticated by the hour" says Tony Greenwood. "Nobody knew what we were doing but organically it worked". This description differs from the rational and well-planned organisation I imagined England would have put in place to deal with the flooding. However, the "to-do" attitude of communities was general and people with absolutely no authority came to work together. NGOs arrived to help further on, and for Todmorden, brought 90 camp beds for the displaced individuals. These were put in the Methodist Church. Newspapers also mentions schools being opened as rescue centres (Pidd, 2015). It is only after three days that the army arrived in Todmorden with 50 soldiers to rescue vulnerable people. But the work had already been done by volunteers, and the military got all the information it needed from informal networks.

Tony Greenwood's account insists on the very strong feeling of community triggered by the flooding. This positive externality had already been identified by the previous issue of *The State of Environmental Migration* regarding the Southern England floods, in which interviewees compared the strengthened sense of communities to "the war years" (Brown, 2014, 200). In Todmorden Mayor's experience, people coming to the town hall

Image 3. Rest centres' beds in the Methodist Church, Todmorden

Source: Tony Greenwood, December 2015

were 50% individuals displaced by the flood and 50% coming to participate to the rescue effort. Volunteers got organised in the court room of the town hall, and worked tirelessly for several days. People also came to give money, needed for the logistics of evacuation, for instance sands packs and the preparation of meals, as well as recovery. The involvement was generalised across age groups and geographic locations. Bradford indian restaurants donated meals, supermarkets were very generous in donating food. People from all social backgrounds came to help. The team of volunteer was skilful and versatile. They were making meals in the kitchen, or rescuing neighbours by knocking on all doors. Newspapers also describe other networks of solidarity such as a system of "laundry bags" so volunteers could get the dirty laundry of displaced individuals and wash it in their washing machines (Pidd, 2015). Finally, a Facebook page was developed in Todmorden: " it was way more effective at getting the message out" says Tony Greenwood. It was used to check whether people were safe and to let volunteers know what was needed at the town hall. However, informal networks was not a lasting comprehensive solution to displacement management. Despite volunteers' incredible work, the emergency of flooding caused problems that a too punctual management exacerbated. First, houses were not only flooded but also destroyed by land-slide or contaminated by filthy water

coming from the sewage. Properties and furniture were therefore permanently damaged. In York for example, house were submerged in filthy water contaminated with sewage for 48 hours (Scott, 2016). Todmorden also experienced contamination: the Mayor testifies that "people kept arriving all night because they had been flooded out, and their house was full of dirty water".

Second, the lack of planning let affected populations with little clue of what was happening and what should be done. Flooded households were stuck with no electricity, they had no more battery in their phone so they could not reach adequate contacts. In the case of Todmorden, individuals like Kathleen Simpson went to the town hall because they did not know where else to go. The government did create several web pages to explain to individuals the recovery process. For instance, the webpage *Flood recovery - households and businesses* details the funding procedure and content. But either flooded households were not aware of these resources or they did not know how to fully exploit them. Dealing with insurance was also a main issue: people did not know who to contact, and the insurance paperwork could be very tricky for people to fill. The volunteers became very handy in the midst of all the administrative distress. In Todmorden, a team was dedicated to help flooded households fill the plaid form to ask for financial help. The court room was full of individuals on computers researching information for evacuated individuals, and the team slowly turned itself into a 'citizen advice bureau'. A psychologist also volunteered to run a psychological care to council distressed persons.

Newspapers insisted on the distress caused by flooding happening on Boxing Day: as people planned to have a lovely time with family, they found themselves in the wet and the cold, having to take shelter in rescue centres and dealing with stressful insurance business. Actually, individuals did not lose their Christmas spirit, which was sustained by the impressive community support. Newspapers talk about "Unruffled Yorkshire spirit" (Pidd, 2015). Tony Greenwood describe displaced people as "stoical". "No one was hysteric and there were very few tears". Unfortunately, while the support to flooded households was unanimous during the crisis, the longer-term support necessary from local authorities was insufficient. Kathleen Simpson testifies that "volunteers were very good on the spot, but as soon as the council got in, it went bad. The support was very temporary and some family were just left with the mess, told to deal with it themselves". This testimony expresses the feeling of having been let down on the long-term, shared by most displaced people. Newspapers still report the bundle of frustration and anger that agitates affected communities.

Image 4. Meals prepared for displaced populations, Todmorden

Source Tony Greenwood, December 2015

The situation is also criticised in Parliament by Kerry McCarthy who says "Rather than a sticking plaster response every time the floods hit, with vague promises and random numbers that are forgotten by spring, we need a long-term, co-ordinated approach. Our priority must be making sure that communities in flood-risk areas across the whole country do not endure another Christmas like this one" (2016). Kathleen Simpson participates to a "flood circle": far from having recovered, flooded households feel that they do not matter anymore or that they have been forgotten. Members of the circle say that agents phone them every week to know how they are coping, but they have not come to see the damages or done anything about it.

Flood Without a Future: Successive Displacement and Cumulative Vulnerability

The second major trap of seeing flooding as a punctual change, cut from its temporal context, is that it prevents seeing cumulative vulnerability created by flooded households' successive displacement. As "problems roll on from one flood to the next" (Simpson, 2016), flooding impairs livelihoods on the long-term. Cumulative vulnerability and successive displacement interact within a vicious circle.

Successive displacement

In December 2015, most evacuated households coped 'only' with a short-term and short-distance displacement. But displacement-induced vulnerability acts on the long-term as households are repeatedly flooded.

Displacement in December 2015 was short-term but it has been frequent. Kathleen Simpson has been now displaced three times in three years. She says that, in these three years, she has been able to enjoy a working kitchen for one month only. Tony Greenwood makes a similar statement, acknowledging that most displaced people in Todmorden had got back to their homes, as of April 2016. However displacement "has happened three times now, it can't go on. Some properties have been flooded over and over and over again. It is not sustainable to live in an area that gets flooded so often". The frequency of displacement should therefore be computed in individuals' vulnerability. Beyond the frequency of the event itself, another long-term problem is caused by insurance. People repeatedly hit by floods have seen their insurance policy increase continuously. Most of them can't afford insurance anymore and some have stopped being eligible. Scott comments: "to add insult to injury, some are now likely to be told their insurer has decided not to renew their policy" (2016). This is the case of Kathleen Simpson: after she got flooded for the first time and battled for months to get her insurance working, her claim was rejected and her policy was cancelled. She is now left with no insurance, just like many other living in flood-risk areas. Newspapers talk about some residents who did not have a policy and have become homeless after the floods of December 2015 (Scott, 2016). Not only does the lack of insurance make people very vulnerable on the long-term, but during the event itself, it makes the decision of evacuating harder to take because evacuation then means abandoning the property, losing everything and having no money to rebuild again. People are tied down to their house, they would like to leave but it is impossible. Many people do not have an insurance anymore because the premiums are too high. Mayor Tony Greenwood talks about an extra £3 000 to pay for each household if they live in a flood risk-area, amount that ordinary people cannot afford. There is some help provided to flooded households regarding insurance issues. Community organisations of Calderdale have for instance raised money to help households get over the crisis and pay for the reparations needed for uninsured houses. However, Tony Greenwood concludes: "you get a bit of help, but essentially you are on your own. Insurance will be worse now. Commercial insurance has no reason to make it easy, and people have to be prepared to pay enough". Beyond being displaced frequently by flooding, insurance make people ever more vulnerable by

Image 5. The military arriving after the battle, Todmorden town-hall

Source: Tony Greenwood, December 2015

keeping on increasing with the increased frequency of flooding. A final major issue occurs when individuals lose the paperwork to prove insurance, common problem during the flooding. Individuals who evacuate either do not think about saving the paper at the time or simply do not have the time. Insurance papers are therefore often washed away in the flood along with other important documents, making the administrative battle even more complicated. This time in Todmorden, a professional photographer spontaneously turned up to the town hall with special photographic equipments enhancing water saturated documents, which was of great help for people who could recover the papers in a wet state.

Multidimensional vulnerability

Vulnerability can take several forms. Of course flooding causes physical vulnerability during the event. But there are also longer-term factors to take into account. Zickgraf et al. underlines that cumulative vulnerability is determined by a complex net of interactions between resilience, mobility and environmental degradation (2016, 17-18). First, there is the psychological distress. While spirit remained high during the evacuation, the return to quieter times left displaced people worn-out, and in the deep fear of the next

flood event. Tony Greenwood talks about "an exhausting and depressive business" to have to deal with recovery, months after the flood: "the signs of the floods are still apparent". In Kathleen Simpson's own experience, flooding "creates a whole other net of problems. It kind of changed everything". It is the third time she is affected by the flood, and each time problems roll on to the next flood, making it each time longer to recover, if recovery is at all possible. She feels that her life has gone on a "downward spiral" with flooding. Problems start with flooding in itself, the difficulty to evacuate, the—sometimes irreversible—damages to houses and furniture, and then become problems with insurance policies and taxes, impossibility to cook in a damaged kitchen, inability to work anymore. "You don't need on top of everything else, it's just too much, I must admit I felt in despair at the time" she says. Vulnerability slowly extends to financial vulnerability, but also nutritional, and psychological. Todmorden Mayor stresses that flooding has particularly affected the elderly who "do not see their retirement coming, and instead have to keep fighting". Kathleen Simpson testifies that she feels "physically that [her] life has been severely affected in several possible ways. I've never imagined how devastating it was". She also identifies this feeling among people around her who have been flooded "people's well-being as felt ill for the last three years". The physical and psychological long-term impacts of flooding have been studied in a report produced by Milojevic (2015). The report acknowledges wide variations in effect size are, reflecting in part the vast heterogeneity in the population exposed and their ability to respond and adapt, and the support they received in the emergency and recovery phases. While diseases with long latency are less straightforward, evacuations lead to frequent coughs, colds and bronchitis. Temporary displacement, along with insurance and financial issues, is also a source of psychological difficulty, leading to increased stress and anxiety. According to Pitt, the longer the displacement, the more detrimental on mental and physical health (2008, xxxxv). This causes a strain on National Health Service and widespread absence from work or school. Vulnerability of individuals have also a economic dimension. Both houses and businesses alike face considerable damages, which translate into massive economic costs for owners. Kathleen Simpson had to throw away her brand new washing machine and fridge, bought after the previous utilities had been destroyed by the 2013 flood. She points out to the fact that costs are not only about reparation and furniture needing replacement. Fuel bills are exorbitant due to the drying out necessary. This means a tremendous increase on the electricity, heat and water bills. Taking only the hot water to wash everything has cost her £90 a week, when her income is £30 a week. All her retirement money and spending have been used to try recover from

the 2012 flood, she had to go into debt to recover from the 2013 flood, debt that has not been repaid yet. She did receive a £700 grant from local authorities, but it is a small amount compared to the long-term expenses. Her car has been damaged by the flood, and she cannot afford to get it fixed, so she is in an even deeper impossibility to move, even going shopping is difficult. This extreme case gives a picture of flooding's permanent effect for people's livelihoods. Moreover, economic prospects seem dull because the region is framed as a risky area, not worth investing in. Owners are losing the value of their property, giving them less chance to escape the area. It has very heavy consequences for businesses which lost a considerable part of their activities, especially in the tourism sector. Goodley and Taylor states that "In the meantime there is a knock-on effect to the problems. In areas that are now OK, there are businesses that need to trade. It is important not to scare people off going to Yorkshire, Carlisle, the Lake District and these areas" (2015). House owners face similar problems. Mayor Tony Greenwood underlines that it is impossible to sell a house when it floods every year, and that your region has made the headlines for the damages it faced. Owners cannot even put a tenant in. Tony Greenwood also raises the issue that a lot of people involved are elderly, who have lived there for a long time. "It's not just your house, it's a community" and moving for older people might also be very complicated to administer. In Todmorden, one disabled person, after having been deeply affected physically by the flooding in their house, and evacuated for three days, could not take it anymore and left. However, moving is simply not an option for most people.

"The problem of the first flood have rolled to the second flood, and the second to the third, and I am still trying to deal with the problems of the first flood" says Kathleen Simpson. For flooded households, flooding is continuous source of worry and vulnerability, far from the sudden and punctual framing. And for most of them, consequences go far in their future. "I can't foresee a time when I can reconnect with normal life".

The "Right To Move", a Remedy to Trapped Populations

The mayor of Todmorden himself states: "if I could move, I would". If cumulative vulnerability is so high, why do people stay? Why do we not witness long-term migration, only successive short-distance short-term displacements after each punctual flooding event? The relation between vulnerability and mobility is not straightforward. Back and Collyer define trapped populations as people who need and want to move but lack the ability to do so, due to policies impeding movement or inability to access

the necessary ressources (2014, 52). Resources encompass financial and social capital (Gemenne, 2011). The 2015 flood exemplifies a disaster which reduces mobility, although mobility could be a "post-disaster coping strategy" (Black & Collyer, 52). Properties are damaged and have lost a lot of their value, making it impossible for inhabitants to sell them and use the money to resettle somewhere else. "What do I do, walk away and leave the house there? You're kind of trapped in your own property and you can't get out" testifies Kathleen Simpson. The long-term vulnerability of flooded households is a considerable factor in trapping populations, resulting in successive displacements. Response measures from local and national authorities have not been efficient at alleviating it, focus on building more flood defences even reinforces it.

The norm of immobility is a major challenge to protection of trapped populations (Black, 2013), which policies need to overcome. This does not entail forcing communities to move, but rather developing a portfolio of adaptation strategies facilitating mobility and ensuring individuals' "right to move" (Black, 39). I asked interviewees whether they would consider moving if they could. They unanimously answered positively. Kathleen Simpson insists "what else can we do? The government should give the option to sell the house, to get a full fresh start". She says that flooded households should not be forced but given the choice. "Most people who rented accommodation have moved, a lot of people have moved" but owners are tied down to their house if they do not have the money to buy a second house. They do not have the option of moving. The government could instead give grants for people wanting to move out by relocating funds currently dedicated to supporting insurance. Adaptation strategies include learning to live—and not cope—with the flood through livelihood adjustments such as building more resistant houses, as well as government funded migration. Assisted relocation must encompass financial compensation, incentive mechanisms and concertation with affected populations (Sherbinin et al., 2011, 456). Resettlement is however a controversial issue, and should only be advocated when staying is not possible. There is no silver-bullet solution to flood induced vulnerability (Zickgraf et al., 2016, 19). While mobility needs to be part of the answer, it cannot be the only answer. A portfolio of adaptation strategies must rather be about giving people the choice. While English policies are missing the necessity to address mobility as an adaptation strategy on the national scale, their local focus has the potential to better involve affected populations in the recovery process and develop mobility as one of a wider panel of solutions. The national recovery fund available through the Bellwin scheme is given to local authorities

directly, which then deals with flooded populations, allowing individual vulnerability to be better addressed. Local strategies also aim at reducing cumulative vulnerability by stating that displaced individuals will not have to deal with the burden of paying taxes, as long as they are out of their properties (DEFRA, 2015). Communities remain very helpful and supportive to flooded households by donating money. Launched by Two Ridings Community Foundation on 5 January 2016, the North Yorkshire Flood Appeal raises funds to directly support individuals and families in hardship and vital community organisations and resident groups in the areas affected by Storm Eva. Alexandra Wales outlined localism as an efficient strategy to educate about flood risks and enlighten mobility decisions on evacuation and settlement. She pointed out to fact that the Yorkshire team Agency had set a free flood warning service. Only one fifth of Yorkshire households at risk of flooding currently receive flood warnings. This service has been a success, as 16, 000 additional properties have signed up. The Environment Agency is also undertaking, according to Louise Rice, a huge amount of research, to improve understand of floods and better prepare for the next flooding event. The goal is to build a more robust body of information, and a more resilient network to access this information. The local involvement of citizens during the flooding has made communities more aware that part of their resilience depend on having a strong united community. To Tony Greenwood, it was an emotional experience to see how generous people were. "It was a sad time because of the flooding but also a great time for the town to show what people are like". Such bonds must be perpetuated and citizens involved in the decision-making process to have a more open debate on what they feel solutions are for the community. At this scale, it will be easier to address the question of mobility and the feeling of being trapped. In Todmorden, the town council is involved in drawing guidelines explaining what to do, based on their experience in December 2015. The community is determined become more resilient, leaving aside engineering solutions to flooding. Localism allows a better involvement of citizens, enabling to understand more precisely their vulnerability to flooding, and draw a panel of adapted solutions. Whether or not mobility will be one of them, this is the decision of the communities, but they will better armed to address problems of trapping policies.

Conclusion

When picturing flooding, Kathleen Simpson states: "I imagined that it gets clean up and got back to normal but it's not like that". This paper

has debunked two misleading ideas about English flooding: (1) even as a developed country, England does face displacement induced vulnerability caused by the increased recurrence of flooding; and (2) immobility in England is problematic as it creates a vicious circle of cumulative vulnerability and trapped populations. It has underlined how the framework of sudden-onset change leads to discourses and policies reinforcing immobility by avoiding the word 'displacement' and focusing on engineering solution to floods. England treats immobility as the unproblematic norm, and such a framing prevents to see that facilitating migration could help to build resilience (Sherbini, 2011). "The aim is to move beyond a sedentary perspective, which does not problematise immobility because it is considered to be the norm, not something to be explained or scrutinised" (Jònsson, 2011, 1). Jònsson explains why immobility is seen as a norm and an ideal. Immobility provides a sense of stability and organisation, while mobility evokes adventure and a scary unknown (6). It has also questioned the relevance of the dichotomy in the context of climate change to show that, flooding's slowly increasing recurrence and intensity have long-term far-reaching consequences on affected populations' vulnerability and mobility. Conceptualising flooding as a sudden-onset punctual event has led to an inadequate flood governance based on immobility, and has blinkered policymakers to cumulative vulnerability of successively displaced and trapped populations. It has also linked the governance of immobility with the understanding of flooding as a punctual event in the context of climate change to better understand the impacts on displacement, during both evacuating and recovery. Rather than seeing flooding as a sudden-onset short-term crisis, this paper suggests that policies should adopt a holistic perspective to challenge the norm of immobility and address mobility as an adaptation strategy. Adaptation strategies can take the form of a portfolio of solutions, implementing the right of people to move among other measures. This long-term analysis will prevent "sticking plasters" to be applied (Helme, 2016, 1). Will the winter floods of 2015 mark a turn toward a longer-term commitment? The next months or years will tell us, but England is currently still in the emergency ad hoc phase. It is time to shift radically our understanding of flooding and its consequences on populations' mobility from technological to social, from short-term to long-term, and from narrow-sighted to open-minded problem solving.

BIBLIOGRAPHY

Academic literature

Black, R., & Collyer, M. (2014). Populations 'trapped' at times of crisis. *Forced Migration Review*, *45*, 52-56. http://www.fmreview.org/crisis/black-collyer.html

Black, R., Arnell, N. W., Adger, W. N., Thomas, D., & Geddes, A. (2013). Migration, immobility and displacement outcomes following extreme events. *Environmental Science & Policy*, *27*, S32–S43. http://doi.org/10.1016/j.envsci.2012.09.001

Boege, V. (2011). *Challenges and pitfalls of resettlement measures: experiences in the Pacific Region.* Bielefeld: COMCAD Working Papers, 1-40. http://pub.uni-bielefeld.de/download/2535162/2535163

Brown, S. (2014) The Impact of Displacement in the 2013/2014 Southern England Winter Floods. *The State of Environmental Migration*. [Gemenne, F., Brücker, P., Ionesco, D. (eds.)] Paris, France: International Organisation for Migration and Sciences Po Press, 191-214.

de Sherbinin, A., Castro, M., Gemenne, F., Cernea, M. M., Adamo, S., Fearnside, P. M.. (2011). Preparing for resettlement associated with climate change. *Science*, *334*(6055),456–457. http://science.sciencemag.org/content/334/6055/456?keytype=ref&siteid=sci&ijkey=3IZXPsMvrcm3k

IPCC (2013) Summary for Policymakers. Climate Change 2013: *The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J.Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1–30, doi:10.1017/CBO9781107415324.004. http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf

Jacobson, D. (1998). New border customs: Migration and the changing role of the state. *UCLA J. Int'l L. & Foreign Aff.*, *3*, 443-463. http://heinonline.org/HOL/LandingPage?handle=hein.journals/jilfa3&div=23&id=&page=

Jónsson, G. (2011). Non-migrant, sedentary, immobile, or 'left behind'? Reflections on the absence of migration. *The International Migration Institute (IMI), Oxford Department of International Development. Working Paper, 39*. http://www.oxfordmartin.ox.ac.uk/downloads/academic/wp-11-39-non-migrant-sedentary-immobile-or-left-behind.pdf

Lonergan, S. (1998). The role of environmental degradation in population displacement. *Environmental Change and Security Project Report*, *4*(6). http://mercury.ethz.ch/serviceengine/Files/ISN/136077/ichaptersection_singledocument/97fcdaac-c13b-4826-9829-eca10a8a259b/en/ch_1.pdf

Zickgraf, C., de Longueville, F., Ozer, P., Gemenne, F., & Vigil Diaz Telenti, S. (2016) The Impact of Vulnerability and Resilience to Environmental Changes on Mobility Patterns in West Africa. *World Bank*. http://www.knomad.org/docs/working_papers/KNOMAD%20WP%20The%20Impact%20of%20Vulnerability%20and%20Resilience%20to%20Environmental%20Change%20and%20Migration.pdf

Government reports

Department of Environment, Food and Rural Affairs (DEFRA) (March 2005) *Making space for water. Taking forward a new Government strategy for flood and coastal erosion risk management*

in England, PB 10516. http://www.look-up.org.uk/2013/wp-content/uploads/2014/02/Making-space-for-water.pdf

DEFRA (December 2014) *The National Flood Emergency Framework for England*. PB 14238. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/388997/pb14238-nfef-201412.pdf

Helm, P. (January 5th 2016) *Flood defence: time for a radical rethink*. http://www.dieterhelm.co.uk/natural-capital/water/flood-defence-time-for-a-radical-rethink/

House of Commons (January 2016) *Debates*. http://www.publications.parliament.uk/pa/cm201516/cmhansrd/cm160105/debtext/160105-0002.htm#16010519000001, http://www.publications.parliament.uk/pa/ld201516/ldhansrd/text/160114-0002.htm#16011452000384

Milojevic, A. (2015) *Flooding and health. Health Report Card Paper 8*. http://www.nerc.ac.uk/research/partnerships/lwec/products/report-cards/health/papers/source08/

Pitt, M. (25 June 2008) *The Pitt Review: Learning lessons from the 2007 floods*. http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/pittreview/_/media/assets/www.cabinetoffice.gov.uk/flooding_review/pitt_review_foreword_executive_summary%20pdf.pdf

Priestley, S. (21 January 2016) *Winter floods 2015-16. Briefing paper CBP7427*. http://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7424

UK Water Partnership Research and Innovation Group (July 2015) *Droughts and Floods: Towards a More Holistic Approach*. http://www.theukwaterpartnership.org/droughts-and-floods-towards-a-more-holistic-approach/

Interviews

Interview with Mohammed Amjid, Engineer, Calderdale Council, conducted by phone on 8 April 2016.

Interview with Debbie Manson, Acting Head of Communications, York City Council, conducted by telephone on 1st April 2016.

Interview with Louise Rice, Regional Corporate Communications Manager, Environment Agency, Yorkshire Team, conducted by phone on 1 April 2016.

Interview with Alexandra Wales, Communication Specialist, Environment Agency, Yorkshire Team, conducted by email on 5 April 2016 and phone on 8 April 2016.

Interview with Tony Greenwood, Mayor, Todmorden, conducted by phone on 1st April 2016.

Interview with Kathleen Simpson, Todmorden Resident, conducted by phone on 2nd April 2016.

Interview with the Met Office conducted by email throughout March 2016.

Media articles

Alderson, L. (6 January 2015) Hundreds still homeless following flooding. *Inside Housing Website*. http://www.insidehousing.co.uk/hundreds-still-homeless-following-flooding/7013382.article

Association of British Insurers (8 March 2016) *Flood Re explained*. https://www.abi.org.uk/Insurance-and-savings/Topics-and-issues/Flood-Re/Flood-Re-explained

Carbon Brief (9 February 2016) UK Floods—Linking Extreme Rainfall, Flooding and Climate Change. *Flood List Website*. http://floodlist.com/protection/uk-floods-climate-change

Carrington, D. (7 December 2015). David Cameron is treating the symptoms of flooding, but not the cause. *The Guardian*. http://www.theguardian.com/environment/damian-carrington-blog/2015/dec/07/david-cameron-is-treating-the-symptoms-of-flooding-but-not-the-cause

Carrington, D. (5 January 2016) December 2015 was the wettest month ever recorded in UK. *The Guardian.* http://www.theguardian.com/environment/2016/jan/05/december-2015-was-wettest-month-ever-recorded-in-uk

Chiverrell, R. (29 December 2015) Those calling for bigger flood defences don't understand the complexity of UK flooding. *International Business Times.* http://www.ibtimes.co.uk/those-calling-bigger-flood-defences-dont-understand-complexity-uk-flooding-1535246

DEFRA (8 December 2015) Greg Clarke: Help with Council Tax and business rates for flood-hit communities. *Government Press Release*. https://www.gov.uk/government/news/greg-clark-help-with-council-tax-and-business-rates-for-flood-hit-communities

DEFRA (29 December 2015) £50 million more immediate support for homes and business affected by floods. *Government Press Release*. https://www.gov.uk/government/news/50-million-more-immediate-support-for-homes-and-business-affected-by-floods

DEFRA (11 January 2016) Flood recovery: households and businesses. *Government guidance*. https://www.gov.uk/guidance/flood-recovery-households-and-businesses

DEFRA (24 February 2016) Prepare for a flood and get help during and after. *Government guidance*. https://www.gov.uk/prepare-for-a-flood/get-help-after-a-flood

Goodley, S. & Taylor, M. (28 December 2015) PM defends government spending as cost of floods set to top £5bn. *The Guardian*. http://www.theguardian.com/environment/2015/dec/28/uk-flood-costs-could-be-higher-than-5bn-pounds-insurance

Glover, M. (22 December 2015) Further flooding worsens troubles for Cumbrian towns hit by storm Desmond. *The Guardian.* http://www.theguardian.com/uk-news/2015/dec/22/further-flooding-cumbria-storm-desmond

KPMG (28 December 2015) Flooding impact will breach £5bn. *KPMG Press release*. https://home.kpmg.com/uk/en/home/media/press-releases/2015/12/flooding-economic-impact-will-breach-5bn.html

McKie (30 July 2016) Fear grow over danger of flooding around the UK as inquiry is shelved. *The Guardian* https://www.theguardian.com/environment/2016/jul/30/uk-flooding-fears-grow-danger-inquiry-prevention-shelved

Pidd, H. (28 December 2015) Unruffled Yorkshire spirit dominates, but there's anger too in flooded homes. *The Guardian.* http://www.theguardian.com/environment/2015/dec/28/unruffled-yorkshire-spirit-dominates-anger-too-flooded-homes

Pidd, H. & Halliday, J. (5 January 2016) Floods hit 16,000 properties in wettest December in a century, MPs Told. *The Guardian.* http://www.theguardian.com/environment/2016/jan/05/floods-hit-16000-properties-wettest-december-century

British Red Cross (27 December 2015) Red Cross volunteers support flooded communities. *BritishRedCross Website*. http://www.redcross.org.uk/About-us/News/2015/December/Red-Cross-volunteers-support-flooded-communities

British Red Cross (30 December 2015) Red Cross teams on standby as Storm Frank approaches. *BritishRedCross Website*. http://www.redcross.org.uk/About-us/News/2015/December/Red-Cross-teams-on-standby-as-Storm-Frank-approaches

Scott, J. (6 February 2016) After the floods, York's residents try to piece their lives back together. *The Guardian.* http://www.theguardian.com/money/2016/feb/06/after-york-floods-residents-piece-lives-back-together

Taylor, M., Goodley, S. & Syal, R. (28 December 2015) Cost of UK floods tops £5bn, with thousands facing financial ruin. *The Guardian*. http://www.theguardian.com/environment/2015/dec/28/uk-floods-costs-financial-ruin

Taylor, M., Quinn, B. & Vidal, J. (27 December 2015) Failed flood defences cast doubt over the UK readiness for new weather era. *The Guardian*. http://www.theguardian.com/environment/2015/dec/27/floods-army-called-continue-devastate-northern-england

Photos & videos

BBC (29 December 2015) December storms' trail of destruction *BBC News Online* http://www.bbc.com/news/uk-35193682

Carrington, D. & Wintour, P. (9 December 2015) Cameron government rejected flood risk warnings from climate advisers. *The Guardian*. http://www.theguardian.com/environment/2015/dec/09/cameron-government-rejected-flood-risk-warnings-from-climate-advisers

Internal Displacement Monitoring Centre (2016) United Kingdom. *IDP Database*. http://www.internal-displacement.org/database/country/?iso3=GBR.

MET Office (27 January 2016) December 2015 breaks records. *MET Website*. http://www.metoffice.gov.uk/news/releases/archive/2016/december-records

Photos taken by Tony Greenwood, December 2015.

Videos taken by Kathleen Simpson, June 2013. https://www.youtube.com/watch?v=ouomXyk9gkw

North Americas

Seeking higher ground

Riparian vulnerability and the annual evacuations of Kashechewan First Nation

Simi Bhagwandass

The deep, thunderous sound of a crack. The voice of a solid mass—a slow moving ice cover—sharply divided by a powerful force beneath it. A northern river breaks free from its winter cage, assisted by the heat of the changing air that increases its flow, and expedites its course towards the ocean.

This sound is a signal of the arrival of spring. For Aboriginal communities, like the Cree of northern Ontario, the primaveral awakening of the earth allows them to reconnect with their ancestral lands through traditional practices such as hunting and fishing.

For the Cree band of Kashechewan First Nation, however, the arrival of spring is now associated with displacement, frustration, and for some, depression. Located on low-lying land at the mouth of the Albany River, this riparian community has experienced either partial or complete evacuation—to a number of towns throughout Ontario—due to rising levels of the Albany River. Kashechewan has been evacuated seven times in the past 11 years (ICI Radio-Canada, 2015, April 23) due to rising river level, or water contamination,[1] with 2015 marking the fourth successive displacement linked to flood risks (National Post, 2015, April 27).

Set within the context of an acutely changing climate in the north, even greater changes are expected in the surrounding environment of Kashechewan First Nation. The rate of landmass warming in Canada has been double that of the global average between 1950 and 2010. This rate has been occurring at an even faster pace for northern regions, and within winter and spring seasons. Annual average precipitation is increasing, with a rise in minimum river flows in the North. This wetter Canadian climate is also reflected in increased snowfall in northern areas. Contrariwise, snow cover is experiencing negative trends, particularly in the spring (Natural Resources Canada, 2014). The flooding of Kashechewan First Nation aligns with the observed reshaping of the natural environment of the Canadian north as "a range of climate-related natural hazards continues to impact communities, presenting increasing risks to future health. Recent flood and wildfire events have severely impacted communities through destruction of infrastructure and displacement of populations." (Natural Resources Canada, 2014, p.4).

This paper explores the impact of recurrent, short-term displacement—in the form of annual evacuations—on community health and livelihoods, through the lens of the First Nation communities located in the James Bay area of northern Ontario. First, the paper will provide a historical overview

[1] In 2005, Kashechewan First Nation's water supply was contaminated with E-coli "resulting in numerous and widespread health problems" (Adkin, 2010, p. 232).

of colonialism, riparian rights and Aboriginal peoples in Canada. Against this background, it will expand upon the cause of the floods and the consequences of successive displacement. Finally, it will review government responses and discuss some of the challenges in developing adaptation and mitigation strategies for Kashechewan First Nation.

Riparian Rights And Colonialism In Canada

Prior to European settlement in Northern Ontario, the James Bay region had been inhabited by Aboriginal peoples, including the Cree, who traveled freely across these lands as part of their traditional hunting practices, and who chose to remain inland during the flood season (Barei, 2012). For Aboriginal peoples, land and riparian rights are agreed upon by virtue of proximity, and involve rights of occupation and use (Sproule-Jones, Johns, & Heinmiller, 2008, p. 80). This traditional understanding of land and riparian rights would play an important role in the land acquisition of settlers, whose land rights entitlements are based on ownership.

In 1905, Treaty Number 9—also known as the James Bay Treaty—was signed, initiating an appropriation process that would cede "almost two-thirds of the area that became northern Ontario" (Aboriginal Affairs and Northern Development Canada, 2010) to the Canadian government. In Canada, "numbered treaties were used by the government to secure the 'surrender' of lands by those of aboriginal descent in exchange for certain rights" (Barei, 2012, p. 13). These rights would include relocation to designated tracks of land—or Reserves[2]—where the lives and livelihoods of First Nation communities could persist without interference.

The Cree band at the Old Fort Albany settlement faced further relocation in 1957 due to a religious dispute—a by-product of missionary work in the region. One faction of the community was subsequently placed on a flood plain[3] by the Federal government "ignor[ing] advice that the houses should be further upstream to prevent water damage" (Murdocca, 2010, p. 376). The Cree community named this Reserve 'Keeshechewan', meaning 'where the river flows fast', in Cree language. A spelling mistake on a signpost created by the Canadian government gave the community its current name:

[2] "Reserves may serve as spiritual and physical homelands for their people, but they are also tangible representations of colonial governance. As such they are often the focal point of activism relating to land claims, resource management, cultural appropriation, socio-economic conditions, self-governance and cultural self-determination" (McCue, 2001).

[3] "Flood plains are lands situated next to the permanent course of a river that are periodically flooded during heavy flow periods" (Sproule-Jones, Johns, & Heinmiller, 2008, p.26)

Kashechewan. This Reserve has faced flood and displacement risks ever since (Kapuskasing Times, 2014, May 16).

History Of Flood And Displacement

Recorded evacuation of Kashechewan First Nation due to flooding and flood risks dates back to 1976 (Hatch, 2015). In 1995—after five evacuations (Hatch, 2015)—the Canadian government invested CAD 16.1 million[4] to build a 5 kilometer long and 3.5 kilometer high ring dike to protect Kashechewan First Nation from rising river levels, and to prevent flooding (Abdelnour, 2013). However, the heavy ice pushed towards the riverbank throughout the annual ice breakup season puts pressure on the existing infrastructure, eroding it gradually.

In 2005, two major evacuations were linked to floods, with a third linked to a water crisis that saw an E-coli outbreak in the community. For the latter, one quarter of the community's residents had to be airlifted out of Kashechewan First Nation to seek medical attention (CBC News, 2006, November 9). For the subsequent decade, life in Kashechewan First Nation has continuously been disrupted by flooding and displacements.

The most severe flood was recorded in 2006 (Hatch, 2015), and that year's evacuation saw a delayed return by community members to the Reserve by a month due to a backed-up sewage system that called for some houses to be decontaminated or rebuilt (ICI Radio-Canada, 2006, May 26).

Difficult weather conditions interrupted the 2008 evacuation causing the most vulnerable to be evacuated first by military aircraft, then 450 residents a few days later, and the remaining 650 residents the following day (CBC News, 2008, April 28). Four years later, a change in river flow caused the 2012 evacuation to be suspended, after the most vulnerable members of the community had been airlifted out as a preventative measure (ICI Radio-Canada, 2012, March 26). In 2013, snowmelt backed up sewers resulting in the need of a partial evacuation of 40 households—roughly 200 residents. Water levels had reached nearly two meters in these homes (ICI Radio-Canada, 2013, May 1).

The following year (2014), three large military aircrafts assisted the complete evacuation of Kashechewan First Nation (ICI Radio-Canada, 2014, May 12), and heavy ice jams damaged the dike severely. A delay in

[4] Approximately EUR 11 million using the spot rate available on www.xe.com on 03 April 2016. Figure taken from (Shimo, 2012).

receiving funding from the government left the dike unrepaired prior to the water's freezing in 2015, thus increasing the flood and displacement risk for that year. Culverts in the dike meant to allow water to flow out of the Reserve actually brought water into the community (NDP Newsroom, 2015, March 31).

In all instances, evacuations required airlift and the Cree band had been scattered to various towns throughout Ontario, taking refuge in hotels and other forms of temporary accommodation, with meals provided in arenas and other public buildings in the receiving communities.

Aboriginal Affairs and Northern Development Canada (AANDC), who invested in building the dike, has funded its upgrades and repairs in recent years. The department is also working with the community to develop an infrastructure investment plan that would schedule repairs and regular maintenance to ensure the dike serves as an adequate flood protection system, while ensuring wastewater evacuation (Aboriginal Affairs and Northern Development Canada, 2016).

Kashechewan First Nation, however, has maintained that the dike does not fit Canadian standards and that it is unfit to protect the community against the powerful Albany River. In 2015 the results of an engineering report commissioned by Kashechewan confirmed this belief. In an interview with the Canadian Broadcast Corporation (CBC), New Democratic Party (NDP) Member of Parliament (MP) Charlie Angus[5] explained that: "The report ... ha[s] warned that the deteriorating condition of this dike wall has placed the community at 'intolerable risk", adding that "if there was a sudden rise of water, lives could be put at risk." (CBC News, 2015, March 31).

Emergency Coordination And Early Warning Detection Systems

Federal support for flood preparation and mitigation measures in First Nation communities is coordinated by AANDC. The department is also responsible for supporting flood watch for the Mushkegowuk Tribal Council,[6] which Kashechewan First Nation is a member. Additionally, AANDC supports—through a contractor— work with First Nation communities to review and update Emergency Management Plans and to train for

[5] Charlie Angus is the elected MP for Timmins-James Bay, the riding that includes Kashechewan First Nation.

[6] Mushkegowuk Council is a non-profit regional chiefs' council representing Cree First Nations in Northern Ontario.

emergency preparedness (Aboriginal Affairs and Northern Development Canada, 2016).

Kashechewan First Nation has also been proactive in developing tools to help mitigate flood risks. With the assistance of the engineering firm Hatch, the community developed a simple ice-breakup forecast tool through tracking historical river flow records upstream from the community. The tool has been effective in providing an advance warning of 10 days based on the severity of ice breakup and its subsequent likelihood to cause flooding. Half of that time allows for an emergency airlift evacuation, and the other half serves as a buffer for adverse weather conditions (Shaw, Lavender, Stephen, & Jamieson, 2013).

Based on an analysis of historical data from 2008 and 2013, the tool has been able to establish criteria for high flood probability. If high ice accumulation occurs before 28 April of any given year, for example, the air temperature will not allow for enough melting to prevent ice jam flooding. Additionally, if snowmelt and rainfall accumulation is greater than 150mm there is a serious risk of ice jam flooding (Shaw et al., 2013).

Events Surrounding the 2015 Flood and Evacuation

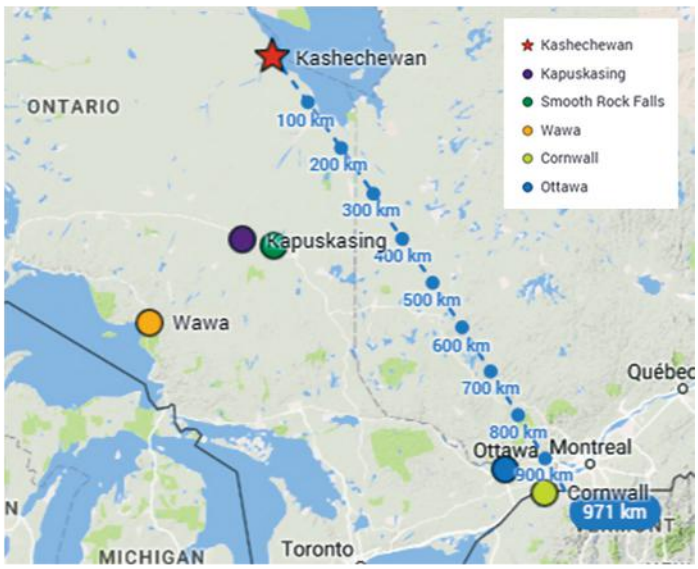
On 23 April 2015, the first step of the now annual evacuation of Kashechewan First Nation resulted in the airlift of 600 of the community's most vulnerable members—mostly the elderly—to towns further south throughout Ontario. The evacuation was coordinated by Emergency Management Ontario, at the request of Kashechewan First Nation Chief Derek Stephen. Observations of the Albany River indicated a rapid river level rise that year, and the evacuation served as a preventative measure.

Two days later, 1,400 residents—accounting for 94% of the on-reserve residents and 74% of the Reserve's total population[7]—had been relocated to multiple locations throughout Ontario: Kapuskasing, Smooth Rock Falls, Wawa, Ottawa and Cornwall. The latter accounts for a distance of nearly 1,000 kilometers from the Reserve.

The remaining residents were scheduled to be evacuated shortly afterwards, with approximately 20 members elected by the community to remain in Kashechewan to monitor the river and ensure security of the homes and infrastructure (ICI Radio-Canada, 2015, April 26).

[7] Population fluctuates since a large number of people leave the community temporarily for education, employment and housing purposes (Faries, 2015).

Image 3. Ice cover on the Albany River.



Source: CBC News Sudbury, 2015

By 27 April 2015, water flow had increased to the point where a complete evacuation was ordered, including the 20 residents assigned to stay behind, and even pets (National Post, 2015, April 27).

Rising River Levels in Subarctic Regions—The Relationship Between Hydroclimatology, Snowmelt Discharge and Air Temperature

Erratic weather conditions—such as rapid rises in air temperature and increased rainfall—lead to premature breakups of ice cover on rivers. For the James Bay area, where Kashechewan is located, ice breakup occurring before the end of April is considered as premature.[8] Increased rainfall and air temperature melts the snowpack—masses of compressed, hardened snow—forcing thick, strong masses of ice into the river flow. Warm air also increases river flow, further breaking up the ice cover, pushing large pieces of ice towards the banks of the river as it continues its course towards the ocean.

[8] The Kashechewan evacuation of 2015 occurred during the third week of April.

Once the ice jams in one area of the river's flow, it causes buildup or a rise in water level elsewhere along the flow. In the James Bay area, this has caused repeated flooding of the low-lying Kashechewan, but ice jams downstream can also protect the Reserve by redirecting flood water to towns upstream. Timing and location of ice jams are therefore crucial in predicting flood patterns (Abdelnour, 2013).

Evidence shows that the James Bay region is warming, with "significantly earlier ice breakup events by 0.8 days per year, and significantly longer ice-free seasons by 0.32 to 0.55 days per year" (Tam, Gough, Edwards, & Tsuji, 2013, p. 443) with acute changes in the Albany River's break up time. Average temperatures in the region are also on the rise.

Consequences of Repeated Displacement

Despite the recurrence of the displacement and the existence of an early warning system, the evacuation of Kashechewan First Nation is carried out under emergency situations. In 2015, "due to the urgency of the evacuation, people just got scattered all over the place without going with their families" explained Kashechewan First Nation Chief Derek Stephen in an account published by Global News (Miller, 2015). Families are also susceptible to separation due to the phased evacuation process where the most vulnerable community members—children, the elderly and the sick—are removed first. In an emergency, community members are not given a choice about their shelter location.

The impact of the recurrent flood and displacement risks have exposed the community to the threat and realities of both economic and non-economic loss and damages.

Loss Of Livelihoods

Spring marks the migratory path north of geese, a traditional food source for the Cree. Goose break season is therefore an important hunting period dating back centuries. It also forms part of the cultural heritage of the Cree, passed from parents to their children (Shem & Robertson, 2014). MP Charlie Angus, a critic for AANDC, stated that: "The evacuation taking place during goose break season means it interrupts peoples' opportunity to provide food for their families in the coming year. It's emotionally traumatic, culturally disruptive and has an enormous emotional impact on the people of Kashechewan." (East, 2015).

The annual floods and evacuations also impact future employability of Kashechewan First Nation's children. As a result of recurrent evacuations, children of the community have been unable to complete a full school year in four consecutive years. Only one child graduated from high school in 2015, a dramatic decrease from the usual range of 10 - 14 graduates.[9] Delays in completing secondary schooling leads not only to delayed entry into the workforce, but can also lead to increased delinquency and dropout rates (Miller, 2015).

Psychological Impact

Subjected to annual removal from their ancestral lands has created a demand for psychological support in their sheltering towns by members of the Kashechewan First Nation. This stress is strengthened by the fear for some, and reality for others, of permanently losing their physical possessions due to the damages caused by repeat flooding (Lapierre, 2016). Commenting on the fact that he had received many requests for psychological support from members of the Kashechewan First Nation community, Gerry Demeules, General Manager of Protective Services for Kapuskasing, explained that "for them, there are many memories, it is hard to believe that they will no longer have all of the things that belong to them over there"[10] (Lapierre, 2016).

The emotional distress described above can only be exacerbated by the fact that the residents of Kashechewan are scattered across multiple locations, at times separating families. In an account provided to CBC News Sudbury, Kashechewan community member Ruby Wesley explained: "we have to leave our personal belongings behind, our family members, some of them are still there. We don't know where they are going. It's kind of frustrating it has to happen every year." (CBC News, 2014, May 13). Volunteers from non-governmental organizations, such as The Canadian Red Cross, endeavor to ease this stress by registering each evacuee, thus providing a system for separated family[11] members to reunite (Snider, 2014). The

[9] Obtaining census information and other data on Kashechewan First Nation (through the National Household Survey), is difficult as many residents refuse to participate. This data has been suppressed by Statistics Canada for confidentiality purposes. Source: Correspondence with the Aboriginal Liaison Officer of Statistics Canada on 06 April 2016.

[10] Translation of: "Pour eux, c'est beaucoup de souvenirs, c'est dur de penser au fait que tout ce qui leur appartient est là-bas et qu'ils ne l'auront plus."

[11] Due to the emergency situations in which the evacuations take place, and/or with phased evacuations were the most vulnerable community members are removed first, families are susceptible to separation during the evacuation process.

separation, however, suggests that community members are not consulted about the choice of their relocation.

Chief Stephen has linked the stress of this separation to delinquency and crime. Shortly after the 2015 evacuation, two community members were charged with unrelated crimes. The Chief implored the sympathy of the residents of their shelter towns, explaining that the multiphase evacuations had negative impacts on the community, and that "people have better control when they're in one area with families and they're able to look after each other..." (Miller, 2015).

MP Charlie Angus supported this view in an interview with the CBC. Touching upon the psychological impact of the recurrent evacuations on children, he explained that it was "incredibly traumatic [...] to be taken out of schools, to be evacuated to emergency centers [...] all over the province, separated from each other" (CBC News, 2015, April 24).

Chief Stephen has also linked the annual floods to high rates of depression and suicide attempts in the community (NDP Newsroom, 2015, March 31). In January 2007, 21 people in the Reserve made attempts to take their own life, including a nine year old child (La Rose, 2013) drawing national attention to the 'crisis'. Suicide crises plague many First Nations in Canada. In 2015, a study regarding suicide attempts was conducted in the community, for which the respondents attributed flooding and the breakup season to their psychological trauma (CBC News, 2016, May 4).

Displacement, Image and Identity

A study on the impact of loss of personal possessions due to a natural hazard—a firestorm in the United States—suggests that "loss of possessions from involuntary disposition can cause a corresponding change in personal identity" (Sayre, 1994, p. 113). The paper draws on a broad literature review that links loss and damage of possessions to a disruption in finding meaning in experience; associating physical goods as an extension of self.

The media also plays an important role on self-image and identity in the context of successive displacements. Constantly being portrayed in the media as vulnerable and in need of rescue, can not only influence how the broader Canadian public perceives the Cree band of Kashechewan First Nation, but also how the community perceives itself. In this regard, there needs to be a clear distinction between an evacuation and a rescue in the media landscape, as "discourses that cast specific communities as either victims or as inherently vulnerable create the risk of self-fulfilling

predictions of dependence, incapacity, and exclusion" (Howitt, Havnen, & Velan, 2012, p. 48).

Using Google Trends, the graph below identifies the top queries associated with the search term 'Kashechewan First Nation", and provides a timeline of interest—based on search engine results—for that term. The graph shows that there is very little interest—based on Internet searches—in the community. However, the little interest that is generated can be linked[12] to events that have had negative impacts on the Reserve. The highest peak in interest falls in late 2005 / early 2006, immediately following the community's water crisis. Moreover, the top queries related to Kashechewan First Nation are: "evacuation", "flooding" and "rash".

Internal Displacement

The UN Refugee Agency (UNHCR) defines internally displaced persons (IDPs) as those who have found sanctuary from a conflict within their own country, or who have been made homeless by a natural hazard and have not had to cross international borders.

At the time of reporting, 400[13] Kashechewan First Nation community members had not returned home from the 2014 evacuation, and were still sheltered in temporary accommodation in the town of Kapuskasing (Lapierre, 2016).

This inability to return to the Reserve is due to the fact that repeated flooding and overflowed sewage systems have left many homes vulnerable to mold. Forty[14] of the 280 homes—or 14%—have been deemed unfit for return due to mold (Dehaas, 2016), leaving an entire neighborhood abandoned (East, 2015).

The absence of 26% of the on-reserve population likely impacts those able and unable to return, although to differing degrees. The absence could be particularly impactful on the lives and morale of children as their class sizes would shrink significantly.

Those unable to return remain disconnected from their traditional land, an important aspect of Cree life. In an interview by ICI. Radio-Canada (Lapierre, 2016), one displaced resident described her difficulties in adapting

[12] "Rising searches are terms that were searched for with the term you entered, which had the most significant growth in volume in the requested time period. "Breakout"... means that the search term grew by more than 5000%." (Google Trends, n.d.).

[13] This figure was originally estimated by ICI.Radio-Canada (2015, April 26) at 350 persons.

[14] ICI. Radio-Canada reported 36 homes condemned due to mold (Lapierre, 2016).

to the new city, managing depression, and ensuring that the six grandchildren currently under her care remained connected to their traditional language. Cognizant of the latter, the Canadian government coordinates with the towns sheltering the Kashechewan evacuees to facilitate schooling in English and Cree language (Lapierre, 2016).

Relocation As A Form of Adaptation

Government View

In 2006, the Canadian government commissioned a report analyzing the viability of potential relocation sites for Kashechewan First Nation. The study was lead by Alan Pope, a former politician in Ontario, who in an interview with the Timmins Times confirmed that he had conducted household surveys as part of his research method (Gillis, 2015).

Table 1: Summary of the sites considered in the Alan Pope report

Proposed Strategy	Issues
Relocating to Site 5 *A site slightly inland from Kashechewan First Nation*	Access to the supply boat would be more difficult and would require supporting infrastructure: extension of the winter road during the cold season and need of a road along the flood plain during the flood season. Flood would isolate community for extended periods of time.
Raising Kashechewan *by 9 meters*	Would require a near new rebuild of the city's infrastructure and flooding would still isolate the town for extended periods.
Relocation to Fort Albany	Fort Albany faces flood and displacement risks, although less frequently than Kashechewan. The contentious history with the Reserve due to a religious dispute in the 1970s poses risks of conflict.
Relocation to Smooth Rock Falls	Distance from ancestral lands, disruption of traditional practices and assimilation concerns.
Relocation to Bigwater Lake *near Timmins, Ontario*	Loss of access to traditional lands.

Source: Gillis, 2015

In 2006, relocation to a Reserve created for the community in the periphery of Timmins, Ontario—the nearest urban center, 550 kilometers to the south—was deemed the most viable option for Kashechewan First Nation by the government. The creation of a Reserve would reduce risks of perceived assimilation attempts, while living in the periphery of an

urban center would increase access to health and education services, and to employment opportunities (Gillis, 2015). Proximity to an urban center would also significantly reduce living costs. This option was rejected by Kashechewan First Nation in 2007 (ICI Radio-Canada, 2007, March 16).

The community favored the option of moving to Site 5—a site 30 kilometers inland from Kashechewan—so that the Cree band could remain close to their ancestral grounds (ICI Radio-Canada, 2015, April 23). A similar move had been successfully achieved in the 1980s for the flood-prone community of Peawanuck in Northern Ontario—a community that remains vibrant to date (CBC News, 2015, April 24). Remaining in the region would also ensure that the community could benefit from any future mineral exploration in the area (Gillis, 2015). The Canadian government subsequently rejected the plan, stating that it was too expensive (ICI Radio-Canada, 2015, April 23).

In a video interview with CBC News, MP Angus confirmed that there was an agreement with the federal government and that a community plan was in place, however the government opted to pledge repairs of the dike wall instead. He emphasized the point by stating: "we had a plan to move the community to higher ground but the government walked away on it" (CBC News, 2015, March 31).

In almost all news coverage of the Kashechewan floods, costs estimates have been circulated for both the evacuations and the proposed relocations.

Kashechewan Chief Stephen estimated the cost of the 2014 evacuation at CAD 21 million[15], to which several additional million supported post-flood repairs. The latter resulted in a delayed return of the residents by one month[16] (ICI Radio-Canada, 2015, April 26). Estimated daily costs for the 2015 evacuation were CAD 280,000[17] (ICI Radio-Canada, 2015, April 23), with figures inflated by the need to evacuate residents by plane.

Incomplete data availability on the floods and evacuations of Kashechewan First Nation holds true for the Canadian Disaster Database, managed by Public Safety Canada[18]. Although entries for the Kashechewan floods date

[15] Approximately EUR 14 million using the spot rate available on www.xe.com on 03 April 2016.

[16] This excludes the 400 persons who, at the time of reporting, had still not returned to Kashechewan due to high mold levels in their homes.

[17] Approximately EUR 188,000 using the spot rate available on www.xe.com on 03 April 2016.

[18] "Public Safety Canada was created in 2003 to ensure coordination across all federal departments and agencies responsible for national security and the safety of Canadians" (Public Safety Canada, 2015).

back to 2005, only one entry was complete with cost information. The database holds a record for an evacuation of 269 persons on 24 March 2012 at a cost of CAD 6,700,000[19].

The situation has also been met with costly, temporary solutions for the community including: (i) government funding of CAD 75,000[20] (ICI Radio-Canada, 2015, April 23) to hire a flood coordinator for Mushkegowuk Council; (ii) CAD 200 million for infrastructure repair; and, (iii) CAD 27.4 million to renovate and build homes (Shimo, 2012).

The cost for the relocation to Site 5, situated 30 kilometers away from Kashechewan, was estimated in 2007 by Jim Prentice, former Minister of Indian Affairs and Northern Development[21], at CAD 500 million (ICI Radio-Canada, 2007, March 16). In 2015, the cost was estimated at CAD 750 million by Chief Stephen (ICI Radio-Canada, 2015, April 26). The estimated cost for relocation to Timmins, Ontario is CAD 200 million.

Through this lens, it seems evident that relocation—particularly to Timmins, Ontario—is the most cost effective policy response for Kashechewan's riparian vulnerabilities. The estimates above, however, do not take into consideration the full financial, social and cultural costs associated with the relocation of First Nations. A report prepared by the Centre for Indigenous Environmental Resources (CIER) specifies the need to account for the non-financial costs of "loss of homeland, loss of cultural or ceremonial sites, loss of Aboriginal and Treaty rights, and resulting loss of identity" (Centre for Indigenous Environmental Resources, 2006b, p. 11).

Community View

Kashechewan First Nation undertook a collaborative assessment of their situation with the aim of presenting their own views on a viable relocation strategy. When asked questions about where they wanted to live and why, the responses of the Cree band channeled their deep connection to their physical environment.

Although the community identified a need to increase access to health, education and employment services, Site 5 was still preferred over the

[19] Approximately EUR 4.5 million using the spot rate available on www.xe.com on 08 May 2016.

[20] Approximately EUR 51,000 using the spot rate available on www.xe.com on 08 May 2016a.

[21] The name of the Ministry has subsequently been changed to Aboriginal Affairs and Northern Development Canada (AADNC).

other options presented in the Alan Pope report as it would allow them to maintain their traditional way of life. Traditional practices such as hunting would also keep the First Nation connected to their traditional food. Proximity to clean water was deemed important, as was the ability to see the river—with a view unobstructed by the dike (Faries, 2015). From a spiritual standpoint, Cree people believe that "the Creator was within the land and that the spirits of their ancestors will continue to live on the land" (Faries, 2015, p. 106).

Views on relocation by the affected community do not remain unwavering, however, and can be influenced by the compounded distress caused by successive displacements, or through the perception of increased risk from the natural hazard. Media reports since 2006 suggests a warming to the idea of relocating to Timmins, Ontario by Kashechewan First Nation over time. From the rejection of the proposal in 2007, a shift has occurred where "community members feel the need to relocate to either higher ground nearby or to Timmins" (Lapierre, 2016).

This may also have been influenced by the government's revised position on relocation, which has evolved on unparallel tracks to that of the community's. Subsequent to commissioning the Alan Pope report, and rejecting the Site 5 relocation proposal, the government agreed to fund the repair of the existing infrastructure at Kashechewan First Nation. However, to date only a portion of the CAD 200 million[22] earmarked for the repair has actually been given to the community[23] (ICI Radio-Canada, 2015, April 23).

Policy Challenges

Given the paternalistic political landscape of former European colonies, like Canada, contemporary challenges faced by Aboriginal communities include: (i) removal from their homes (or land); and, (ii) loss of loved ones, personal possessions and cultural properties. In this regard, the daily life of Aboriginal peoples already embody the challenges experienced by those displaced by environmental events or conflict (Howitt et al., 2012).

When this history of "dispossessing, disempowering, and relocating people" (Howitt et al., 2012, p. 51) is aggravated by a natural hazard—as is the case for Kashechewan First Nation—it creates a political quagmire

[22] Approximately EUR 136 million using the spot rate available on www.xe.com on 08 May 2016.

[23] Only 97 million has been delivered with 50 million put towards emergency evacuations and continual repairs. (CBC News, 2015, March 31).

when striving to develop culturally appropriate adaptation and mitigation strategies.

Reinforcing the Colonial Relationship

Kashechewan faces a disproportionate amount of resources and capacity to manage the severity of their environmental challenges. Although the Reserve has taken appropriate actions to develop an early warning system, they remain dependent on the federal government to fund the expensive evacuations needed to ensure their safety. Moreover, the accrued costs of accommodating the long-term displaced—those whose homes were condemned and who are unable to return to the Reserve—is also out of the community's financial purview.

Flood and displacement risks reinforce the colonial relationship between the Cree and the Crown beyond financial dependence. The disruption to their lives, livelihoods and traditional practices, and the cultural consequences of being removed from their ancestral land, echoes previous political pursuits of assimilating Aboriginal peoples into a broader 'Canadian' culture.

Research on the impact of displacement on other remote, indigenous communities offers strong parallels to the experiences of Kashechewan First Nation. The Kiwirrkurra community was placed by the Australian government in an area that makes them vulnerable to natural disasters. High rainfall induced floods that made homes uninhabitable, and the entire community was evacuated. State intervention in the Kiwirrkurra case "directly exacerbated the existing vulnerabilities of the community, placing at risk their relationships with each other, their most important assets and cultural properties, their sense of identity and the means with which they would ultimately re-establish themselves and their community" (Howitt et al., 2012, p. 55).

Managing environmentally induced displacement in the context of indigenous people is therefore unique from that faced by majority populations due to a risk that "poor policies and practices [...] extend cycles of colonization, marginalization, and alienation and impose ever increasing social, cultural, and human costs" (Howitt et al., 2012, p. 48) on society. The parallels of both cases encompass the fact that state actions do not consider how problematic evacuations can be in this specific historical context.

Perennial Mistrust and Ancestral Lands

Relocating a community that faces annual floods seems to be an obvious solution to recurrent and protracted displacement. However, well-founded,

perennial mistrust by Aboriginal peoples towards the government weighs heavily in relocation strategies as these can be perceived as a means for the state to use natural hazards to reclaim indigenous land. In Canada, this mistrust is rooted in the spillover effects of the numbered treaties like the James Bay Treaty. Developing strategies in partnership with Kashechewan First Nation—involving them at the beginning of the planning process—is therefore critical to developing appropriate, sustainable responses to the annual floods and displacement.

Relocation can also impact culture and community as these "are often rooted in physical places, permanent relocation threatens not only individuals' sense of identity but also communities' ability to organise and cope with difficult circumstances" (Roberts & Andrei, 2015, p. 261).

Another issue with relocation in the context of First Nations relates to self-governance. Indigenous communities are often not fully engaged with at the provincial or federal levels of government to manage issues such as sea level rise—or rising river levels. They also lack the capacity to do so effectively. A large adaptation project like a relocation "will challenge every governance system within the community. From the ability of the First Nation to reach consensus decision of its members regarding the selection of new, appropriate land, to the capacity of the First Nation administration to process the legal, financial and reporting requirements associated with compensation, all systems will be challenged." (Centre for Indigenous Environmental Resources, 2006a, p. 4).

Additionally, indigenous people often face racism by the majority population of their countries. Relocation away from their ancestral lands can often cause them to face "double discrimination as both migrants and as indigenous peoples" (UN, n.d.).

Conclusion

The successive displacements due to flood risks of the Kashechewan First Nation serve as an effective case study when exploring the impact of colonial constructs in the broader context of environment and migration[24]. In many ways, the challenges faced by indigenous people in managing the effects of anthropogenic climate change are a microcosm for the inequalities between the Global North and the Global South in managing these

[24] Although the needs of Aboriginal peoples in Canada should not be amalgamated, the vulnerability to anthropogenic climate change faced by indigenous people—in Canada and worldwide—has many common characteristics.

same challenges—most notably the fact that indigenous people have negligible carbon footprints yet bare a heavier load of the negative impacts of climate change[25].

Climate change is happening at an accelerated pace in polar regions, resulting in its effects being most acute in northern Canada. As Kashechewan First Nation falls within the Mushkegowuk region—geographically classified as boreal and subarctic—it risks experiencing greater floods, amplified protracted displacement and increased difficulties in maintaining their traditional way of life. Outside of the context of flood and displacement, a changing sub-arctic ecosystem will affect traditional harvesting and hunting—reducing access to traditional food sources. As climate change can intensify the already harsh conditions of northern regions, the health and safety of northern indigenous communities are also at risk (Tam et al., 2013).

Moreover, climate change can risk isolating northern communities like Kashechewan First Nation during the cold season. In the James Bay region, an ice road—or winter road—is built connecting the fly-in Northern Reserves to each other. It offers a cheaper means of travel for community members. The warming of the North decreases the length of the time that the ice road can be used, thus decreasing access to these communities. The above makes it evident that a long-term solution is needed.

Through the lens of the Kashechewan First Nation, the consequences of successive displacement can be strongly linked to economic and non-economic loss and damages: loss of livelihoods, disrupted sense of purpose and self-image, identity crises and depression, and loss of physical assets. Responsible and sustainable policy making in the context of environment, migration and indigenous people must therefore put reconciliation at its core—including indigenous knowledge as a pathway for understanding a changing natural environment, taking community-based research and participatory approaches to developing effective adaptation strategies, and aligning with the existing national and international frameworks that protect the rights of indigenous people. By means of example, policy making should be anchored by Article 25 of the United Nations Declaration on the Rights of Indigenous Peoples, which states: "Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used

[25] Due to the location of the areas that Aboriginal peoples inhabit, and the interconnectedness of their temporal and spiritual lives with their natural environment, these communities tend to be the most negatively affected by climate change (UN, n.d.).

lands, territories, waters and coastal seas and other resources and to uphold their responsibilities to future generations in this regard" (UNGA, 2007)[26].

The case study is also effective for developing inclusive climate change adaptation and mitigation policies in Ontario. The current responses by the Canadian government to the Kashechewan situation has largely been costly, unsustainable and ineffective. Given the fact that the effects of climate change are most acute in the Canadian north, that three of the longest rivers in the world course through or discharge in Ontario (Environment and Climate Change Canada, 2013), and that it is inhabited by 23.6%[27] (Statistics Canada, 2013) of all First Nations people in Canada, the provincial government will inevitably be confronted with similar situations to that of Kashechewan First Nation. An appropriate way forward, as exemplified by the Kashechewan case, is to prioritize strategies that keep indigenous people connected to their ancestral land, while remaining cognizant of the historical trauma and perennial mistrust associated with the removal from such land—even if in the form of evacuations.

[26] This aligns closely with the call to action point #48 by the Truth and Reconciliation Council of Canada (2015) which states: " We call upon the church parties to the Settlement Agreement, and all other faith groups and interfaith social justice groups in Canada who have not already done so, to formally adopt and comply with the principles, norms, and standards of the United Nations Declaration on the Rights of Indigenous Peoples as a framework for reconciliation."

[27] Based on 2011 data from Statistics Canada.

BIBLIOGRAPHY

Academic Sources

Abdelnour, R. (2013). Albany River 2008 Ice breakup: forecasting the Flood Event, Observations of the River during . the Spring breakup and the Potential for mitigating the Flooding Risk of the Kashechewan and Fort Albany. First Nation.

Adkin, L. E. (2010). Environmental conflict and democracy in Canada. UBC Press.

Barei, A. (2012, January 13). Where the River Flows Fast. University of Waterloo.

Faries, E. (2015). Voice of the People on the Re-location Issue—Kashechewan First Nation, Ontario, Canada. International Journal of Sustainable Development, Ontario International Development Agency, Canada.

Howitt, R., Havnen, O., & Velan, S. (2012). Natural and Unnatural Disasters: Responding with Respect for . Indigenous Rights and Knowledges. Geographical Research, 50(1), 47–59.

Murdocca, C. (2010). There Is Something in That Water": Race, Nationalism, and Legal Violence. Law & Social . Inquiry, 35(2), 369–402.

Roberts, E., & Andrei, S. (2015). The rising tide: migration as a response to loss and damage from sea level rise . in vulnerable communities. International Journal of Global Warming, 8(2).

Sayre, S. (1994). Possessions and Identity in Crisis: Meaning and Change for Victims of the Oakland Firestorm. Advances in Consumer Research, 21(1).

Shaw, J. K. E., Lavender, S. T., Stephen, D., & Jamieson, K. (2013). Ice Jam Flood Risk Forecasting at the . Kashechewan FN Community on the North Albany River. CGU HS Committee on River Ice Processes and the Environment 17th Workshop on River Ice.

Sproule-Jones, M., Johns, C., & Heinmiller, B. T. (2008). Canadian water politics: Conflicts and institutions. McGill-. Queen's Press-MQUP.

Tam, B. Y., Gough, W. A., Edwards, V., & Tsuji, L. J. S. (2013). The impact of climate change on the well-being and lifestyle of a First Nation community in the western James Bay region. *The Canadian Geographer / Le Géographe Canadien,* 57(4), 441–456.

Images and Graphs

Google Trends (n.d.) Available at: http://www.support.google.com/trends/answer/4355000?hl=en (Accessed: 07 May 2016).

Media Sources

CBC News (2006, November 9). Kashechewan: Water crisis in Northern Ontario.

CBC News (2008, April 28). Anxiety deepens as floods force another Kashechewan evacuation.

CBC News (2014, May 13). Kashechewan flooding costs government millions 'year after year'.

CBC News (2015, March 31). Kaschechewan spring flood risk "intolerable," report says.

CBC News (2015, April 24). Kashechewan to start evacuation, again, amid flood concerns. Retrieved from www.youtube.com/watch?v=ly4Q8rX9u7Y

CBC News (2016, May 4). Kashechewan First Nation spring flooding spurs talk of moving—for good.

Dehaas, J. (2016, March 25). Mould problems abound in flood-prone Kashechewan. CTV News.

East, J. (2015, May 15). Report says inadequate Kashechewan dike puts community at risk. The Nation: Cree News.

Gillis, L. (2015, April 23). Alan Pope believes Kashechewan can still be saved. Timmins Times.

ICI Radio-Canada (2006, May 26). Pas de retour à Kashechewan avant un mois.

ICI Radio-Canada (2007, March 16). Quel choix pour les autochtones?

ICI Radio-Canada (2012, March 26). L'évacuation à Kashechewan et à Fort Albany est suspendue.

ICI Radio-Canada (2013, May 1). Évacuation partielle des Premières Nations de Kashechewan et Attawapiskat.

ICI Radio-Canada (2014, May 12). Inondations : vols d'évacuation à Kashechewan.

ICI Radio-Canada (2015, April 23). 7e evacuation printaniere en 11 ans de la reserve de Kashechewan.

ICI Radio-Canada (2015, April 26). L'évacuation de Kashechewan se poursuit.

Kapuskasing Times (2014, May 16). Kash Residents Return.

Lapierre, S. (2016, February 27). Des résidents de Kashechewan toujours à Kapuskasing deux ans après leur . évacuation. ICI Radio-Canada.

La Rose, L. (2013, January 7). Kashechewan a "community in crisis." Toronto Star / Canadian Press.

Miller, A. (2015, May 1). Chief says arrest of two Kashechewan evacuees related to "stress" from displacement.

Global News Canada.

National Post (2015, April 27). Flooding forces full evacuation of Kashechewan; more than 1,800 displaced from . remote James Bay community.

NDP Newsroom (2015, March 31). New report confirms Kashechewan at "intolerable risk" of flood catastrophe.

Shem, M., & Robertson, E. (2014, May 5). Goose break': Cree tradition goes back centuries. CBC News.

Shimo, A. (2012, January 6). My four months on a James Bay reserve. Globe and Mail.

Snider, K. (2014, May 15). Photo of the Day: Red Cross assisting Kashechewan residents after flooding. Retrieved from http://www.redcross.ca/blog/2014/5/photo-of-the-day--red-cross-assisting-. kashechewan-. residents-after-flooding

Online Resources

Aboriginal Affairs and Northern Development Canada (2016). Flooding in First Nation Communities. *Available at: https://www.aadnc-aandc.gc.ca/eng/1397740805675/1397741020537 (Accessed: 27 April 2016).*

Aboriginal Affairs and Northern Development Canada (2010). Treaty guide to treaty no. 9 (1905-1906). *Available at: . http://www.aadnc-aandc.gc.ca/eng/1100100028855/1100100028857 (Accessed: 27 April 2016).*

Environment and Climate Change Canada (2013). Rivers. Available at: http://www.ec.gc.ca/eau-. water/default.asp?lang=En&n=45BBB7B8-1 (Accessed: 25 March 2016).

McCue, H.A. (2001) *Aboriginal Reserves - The Canadian Encyclopedia*. Available at: http://www.thecanadianencyclopedia.ca/en/article/aboriginal-reserves/ (Accessed: 7 May 2016).

Ministry of Community Safety and Correctional Services Ontario website (First accessed 01 May 2016). https://www.emergencymanagementontario.ca/english/home.html

Public Safety Canada (2015). About Public Safety Canada. Available at: http://www.publicsafety.gc.ca/cnt/bt/index-. eng.aspx (Accessed: 18 March 2016).

Statistics Canada (2013). Aboriginal Peoples in Canada: First Nations People, Métis and Inuit. Available at: http://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-011-x/99-011-x2011001-eng.cfm (Accessed: 23 March 2016).

Reports

Centre for Indigenous Environmental Resources. (2006a). Report 4: First Nations' Governance and Climate Change: Key Issues. The Assembly of First Nations.

Centre for Indigenous Environmental Resources. (2006b). Report 5: Climate Change First Nations: Recommendations for Action. The Assembly of First Nations.

Hatch (2015). "Kashechewan First Nation—Assessment of Dam Safety Risks and Dam Safety Management . Requirements for the Kashechewan Ring Dyke".

Natural Resources Canada (2014). "CANADA IN A CHANGING CLIMATE: Sector Perspectives on Impacts and Adaptation" Government of Canada. ISBN: 978-1-100-24143-2.

Truth and Reconciliation Commission of Canada (2015). "Truth and Reconciliation Commission of Canada: Calls to Action".

UN. (n.d.). Climate change and indigenous peoples. United Nations Permanent Forum on Indigenous Issues.

UNGA. (2007). United Nations Declaration on the Rights of Indigenous Peoples. United Nations.

Poor and African American in Flint

The water crisis and its trapped population

Bérengère Sim

Introduction

> *"We've had a city in the United States of America where the population, which is poor in many ways and majority African American, has been bathing and drinking in lead-contaminated water. And the governor of that state acted as though he didn't really care. He had requests for help that he basically stonewalled. I'll tell you what: If the kids in a rich suburb of Detroit had been drinking contaminated water and being bathed in it, there would've been action."*
>
> **Hillary Clinton, 17 January 2016**

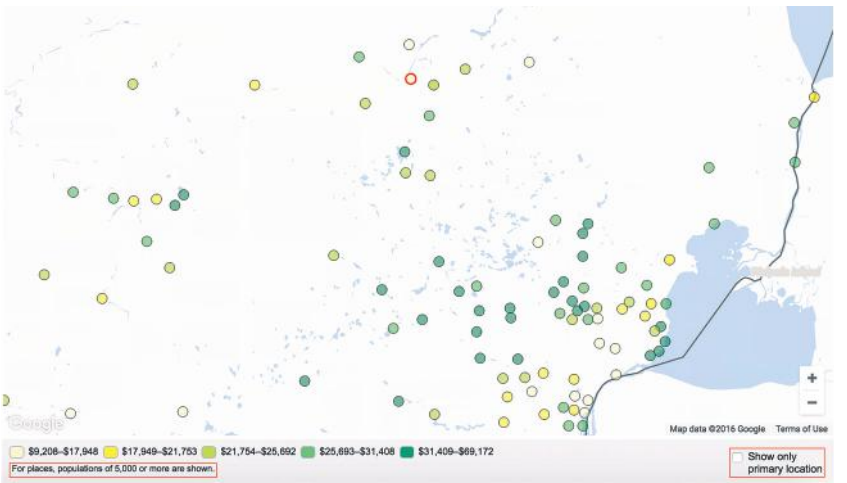
The presidential candidate declared this during the Democratic debate in Flint on 17 January 2016 and the statement spread rapidly through the Twittersphere and the media. They resounded with many in a United States of America (U.S.) grappling with a deeply divided society on many levels, particularly raw and sensitive during the current circus-like presidential election campaign. The Flint Water Crisis is a "story of government failure, intransigence, unpreparedness, delayed inaction and environmental injustice" (Flint Water Task Advisory, 2016: 1). This lethal combination culminated in the lead contamination of the city's water supply, with grave consequences ranging from public health to economic failure, to a plummeting in the trust placed by citizens in their government. Although the events leading up to the lead contamination took place in 2013 and 2014, the crisis was finally acknowledged by the state government in 2015 and gained more exposure in the public eye that same year, thus meriting discussion in this publication.

This paper will focus on the Flint Water Crisis, analysing the existence of a trapped population, an invisible facet of migration, and deconstructing the intersections between race and socio-economic factors in cases of environmental injustice. In order to do this, the events leading up to the water crisis will be detailed, followed by an examination of the evidence pointing to a case of environmental injustice as well as the discourse surrounding the trapped population. Finally, the policy challenges will be discussed and recommendations will be given.

Context

Flint, the largest city and county seat of Genesee County, Michigan, located approximately 100 kilometres northwest of Detroit, is no stranger to hardship, even before the ongoing water crisis. The city has suffered a dramatic decline in the population with a peak of more than 200,000 in 1960

Map 1. Per capita income in past 12 months (in 2014 dollars)



Source: United States Census Bureau, 2015

falling to 99,000 in 2014, 57% of which is Black or African American (United States Census Bureau, 2015; Flint Water Task Advisory, 2016). According to the latest census undertaken in 2010, a staggering 41.6% of its population lives in poverty[1]—2.8 times the national average—and its per capita income in 2014 was US$14,527 (United States Census Bureau, 2015). Map 1 below, showing the per capita income of cities in Michigan in 2014, demonstrates that Flint, circled in red, is among the poorest in the region. The median value of own-occupied housing is US$37,000, a figure that is one fifth of the national average (Flint Water Task Advisory, 2016). In addition, it is the second most dangerous city in Michigan (after Detroit) with, according to the Federal Bureau of Investigation (FBI) (2010), a violent crime[2] rate of 2,207 per 100,000 of the population. Years of disinterest in the automobile industry and associated manufacturing activities plunged the city and its surrounding area, known as Greater Flint, into financial distress: the region has lost 77% of its manufacturing employment and 41% of employment overall since 1980 (Jacobs, 2009; Rosner, 2016b). The harmful effects of General Motors' (GM) decline, which at its height employed as many

[1] Poverty, measured by the U.S. Census Bureau, is done so by using a set of income thresholds that vary by family size and composition and the age of the individuals (U.S. Census Bureau, n.d.). For example, in 2014, a family of three (two parents and a child below the age of 18) is considered to be living in poverty if its income threshold is below US$19,055.

[2] Violent crime includes murder, non-negligent manslaughter, forcible rape, robbery and aggravated assault (FBI, 2010).

as 80,000 workers in factories along the Flint River, remain etched in the collective memory of the town (Roger and Me, 1989). This drawn-out financial struggle and its consequences are indirectly at the root of the lead contamination disaster.

The Role of Emergency Managers

In 2011, Michigan Governor Rick Snyder signed Public Act 4. This measure broadened Public Act 72, which was passed in 1990, and provided an emergency financial manager, an unelected official with near-total control over the city's finances, for financially distressed cities and school districts (Coyne, 2016). Michigan voters, concerned that Public Act 4 placed too much power into one person's hands, repealed it through a referendum in 2012 (Hakala, 2016). However, the Republican-dominated state legislature reacted by introducing Public Act 436 (Coyne, 2016). The implementation of this bill saw emergency financial managers renamed emergency managers, retaining their original responsibilities but paid by the state instead of local funds (*Ibid*).[3] However, what did change is that legislators included an appropriation in their bill, meaning that the public cannot repeal it in the same way Public Act 4 was.[4] The lethal combination of Public Act 4 and Public Act 436 meant that, from 2011 to 2015, Flint officials had no real control over municipal policy, with emergency managers retaining the power to veto any decision with which they did not agree (*Ibid*).

As the city stared into the abyss of bankruptcy, Governor Snyder, desperate to save money, appointed an emergency manager with the sole mandate of being cost-effective (Nelson, 2016). One of the first manager's decisions was to suspend the local government, a measure that remained in force until the departure of the last manager in 2015. This not only removed the democratic system of checks and balances, ensured when local representatives participate in decision-making, but it also removed any trace of public accountability (Flint Water Advisory Task Force, 2016).

One of the measures adopted was drawing water from the Flint River instead of the pre-treated water source in Detroit, which charged Flint US$21 million in 2011 (Nelson, 2016). Originally, the plan had been to draw water from Lake Huron by building a new water pipeline, thereby alleviating

[3] These include suspending and overruling local government by reversing pre-negotiated or signed city contracts, liquidating assets, as well as drafting policy or disincorporating (Coyne, 2016).

[4] That said, local governments can vote to remove an emergency manager with a 2/3 majority vote, but only after 18 months (State of Michigan, 2012).

the financial pressure (*Ibid*). This was approved in 2013, voted 7-1 by the Flint City Council, but emergency manager Edward Kurtz overruled the decision and decided to use the Flint River water until the new system was ready (Coyne, 2016). The subsequent emergency manager, Darnell Earley, rejected offers from Detroit to continue selling water to Flint, and validated the filtration and use of Flint River water (Coyne, 2016). Thanks to the release of Governor Snyder's emails in January 2016, it has been possible for the Flint Water Advisory Task Force (FWATF) to compile a timeline and provide clarity on the events leading up to the change in water source.

One of the aforementioned emails shows that several staff members from different departments in the Michigan Department of Environmental Quality (MDEQ) voiced concerns and warned of the acidity risks in the Flint River water (Flint Water Advisory Task Force, 2016). In addition, an employee of the Flint Utilities Department warned the MDEQ of the "unpreparedness" of the Flint Water Plant, notifying them of the "political pressure" to start distribution as soon as possible (*Ibid*: 17). Despite these warnings, in April 2014, as the city's contract with Detroit Water and Sewerage Department came to an end, Flint began using treated water from the Flint River as a temporary solution. Two years down the line, with rumours spreading of lead-contaminated water, the city council once again voted 7-1 to "do all things necessary" to switch back to Detroit water; a decision vetoed by another emergency manager, Jerry Ambrose, who claimed it was incomprehensible (Coyne, 2016, no pagination).

Turning a Blind Eye: Disregarding Proof

The Flint River water is highly corrosive and the Flint Water Treatment Plant failed to properly treat the water and the state failed to properly test it (Flint Water Advisory Task Force, 2016; Roy, 2016). Inevitably, the compounds in the water started to eat through the aging water distribution system's lead pipes and plumbing. The network delivering water to Flint residents was being poisoned.

After the change of water source, the state desperately tried to sweep citizens' growing complaints about the taste, colour and smell of the water under the rug, fervently denying any wrongdoing. On 5 August 2014, *Escherichia coli* bacteria (more commonly referred to as *e-coli*) were detected in the distribution system leading to a local boil water advisory[5] (Flint

[5] This public health directive given by health authorities to consumers recommends that water be brought to a boil before use, in order to kill bacteria (Centres for Disease and Control Prevention, 2009).

Image 1. Water from Flint resident Patty Warner's heater

Source: © Patty Warner, 2016

Water Advisory Task Force, 2016). Shortly afterwards, on 2 January 2015, eight months after switching water sources, the MDEQ issued a notice of violation of the Safe Drinking Water Act for maximum contaminant levels for trihalomethanes (TTHM),[6] a group of four chemicals that are formed as a by-product of disinfecting water (Flint Water Advisory Task Force, 2016; Fonger, 2015). The notice in question, although warning those who have a "severely compromised immune system, [who] have an infant or are elderly" to seek medical advice about drinking water, nonetheless claims there is no need to boil water or take other action for those who do not fit into the aforementioned categories (Fonger, 2015: no pagination).

On 1 July 2014, Flint began its first 6-month monitoring period for lead and copper in drinking water, which ended on 31 December. Although there is no safe level to begin with, it is important to bear in mind that the standard set by the Environmental Protection Agency (EPA) is 15 parts per billion (ppb) (Roy, 2016). This first round of monitoring used 100 samples and these were not necessarily drawn from the highest risk homes, as is required by the Lead and Copper Rule (LCR) (Fonger, 2015). The outcome of the tests found that the 90th percentile lead level result was 6 ppb with two samples

[6] TTHM have been proven to cause liver, kidney or central nervous system problems as well as an increased risk of cancer in case of exposure over a long period of time (Flint Water Advisory Task Force, 2016).

above action levels for lead with 15 ppb (*Ibid*). In light of these results, the LCR dictates that Flint would have to implement corrosion control treatment, regardless of the next batch of testing, a regulation regarding which the MDEQ does not inform the Flint Water Treatment Plant (*Ibid*).

One of the key actors in flagging the lead poisoning was Flint resident LeeAnne Walters, who contacted the EPA in February 2015 regarding high levels of lead found in the drinking water in her home (Flint Water Advisory Task Force, 2016; Roy, 2016). In April of the same year, Miguel Del Toral, then-Regulations Manager of the Ground Water and Drinking Water Branch of the EPA and a concerned employee, visited Walters to test her water (Flint Water Advisory Task Force, 2016). Del Toral (2015) sent a memo to his head of department, Thomas Poy, highlighting that the lead results were "especially alarming", ranging in value from 200 ppb to 13,200 ppb, as demonstrated by the Graph 1 below, with an average of around 2,000 ppb (Roy, 2016). Despite this warning and Del Toral's (2015) accompanying recommendations to remedy the water issues, the EPA ignored the evidence and Del Toral was "silenced", no longer allowed to talk to the media, prompting Walters to leak the aforementioned memo to the press (Roy, 2016).[7]

Despite the memo now being in the public sphere, the MDEQ did not change their stance and continued to insist that the water was safe. In fact, the MDEQ is being accused of having purposefully manipulated samples in order to downplay the situation. Their results contrast starkly with those presented by the Virginia Tech team of researchers, who published the Flint Water Study, investigating water lead levels as well as those published by paediatricians at Michigan State University on blood lead levels in children under five (Nelson, 2016).

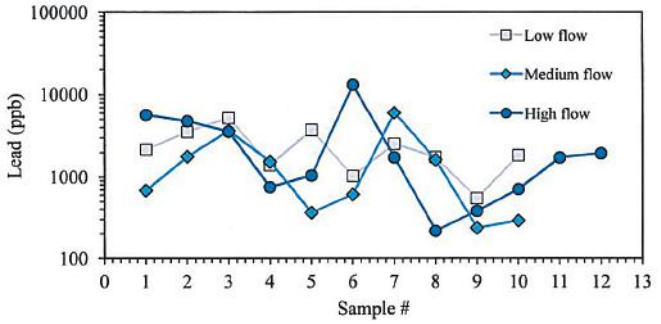
Lead Contamination

These paediatricians include Dr Mona Hanna-Attisha, who conducted several tests investigating the elevated blood lead levels (BLLs) in children younger than five years old before (2013) and after (2015) the water source change (Hanna-Attisha et al., 2016).[8] The results of this study reinforced Flint residents' prior worries and protests concerning the quality of the

[7] Quote from Skype interview, see bibliography.

[8] Testing BLLs of individuals is challenging: when one is exposed to lead for a given amount of time, and has high BLLs, but is then, for whatever reason, no longer exposed to lead, the BLLs go back down, even though the damage has already been inflicted (Redlener, 2016). This means it is difficult to give an accurate number of those, children or otherwise, who have had high BLLs.

Graph 1. Drinking water samples collected from the Walters' residence on April 28, 2015



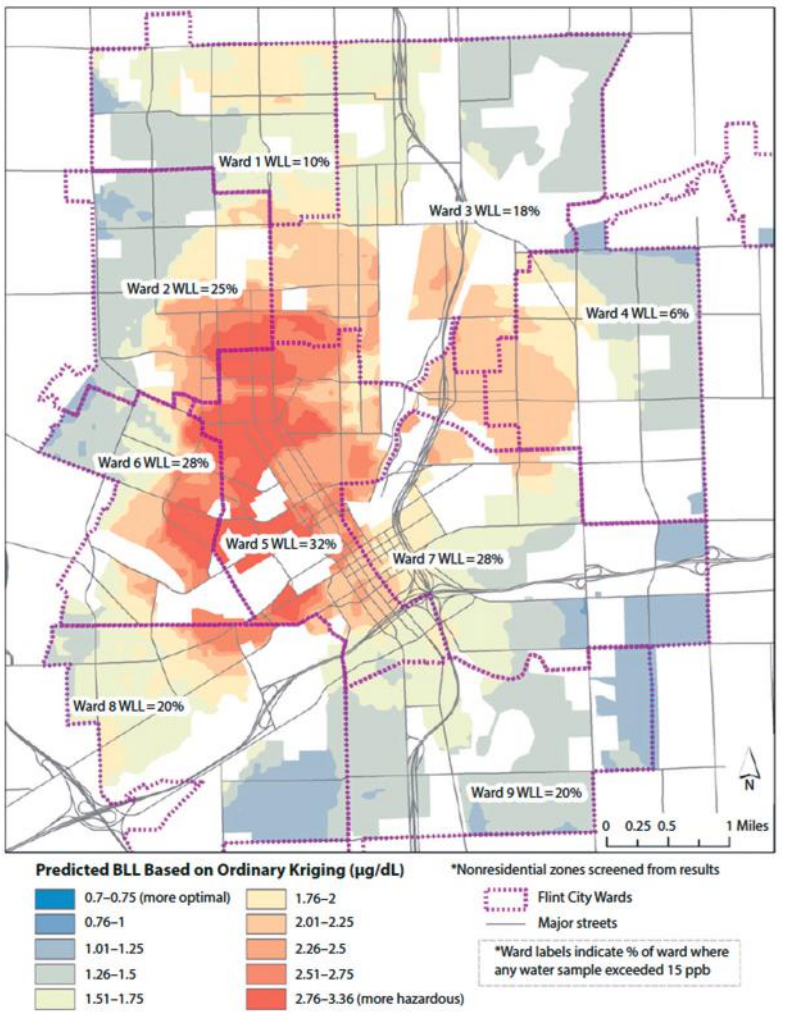
Source: Del Toral, 2015, based on results and graph provided by Virginia Tech

water: the incidence of elevated BLLs increased from 2.4% to 4.9% after the change of water source, with neighbourhoods with the highest BLLs experiencing a 6.6% rise (*Ibid*). According to the report, the neighbourhoods with the greatest elevated BLL increases are also the most disadvantaged socio-economically speaking (*Ibid*). Image 1 below shows the distribution of BLLs and water lead levels in Flint—the areas in which the highest water lead levels were recorded had the highest population of African American children at 76.8% as opposed to 67% in lower water lead level areas (*Ibid*). As the map demonstrates, the areas with the highest water lead level coincide with those where BLLs were highest amongst children tested; these areas, shaded in red, have seen a significant demographic change, an increase in poverty and a hike in vacant properties (*Ibid*). The neighbourhoods in the far north and south of the city, where most middle-class citizens reside, observed a decreasing trend of the BLLs as these residents could afford certain prevention efforts in response to the use of the Flint River water, notably purchasing bottled water (*Ibid*).

Following the findings published on the lead-poisoning of many of Flint's children, in October 2015, the State of Michigan admitted that there was lead in the water: "We, and our children, were being poisoned" (Coyne, 2016, no pagination). This was followed, on 12 January and 16 January 2016 respectively, by Governor Snyder and President Barack Obama declaring a state of emergency, allowing the city access to state and federal financial aid (Flint Water Advisory Task Force, 2016; Egan and Spangler, 2016).

In June 1986, Congress enacted the Safe Drinking Water Act Amendments, of which two sections dictate the lead ban; Section 1417 and 109 prohibit the instalment of lead pipes or any other lead-bearing plumbing material in

Image 2. Predicted Surface of Child Blood Lead Level and Ward-Specific Elevated Water Lead Level After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River: Flint, MI, 2015



Note. BLL = blood lead level; WLL = water lead level.

Source: Hanna-Attisha et al., 2016

both private and public housing (EPA, 1989). Given that no new homes have been built in Flint since the mid-1980s, it has been estimated that almost all homes have some form of lead in them and that Flint has between 10,000 and 15,000 lead pipes, although some estimates point to 70,000 pipes that need to be removed (Roy, 2016; Milman, 2016). It is therefore assumed that the majority of the population has been exposed to lead (*Ibid*). As for the children affected, there are 9,000 children under the age of 6 in Flint therefore the same number have been potentially exposed to lead poisoning (Roy, 2016; Redlener, 2016; Dyar, 2016).

Immobility and (In)Justice: The Case of Flint

This section of this paper will explore the concepts of environmental injustice and trapped populations in relation to the case of Flint. It will demonstrate how the existence of a trapped population in Flint reinforces the notion exposed by environmental injustice; communities most likely to be affected by manmade environmental disasters are minorities and the poor.

Environmental (in)justice

One of the issues identified by the FWATF (2016) is the existence of environmental injustice. Their report explains that environmental justice embraces two principles: the fair, non-discriminatory treatment of all people and the provision for meaningful public involvement of all people, regardless of race, colour, nationality or income, in government decision-making regarding environmental laws, regulations and policies (*Ibid*). The circumstances in which environmental injustice unfolds are when responsible parties for the protection of public health fail to do so in the context of environmental considerations. Those who fall victim to environmental injustice are guaranteed three basic rights: the right to information, the right to a hearing and the right to compensation (Cutter, 1995).

Environmental justice was born out of the 1982 protests over a PCB (polychlorinated biphenyl)[9] dump, located in Warren County, North Carolina, near a community of mostly African-American, rural and poor individuals (Northridge et al., 2003; Cutter, 1995). Originally dubbed "environmental racism", the term has since evolved to move beyond race

[9] PCB is a product that was used as a coolant fluid for machinery as well as in certain pesticides and plasticiser in paint and cement.

and include others who can also be deprived of their environmental rights, such as women, children and the poor (Cutter, 1995: 112).

As a result of political activism on the matter, in 1990, the EPA established an Environmental Equity Workgroup (EEW) tasked with the evaluation of evidence that racial minority and low-income groups bear a disproportionate burden of environmental risks (*Ibid*). The EEW were assigned the research of factors that contributed to different risk burdens as well as the elaboration of strategies for improvement (*Ibid*). The EEW's first report was released in 1992, confirming earlier studies that demonstrated a strong correlation between the location of toxic industry facilities and the percentages of minority residents in those communities (*Ibid*). Following this, in 1994, President Bill Clinton signed Executive Order 12898, obliging federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programmes, policies and activities on people of colour and impoverished communities in the U.S. (Northridge et al., 2003; Cutter, 1995).

Environmental injustice includes the natural and man-made environment and, although not focused on lead poisoning, Allen (2001) provides insight as to the socio-economic implications observed in case of toxic releases in American counties. Indeed, he diagnoses an "environmental classism" that is such that poor communities are more often affected by toxic releases that harm their environment, due to the fact that land is cheaper in areas with existing industry as well as in poorer neighbourhoods (*Ibid*: 15). On the other hand, wealthier and well-educated residents, in a bid to protect themselves against the polluting industries in question, will organise opposition or political mobilisation, which will capture the attention of decision makers due to their affluence (*Ibid*). Such a fervent reaction to the polluting industry means the company will most likely have to relocate elsewhere or lower their toxic outputs.

Northridge et al. (2003) concur with this analysis, however, point out that there is limited health research done vis-à-vis environmental injustice. To remedy this gap, a literature analysis is conducted to investigate the range of environmental exposure borne by certain population groups. In a case study focused on BLLs of children in rural and urban regions of the U.S., results using the National Health and Nutrition Examination Survey (1988-1994) data show that it is predominantly poor children in both areas that test for levels that are 10 ng/dL (nanograms per decilitre) or higher: 12% of children living in poor families had elevated BLLs, as opposed to 2% in high-income families (*Ibid*). Moreover, when the data are disaggregated by racial/ethnic

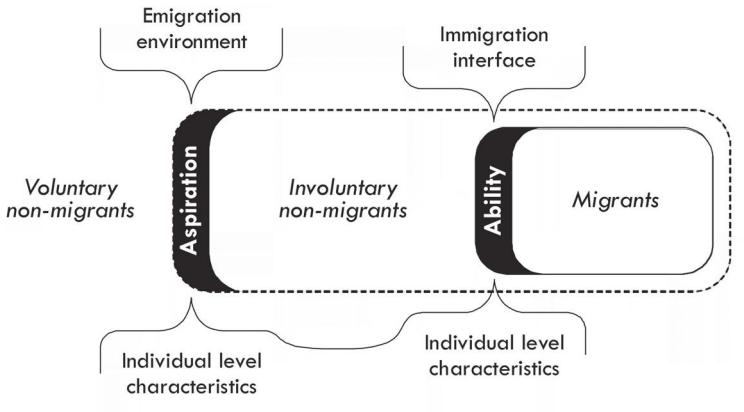
group, African American children are more likely to have elevated BLLs in each income group (*Ibid*). Interestingly, when discussing the complexities of assessing local threats, Northridge et al. (2003) find that research has indicated that it is the nature of the official responses to the environmental event that highlight racist tendencies, not the polluting activity itself.

Trapped Populations

After natural or man-made disasters, a common reaction is to leave the area affected, sometimes out of choice and other times out of obligation. However, an oft-overlooked reaction, or lack thereof, is that of trapped populations, defined as those "who lack the ability to move but also either want or need to move" (Black and Collyer, 2014: 52). Indeed, the consistent and assumed focus on movement in migration studies "renders the involuntarily immobilised invisible", a trend that applies to the Flint case study (*Ibid*: 52). Jónsson (2011) reinforces this notion and points out that the socio-economic implications this immobility entails are subsequently rarely examined. Carling (2002: 1) discusses this phenomenon, underlining that in the so-called "Age of Migration", little attention is paid to the explorations and explanations of the act of non-migration. Although his focus is mainly on international migration and the Cape Verdean example, his model, illustrated by Image 3 below, dubbed the aspiration/ability model, provides clarification and insight into the characteristics of migrants in comparison to those who stay behind, either voluntarily or involuntarily. Through a dual-analysis strategy, Carling breaks down the many factors that determine one's aspiration or ability, on both a macro- and a micro-level, that can lead an individual to voluntarily or involuntarily stay, or migrate.

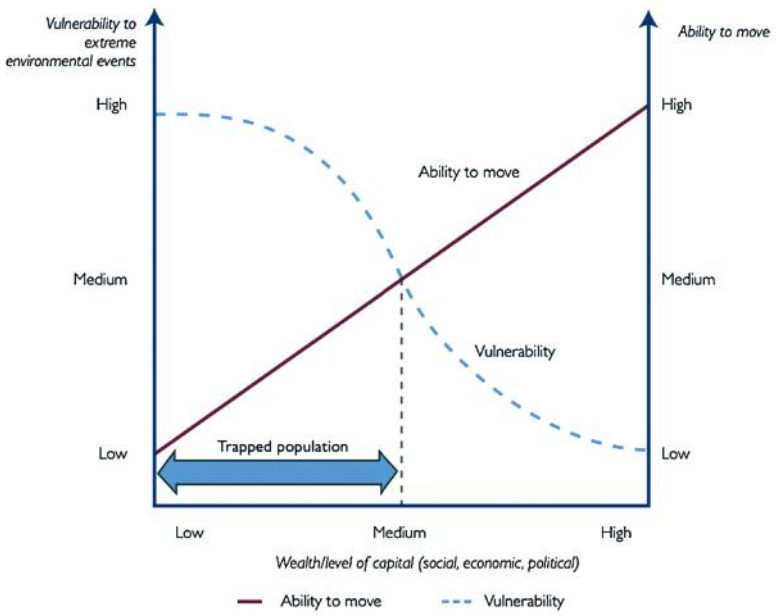
Lubkemann (2008), who focuses on the context of wartime situations, echoes this perspective underlining that there is a direct link between migration and displacement. He argues that the use of the two terms interchangeably conceals those who suffer a form of "displacement in place" through involuntary immobilisation (*Ibid*: 453). Immobile populations, usually the most vulnerable, are more likely to be trapped, a reality clearly demonstrated by Image 4 below; those with the lowest ability to migrate, the highest vulnerability to extreme environmental effects and the lowest wealth/level of capital, finds themselves trapped. Also, although not included in Image 4, in an indirect way, these populations have heightened vulnerability due to their low involvement in social networks beyond the

Image 3. The aspiration/ability model



Source: Carling, 2002

Image 4. Vulnerability to extreme environmental events and ability to move



Source: Foresight , 2011, used in Black et al. 2013

area immediately affected by the crisis, thus preventing them from relying on assistance from further afield (*Ibid*).

Much like the many categories of those who migrate, multilayered nuances are important to take into account when determining whether or not a population is trapped, if that is at all possible on a meso level. Similar to Carling's (2002) model, these include ability, desire and need: "trapped populations are those people who not only aspire but also need to move for their own protection but who nevertheless lack the ability" (Black and Collyer, 2014: 54). It is also important to add that it is possible to be trapped on the move, particularly in refugee/internally displaced persons (IDP) camps, however, as this point does not apply to the case of Flint, it shall not be discussed in the framework of this paper (*Ibid*).

An infamous example of a trapped population is the underprivileged African-American population of New Orleans after Hurricane Katrina devastated the city: those with financial resources and/or vehicles left in advance, as did those with friends and family elsewhere, whereas those without resources found themselves trapped as floodwaters rose (Black and Collyer, 2014; Masquelier, 2006). This example, although different by virtue of being a natural disaster, is particularly pertinent as Governor Snyder admitted, during an interview with *The National Journal* in January 2016, that the Flint Water Crisis was "his Katrina", referring to then President George W. Bush's poor handling of the natural disaster (National Journal, 2016, no pagination).

The Varying Degrees of Flint's Trapped Population

As explained above, a trapped population is characterised by a desire[10] to migrate, a need to migrate and the ability to do so. To explore the link between environmental injustice and trapped populations, these characteristics will be explored vis-à-vis the situation in Flint through the examination of articles published in the press.

Firstly, the desire to leave Flint City resurfaces in many articles and interviews; in *The New York Times*, Bosman (2016, no pagination) explains that "untold numbers of them are *desperate to leave* [emphasis added]", denoting a clear aspiration to leave their hometown, with 'desperate' indicating a sense of urgency. However, this statement is followed by: "few see a way to pick

[10] It is challenging to draw conclusions regarding the desire of an individual in a given situation; especially considering the geographical constraints that are such that the author of this article was not able to conduct interviews with those affected by the lead contamination.

up and move to a place where the water that flows from the taps is clean and safe", pointing to the notion of being immobile (*Ibid*). This sentiment is also conveyed in a *Vox* article, nearly word-for-word: "many Flint residents are desperate to leave" (Nelson, 2016, no pagination). Similarly, *The Washington Post*'s Emily Badger (2016, no pagination) reiterates the residents' wish to migrate, then dashed by the affirmation that they are incapable of doing so: "ask families in Flint and many *want to leave* [emphasis added] [...] but the same problems that harm them *trap them there* [emphasis added], in the middle of an environmental disaster". Patty Warner (2016, no pagination), a Flint resident who has chosen to stay in her hometown, explains during a phone interview that "there are other people who do feel trapped and they feel like they want to escape, they want a better life for themselves, for their children".

Secondly, the need to leave will be discussed taking into account the severity of the situation and the complex interlinking factors that interact to discuss the urgency with which many residents feel the necessity to escape. Brittny Giles, interviewed by *The Washington Post*, admitted that she would rather stay, but the lack of quality public services for her children mean that it is imperative to migrate: "I don't want to leave [...] but if there is no water or schools for my children, I have to give them a better future" (Bernstein, 2016, no pagination). Likewise, in an op-ed by Dr Irwin Redlener (2016a, no pagination) published in *The Washington Post*, a "deeply frustrated" mother admitted to being "so afraid for [her] kids" adding that "all of [her] friends say the same thing: if we could afford it, we would be out of Flint".

Charles White, a father and carpenter in Flint City, told Bosman (2016, no pagination) that "[he's] prepared to sell everything [he] own[s] to get out and save [his] children" but recognises "he is as good as trapped". In these cases, the heightened effects lead poisoning has on children and the extra attention they already do and will need in the future—be it physical or mental—are considered by many families as a factor making migration necessary. Moreover, whilst Cheryl Farmer also admits she "needs to leave", she points not only to the high lead levels in her 8-year old daughter's blood, but also to the "poverty, crime, gunshots that ring out at night and send her daughter running to her room" (Simon and Sidner, 2016, no pagination).

After having already established the desire and need to migrate, the last characteristic of a trapped population is an analysis of the ability of the affected community to do so, financially speaking. Given that 41.6% of the

population lives in poverty, the press is littered with examples of residents citing financial difficulties as an inhibitor to their potential plans to move, supported by the socio-economic context laid out in the first section of this chapter. For example, Terraca Rogers, interviewed by Villalobos (2016), stated "I want to move but don't have the funds to go". Echoing this sentiment, Sandra Ballard, a retiree, lamented the fact that she already struggles to pay her monthly rent of US$350: "You've got to put first and last month's rent down. Believe me, I wish I could get out of here" (Bosman, 2016, no pagination). These financial difficulties are often directly linked to the trouble residents face when trying to sell their homes. No one wants to buy property in an area that has been making headlines for poisonous water as well as the pre-exiting levels of crime and poverty (Nelson, 2016). Kala Green, a retiree interviewed in *The Washington Post*, asked dejectedly "What are we going to do? [...] Ain't nobody gonna buy our homes" (Bernstein, 2016, no pagination). Warner (2016) cites her neighbourhood's Facebook page, describing that many people have written saying they felt frustrated by the depreciation in the value of their property, claiming they cannot sell their house because of the water situation.

Another important element in the ability to move, as mentioned above, is the social network needed outside the place of residency of the population affected, which can often provide a temporary home and support during migration. Many of those who identify as being trapped, as well as citing the expenses of moving, also point to an attachment to their town:

> It kills him to say it, but Darren Bentley is thinking about leaving town. He was born here, went to Kearsley High School and rents a place near a couple of college campuses. He has never lived anywhere else (Bernstein, 2016, no pagination).

Also, the testimony of Demetrius Williams is telling as it establishes the two sides of this issue: on the one hand, in his interview, he announces that he plans to move to Tulsa, Oklahoma, where he had lived before and could find work easily, pointing to a pre-established social network (Bosman, 2016). On the other hand, he explains that one of his friends would leave too were he not too "established", owning several houses in Flint (*Ibid*, no pagination).

To return to the example of Hurricane Katrina, Masquelier's (2006) analysis of the discourse surrounding the damage and, in some cases, the displacement caused by the floods is pertinent when compared to the situation in Flint. Masquelier (*Ibid*: 736) is particularly interested in the use of the term 'refugee' to refer to New Orleanians, be they displaced or not; a

word that, in this context, is technically incorrect and projects an image of vulnerability that "contradicted everything that the United States—and its citizens—supposedly stood for". Paralleling the socio-economic situation of Flint, 28% of New Orleans' residents pre-Hurricane Katrina lived below the poverty line, and of that percentage, 84% were African American (*Ibid*). She argues that the rejection of the term 'refugee' by those homeless or displaced post-Katrina and the discomfort felt by the American public points to the exposure of vulnerability and poverty suffered by a fraction of the population, which is not usually apparent: "If the poverty of so many New Orleans residents was suddenly exposed, [...] it is largely because in the aftermath of Katrina social suffering became newsworthy" (*Ibid*: 741).

Although none of the residents of Flint have been referred to as refugees, the poverty and vulnerability of many Flint residents have been broadcast and exposed to the rest of the US. Bernstein (2016, no pagination) touches upon the many layers of Flint residents' trapped characteristic: "It wasn't simply the decision to switch the city's water supply that *prevents children there from reaching the American dream* [emphasis added]". The projection of a sudden emergence of a trapped population is thus incorrect, as Dr Redlener (2016) points out during a Skype interview:

> You are trapped before the problem and, unless it is so dramatic and visual that there is no choice but to get you out like with the Katrina flooding, [...] the mobility to make a decision to move to do something different or interesting is a privilege of people with enough resources and money to do so.

Indeed, the population most affected by the lead contamination, poor and African American, and thus that which suffered environmental injustice was already trapped in Flint given their precarious financial state and their limited social network. To be 'trapped' is a fluctuating process, which can be amplified by an event, be it a man-made disaster or a natural disaster, which is then determined a case of environmental injustice. Similar to the case of Hurricane Katrina, the struggles of this particular demographic were highlighted to the rest of the country by the lead contamination disaster and the media's subsequent coverage of it. Congressman Dan Kildee admitted in an interview with *The Huffington Post* that the "president's visit [came] at a really crucial time, at least for the people from Flint [...] it was beginning to feel like the urgency was fading" (Delaney, 2016: no pagination). This was echoed by the mayor Karen Weaver who told *The Detroit Free Press* that the president's visit "brought attention to her city that had been waning

since Democratic presidential candidates brought a national spotlight to the struggling city" (Riley, 2016).

However, it is important to stress that, when it comes to the determination of how 'trapped' a population is, not all those affected by the lead contamination have a desire or feel the need to leave Flint. As Patty Warner (2016), who lives in the 48503 zip code, which had some of the highest levels of lead, explained over a phone interview:

> Personally, we are not happy [...] but I like my house, I like Flint, like my friend says, his slogan is—he's also staying—"Flint is a great place to make better". So most of my friends, *as disappointed and frustrated as they are*, [emphasis added] they've chosen to stay.

Given the difficulties associated with producing figures on trapped populations, the absence of an international body (or a national U.S. institution) that is able to measure trapped populations, and the little attention paid to the subject within migration studies, there are no estimates regarding how many people consider themselves 'trapped'. Moreover, in the case of Flint, as those who have been able to leave are not crossing international borders, requiring an identity check or a formal visa application process, it is not possible, at this time, to procure numbers as to how many residents have left the area, nor determine how far they moved and how long they intend to stay. That said, as Siddarthra Roy (2016), researcher at the Flint Water Study, explained in a phone interview, when the team of engineers returned to Flint to collect water samples from the same homes they tested in the first round, they found that many people had moved.

The Environmental Injustice Trap

Given these challenges, the question therefore is how is this situation magnified by the environmental disaster at hand? As detailed in the context section of this chapter, Flint is a city where, according to the U.S. 2010 Census, 41.6% of the population lives in extreme poverty and 57% of its residents are African American (United States Census Bureau, 2015). Moreover, as mentioned above, Hanna-Attisha et al.'s (2016) study investigating the BLLs in children younger than five demonstrated that the areas with the highest water lead levels recorded, and thus the highest BLLs, had the highest proportion of African American residents at 76.8%; these areas were also the most disadvantaged socio-economically. This further confirms a trend analysed by Northridge et al. (2003): in the U.S., children

from poor families and from African American families are more likely to have elevated BLLs.

Indeed, this demographics' higher exposure to the man-made lead crisis points clearly to an instance of environmental injustice as the population did not enjoy the same degree of protection from environmental and health hazards as that afforded to other communities, considering the use of emergency managers, the subsequent denial by officials of the lead levels in the water and their refusal to investigate the allegations thoroughly (Flint Water Task Force, 2016). In addition, the use of emergency managers and the power they exercised was such that Flint residents did not have equal access to or meaningful involvement in the government decision-making process, thus fulfilling the second component of environmental injustice (*Ibid*). However, as argued by Northridge et al. (2003), it is the nature of the official responses to an environmental event that highlight racist tendencies, not the polluting activity itself, and thus qualify for a case of environmental injustice. Indeed, the entire population of Flint was exposed to lead poisoning but the socio-economically disadvantaged community, chiefly African American and poor, did not have the financial means to protect itself by buying bottled water, as established in Hanna-Attisha's study, and their complaints were ignored.

As such, the sharp increase in lead-poisoning rates has increased the vulnerability of an entire generation of Flint children, many of whom are already burdened with stress contributors: poverty, violence, unemployment and food insecurity (Hanna-Attisha et al., 2016). The consequences of lead-poisoning, which is a potent neurotoxin, are far-ranging, particularly on children: intelligence, behaviour and overall life achievement can be affected, as evidenced by Table 1 below, which attempts to offer threshold exposure levels for certain effects (CDC National Centre for Environmental Health, 2015: viii). According to the Agency for Toxic Substances and Disease Registry (2010), children absorb more ingested lead than adults, meaning they are more affected by lead exposure; the percent of lead absorbed in the gut is estimated to be five to ten times greater in infants and young children than in adults (*Ibid*). Lead poisoning also has tremendous societal costs and disproportionately affects low-income and minority children, as is the case in Flint (*Ibid*).

In addition to the outcomes listed in Table 1, children who have had high BLLs can also display a longer reaction time and poorer hand-eye coordination (*Ibid*; CDC National Centre for Environmental Health, 2015). Also, for foetuses and children up to 36 months of age, the incomplete development

Table 1. Studies on Lead and Educational Outcomes

Blood Lead Levels	Educational Impact	Size of Study	Location of Study
≤ 3 μg/dL	Decreased end of grade test scores	More than 57,000 children	North Carolina (Miranda et al. 2009)
4 μg/dL at 3 years of age	Increased likelihood learning disabled classification in elementary school Poorer performance on tests	More than 57,000 children 35,000 children	North Carolina (Miranda et al. 2009) Connecticut (Miranda et al. 2011)
5 μg/dL	30% more likely to fail third grade reading and math tests	More than 48,000 children	Chicago (Evens et al. unpublished data)
	More likely to be non—proficient in math, science, and reading	21,000 children	Detroit (Zha ng et al. 2013)
5-9 μg/dL	Scored 4.5 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013]
≥ 10 μg/dL	Scored 10.1 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013)
10 and 19 μg/dL	Significantly lower academic performance test scores in 4th grade	More than 3,000 children	Milwaukee (Amato et al. 2012)
≥ 25 μg/dL	$0.5 million in excess annual special education andjuvenile iustice costs	279 children	Mahoning County, Ohio (Stefanak et al. 2005)

Source: CDC National Centre for Environmental Health, 2015

of the brain increases the likelihood of lead entry into the developing nervous system, which can result in prolonged or permanent neurobehavioral disorders (Agency for Toxic Substances and Disease Registry, 2010). Another particularly vulnerable population is pregnant women; their BLLs are an important factor in the probability that neurological problems exist in newborns (*Ibid*). Pregnant women with elevated BLLs have an increased chance of preterm labour, miscarriage, spontaneous abortion or stillbirth, and low birth weight of the baby (*Ibid*). A much-mediatised example of this is Nakiya Wakes' miscarriage; the Flint resident and mother of two explained to *CNN*'s Simon and Sidner (2016) that she believes it is the lead in the water that caused her to miscarry twins, although this has not been proven.

Policy Challenges

Flint's trapped population, further immobilised through the lead contamination of the water, is a hidden facet migratory reaction, or lack thereof, to a man-made environmental disaster and the policy challenges they present merit discussion in this chapter's last section.

Identifying the Immobilised

Delmont Jackson, a Flint retiree, admitted during an interview that he thinks the state should relocate him, given he does not have the funds to do so (Bosman, 2016). Resettlement is a policy response oft considered when officials are faced with an environmental disaster. However, when it pertains to trapped populations, Black et al. (2013) explain it is should be anticipatory, implying a pre-identification of the community in question and a pre-determination of what it means to be trapped. As Ian Dyar (2016), the regional disaster officer for the Michigan Red Cross, explained in a phone interview, there has not been much discussion concerning large-scale resettlement in the case of Flint due to the necessity to maintain Flint's tax base, especially given the city had been in a phase of redevelopment prior to the water switch. Indeed, the series of events, detailed in the context section of this chapter, that lead to the neglect of Flint in the decades leading up to the water contamination is partly to blame and the revitalisation of the city and its infrastructure is crucial to 'untrap' the population in question.

Furthermore, it would be a highly political decision to dictate that remaining in place is impossible. What criteria would the federal government use to determine who qualifies for resettlement? Where would these people go? According to the UNHCR (2015) guide to planned relocation, the government's plan should provide the community with the opportunity to voice alternative options; indeed, their perspective would have to be taken into consideration if the option of resettlement was to be entertained. Although Dr Redlener (2016) calls for the resettlement of Flint's children and stresses that they are gravely threatened by this disaster, he admits that it is a complex process and, at the current time, no agency—federal or otherwise—has the budget to do so. Moreover, he explains that the invisibility of the threat is such that it keeps the pressure off politicians to fix it, as opposed to a natural disaster like Katrina or a warzone (*Ibid*). This further emphasises the perceived temporality of a trapped population, as opposed to a state of being that is a culmination of socio-economic factors.

Environmental injustice

Flint's trapped poor, majority African American, population has suffered from a case of environmental injustice and are thus guaranteed three basic rights: the right to information, the right to a hearing and the right to compensation by law (Cutter, 1995). However, officials need to be able to identify populations that are more exposed to falling victim to environmental injustice and, depending on the circumstances pertaining to trapped

populations, may potentially immobilise a particular demographic. The FWATF (2016) rightly advocates that an Executive Order should be issued mandating guidance and training on environmental injustice across all state agencies in Michigan, highlighting the Flint Water Crisis as a key case study. The team also underscores the importance of updating the implementation of an environmental justice plan for the State of Michigan (*Ibid*). Meanwhile, Northridge et al. (2003) underline the necessity of mobilising public health professionals with urban planning, environmental protection, and civil rights adherents to articulate and guide informed decision-making. This last point would be particularly important in the pre-identification mentioned by Black et al. (2013) of a population that has the potential to be trapped should there be a disaster. Indeed, Flint will provide a "book of lessons", especially the lesson of poor governance and unintended consequences of their actions (Redlener, 2016).[11]

Conclusion

The Flint Water Crisis presents a clear case of environmental injustice and this paper has shown that the disaster also includes the migratory dimension of a trapped population that both needs and wants to leave, yet does not have the ability to do so. The testimonies of residents have established the emergence of a discourse of a particular section of the population that feels trapped following the infiltration of lead into the city's water system. This has exposed an entire community to lead poisoning, with the gravest consequences affecting socio-economically disadvantaged children and pregnant women. However, in examining the intricate layers of factors pertaining to trapped populations and varying examples of environmental injustice, this paper has sought to further research examining the overlap the two issues. Indeed, it appears that the socio-economic situation of the poor, majority African American, population of Flint is such that they were trapped before and during the crisis as well as continuing to be so. The environmental disaster heightened their immobility as well as beamed it across the country, much like the post-Katrina situation discussed by Masquelier (2006).

In a country as unequal[12] as the U.S., the issue of involuntary immobility reflects "the different hierarchies of globalisation" (Carling, 2002: 34). As

[11] Quote from Skype interview, see bibliography.

[12] According to the World Bank's classification of the Gini index, which is a measure of inequality by income dispersion, in 2013, the U.S. scored 41.1, making it the 15th most unequal country in the world.

documented by the press, of which a selection of articles were explored in the course of this study, in Flint, the poor, majority African American, population most affected by the lead contamination belong to a lower strata of the globalisation hierarchies because they cannot leave even if they manifest a desire and need to do so. Experts predict that the city will emerge as a case study on lead poisoning and the effects it has on different segments of a population, becoming a laboratory for academics keen to explore the political and socio-economic consequences of lead. In the meantime, Flint residents and its government, still in deep water, will attempt to rebuild their city and will have to develop it in such a way that the poor and African American trapped population can be mobile, should they feel a desire for it or need it.

BIBLIOGRAPHY

Press

Bernstein, L. (2016). Hope—and clean water—remains elusive for the people of Flint. *The Washington Post*. [online] Available at: https://www.washingtonpost.com/national/health-science/for-the-people-of-flint-hope--and-clean-water--remains-elusive/2016/02/06/1a6013c0-caa0-11e5-88ff-e2d1b4289c2f_story.html [Accessed 7 May 2016], [no pagination].

Bosman, J. (2016). Many Flint Residents Are Desperate to Leave, but See No Escape. *The New York Times*. [online] Available at: http://www.nytimes.com/2016/02/05/us/many-flint-residents-are-desperate-to-leave-but-see-no-escape.html [Accessed 3 May 2016], [no pagination].

Coyne, C. (2016). Flint, Michigan's water crisis: what the national media got wrong. *Vox*. [online] Available at: http://www.vox.com/2016/1/20/10789810/flint-michigan-water-crisis [Accessed 24 Mar. 2016], [no pagination].

Delaney, A. (2016). President Obama Says Flint's Glass Is Half Full. *The Huffington Post*. [online] Available at: http://www.huffingtonpost.com/entry/obama-flint-water_us_572cfbb7e4b0bc9cb046db16 [Accessed 8 May 2016], [no pagination].

Egan, P. and Spangler, T. (2016). President Obama declares emergency in Flint. *The Detroit Free Press*. [online] Available at: http://www.freep.com/story/news/local/michigan/2016/01/16/president-obama-declares-emergency-flint/78898604/ [Accessed 8 May 2016], [no pagination].

Eligon, J. (2016). A Question of Environmental Racism in Flint. *The New York Times*. [online] Available at: http://www.nytimes.com/2016/01/22/us/a-question-of-environmental-racism-in-flint.html [Accessed 10 May 2016].

Fonger, R. (2015). City warns of potential health risks after Flint water tests revealed too much disinfection byproduct. *Michigan Live*. [online] Available at: http://www.mlive.com/news/flint/index.ssf/2015/01/flint_water_has_high_disinfect.html [Accessed 24 Mar. 2016], [no pagination].

Hakala, J. (2016). *How did we get here? A look back at Michigan's emergency manager law*. Michigan Radio. Retrieved 3 February 2016, from http://michiganradio.org/post/how-did-we-get-here-look-back-michigans-emergency-manager-law#stream/0

National Journal, (2016). Snyder Concedes Flint is His "Katrina," a Failure of Leadership. *National Journal*. [online] Available at: https://www.nationaljournal.com/s/352793/snyder-calls-flint-his-katrina-catastrophic-failure-leadership [Accessed 4 Apr. 2016], [no pagination].

Nelson, L. (2016). The Flint water crisis, explained. *Vox*. [online] Available at: http://www.vox.com/2016/2/15/10991626/flint-water-crisis [Accessed 24 Mar. 2016], [no pagination].

Redlener, I. (2016). We need to resettle the children of Flint. *The Washington Post*. [online] Available at: https://www.washingtonpost.com/opinions/get-flints-families-out-of-harms-way/2016/02/17/e8553e40-d4dc-11e5-be55-2cc3c1e4b76b_story.html [Accessed 31 Mar. 2016], [no pagination].

Riley, R. (2016). Flint's Dr. Mona: Why didn't Obama bring more resources to fix problem?. *The Detroit Free Press*. [online] Available at: http://www.freep.com/story/news/columnists/rochelle-riley/2016/05/06/dr-mona-flint-water-obama/84031520/ [Accessed 9 May 2016].

Simon, M. and Sidner, S. (2016). Flint water crisis: Families bear scars from 'manmade disaster'. *CNN*. [online] Available at: http://edition.cnn.com/2016/03/03/health/water-crisis-flint-michigan/ [Accessed 22 Mar. 2016], [no pagination].

Villalobos, J. (2016). *Water crisis has Flint mother feeling trapped*. [video] Available at: https://www.youtube.com/watch?v=lXig9YoM-ls [Accessed 25 Mar. 2016].

Books/Reports

Agency for Toxic Substances and Disease Registry, (2010). *Lead Toxicity*. Case Studies in Environmental Medicine.

Centres for Disease and Control Prevention, (2009). *Fact Sheet for Healthy Drinking Water*.

CDC National Center for Environmental Health, (2015). *Educational Interventions for Children Affected by Lead*. [online] Atlanta. Available at: http://www.cdc.gov/nceh/lead/publications/Educational_Interventions_Children_Affected_by_Lead.pdf [Accessed 20 Mar. 2016].

Del Toral, M. (2015). *Memorandum: High Lead Levels in Flint, Michigan - Interim Report*. [online] Chicago: U.S Environmental Protection Agency. Available at: http://flintwaterstudy.org/wp-content/uploads/2015/11/Miguels-Memo.pdf [Accessed 8 May 2016].

EPA, (1989). *The Lead Ban: Preventing the Use of Lead in Public Water Systems and Plumbing Used for Drinking Water*. Washington DC: EPA.

Flint Water Advisory Task Force, (2016). *Flint Water Advisory Task Force: Final Report*. [online] Flint. Available at: http://www.michigan.gov/documents/snyder/FWATF_FINAL_REPORT_21March2016_517805_7.pdf [Accessed 29 Mar. 2016].

State of Michigan. (2012). *Public Act 436*.

UNHCR, (2015). *Guidance on Protecting People from Disasters and Environmental Change through Planned Relocation*. Georgetown University.

World Bank. (2013). *GINI index*. [online] Available at: http://data.worldbank.org/indicator/SI.POV.GINI?year_high_desc=true [Accessed 28 Aug. 2016].

Articles

Allen, D. (2001). Social class, race, and toxic releases in American counties, 1995. *The Social Science Journal*, 38(1), pp.13-25.

Black, R. and Collyer, M. (2014). Populations 'trapped' at times of crisis. *Crisis*, pp.52-56.

Black, R., Arnell, N. W., Adger, W. N., Thomas, D., & Geddes, A. (2013). Migration, immobility and displacement outcomes following extreme events. *Environmental Science & Policy*, 27, Supplement 1(0), S32-S43.

Carling, J. (2002). Migration in the age of involuntary immobility: Theoretical reflections and Cape Verdean experiences. *Journal of Ethnic and Migration Studies*, 28(1), pp.5-42.

Cutter, S. (1995). Race, class and environmental justice. *Progress in Human Geography*, 19(1), pp.111-122.

Hanna-Attisha, M., LaChance, J., Sadler, R. and Champney Schnepp, A. (2016). Elevated Blood Lead Levels in Children Associated With the Flint Drinking Water Crisis: A Spatial Analysis of Risk and Public Health Response. *Am J Public Health*, 106(2), pp.283-290.

Jacobs, AJ. (2009). The impacts of variations in development context on employment growth: a comparison of central cities in Michigan and Ontario, 1980–2006. *Econ Dev Q*, 23(4), pp.351–371.

Jónsson, G. (2011). Non-migrant, sedentary, immobile, or 'left behind'? Reflections on the absence of migration. The International Migration Institute (IMI), *Oxford Department of International Development*. Working Paper, 39.

Lubkemann, S. (2008). Involuntary Immobility: On a Theoretical Invisibility in Forced Migration Studies. *Journal of Refugee Studies*, 21(4), pp.454-475.

Masquelier, A. (2006). Why Katrina's Victims Aren't Refugees: Musings on a "Dirty" Word. *American Anthropologist*, 108(4), pp.735-743.

Northridge, M., Stover, G., Rosenthal, J. and Sherard, D. (2003). Environmental Equity and Health: Understanding Complexity and Moving Forward. *Am J Public Health*, 93(2), pp.209-214.

Rosner, D. (2016a). Flint, Michigan: A Century of Environmental Injustice. *Am J Public Health*, 106(2), pp.200-201.

Websites

Rosner, D. (2016b). *Flint's Toxic Industrial Legacy*. [online] Colombia University: Mailman School of Public Health. Available at: https://www.mailman.columbia.edu/public-health-now/news/flints-toxic-industrial-legacy [Accessed 3 Apr. 2016].

Barthel, M. (2015). *State of the News Media 2015*. [online] Pew Research Center's Journalism Project. Available at: http://www.journalism.org/2015/04/29/newspapers-fact-sheet/ [Accessed 8 May 2016].

FBI, (2010). *Michigan*. [online] FBI. Available at: https://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2010/crime-in-the-u.s.-2010/tables/table-8/10tbl08mi.xls [Accessed 9 May 2016].

United States Census Bureau, (2015). *QuickFacts: Flint, Michigan*. [online] United States Census Bureau. Available at: http://www.census.gov/quickfacts/table/PST045215/2629000 [Accessed 24 Mar. 2016].

U.S Census Bureau, (n.d.). *How the Census Bureau Measures Poverty*. [online] U.S Census Bureau. Available at: http://www.census.gov/hhes/www/poverty/about/overview/measure.html [Accessed 8 May 2016].

Interviews

Interview with Ian Dyar, Regional Disaster Officer for American Red Cross in Michigan, April 18, 2016 by Skype.

Interview with Dr. Irwin Redlener, Director at National Centre for Disaster Preparedness, Columbia University, and Co-Founder and President of the Children's Health Fund, April 14, 2016 by Skype.

Interview with Ms. Patty Warner, Flint resident, April 7, 2016 by phone.

Interview with Siddhartha Roy, Researcher at the Flint Water Study and PhD student at Virginia Tech, April 6, 2016 by phone.

Documentaries

Roger and Me. (1989). [film] Flint: Michael Moore.

South Americas

Lost in the definition

Environmental displacement in Salgar, Colombia

Laura Gamez

In the early hours of the morning in the municipality of Salgar, Colombia, on 18 May 2015, heavy rainfall and flooding resulted in a landslide that marked one of the country's deadliest single-environmental disasters since 1999. In the immediate aftermath it was reported that the landslide in Salgar had left more than 93 people dead and 300 to 782[1] people displaced ("Falsa alarma sobre nueva avalancha causó pánico en Salgar, Antioquia," 2015). The event was not only a shock in terms of the loss of life, but reignited fierce debate about appropriate humanitarian response, legal challenges of land rights, and more importantly how to suitably address displacement caused by environmental disasters. Colombia, after all, is a country that often faces environmental challenges in part because of its topography and climate, as well as high disaster risks due to settlements in environmentally vulnerable zones. Furthermore, as of 2014, Colombia has one of the highest levels of forced migration and internal displacement in the world (second only to Syria) due to political violence and strife (COHA, 2015). However in Colombia, policies and responses to environmental migration have varied over the years. In light of the country's civil strife, a policy narrative has emerged whereby environmental induced-displacement is seen as a temporary and often short-term effect that is not necessarily addressed in the same way as conflict-induced displacement. Noting the events that took place, the humanitarian response, the policy narrative, and the legal challenges regarding return, the case of Salgar provides interesting insight into how a government with experience in forced migration addresses a different type of migration—environmentally induced displacement.

The Landslide: What happened?

In the days leading up to the landslide, the municipality of Salgar had been hit by heavy rainfall, common to the season. However, unlike previous seasons heavy flooding occurred around the Liborina gully leading to a landslide. At 3am, residents awoke to find entire neighbourhoods completely destroyed, including almost the complete destruction of La Margarita, a village that is part of the Salgar municipality. The landslide not only affected the semi-urban[2] area considered as the city of

[1] Numbers reported vary across media. This was the immediate number reported across several media outlets (El Especatdor, Teleantioquia, El Tiempo, etc), although it subsequently changed, as people were able to return. It should also be noted that, as explored below, the exact number of displaced people is difficult to pin down because of the differences in terminology.

[2] This study considers Salgar as semi-urban because although the city itself has a high concentration of population in comparison to nearby villages, it is not urbanized like Medellin, the closest city.

Salgar, but it also broadly affected the surrounding area where the majority of the inhabitants are farmers. Prior to the landslide an estimated 17,608 people lived in the municipality ("Departamento Administrativo Nacional de Estadística (DANE)," 2005.). After the landslide, the first reported number of "damnificados" was 782, and during the two weeks following the event, the reported number in the media fluctuated from 250 to 750.[3] In an interview with Cuadros Usma, one of those affected by landslide, he noted that the number is inconsistent because a lot of the people that had family in Medellin left before registering with the government, while others that were in nearby municipalities having heard of aid tried to register under false pretences. Furthermore, immediately following the landslide, agencies from different NGO's, people from different municipalities, the media and even independent GIS cartographers arrived at the scene but shortly after arriving the government ordered all non-government agencies to leave the area, considering that the best way to coordinate the response was through one single entity.

The Humanitarian Response

Immediately, after the landslide, the Colombian government promised to rebuild for free all houses lost in the landslide ("Gobierno anunció paquete de ayudas para damnificados en Salgar, Antioquia," 2015), and also promised to provide temporary housing to those affected. Over the following weeks, as people started to try to find those missing, some recovery efforts were also undertaken by NGOs, and even the private sector participated in the humanitarian response. Companies like Starbucks, the national federation of football, and real-state agencies made commitments to help rebuild Salgar—but rebuild for whom? An answer that the government wanted to immediately know and as such set up offices in Salgar and Medellin,[4] where people could go to register for free as a "damnificado." The offices also offered free identity cards to replace all those lost in the landslide, and a legal clinic for those needing to register and identify deaths in their families. Immediately, reports from residents of Salgar emerged claiming that people who were not from the municipality were claiming to be victims. As a result the Ministry of Housing made a statement that all those falsely claiming to be affected with the aim of receiving free housing could face up to 12 years in prison ("Hasta 12 años de cárcel podrían pagar falsos damnificados en

[3] It seems that differing publications all had different estimations and numbers with no consensus on an exact figure.

[4] This was not in the report, but it was the answer provided in email exchanges with the municipality

Salgar, Antioquia," 2015). In addition to this statement on 25 May, seven days after the landslide the Ministry of Housing claimed they had received only 383 claims from families who lost their homes.

Reported numbers from the 18 of March, Municipal Report (Translated from Spanish)		
People killed	93	37 men 34 women 10 boys 12 girls
People disappeared	11	
People hurt	62	All have been discharged
People affected	1,465	522 men 494 women 259 boys 213 girls
Families Affected	462	
Families Assisted	462	
Houses Destroyed	66	
Houses Semi-Destroyed	24	
Houses affected	219	
Families registered	462	Government Registered Only
Bridges for vehicles	8	7 affected 1 destroyed
Bridges for pedestrians	9	4 affected 5 destroyed
People living in shelters	0	0
People receiving Red Familiar (economic substaincance from the government)	675	Under Plan Padrino
Government Construction of Homes	42	Lote la Habana. 34% completed. Apartments.
	186	Lote la Florida. License approved for first 124 apartments
	50	Lote la Pradera, semi-detached homes. 7.1 % completed
Private construction of Houses[1]	30-45	This includes the building La Aldea Margarita, which will be 30 detached homes. The project was donated by the Estate Farm Corporation La Margarita. In addition other agencies have promised to build a few houses for those affected by the Landslide

1. This was not in the report, but it was the answer provided in email exchanges with the municipality

Almost a year later on 18 March, the municipality of Salgar released a report updating the figures and reporting progress, which is shown in the adjacent table. From this humanitarian response, it can be deduced that at least 200 people lost their homes and were most likely immediately displaced to another town or city.

In an interview with Marianna Johnson Hurtado, a person displaced by the disaster, she noted that majority of the people that completely lost their homes left Salgar to work in Medellin, as the monetary assistance they were receiving from the government was not sufficient. She explained that in addition to losing their homes, staying in Salgar was difficult for many because it was there that they had lost loved ones. She noted that for her, coping with the disaster was not only financially better in Medellin but also emotionally so, as her sister lives there and they could mourn together. However, as one of the beneficiaries from the free homes provided by the government she may return to Salgar, pending financial opportunities but as that time she seemed uncertain. Similarly, Cuadros Usma also noted some people left Salgar after the landslide not because of the loss of their home, but because of the loss of their primary source of income. He noted particularly that many farmers lost their livestock and/or produce and could not afford to stay. This also explains why according to the report, the government is spending around 1.2 billion pesos ($405,000 USD) on agricultural projects ranging from building greenhouses to providing livestock. All the funding is currently under the plan named Response and Recuperation, which, under UNGRD and the municipality of Salgar seeks to restore the area to what it was prior to the landslide by the end of 2019.

Challenges in the response

A legal challenge that arose out of the Salgar case was that across the municipality some people who lost their homes did not have land titles (either never officially registered or lost and could not be found). Without procuring land titles they were not able to access any housing benefits provided by the government. In fact, a few months later in November, Margarita Maria Restrepo, a member of the government representing the department of Antioquia, penned a letter fiercely criticizing the government for abandoning Salgar (Restrepo, 2015). In the letter, she noted that heavy bureaucracy was affecting the most vulnerable, highlighting the plight of people whose only proof of home purchase was a paper that they kept in their home, thus once the home was lost, so was the only proof of purchase. For Restrepo, the government's insistence on official documents is not only

insensitive but a means to avoid its responsibility. In an interview with Edison Restrepo, a person affected by the landslide, he confirmed cases of people in such situations. He also noted that he knew of cases where people having heard the purchase proof was lost, had come back to claim benefits even though they had not lived in the house in question for years and had indeed sold it to someone else. In addition, he noted in some cases the most affected where people who lived in the homes of their parents, but had no official will leaving them the house. For example, in a family of three children one child took over the upkeep of the farm, but after the landslide, all three children tried to equally claim benefits in relation to the house despite the fact that only one was the caretaker. Edison Restrepo conceded that this was not very common, but nevertheless an issue that the "government's strict bureaucratic rules did not know how to address or even have the compassion to try to comprehend"[5] (Edison Restrepo, n.d.).

Restrepo also noted that for farmers who lost their livestock or produce, help was not coming fast enough. She noted that in many cases, government aid was being held back by bureaucratic procedures, the main problem being that many of the farmers are subsistent. Thus, without aid they were forced to beg, find other less well-paid work, or move outside the municipality. The 2007 World Bank report Environmental Priorities and Poverty Reduction, noted that in the context of Colombia, farmers who lose their homes or livelihood due to environmental disasters are at great risk. Colombia's rural farmers tend to have lower levels of education and financial resources outside their farms, and in some peripheral cities even less social networks outside their specific municipalities. As such, losing their source of income could mean not only displacement to a larger city in search of work but also will most likely mean that when they arrive the city their standard of living will be very low—in most cases below the poverty line (The World Bank, 2007).

Past Policies and Salgar

To understand the political response to Salgar and the points of contention regarding the policies implemented, it is important to discuss the development of these frameworks through past case studies. Consequently, two main cases are key in this respect not because they were landslides, but due to the fact that as a result of a very high death toll and level of displacement, policies were enacted that are also at work in the case of Salgar. The two cases are Armero, which took place in 1985 as result of a volcanic eruption, and an earthquake in Armenia in 1999.

[5] Translated from Spanish.

Armero

On the 13 November 1985, the volcano el Nevado del Ruiz, commonly nicknamed the sleeping lion, erupted. The icecaps that covered the volcano melted and resulted in heavy amounts of mud flowing down the volcano and subsequently burying the city of Armero. This happened at 9pm, while the residents of Armero were sleeping. As a result, when the mud flowing at a speed of 50km per hour, the majority of the residents were unable to escape, resulting in the second deadliest eruption of the 20th century with about 20,000 deaths ("BBC" 1985). However, the volcanic eruption not only resulted in a large amount of loss of life, but also territorial losses, as the 3,000 survivors were forced to move after the government declared Armero to be an unsafe permanent settlement and designated it as a "holy burial site."[6] The majority of people resettled in the nearby towns of Guayabal y Lérida (Avendaño Castro & Aguilar Rodriguez, 2014), which today are considered to be at high risk should the volcano erupt again.[7] The death toll in Armero was actually the main proponent in expediting the development of SNPAD in 1988: it has been cited as the single most important disaster in inducing the development of environmental policy in Colombia (Avendaño Castro & Aguilar Rodriguez, 2014). Shortly after the disaster about 1,000 survivors sued the government for lack of emergency preparedness, in the first lawsuit of its kind claiming 20,000 million pesos, about 40 million pounds sterling, in damages. The government was absolved of the lawsuit as a result of the opinion of three experts that it was impossible for the government to know the extent of the volcanic activity at the time, and therefore impossible for it to plan accordingly. This created two precedents, one where if the government could prove "force majeure" [8] it was not liable to pay damages. However, a second precedent—which can be discerned in both Armenia and Salgar—was that having set budgetary measures aside for environment-induced costs under SNPAD, the government can now provide some monetary alleviation for damnificados. The aim of this precedent is perhaps to mitigate future lawsuits but also to alleviate some of the burden of towns that may have to take in evacuees.

[6] It should again be noted here that damnificados is used to describe the 3,000 people rather than the term "displaced".

[7] El Nevado del Ruiz is the second most active volcano in Colombia.

[8] A legal term, often known as an "Act of God", designating events that take place out of human control and could not have been foreseen, and therefore no one can be held accountable.

Lastly, Robert Desjarlais, the author of *World Mental Health: Problems and Priorities in Low-income Countries,* used the Armero case to study the effect of natural disasters on mental health. He noted that survivors from Armero demonstrated high levels of emotional distress even years later (Desjarlais, 1996). The subsequent study of Armero by Desjarlais and general research about this subject matter thus indirectly allowed for greater policy awareness of the need to address mental health issues. In fact, in the case of Salgar, the City Hall reported in March 2016 having organized nine specific groups to address psychological wellbeing, 900 individual psychiatric appointments provided for free for those affected by the landslide, and assisted 430 families in grieving.[9] Therefore, to an extent the case of Armero not only demonstrates the development of legal precedents and policy, but also can help to begin to understand fields in which which Colombia's government has or has not evolved to address environment-induced displacement.

Armenia

Consequently, the second case study of Armenia is key because as of 2007 it was the only natural disaster in relation to which a comprehensive and systematic estimates of costs had been undertaken. On 25 January, 1999 an earthquake hit Armenia, a city located in the coffee-producing region of Colombia. The estimated number of deaths was about 1,000 though no exact number exists, and about 200,000 people were left homeless (BBC, 1999). The estimated cost was 1.8 billion USD in 1999, "which more than 70 per cent was housing and building damages" (The World Bank, 2007 pp 147). This cost has then been used to estimate annual costs for other natural disasters in the country henceforth, and has also been used by Colombia's government to set priorities in risk reduction under SINA and SNPAD. Consequently, in understanding how budgetary decisions were made in Salgar, a lot of the estimations from the municipality after the landslide were based on figures from the case of Armenia ("Unidad Nacional para la Gestión del Riesgo de Desastres," n.d.).

A more difficult subject to explore but also applicable to the case of Salgar is the legacy of addressing environment-induced displacement in cases where there is already existing conflict-induced displacement. Prior to the earthquake, Armenia was called the miracle city, and was one of the

[9] The report was not clear on how it assisted 430 families in grieving, and to what extent. The report was made available to the author by Beatriz Helena Duran Diaz, who works in Salgar's City Hall.

fastest growing cities in the region. According to a report by the Economic Common for Latin America and the Caribbean (CEPAL) as a result of the growing prosperity of the city at that time, many of those who were internally displaced by conflict within the country moved to Armenia. After the earthquake hit the city, the number of people displaced naturally increased. However, when it came to benefits of the "damnificados" or "desplazados," only damnificados—meaning those with direct linkage to infrastructure—were recognized for aid. Those that were living in Armenia because they had been internally displaced had a more difficult time accessing aid. Furthermore, the report by CEPAL notes that to this day the socio-economic impact of the earthquake is difficult to completely understand because of the multiplicity of displacement that existed at the time.

Conversely, 16 years later in Salgar, people displaced by violence from Salgar prior to the landslide were also affected when returning to Salgar due to the landslide. In February, TeleAntioquia, one of the main news agencies in the department, noted that the landslide had resulted in delays over housing promised for those displaced by violence. According to the report, prior to the landslide, 24 families that were displaced due to conflict were promised houses in Salgar, construction of which was nearing completion before the landslide hit. The UNGRD, citing structural concerns, halted further construction until further assessments can be made. According to the report, the families are still waiting for homes almost a year later, without any information. ("Desplazados de Salgar esperan vivienda de la que son beneficiarios," 2016).

Colombia's geographic vulnerability and Disaster-Risk Policy

The case of Salgar demonstrates the varying policy interventions at play in humanitarian response. In a broader context it demonstrates a willingness of the government to act to address the issue, but also the contentions between policy and implementation. This largely plays out due to the disaster-risk policy of Colombia.

In 2004, the World Food Programme assessed that out of Colombia's 32 departments, 19 departments had high to severe vulnerability to disaster risk (Acuña, 2014). In addition, Colombia, which is located at the northern tip of Latin America, "has the 10th highest economic risk to three or more hazards in the world, according to the Natural Disaster Hotspot study by the World Bank" (GFDRR and The World Bank, 2010). Colombia has six active volcanoes, most of the country's largest urban areas are located in zones with high levels of seismic activity, the country is prone to flooding,

and has the highest level of landslide risk in South America. Climate change is also increasing these vulnerabilities, and, according to a World Bank report, "for both hydrometeorological and geological hazards, Colombia is probably the most densely monitored country in Latin America" (GFDRR and The World Bank, 2010).

As a result Colombia adopted several disaster risk protocols and treaties to address these disaster-risk vulnerabilities with an aim to go beyond simple emergency response to overall risk reduction. The first type of notion of disaster risk or the need for the management of it came into effect in 1979. Following the Tsunami in Colombia's Pacific Coast, the government implemented Law 9, which created the National Committee of Emergencies. Then in 1988, Law 46, National Disaster Preparedness and Response System, or SNPAD (in Spanish) was implemented, which called the government to involve both private and public agencies in the prevention and response to natural disasters, and rehabilitation of areas affected by disasters (Galvis, n.d.). This in itself was an important legal amendment because it now allowed for the inclusion of civil society groups and non-government agencies in mitigating disaster risk. It also created a high-level committee that worked alongside other government ministries from environment to defence, to develop frameworks to help to understand geographic and disaster risk vulnerability. Consequently, ten years later in 1998 under Decree 93, it mandated both national and local institutions to form detailed plans to address disasters. Under the National Environment system (SINA in Spanish) and SNPAD, the government has decentralized responsibilities to multiple stakeholders, while also formally including disaster risk management as a main priority for policy development (The World Bank, 2007). As a result in 2001, recognizing the need to encourage local authorities to invest in disaster mitigation, the national government passed law 715 allowing municipalities to spend part of their budget on disaster prevention and response (GFDRR 2010). Furthermore, the National Unit for Disaster Risk Management (UNGRD) was created, which actively monitors environmental changes and is responsible for reducing any environment-induced risk. At the international level, Colombia has also adopted the UN Framework Convention of Climate Change and the Kyoto protocol.

At the policy level, in the context of disaster-risk reduction it is clear that Colombia's governments are committed to understanding disaster-induced risk on a long-term basis. However, the case of Salgar demonstrates two areas of friction: policy related to disaster or environmental risks vis-à-vis policy related to displacement, and general policy vis-à-vis actual implementation.

"Damnificados" or "Desplazados"

Consequently, having outlined the basic environmental policy in Colombia regarding disaster-risk reduction is it also important to note the terminology used to refer to people displaced by environmental disasters or phenomena. In Colombia, when people are affected by natural or environmental disasters they are called "damnificados," the translation from Spanish to English can vary from "victims" to "survivors" if used as a noun, or "affected" or "damaged" if used as an adjective. In none of the articles, either from the media or reports from Salgar's City Hall, was the term "desplazados" or "displaced" used. In fact, the term was only used when talking about people from Salgar who had been displaced by violence prior to the landslide.[10]

This is important to note because it means that as such no precise data of displacement exists regarding any environmentally-induced movement because the word displacement is never used. Even in cases where there is clear displacement, as is the case of Armero, the words displacement or displaced still do not appear in any official document. In fact, Sebastian Rubiano Galvis addresses this point in his article regarding the protection of environmentally displaced people in Colombia, by stating that this clear division in terminology is a direct result of legal and political frameworks put in placed so that environmental displacement is clearly addressed in a different manner than conflict induced displacement. This will be addressed below when seeking to understand the legal challenges presented in the case of Salgar. Furthermore, it is also important to note that none of those that were interviewed in the framework of this paper used the term displaced, though they did note that families had to move and that as a result of the landslide they were now living in other cities or areas.

As a result of the divergence in terminology around "displaced people" and "damnificados," it is impossible to firmly claim exact numbers because the concept of "displacement as a result of environmental causes" does not exist in official government reports, literature, or data. Yet, international organizations such as IOM in Colombia have previously (in English press releases) used the word displaced to refer to people that migrated because of environmental causes. However, the word "damnificados" is predominantly only used in Spanish publications, which also happen to be in the majority or the only publications available on the subject matter.

[10] I will explore later in the paper, how people also displaced by violence, were further affected as a result of the landslide.

The Legal Challenge of conceptualizing environmental displacement in Colombia

Two main reasons: existing law related to conflict-induced displacement and geopolitics.

Law 387 in 1997, the government introduces a series of programs and policies to help address the needs of those internally displaced by conflict. Originally in Colombia displaced people, regardless of the reason, received help from government agencies dealing with emergency and/or disaster. As conflict began to increase and the number of people internally displaced by conflict rose:

Verdict T-025 in 2004, declared the state of displacement to be unconstitutional as it left populations in extreme conditions of vulnerability.

Law 1448 in 2011 named programs for people displaced by violence, including a specific note whereby if people are victims of natural disasters caused by actions of armed groups they can be counted as displaced. This was the only mention of natural disasters as a source of displacement.

Law 1523 in 2012 comes into effect, whereby it formally established the category of "damnificado" as someone that is in need of attention from the state. However, the law does not establish the type of attention required from the state.

Geopolitics: The hesitance for the government officially recognize environmental displacement is in part a consequence of geopolitical views on environmental migration. For governments like Colombia, framing environmentally induced displacement as forced displacement, can not only mean that it could be subjected to accepting people from nearby countries as refugees, but it can also affect other international relationships.

Source: Galvis, n.d.

Salgar Today

In the interviews one of the main themes that came across was that people essentially felt that after the media storm ended they were forgotten. In Colombia's complicated political landscape, with the media focusing on peace talks that could possibly end the civil war, efforts to rebuild or assist those displaced by environmental disasters are not always a priority. One of the main examples of this is the citation of locals of a bridge that was

finally built in Salgar that would help re-connect agricultural communities to the town of Salgar almost 6 months later, while in a similar town nearby the same bridge was built much quicker but for the purpose of a development project. Generally many of those affected that had income to leave or family in Medellin have not returned, while farmers (the majority of those that lived in this area) returned. Some measures around disaster risk reduction have also been put in place where residents undertook a training course of what to do in the case of another landslide or similar disaster ("En Salgar Antioquia hubo simulacro de evacuación para prevenir desastres—RCN Radio," 2016). Nevertheless, from progress reports it seems that the government is at least committed to re-building the community for those that want to return and those that stayed. Recent photos on the Soy Salgar Facebook group show rebuilding of communal areas such as parks, which many in the comments applauded as a sign that Salgar is returning to the city they once knew—whether this means the return of those displaced or not is a broader issue.

Conclusion

The case of displacement after the landslide in Salgar and, more generally, the case of displacement as a result of environmental factors in Colombia offers unique insight into how environmental migration can be indirectly addressed by a government. Furthermore, legal and policy-related challenges also increase the difficulty in understanding environmentally induced displacement from other perspectives, such as gender or socio-economic angles. The case of Colombia is also unique because it is a country that is already under great financial strain from addressing conflict-induced displacement (Carrillo, 2009). Meanwhile, increasing factors related to climate change and general geographic vulnerability mean that cases like Salgar will continue to occur, but the country will face varying degrees of environmental changes which may result in displacement. Essentially, Colombia's displacement policy and response will continue to be at a crossroads, because the current conceptualization limits the development of any guiding frameworks, research, or even policy regarding environmental migration.

BIBLIOGRAPHY

Press

1985: Volcano kills thousands in Colombia. (1985, November 13). *BBC*. [online] Available at: http://news.bbc.co.uk/onthisday/hi/dates/stories/november/13/newsid_2539000/2539731.stm [Accessed 10 May 2016], [no pagination].

1999: Colombia quake leaves hundreds dead. (1999, January 25). *BBC*. [online] Available at: http://news.bbc.co.uk/onthisday/hi/dates/stories/january/25/newsid_2506000/2506407.stm [Accessed 10 May 2016], [no pagination].

Aumenta a 47 el número de muertos por desbordamiento de río en Salgar. (n.d.). *Noticias Caracol*. 19 May 2015. [online] Available at: http://www.bluradio.com/99639/nueve-muertos-dejo-emergencia-invernal-en-salgar-antioquia [Accessed 10 May 2016], [no pagination].

Crecen los afectados por Avalancha en Salgar. (2015, May 20). *www.elmundo.com*. [online] Available at: http://www.elmundo.com/portal/noticias/territorio/crecen_los_afectados_por_avalancha_en_salgar.php#.VzG9KRV973R [Accessed 10 May 2016], [no pagination].

Damnificados por avalancha en Antioquia serán beneficiarios del programa de viviendas gratis. (2015, May 18). *ElEspectador*. [online] Available at: http://www.elespectador.com/noticias/nacional/damnificados-avalancha-antioquia-seran-beneficiarios-de-articulo-561177 [Accessed 7 May 2016], [no pagination].

Desplazados de Salgar esperan vivienda de la que son beneficiarios. (2016, February 28). *Teleantioquia*. [online] Available at: http://www.teleantioquia.cov/34742-27284.html [Accessed 7 May 2016], [no pagination].

El drama de los niños afectados por la tragedia en Salgar. (2015, May 20). *Noticias Caracol*. [online] Available at http://www.noticiascaracol.com/colombia/el-drama-de-los-ninos-afectados-por-la-tragedia-en-salgar [Accessed 7 May 2016], [no pagination].

En Salgar Antioquia hubo simulacro de evacuación para prevenir desastres—RCN Radio. (2016, April 23). *RCN Radio*. [online] Available at: http://www.rcnradio.com/locales/salgar-antioquia-hubo-simulacro-evacuacion-prevenir-desastres/ [Accessed 7 May 2016], [no pagination].

Falsa alarma sobre nueva avalancha causó pánico en Salgar, Antioquia. (2015, May 20). *El Espectador*. [online] Available at: http://www.elespectador.com/noticias/nacional/falsa-alarma-sobre-nueva-avalancha-causo-panico-salgar-articulo-561528 [Accessed 7 May 2016], [no pagination].

Gobierno anunció paquete de ayudas para damnificados en Salgar, Antioquia. (2015, May 18). *Noticias RCN*. [online] Accessed to: http://www.noticiasrcn.com/nacional-regiones/gobierno-anuncio-paquete-ayudas-damnificados-salgar-antioquia [Accessed 10 May 2016], [no pagination].

Gomez M, M. A. (n.d.). Aldea La Margarita. *www.elcolombiano.com*. [online] Available at: http://www.elcolombiano.com/opinion/columnistas/aldea-la-margarita-MB2210439 [Accessed 10 May 2016], [no pagination].

Hasta 12 años de cárcel podrían pagar falsos damnificados en Salgar, Antioquia. (2015, May 25). *El Espectador*. [online] Available at: http://www.elespectador.com/noticias/nacional/hasta-12-anos-de-carcel-podrian-pagar-falsos-damnificad-articulo-562478 [Accessed 10 May 2016], [no pagination].

IOM Steps Up Support to Victims of Deadly Floods and Landslides in Colombia. (2011, May 6).*IOM*.[online] Available at: from https://www.iom.int/news/iom-steps-support-victims-deadly-floods-and-landslides-colombia [Accessed 10 May 2016], [no pagination].

No necesitan ayudas humanitarias en Salgar: Gobernación. (2015, May 19). *Noticias Caracol*. Medellin. [online] Available at: http://www.noticiascaracol.com/antioquia/medellin/asi-puede-ayudar-los-damnificados-de-salgar [Accessed 10 May 2016], [no pagination].

Restrepo, M. M. (2015, November 4). El abandono de Salgar. *Minuto30.com*. [online] Available at: http://www.minuto30.com/el-abandono-de-salgar/404030/ [Accessed 10 May 2016], [no pagination].

Se derrumbó vía principal de Salgar, Antioquia. (2015, May 21). *El Espectador*. Available at: http://www.elespectador.com/noticias/nacional/se-derrumbo-via-principal-de-salgar-antioquia-articulo-561697 [Accessed 10 May 2016], [no pagination].

Tragedia en Antioquia: Avalancha de quebrada arrasó un corregimiento en Puerto Salgar y se reportan 16 muertos y 30 heridos. (2015, May 18). *Noticias Principales de Colombia Radio Santa Fe 1070 Am*. [online] Available at: http://www.radiosantafe.com/2015/05/18/tragedia-en-antioquia-avalancha-de-quebrada-arraso-un-corregimiento-en-puerto-salgar-y-se-reportan-16-muertos-y-30-heridos/ [Accessed 10 May 2016], [no pagination].

Tragedia en Salgar: Cada familia, con su desgracia a cuestas. (2015, May 29). *Semanario Voz*. [online] Available at: http://www.semanariovoz.com/2015/05/29/tragedia-en-salgar-cada-familia-con-su-desgracia-a-cuestas/ [Accessed 10 May 2016], [no pagination].

Books/Reports/Journals

Acuña, P. (2014, April 22). Colombia natural disaster risk high due to climate change; World Food Program. *Colombiareports.com*. [online] Available at: http://colombiareports.com/colombia-natural-disaster-risk-high-due-climate-change-world-food-program/ [Accessed 10 May 2016], [no pagination].

Avendaño Castro, W. R., & Aguilar Rodriguez, D. E. (2014). Geopolitica y Media Ambiente: Una Mirada a la Problematica De los Desplazados Ambientales. *Investigacion & Desarollo*, 22(2), 283-308.

Bankoff, G., Frerks, G., & Hilhorst, T. (Eds.). (2004). *Mapping vulnerability: disasters, development, and people*. London; Sterling, VA: Earthscan Publications.

Blaikie, P. M. (1996). *Vulnerabilidad: el entorno social, político y económico de los desastres*. Santafé de Bogotá: Tercer Mundo Editores.

Carrillo, A. C. (2009). Internal displacement in Colombia: humanitarian, economic and social consequences in urban settings and current challenges. *International Review of the Red Cross*, *91*(875), 527.

CEPAL. (1999). *El Terremoto de Enero de 1999 en Colombia: Impacto socioeconomico del desastre en la zona del Eje Cafetero*. [online] Available at: http://www.cepal.org/publicaciones/xml/6/10136/colombia-1.pdf [Accessed 7 May 2016], [no pagination].

COHA. (2015, February 2). Colombia's "Invisible Crisis": Internally Displaced Persons. [online] Available at: http://www.coha.org/colombias-invisible-crisis-internally-displaced-persons/ [Accessed 7 May 2016], [no pagination].

Colombia to reduce its vulnerability to natural disasters with IDB support. (2011, November 9). [online] Available at: http://www.iadb.org/en/news/news-releases/2011-11-09/natural-disasters-loan-colombia,9664.html [Accessed 10 May 2016], [no pagination].

Departamento Administrativo Nacional de Estadística (DANE). [online] Available at: http://www.dane.gov.co/index.php [Accessed 10 May 2016], [no pagination].

Desjarlais, R. (1996). *World Mental Health: Problems and Priorities in Low-income Countries*. Oxford University Press.

Duran Diaz, B. H. (n.d.). Información Avenida Torrencial Salgar. [email].

Food Security, Disasters and Climate Change in the Andean Region: Factors contributing to vulnerability to food insecurity relative to disaster risk and climate change. (2014). *World Food Programme*. [online] Available at: http://documents.wfp.org/stellent/groups/public/documents/communications/wfp264410.pdf [Accessed 10 May 2016], [no pagination].

Galvis, S. R. (n.d.). La Proteccion del Desplazamiento Forzado por desastres ambientales en Colombia: Una Perspectiva de Derechos Humanos. In J. F. Beltrao, J. C. Monteiro de Brito Filho, E. Pajares, F. Paredes, & Y. Zuniga (Eds.), *Derechos Humanos de los Grupos Vulnerables*. Universitat Pompeu Fabra. [online] Available at: https://www.upf.edu/dhes-alfa/materiales/res/dhgv_pdf/DHGV_Manual.431-476.pdf [Accessed 10 May 2016], [no pagination].

GFDRR. (2014). *Country Program Update. Colombia*.[online] Available at: https://www.gfdrr.org/sites/gfdrr/files/region/CO.pdf [Accessed 10 May 2016], pp. 1-4.

GFDRR and The World Bank. (2010). *Disaster Risk Management in Latin America and the Caribbean Region: GFDRR Country Notes. Colombia.*[online] Available at: http://www.gfdrr.org/sites/gfdrr.org/files/DRM_LAC_CountryPrograms.pdf [Accessed 10 May 2016], pp.1-216.

Jaramillo Marin, J. (2007). La politica pública sobre atención a población desplazada en Colombia. Emergencia, constitución y crisis de un campo de prácticas discursivas. *Tabula Rasa*, 6. Available at: http://www.redalyc.org/articulo.oa?id=39600613 [Accessed 10 May 2016].

McMichael, A. J., McMichael, C. E., Berry, H. L., & Bowen, K. (2010). Climate- Related Displacement: Health Risks and Responses. In J. McAdam (Ed.), *Climate change and displacement: multidisciplinary perspectives* (pp. 191–219). Oxford; Portland: Hart Pub.

Norwegian Refugee Council and Internal Displacement Monitoring Centre. (2014). *Global Overview 2014: People internally displaced by conflict and violence*. [online] Available at: http://www.internal-displacement.org/assets/publications/2014/201405-global-overview-2014-en.pdf [Accessed 10 May 2016].

Planeación y ejecución. (n.d.). [online] Available at: from http://www.salgar-antioquia.gov.co/Informes_empalme.shtml [Accessed 10 May 2016], [no pagination].

Registraduría Nacional del Estado Civil - Damnificados en Salgar, Antioquia podrán adelantar trámites gratuitos de identificación ante la Registraduría. (2015). [online] Available at: http://www.registraduria.gov.co/Damnificados-en-Salgar-Antioquia.html [Accessed 10 May 2016], [no pagination].

Renaud, F. G., Dun, O., Warner, K., & Bogardi, J. (2011). A Decision Framework for Environmentally Induced Migration: Framework for environmentally induced migration. *International Migration*, *49*, e5–e29.

The World Bank. (2007). *Environmental Priorities and Poverty Reduction: A country Environmental Analysis for Colombia*. [online] Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/6700/405210Envopri0101OFFICIALoUSEoONLY1.pdf?sequence=1&isAllowed=y [Accessed 10 May 2016], [no pagination].

UNGRD, MiniVivienda, DPS, Governacion de Antioquia, Municipio de Salgar. (2016). *Seguimineto, Monitoreo y Evaluacion al Plan De Accion Especifico: Un Nuevo Comienzo para Salgar 2016-2019* (No. 10). Salgar, Antioquia. [online] Available at: http://salgar-antioquia.gov.co/apc-aa-files/32373762643634663436531616536 34/plan-de-desarrollo-2016-2019-salgar.pdf [Accessed 10 May 2016], [no pagination].

Unidad Nacional para la Gestión del Riesgo de Desastres. (n.d.). [online] Available at: http://portal.gestiondelriesgo.gov.co/ [Accessed 10 May 2016], [no pagination].

Protegiendo La Poblacion Desplazada Colombiana: El Papel De las Autoridades Locales Resumen. (2008). *Universidad de los Andes, Proyecto Brookings-Bern.* [online] Available at: https://www.brookings.edu/wp-content/uploads/2016/06/07_colombia_Spa.pdf [Accessed 10 May 2016], pp. 1-87.

Zetter, R. (2010). Protecting People Displaced by Climate Change: Some Conceptual Challenges. In J. McAdam (Ed.), *Climate change and displacement: multidisciplinary perspectives* (pp. 131–150). Oxford; Portland, Or: Hart Pub.

Websites

2015 Salgar Colombia landslide - OpenStreetMap Wiki. (n.d.). [online] Available at http://wiki.openstreetmap.org/wiki/2015_Salgar_Colombia_landslide [Accessed 10 May 2016], [no pagination].

Estudio sobre la Distribución Espacial de la Población en Colombia. (2003). *United Nations Publications and CEPAL.*[online] Available at: http://www.cepal.org/es [Accessed 10 May 2016], [no pagination].

Interviews

Interview with Cuadros Usma, person affected by disaster, April 12, 2016 by Skype.

Interview with Edison Restrepo, person affected, on April 22, 2016 by Skype.

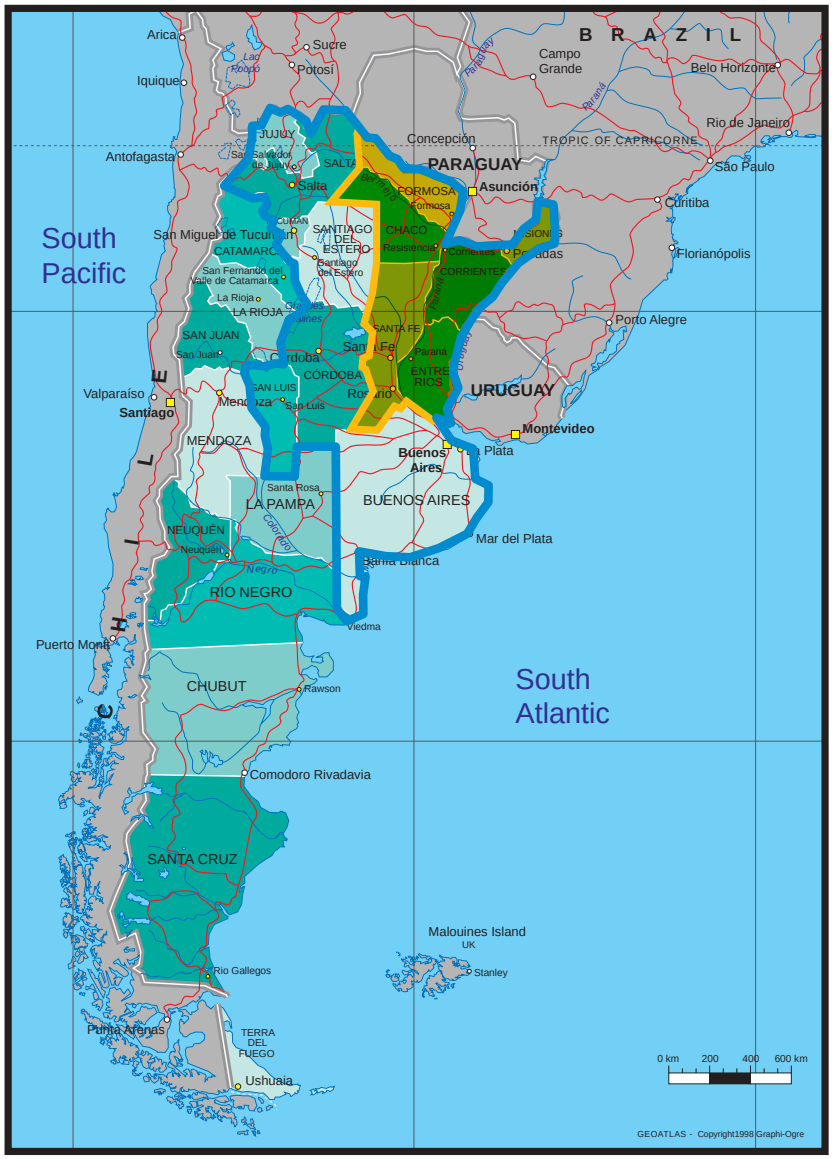
Interview with Johnson Hurtado, person affected, on May 1, 2016 by Skype.

El Niño floods in Argentina

A story of displacement and vulnerability

Tamara Ulla

Image 1. Map depicting the area of the Río de la Plata Basin (blue) and the area affected by flooding in December 2015 (orange)



Source: designed by author on the basis of a map of the Ministry of Education of Argentina, 2015

"They are the ones who are well, and we are the ones suffering. Our heart is wounded".

Javier, fisherman and head of household

Javier, a fisherman and head of household from the Argentinean city of Concordia in the province of Entre Ríos had to leave his house and all his belongings behind when the Uruguay river level increased dramatically due to heavy rains and flooded the entire city. Like him Yanina, a single mother with two children and no stable job, had to be evacuated into a local primary school with was left of her possessions (La Izquierda Diario, 2016). Javier and Yanina are just two of the thousands inhabitants of the Argentine riverside who were displaced during the floods of December 2015.

Due to their waterside location, the affected provinces, namely Chaco, Corrientes, Entre Ríos, Formosa, Misiones and Santa Fe, are familiarized with the seasonal rise in the river level and how to respond to it. However, during December the rivers reached historical levels and rainfall surpassed its habitual amounts affecting not only coastal and more vulnerable areas but also spreading to the city centers and middle class neighborhoods where people thought they could never be impacted by flooding (Lozano, 2016).

Javier's testimony emphasizes the contrast of two realities: the idea of a *they* (the wealthiest) that aren't affected by events such as floods, and a *we* (the poorest) that suffer the worst consequences because they are more vulnerable to the risks these events suppose. This underscores the relevance of socio-economical vulnerability in influencing both the propensity to be exposed to climate hazards and the capacity to cope or adapt to them (Garschagen & Romero-Lankao, 2015; Qin, Romero-Lankao, Hardoy, & Rosas-Huerta, 2015; Romero-Lankao et al., 2014).

The fact that many people in Concordia and the region refused to leave their homes because they feared being robbed (El Explorador Producciones, 2015) or because they didn't have anywhere safer to go stresses the importance of considering the links between demographic and socio-economic factors and the ability to move as a means to cope with natural events. In this sense, it appears that communities with prevalence of certain demographic groups (i.e. the elders), with higher rates of people under the poverty line or depicting more unemployment rates, just to name a few factors, have a higher propensity to be affected by being less able to move even if they wish to do so. This situation magnifies their vulnerability in many ways, especially because their *immobility* exposes them to higher risks,

such as potential death, injury and disease (Black, Arnell, Adger, Thomas, & Geddes, 2013; Black & Collyer, 2014).

This paper is centered in the analysis of displacement as caused by flooding in the Argentinian riverside starting in December 2015. The remainder of the paper is organized as follows: it begins by analyzing the environmental and social context of Argentina and by assessing the country's vulnerabilities to environmental disasters (Part II). It then examines the characteristics of the event (Part III) and focuses on the impacts and displacement process (Part IV) to finally conclude with some lessons learnt and policy implications.

Environmental And Social Context Of Argentina

Argentina, a country marked by flooding

The planet has gone through a process of rapid urbanization over the past six decades. In Latin America[1] about 80 percent of the region's population lives in cities, making it the world's most urbanized region (United Nations, Department of Economic and Social Affairs, & Population Division, 2014). It has been estimated that 38 percent of the entire Latin America's population is at risk of falling into poverty (UNDP, 2014).

From 1950 to 2015, there has been an upward trend in the frequency of large disasters arising from natural events in general and weather-related events in particular. Most specifically, in this climate scenario the region has registered during the past years devastating floods in urban areas associated with severe storms. (Bertoni, 2005; Satterthwaite, 2007).

Extending over an area of approximately 3,100,000 km^2, the Río de la Plata Basin is one of the largest in the world covering territories in five countries: Argentina, Bolivia, Brazil, Paraguay, and Uruguay. The major rivers of the basin, namely the Paraná, Uruguay and Paraguay rivers, drain into the La Plata River, the widest river in the world. Over its extended territory, the basin concentrates more than 95 million people. In Argentina, the Río de la Plata Basin extends over the provinces of Buenos Aires, Chaco, Córdoba, Corrientes, Entre Ríos, Jujuy, Formosa, Misiones, Salta, San Luis, Santa Fe, Santiago del Estero and Tucumán (see Image 1), and concentrates 77

[1] Latin America is referred to as the territories of the American continent where a Romance language derived predominates (Spanish, Portuguese, and French), covering twenty sovereign states and several territories and dependencies from the northern border of Mexico to the southern tip of Chile and Argentina.

per cent of the country's total population (Casco, Natenzon, Basterra, & Neiff, 2011).

Since it became an independent nation in the nineteenth century, flooding has repeatedly affected the country, which has been accentuated with the urbanization process and population growth over the years. Since the early 1800s weather related events, predominantly floods and heavy rains, together with rises in the river levels have particularly affected the population of the northeastern provinces, specifically Chaco, Corrientes, Entre Ríos, Formosa, Misiones and Santa Fe (usually referred to as the "Littoral" region) (Casco et al., 2011).

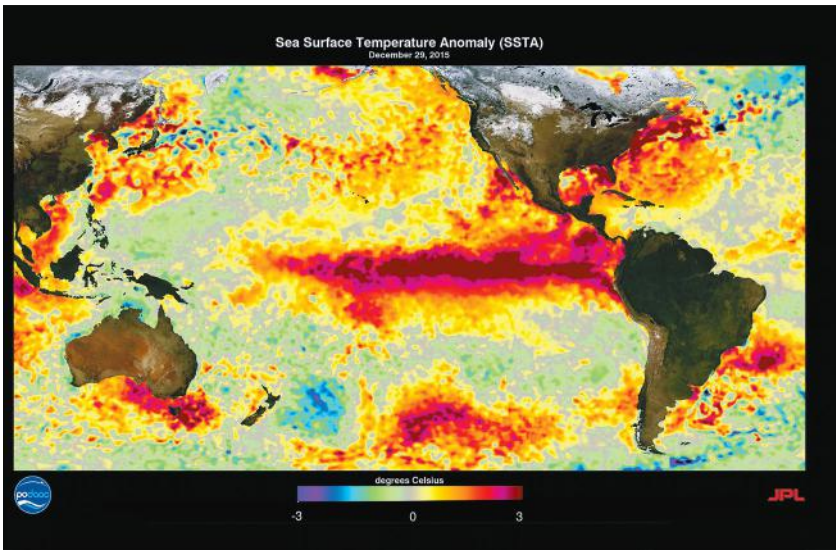
In almost all the Littoral region, annual rainfall has increased over the second half of the twentieth century, and precipitations have become more extreme in their intensity and frequency. Scientific modeling studies focused on the tendencies for the twenty-first century depict that in mid-term and long-term scenarios the regional average rainfall will increase about 10 per cent, with a high tendency for extreme precipitation (Centro de Investigaciones del Mar y la Atmósfera (CIMA), 2011). Of we consider the region's high demographic density and economic relevance, such models allow us to expect higher exposure to risks related to flooding and heavy rains together with an increased propensity for human displacement.

Despite the historical trends and future projections, public policies over the years have not yet succeeded in achieving a response to the planning deficiencies of water draining systems or a comprehensive environmental management and forecasting emergency plan. Instead, most of the actions and governmental responses to flooding events and severe rains in this region of high climate and hydrological variability have had an emergency-response type of nature (Bertoni, 2005; Casco et al., 2011; Natenzon, 2015).

Social, economic and infrastructure vulnerability

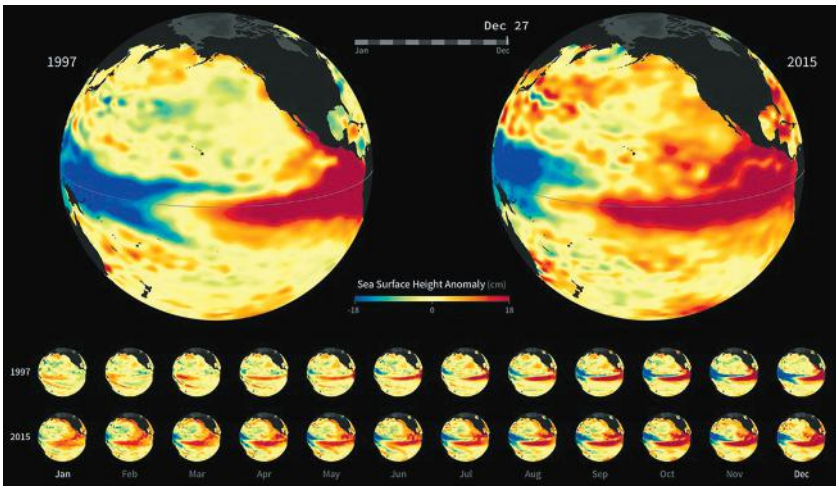
The interaction between environmental events and social activities over time has outlined a set of social and economic aspects contributing to the Littoral region's vulnerability to weather-related events in general and flooding in particular. These vulnerabilities have arisen predominantly due to natural resources use focused on short-term economic gains (for instance, soybean crop with high economic performance) without taking into account long-term effects such as land erosion affecting the soil's capacity to absorb water. Other aspects contributing to the increase in the region's vulnerability are the unplanned growth of human settlements and

Image 2. Sea Surface Temperature rise in December 2015



Source: NASA's Jet Propulsion Laboratory, 2015.

Image 3. Sea Surface Height Anomaly for 2015 compared to 1997



Source: NASA/JPL OSTM, Jason, 2015

their location on floodable or hazardous areas, and the lack of risk analysis in many infrastructure projects (Celis, 2009).

In terms of cumulative damage, floods are the type of natural disaster that has generated the greatest amount of losses in the country and especially the Littoral region. They are type of event that has generated the highest number of affected people representing 95.8 per cent of total evacuees in the country by all kinds of disasters between 1944 and 1915. Over the same period, floods have also had significant impacts in infrastructure losses, causing the waterlog and interruption of road networks and leaving over half a million people homeless (Guha-Sapir, Below, & Hoyois, 2016). Severe impacts have also be seen in terms of agricultural yield, both in large-scale and small-scale production, generating millions in agricultural losses and affecting 1.6 million cattle (Casco et al., 2011; Celis, 2009).

The Event

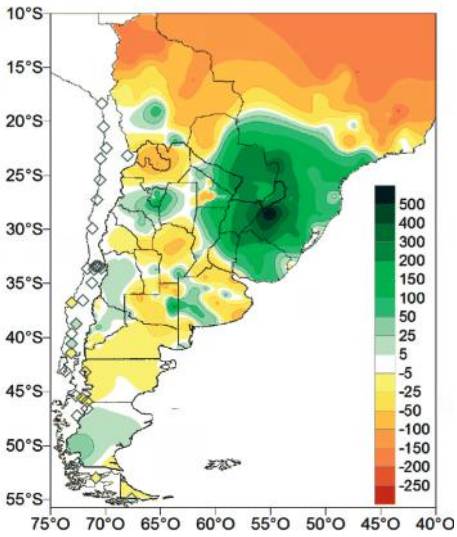
El Niño Reaching South America

In December 2015, above average rains driven by a strong El Niño have fallen in widespread river catchment areas of the Río de la Plata Basin and dramatically increased river levels in Paraguay, Argentina, Uruguay and Brazil, which triggered severe flooding involving three major rivers running through the four countries, namely the Uruguay, Paraguay and Paraná rivers, together with their tributaries. (Davies, 2016a).

El Niño is the warm phase the "El Niño-Southern Oscillation" climate phenomenon (commonly called ENSO). It is caused by a warming of the ocean surface, or above-average sea surface temperatures, in the central and eastern tropical Pacific Ocean (Image 2). The low-level surface winds, which normally blow from east to west along the equator ("easterly winds"), instead weaken or, in some cases, start blowing in the other direction (from west to east or "westerly winds") (L'Heureux, 2014). This produces shifts in water levels making warmer water pools to move in an eastward direction and eventually reach the South American Coast. (Department of Atmospheric Sciences (DAS), 2010).

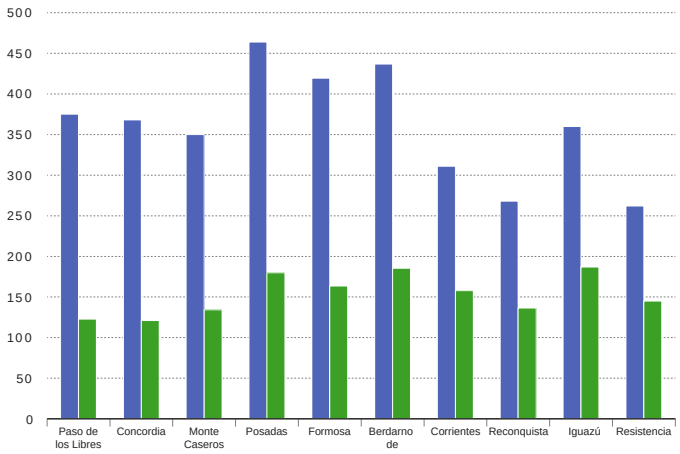
El Niño related events have been occurring for thousands of years in irregular intervals of two and up to seven years, peaking typically during the

Image 4. Rainfall deviation from normal (1981-2010) in December 2015, expressed in millimeters (mm)



Source: Skansi, 2015

Graph 1. Cumulative rainfall in December 2015 (blue) in contrast with average values for December (green)



Source: Compiled by author from Repetto, 2015.

last months of the year and Christmas time in particular, hence explaining the phenomenon's name (United Nations News Service Sections, 2016).[2]

In South America, El Niño creates favorable conditions for storms to develop affecting weather patterns and bringing heavy rains to areas of Argentina, Bolivia, Brazil, Chile, Peru and Uruguay (United Nations Environmental Programme & Economic Commission for Latin America and the Caribbean (ECLAC), 2010).

According to the World Meteorological Organization (WMO) Secretary General Petteri Taalas the rise of surface temperatures above average in late 2015 provided evidence that the 2015-2016 El Niño is one of the strongest on record and one of the most powerful, comparable with the 1997-1998 events which have been regarded until 2015 as the largest of such event ever registered (Nullis, 2016).

Specialists from NASA's Jet Propulsion Laboratory (JPL) project have pointed out that even when the degree of irregularity in water height was more intense in 1997, in 2015 the size of the area showing sea level shifts was larger (as can be seen in Image 3), which could mean that the topmost effects of this El Niño have not yet be seen (Buis, 2015).

Affected regions

As was forecasted by the Argentine National Weather Service (Skansi, 2015a), the El Niño phenomenon reached South America at the end 2015. In the particular case of Argentina, it mostly affected riverside areas in the northeastern part of the country (for a better perspective of the affected area, refer to Image 1).

During December 2015, high rainfall levels (over 100 millimeters (mm) of cumulative rains) were registered in the central and northern parts of Argentina, where the provinces of Misiones, Corrientes and Entre Ríos depicted the highest levels. During this period, monthly precipitations reached historical highs in many administrative regions of the aforementioned provinces, as can be seen from Image 4 below.

The highest values were in Bernardo de Irigoyen (Misiones), Posadas (Misiones), Concordia (Entre Ríos), Oberá (Misiones), Paso de los Libres (Corrientes) and Formosa (Formosa). A better appreciation of the change

[2] "El Niño" comes from the Spanish *child*, and can also refer to the Christ Child (baby Jesus).

in rainfall from its normal historical values for the same time of year can be seen in Graph 1 below (Skansi, 2015b).

What made this event to be called "one of the most complex floods in [Argentine] history" (Argentine Red Cross, 2016) was not only the amount of daily rainfall that surpassed the 75-100mm a day, but also the presence of several consecutive days over a monthly period with rain values greater than 50 mm a day. In December, the frequency of days with non-stop rain reached the 18 days in Oberá (Misiones), 17 days in Bernardo de Irigoyen (Misiones) and 14 days in Mercedes (Corrientes), also depicting higher values than the historical average (Skansi, 2015b).

According to a study conducted by the Agronomy School at the University of Buenos Aires (UBA), the excessive amounts of rainfall registered in the northeastern parts of the country during December surpassed the soil's water absorption capacity worsening the impacts of severe rains, water-logging and river overflows (Repetto, 2015).

Impacts and Displacement

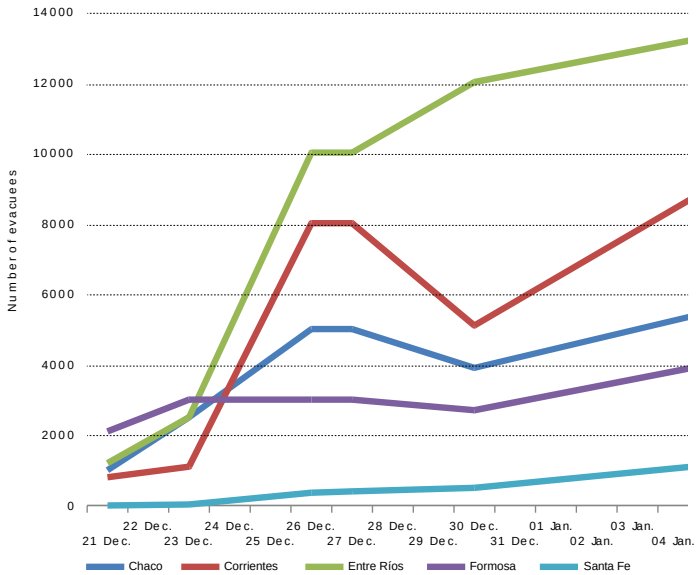
Economic and health impacts

Economic losses

Full loss assessments and information regarding damage to structures or loss of dwellings have been difficult to carry out by civil defense and relief agencies, as stated by a report on their Floods Emergency Plan of Action for Argentina by the IFRC. Even though there is still uncertainty about the amount of hectares that laid under water and on how severe the damage on crops and animals was, analysts do not hesitate to describe this as the worst flooding in 50 years (Davies, 2016a).

Given its relevance to the country's exports and its weight in the balance of payments, it is inevitable to turn one's attention to soybean crops. Consultancy agency "Oil World" has estimated that the rains and floods that affected the country could imply the loss of 3 million tons of soybean production, which represent around 1000 million dollars. The area of the affected region also coincides with some of the major agricultural provinces of the country with high economic and productive significance. The accumulation of water has waterlogged roads and large land surfaces, affecting many agricultural establishments and causing the loss of

Graph 2. Number of evacuees by province, between December 21st and January 7th



Source: Compiled by author based on Argentine Red Cross, 2016; Argentine White Helmets Knowledge Management Team, 2015a, 2015b, 2016a, 2016b

livestock raised and a decline in the quality and quantity of crops harvested. Additionally, thousands of hectares have already been considered to have suffered irreversible damage (Grandinetti, 2015; Todo Noticias (TN), 2016; TV Pública Argentina, 2015).

Losses in terms of housing and urban infrastructure have been hard to measure. In addition to structural damages in houses, some of the persisting impacts include problems in the provision of services such as electricity and potable water. By the end of January, 100,000 people were still out potable water in their homes (El Explorador Producciones, 2015; Gualeguaychú Correspondent, 2016).

Health impacts

Cases of dengue had been identified before the December 2015 events, but the rains and water accumulation decisively reinforced the outbreak and affected the measures taken to combat a potential epidemic. As explained by the Health Minister Jorge Lemus, the rains not only have multiplied the water spaced where mosquitoes breed but have also washed out fumigations

against mosquito from the soils (Argentine White Helmets Knowledge Management Team, 2016a).

As of February, the Ministry of Health had reported a total of 4,516 cases of dengue, nine cases of chikungunya, and ten cases of zika, with Formosa, Corrientes, Santa Fe and Entre Ríos being the most affected provinces (Argentine Red Cross, 2016).

Affected People and Displaced Population

An Increasing Number of Displaced Population Over Time

At its strongest point, flooding caused by El Niño had forced over 150,000 people from their homes in Argentina, Brazil, Paraguay and Uruguay (Davies, 2016b).

Parts of Asunción, the capital of Paraguay, have been experiencing flooding since November 2015. By mid-December, the levels of the Paraguay River had reached their highest point of the year (6.5 meters, although it then continued to increase), affecting around 6,000 families in the first weeks of December (Davies, 2015).

An increase in rainfall and river levels upstream the Río de la Plata Basin began to affect the northern parts of the Argentine territory by December 20th. The situation was exacerbated by increased water flows coming from Paraguay where, by that time of December, 72,000 evacuees were recorded (Argentine White Helmets Knowledge Management Team, 2015a). On December 21st, the Paraná river surpassed its normal levels in Chaco, and in Concordia (Entre Ríos), as confirmed by spokespersons of the Civil Defense agency, the Uruguay river had exceeded the level set for evacuation[3] by 0.5 meters (Télam, 2015a). Consequently, the local government of Concordia declared the state of emergency on December 22nd, while the Province of Entre Ríos did the same on the 23rd (Argentine Red Cross, 2016).

By December 23rd the situation worsened in Entre Rios where heavy rainfall and the overflowing of the Uruguay River caused flooding in several riverside areas and cut numerous roads and bridges. Meanwhile, the levels reached by the Paraná, Uruguay and Paraguay rivers with respect to their evacuation levels continued to increase day by day (Télam, 2015c).

[3] The emergency level defined by governmental agencies at which an evacuation is necessary.

By this time of the month, floods of the Parana, Paraguay and Uruguay rivers had displaced at least 9,000 people from their homes in the Argentine provinces of Chaco, Corrientes, Entre Rios, Formosa and Santa Fe (Todo Noticias (TN), 2015).

In the strongest point of the disaster, the Uruguay River would reach its highest point in 50 years, which was close to 16 meters above normal. This caused the flooding of surrounding areas and affected around a quarter of the population in Concordia (Entre Ríos), the most impacted city (Argentine Red Cross, 2016).

On the 26th, at the peak of the flood, more than 20 thousand people were reported to be displaced[4] in the aforementioned provinces, and at least two killed as a consequence of the severe storms (Argentine White Helmets Knowledge Management Team, 2015a).

Although by December 27th the Parana River began to decrease its level, by that time many cities of the region were still in emergency state. This situation was reflected by the thousands of displaced people still unable to return to their homes in the midst of the evacuation process (Argentine White Helmets Knowledge Management Team, 2015a).

The number of affected households and people forced to leave their homes continued to increase with time. The rainfall stopped and the level of the rivers began to normalize only after the first week of January, taking 41 days for the flooding to start to subside (Argentine Red Cross, 2016).

In consequence, by this time, there were over 36,000 people reported evacuated and 76,000 whose properties reported to be affected in all the Littoral region (Argentine Red Cross, 2016; Argentine White Helmets Knowledge Management Team, 2016a; Bolado, 2016).

In addition to the displaced population in its own territory, Argentina kept continuous dialog with its neighbor countries that were also suffering the impacts of El Niño. Although the majority of coordination occurred particularly due to the dengue outbreak, coordination also occurred in terms of human displacement. By December 27th, the city of Alberdi in Paraguay, close to the frontier with the argentine province of Formosa, was facing the imminent danger of the collapse of the wall that protected the city from being flooded by the Paraguay River. Authorities from Formosa and Alberdi (Paraguay) established joint action in order to move 7,000 inhabitants of the border city of Alberdi to Formosa (Página/12, 2016).

[4] This includes both self-evacuated people who looked for shelter at friends' or relatives' houses, and those evacuated by governmental entities in collective centers.

Different behaviors among the displaced

In contrast to previous flooding events of similar characteristics, the emergency situation lived in Argentina during December 2015 and continuing in the first months of 2016 differed especially due to its duration. Riverside provinces such as the affected are used to tackling the effects of overflowing rivers, though in this case the intensity and duration of this particular flooding impacted the region differently particularly in terms of longer periods of displacement and newly affected areas.

Over the five main impacted provinces, at least three different behaviors were identified among the displaced population. Although this categorization is based on distinctive displacement attitudes related to the level of risk both suffered and perceived by each group, it can also be linked to a geographical aspect that is ultimately connected with the socioeconomic characteristics of the population.

A first group is comprised by those that are affected by flooding year after year due to the location of their residence in lower or more floodable terrains. Left with fewer accommodation choices, this location appears to be a reflection of this group's lower socio-economic and infrastructural conditions and, hence, higher vulnerability levels. Despite this, people in this group acknowledge the risks of their own living situation up to a high degree leading them to know the river's behavior and to react with a certain level of anticipation. The fact that they have experienced repeated floods over the years has made them develop their own "displacement strategy" launched every time a new flood occurs. Based primarily on social links, they tend to prefer self-evacuation at friends' or relatives' houses, although in some areas of the country people even build their own temporary housing as a response to the emergency (Bolado, 2016).

The city of Clorinda, situated 167 kilometers north of the city of Formosa, depicts a clear example of the abovementioned. Located by the coast of Pilcomayo river it faces the effects of overflows year after year. Since flooding is recurrent on an annual basis, the local population has become used to tackling the consequences by assembling their own temporary shelters that they usually locate by the verge of a national road (see Image 6) (Bolado, 2016).

However, the prolonged nature of December's floods affected the dynamic of this population. On a regular year, they would stay at their provisional shelters only for over a month, two at most. The lengthy duration of this floods together with their regular flooding season caused them to be unable

Image 5. Temporary shelters by the verges of National Route 11 in Clorinda, Formosa

Source: ADRA Argentina, n.d; © Elián Giaccarini

to return home and confined by the verges of National Route 11 for over five months. By February 2016, 600 families remained living there (Argentine Red Cross, 2016; Bolado, 2016).

A second identified group includes those who were not usually affected or had never been affected by flooding. Among this group, which was particularly large in the city of Concordia, risk perception was very different to that on the first group and the way they faced loss and displacement had more profound psychological impacts on them. Those who had somewhere safe to go, such a family member o friend's house, were generally self-evacuated, while those with no safe alternatives were evacuated in provisional shelters by the organizations in charge of the humanitarian response (Bolado, 2016; Lozano, 2016).

During the December 2015 events, river levels reached 15.8 meters turning Concordia into the urban area that saw the highest amounts of displaced and affected population with a total of almost 14,000 displaced people and 37 collective emergency shelters.

Despite the forecasts of the National Weather Service, the well-known potential threats of El Niño and the floods and displacements happening upstream, political measures only arrived together with the humanitarian response once the disaster had already flooded the city (Skansi, 2015a).

A third and last group was composed by populations that got trapped in isolated areas who suffered not only the impacts of the floods in their

Image 6. Isolated people in Concordia during Christmas

Source: Diario La Nación, 2015; © Hernan Zenteno
Note: Confined on the first floor of their home, Alicia Fasano and her mother wait for her husband and daughters, who "descended" into the water to get food and cleaning supplies. They had lived in Concordia for 24 years and this is the first time they suffered a flood.

homes, but also the lack of food and medicines as the days went by and the waterlogged roads didn't subside. This last group required special logistics in terms of their humanitarian response, such as assistance provision by air, as was the case for 50 families isolated in Itacurubí and Batel Araujo, in Corrientes (Argentine White Helmets Knowledge Management Team, 2015a).

Humanitarian response

At the peak of the flooding in late December 2015 a state of emergency was declared in order to enable timely access to water, health and social benefits during the time the disaster lasted. To that end, on December 26th the argentine Chief of Staff, Marcos Peña, announced the creation of a Crisis Committee to asses the situation (Diario La Nación, 2015).

In addition, the Federal Emergency System (SIFEM), a body created in 1999 as a warning and contingency system that had not been used since

then, was revitalized. As part of its renewed competencies, the SIFEM established two operating centers, one in the neighbor cities of Resistencia (Province of Chaco) and Corrientes, and another in the neighbor cities of Santa Fe and Paraná (Entre Ríos) in order to effectively coordinate the assistance to people both affected and displaced by the flood (El Independiente, 2015; Télam, 2015d).

The emergency assistance was the result of a dense network of actors involved in the logistics, which included local, provincial and national governmental agencies, the army and non-governmental organizations comprising local volunteer firemen associations, the Argentine Red Cross, and national NGOs (Argentine White Helmets Knowledge Management Team, 2015a).

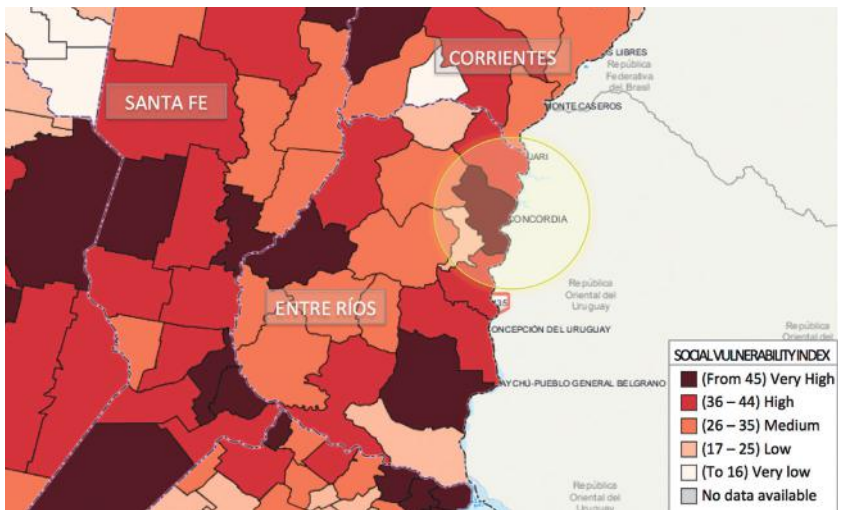
Humanitarian response actions directed towards the abovementioned displaced groups had three major components: getting aid to those displaced and trapped in isolated areas, deploying emergency supplies to those self-evacuated or evacuated in community centers, and managing the collective emergency shelters. All in all, the entire response implied the deployment of emergency and healthcare trucks, including pediatric and sanitary services; the provision of food, clothing and cleaning and disinfection supplies; and the transportation and relocation of evacuees. Additionally, intensive operations were carried out in all affected provinces to prevent the spread of typical flooding diseases such as dengue, chikungunya and zica, including fumigations and preventive action with local communities (Argentine White Helmets Knowledge Management Team, 2016b).

Infrastructure works to halt the spread of water in coastal areas were also put in place. In Santa Fe, for instance, defenses to protect residential areas from water overflow were built to prevent 800 families from being displaced (Télam, 2015b).

Also in terms of infrastructure, provisional collective shelters were built with the support and management of local governments of each province, offering proper sleeping and sanitation conditions, as well as water sources and food. In Entre Ríos alone, a total of 42 collective centers were set up in warehouses, sport clubs, schools and army facilities (Argentine Red Cross, 2016).

The extended duration of the rainfall and the water accumulation certainly conditioned the slow return home for all of the identified groups. In many cases, such as the one of Santa Fe, people remained evacuated after 40 days without being able to return home (by February 2016). In Concordia,

Image 7. Social Vulnerability Index in the city of Concordia, Entre Ríos



Source: Prepared with data from Research Program in Natural Resources and Environment (PIRNA), n.d.

displaced people were able to go back home more rapidly but faced other very serious hazards: their homes were covered with a 10 centimeters thick layer of mud, which was a proper setting for the spread of dangerous species including snakes, as well as flood-related diseases. In cases like this, humanitarian actions focused on the return home worked together with the local population in the cleaning-up of residences, or in the reconstruction of houses (Argentine Red Cross, 2016; Bolado, 2016).

Social Vulnerability

In the argentine Littoral region and the extended Río de la Plata Basin riverside areas are a source of income and livelihood activities for many of its inhabitants. Factors including the lack or poor socio-economic opportunities, land tenure issues together with historical and anthropological aspects sit behind the very habitual reality of entire populations living in floodable and risky areas over the banks of the rivers. Their location makes them suffer from yearly recurrent flooding, contributing negatively to their already vulnerable socio-economic conditions. In many cases, even when acknowledging their own risks, these populations have strong feelings against leaving their areas of residence for reasons linked to cultural factors, such as a generational history of living in that area, but most particularly

due to the fact that their livelihoods depend on the proximity to the river for fishing and trading activities.

The above exemplifies how social and economic conditions are connected to the way populations relate to their surrounding environment and the decisions these links entail. The idea of vulnerability, already mentioned on this paper, stands-out again. Poverty incidence, health and education deficiencies, habitation and health standards and job stability all contribute to portray a population's level of socio-economic vulnerability. Viewed from a environmental perspective, these conditions will influence the propensity to be adversely affected by climate-related hazards and the capacity to cope with or adapt to impacts (Qin et al., 2015).

The case of Clorinda, seen above, clearly depicts this last argument: affected year after year by the flooding of the Pilcomayo river, the population of Clorinda has found in short-term displacement a way to cope with recurrent effects of river overflows. However, this case also poses some additional concerns. Under the circumstances of the December events, the longer-than-average duration of the floods instigated this population to prolong their stay in precarious shelter conditions from one month to five, affecting their effective return home and impacting not only on their livelihoods but also on their health conditions. Consequently, we can say that what began as a mechanism to cope with the regular flooding conditions of their region ended up contributing to higher and more profound levels of vulnerability.

All the above emphasizes the need for preventive and early warning actions that not only include environmental and atmospheric indicators. The incidence that vulnerability has on risk exposure and displacement decisions needs to be bared in mind by incorporating socio-economic characteristics into the equation. In this direction, the Research Program in Natural Resources and Environment (PIRNA) from the University of Buenos Aires has developed a Social Vulnerability Index based on a set of demographic, life conditions, work, production and consumption indicators originated from census data and the Permanent Household Survey (see Image 8). Once applied to a specific territory and cross-referenced with weather forecast bulletins or satellite images (see Image 9), the obtained results can then be used to detect current and potential at risk populations facing high levels of vulnerability to environmental conditions (Natenzon, 2005, 2016).

Applied accordingly and timely, the index can be a powerful tool for disaster prevention actions and the development of contingency plans during emergencies (Natenzon, 2005, 2016; Natenzon, González, Gentile,

Ríos, & Boudín, 2003). More importantly, by identifying socio-economic conditions of vulnerability pre-existing the occurrence of the disaster, the use of an index of this sort would allow to identify communities and even specific areas in neighborhoods with higher risk exposure to environmental hazards and higher propensity to be displaced in the case of an event. Built up on this data, policies and programs with a durable solutions perspective could be implemented both to prevent potential human displacements under emergency and dangerous circumstances and to provide sustainable solutions to those already displaced (Project on Internal Displacement, 2010).

Conclusions

The flooding in Argentina in December 2015 can either be seen as the consequence of a phenomenon of unpredictable characteristics like El Niño, or as a reflection of the country's institutional instability. Favoring the second path, it is relevant to highlight that Argentina has gone through years of political mismanagement (or non-management) of early warning and contingency systems related to weather hazards and has given little priority to policies focused on sustainable solutions for displacement caused by frequent floods.

The revitalization of a six-year-old governmental agency such as the SIFEM reflects on the lack of preparedness of the Argentine state to such type of events and its inefficiency in taking measures to prevent displacement under dangerous emergency situations. Additionally, and even when the failures reflected by the response to this particular event have been accumulating for years, the Chief of Staff, Marcos Peña, admitted what no one else in the government was saying. He pledged for a better preparedness for such events, acknowledging the government's errors and noting that "the El Niño situation had been known for several months, requiring much improvement in the state's ability to respond, anticipate and avoid emergencies" (Télam, 2015d).

Thus, as an immediate political response to the flooding events, the new national authorities began announcing long-due infrastructural improvements. President Mauricio Macri claimed on December 27th the will of the Executive Power to invest resources in infrastructure in order to give a definitive solution to flooding in the region (Diario Los Andes, 2015). As of December 28th, Minister of the Interior Frigerio announced the construction of two aqueducts in Concordia (Entre Ríos) and promised a three-stage plan to provide solutions to those constantly displaced and affected by floods.

He also anticipated the construction of 250 houses in Concordia for people living in low floodable areas while admitting that the long term solution of the flooding would take time to be solved (Télam, 2015d).

The main lesson with policy implications is illustrated by both the case of Concordia explained in the previous section and the revitalization of the existing Federal Emergency System (SIFEM). They both portray that even if the technical and cognitive tools are available, political will is required to advance in the direction of true climate adaptation, risk prevention and its implications for human life. It is the lack of an overarching protocol that contemplates contingency plans, risk prevention system and relocation alternatives what it is still missing in Argentina in order to effectively channel the efforts of the different involved actors, including the government in its different levels and the community.

From this last point derives the other major lesson that can be apprehended from this event. The distinct behaviors of diverse population groups facing the same flooding have shown us that experience and preparedness can have an impact on displacement decisions under emergency situations, even when vulnerability factors aren't favorable. The fact that people having been through several floods depicted an anticipatory reaction to river overflows reinforces the importance being prepared for risk as well as the relevance of social awareness and preventive outreach actions at the community level. It additionally highlights the role of local communities and the importance of fostering a bottom-up perspective in which the afflicted (in this case, displaced) population is an active actor in the discussion and implementation of sustainable policies.

These lessons together with an historical and preventive conception of risk towards environmental hazards gain relevance when considering that hydrological and climate-related disasters have caused almost 2 million evacuees, 2000 deaths, destroyed 40,000 dwellings and affected almost 130,000 houses in Argentina between 1970 and 2007 (Celis, 2009). If we also consider the prospective climate tendencies for Argentina during the next decade, which include increases in the average rainfall and high tendencies for extreme precipitation, the question acquires more and more political relevance requiring for immediate policy actions.

BIBLIOGRAPHY

Press

Diario Clarín. (2016, January 25). After the flood, there are 100,000 people without water in Concordia. *Diario Clarin*. Retrieved from http://www.clarin.com/sociedad/inundacion-mil-personas-agua-Concordia_0_1510649044.html

Diario La Nación. (2015, December 27). The Government created a Crisis Committee to deal with the situation in the affected areas. *Diario La Nación*. Retrieved from http://www.lanacion.com.ar/1857476-el-gobierno-formo-un-comite-de-crisis-para-enfrentar-la-situacion-de-las-zonas-afectadas

Diario Los Andes. (2015, December 27). Macri: "We wanted to be here with you during these difficult times'. *Diario Los Andes*. Retrieved from http://www.losandes.com.ar/article/macri-viaja-a-concordia-y-encabezara-un-comite-de-crisis-por-las-inundaciones

El Independiente. (2015, December 28). Michetti, Bullrich Peña and coordinate Federal Emergency System. *El Independiente*. Retrieved from http://www.elindependiente.com.ar/pagina.php?id=102290

Grandinetti, M. (2015). After the floods, the crisis: millions in losses and require recalculating the entire economy 2015. *iProfesional*. Retrieved from http://www.iprofesional.com/notas/207682-Tras-las-inundaciones-la-crisis-las-prdidas-millonarias-ya-obligan-a-recalcular-toda-la-economa-2015

Natenzon, C. (2015, August). Floods: We have meekly accepted to live at risk. *Clarin.com*. Retrieved from http://www.clarin.com/opinion/responsabilidad_de_funcionarios-catastrofes_0_1413458710.html

Página/12. (2016, January 1). More than 30,000 evacuees on the coast. *Página/12*. Retrieved from http://www.pagina12.com.ar/diario/ultimas/20-289383-2016-01-01.html

Télam. (2015a, December 21). Parana and Uruguay rivers levels increase, in Concordia there are already 603 evacuated. *Télam (Argentine National News Agency)*. Retrieved from http://www.telam.com.ar/notas/201512/130756-crecida-rio-parana-rio-uruguay-entre-rios-concordia-evacuados.html

Télam. (2015b, December 21). The flooding of the Parana exceeds the area of the docks in Reconquista Port. *Télam (Argentine National News Agency)*. Retrieved from http://www.telam.com.ar/notas/201512/130751-crecida-rio-parana-santa-fe.html

Télam. (2015c, December 23). More than eleven thousand people affected by the flooding of rivers in the Littoral. *Télam (Argentine National News Agency)*. Retrieved from http://www.telam.com.ar/notas/201512/131082-crecida-rios-evacuados-provincias-litoral-paraguay.html

Télam. (2015d, December 28). The government established the Federal Emergency System. *Télam (Argentine National News Agency)*. Retrieved from http://www.telam.com.ar/notas/201512/131366-michetti-pena-bullrich-inundaciones-coordinacion-tareas.html

Todo Noticias (TN). (2016, April 20). With flooded fields, the meat prices could rise again. *Todo Noticias*. Retrieved from http://tn.com.ar/economia/con-campos-inundados-la-carne-podria-volver-subir_667151

Books / Reports

Argentine Red Cross. (2016). *Emergency Appeal Operations Update. Argentina: Floods* (International Federation of Red Cross and Red Crescent Societies (IFRC)).

Argentine White Helmets Knowledge Management Team. (2015a). *Floods in Argentina: December 2015 - Report #1* (Status Report No. 1). Argentine White Helmets. Retrieved from http://www.redhum.org/documento_detail/reporte-de-situacion-argentina

Argentine White Helmets Knowledge Management Team. (2015b). *Floods in Argentina: December 2015 - Report #2* (Status Report No. 2). Argentine White Helmets. Retrieved from http://www.redhum.org/documento_detail/reporte-de-situacion-argentina-actualizado

Argentine White Helmets Knowledge Management Team. (2016a). *Floods in Argentina: December 2015 - Report #3* (Status Report No. 3). Argentine White Helmets. Retrieved from http://www.redhum.org/documento_detail/argentina-inundaciones-actualizacion-del-31-01-2015-al-07-01-2016

Argentine White Helmets Knowledge Management Team. (2016b). *Floods in Argentina: December 2015 - Report #4* (Status Report No. 4). Argentine White Helmets. Retrieved from http://www.redhum.org/documento_detail/argentina-inundaciones-actualizacion-14-01-2016

Bertoni, J. C. (2005). *Urban Flood in the New Climate Context: some cases in Latin America* (A contribution to understanding the regional impacts of global change in South América). São Paulo: Instituto de Estudos Avançados da Universidade de São Paulo.

Celis, A. (2009). *Country Document: Disaster Risks in Argentina*. Argentine Red Cross. Retrieved from http://www.redesdegestionderiesgo.com/Descargar/353/1382

Centro de Investigaciones del Mar y la Atmósfera (CIMA). (2011). *Climate Change in Argentina: tendencies and projections*. Retrieved from http://www.ambiente.gov.ar/?idarticulo=13291

Department of Atmospheric Sciences (DAS). (2010). *Weather World Project: El Niño*. University of Illinois Urbana-Champaign (UIUC). Retrieved from http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/eln/home.rxml

Natenzon, C., González, S., Gentile, E., Ríos, D., & Boudín, C. (2003). *Social Vulnerability, Climatic Change and Floods*. Retrieved from http://www.pirna.com.ar/files/pirna/PON-Natenzon-Gonzalez-Rios-Boudin-Component%20of%20social%20vulnerability.pdf

Natenzon, C. (2005). *Social Vulnerability, Disasters and Climate Change in Latin America. Thematic, Theoretical and Methodological Approaches* (A contribution to understanding the regional impacts of global change in South América). São Paulo: Instituto de Estudos Avançados da Universidade de São Paulo.

Nullis, C. (2016). *Exceptionally strong El Niño has passed its peak, but impacts continue*. World Meteorological Organization. Retrieved from http://public.wmo.int/en/media/press-release/exceptionally-strong-el-ni%C3%B1o-has-passed-its-peak-impacts-continue

Project on Internal Displacement. (2010). *IASC Framework on Durable Solutions for Internally Displaced Persons*. Washington, DC USA: The Brookings Institution – University of Bern.

Satterthwaite, D. (2007). *Adapting to climate change in urban areas: the possibilities and constraints in low- and middle-income nations*. London: International Institute for Environment and Development.

Skansi, M. de los M. (2015a). *Bulletin of Forecast Climate Trends. November 2015* (No. Vol. XXI). Buenos Aires, Argentina: National Weather Service. Retrieved from http://www.smn.gov.ar/serviciosclimaticos/clima/archivo/ten_noviembre15.pdf

Skansi, M. de los M. (2015b). *Climate Monitoring Bulletin in Argentina and in the adjacent Subantartic region* (No. Vol. XXVII). Buenos Aires, Argentina: National Weather Service.

UNDP (Ed.). (2014). *Sustaining human progress: reducing vulnerabilities and building resilience*. New York, NY: United Nations Development Programme.

United Nations, Department of Economic and Social Affairs, & Population Division. (2014). *World urbanization prospects: the 2014 revision : highlights*.

United Nations Environmental Programme, U., & Economic Commission for Latin America and the Caribbean (ECLAC). (2010). *Vital climate change graphics for Latin America and the Caribbean*. Retrieved from http://www.grida.no/publications/vg/lac/page/2766.aspx

Articles

Black, R., Arnell, N. W., Adger, W. N., Thomas, D., & Geddes, A. (2013). Migration, immobility and displacement outcomes following extreme events. *Environmental Science & Policy*, *27*, S32–S43. https://doi.org/10.1016/j.envsci.2012.09.001

Black, R., & Collyer, M. (2014). Populations "trapped" at times of crisis. *Forced Migration Review*, *45*, 52–56.

Casco, S. L., Natenzon, C. E., Basterra, N. I., & Neiff, J. J. (2011). Floods in the Lower Parana River: Can social measures be articulated to hydrological regime? *Interciencia*, *36*(6), 423–430.

Garschagen, M., & Romero-Lankao, P. (2015). Exploring the relationships between urbanization trends and climate change vulnerability. *Climatic Change*, *133*(1), 37–52. https://doi.org/10.1007/s10584-013-0812-6

Qin, H., Romero-Lankao, P., Hardoy, J., & Rosas-Huerta, A. (2015). Household responses to climate-related hazards in four Latin American cities: A conceptual framework and exploratory analysis. *Urban Climate*, *14*, 94–110. https://doi.org/10.1016/j.uclim.2015.05.003

Romero-Lankao, P., Hughes, S., Qin, H., Hardoy, J., Rosas-Huerta, A., Borquez, R., & Lampis, A. (2014). Scale, urban risk and adaptation capacity in neighborhoods of Latin American cities. *Habitat International*, *42*, 224–235. https://doi.org/10.1016/j.habitatint.2013.12.008

Websites

Buis, A. (2015, December). A still-growing El Niño set to bear down on U.S. Retrieved May 8, 2016, from http://climate.nasa.gov/news/2382/

Davies, R. (2015, December 18). Paraguay - 13,000 Families Affected by Floods in Asunción as River Levels Top 7 Metres. Retrieved May 9, 2016, from http://floodlist.com/america/paraguay-floods-asuncion-river-levels-7-metres

Davies, R. (2016a, January 13). More Flooding in Argentina, Situation Improves in Uruguay, Disease Alert in Paraguay. Retrieved April 3, 2016, from http://floodlist.com/america/south-america-floods-argentina-paraguay-uruguay-january-2016

Davies, R. (2016b, January 18). Paraguay River Floods from Space. Retrieved April 3, 2016, from http://floodlist.com/america/paraguay-river-floods-space

Guha-Sapir, D., Below, R., & Hoyois, P. (2016). EM-DAT: International Disaster Database. Université Catholique de Louvain. Retrieved from www.emdat.be

L'Heureux, M. (2014, May). What is the El Niño–Southern Oscillation (ENSO) in a nutshell? Retrieved May 8, 2016, from https://www.climate.gov/news-features/blogs/enso/what-el-ni%C3%B10%E2%80%93southern-oscillation-enso-nutshell

NASA/JPL OSTM/Jason-2. (2015, December). El Niño Watch 2015. Retrieved from https://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=30629

NASA's Jet Propulsion Laboratory. (2015). ENSO Sea Surface Temperature Anomalies: 2015-2016. Retrieved from https://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=30645

Repetto, J. M. (2015, December 28). The northeastern region compromised by flooding. Retrieved April 4, 2016, from http://sobrelatierra.agro.uba.ar/los-suelos-del-nea-muy-comprometidos-por-las-inundaciones/

United Nations News Service Sections. (2016, February 18). El Niño passed peak, but UN weather agency warns "not to lower guard" as impacts continue. Retrieved May 8, 2016, from http://www.un.org/apps/news/story.asp?NewsID=53266#.Vy8bLhWLToA

Research Program in Natural Resources and Environment (PIRNA). (n.d.). GeoServer with SV Index. Retrieved May 10, 2016, from http://www.pirna.com.ar/node/262

Tv Broadcast

El Explorador Producciones. (2015, December 24). Testimonies of flood victims. Retrieved from https://www.youtube.com/watch?v=40tMk7ndXuI

La Izquierda Diario. (2016, January 5). Cobertura especial Inundaciones en Concordia. Retrieved from https://www.youtube.com/watch?v=S6hpvgpxT00

Todo Noticias (TN). (2015, December 24). More than 20,000 evacuees in the Litoral by floods. Retrieved from https://www.youtube.com/watch?v=I7nBji_Zank

TV Pública Argentina. (2015, December 22). Flooding in the Littoral and Northeastern region. Retrieved from https://www.youtube.com/watch?v=Kczv6904mPQ

Interviews

Adamo, S. (2016, March 28), Research Scientist and Adjunct Assistant Professor at the Center for International Earth Science Information Network—CIESIN- (The Earth Institute, Columbia University) [Skype interview].

Bolado, C. (2016, April 12), Disaster Response Director at Red Cross (IFRC) Argentina [Skype interview].

Lozano, M. (2016, February 29), Executive Director of "Fundación Sí" (Argentinian nonprofit) [Personal interview].

Natenzon, C. (2016, April 20), Dr. in Geography PIRNA Natural Resources and Environmental Research Program University of Buenos Aires/FLACSO Argentina [Skype interview].

South Asia

2015 Flood in Tamil Nadu, India

Disaster-induced displacement

Magdalena Szynkowska

Introduction

> *"Most of the people who were affected by the flood were marginalized people. They will probably remain on the margins of society, maybe not the same margins, but different ones, because the local government of the city has no willingnes of changing the situation."*
>
> **Nityanand Jayaraman, social activist and journalist**

In early 2015, the Internal Displacement Monitoring Center published a report entitled, "Risk of disaster-induced displacement in South Asia" in which they attempted to assess the risk of displacement due to natural disasters in eight countries of South Asia. In this report, India was ranked as the country with the highest quantity of potentially displaced people over the next ten years as a consequence of natural hazards. The research indicated that in India, disaster-induced displacement is a problem relevant for both urban and rural areas and that "urban Indians' vulnerability to hazards is very high due to rapid urban growth, unplanned development, and the large numbers of people without access to adequate housing, water, health, and sanitation" (IDMC, 2015).[1]

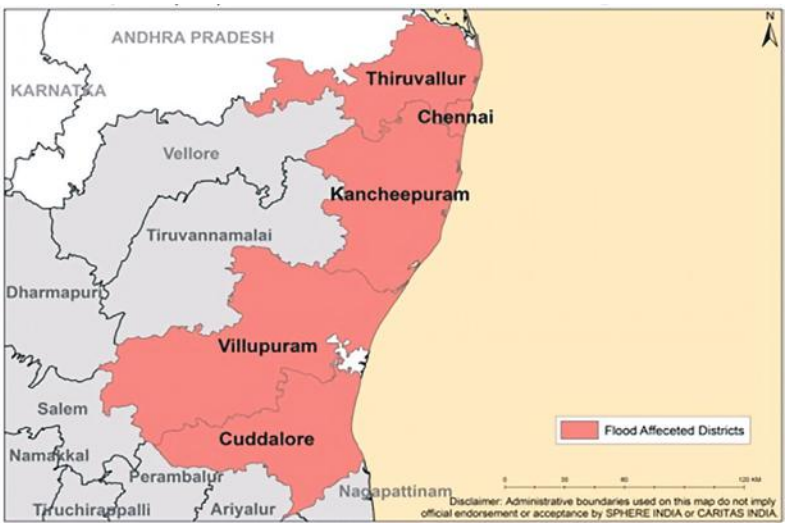
Eight months later, record-breaking rainfalls during monsoon season produced floods that devastated the southern part of India, affecting nearly three million of people and claiming 354 human lives (OXFAM, 2016).

As Chennai, the capital city of the Indian State Tamil Nadu, was drowning, world leaders discussed the impact of climate change and negotiated an agreement to limit the rise in worldwide temperature during the 2015 United Nations Conference on Climate Change in Paris. The situation in Chennai was echoed at the conference in a statement made by Laurent Fabius, French Foreign Minister and Chair of Global Negotiations, who said, "the unprecedented magnitude of the flooding confirms yet again that we no longer have time; we must take concrete and urgent action against climate disruption" (The Economic Times, Dec 2016).

The aim of this paper is to present how extreme weather conditions attributed to the strongest-ever El Niño phenomenon and high temperatures in the Indian Ocean together with environmental degradation caused by rapid urbanization and the unpreparedness of India's cities for extreme weather events caused the deaths of more than 300 people and massive human

[1] Read more: Internally Displaced Monitoring Center (2015) The risk of disaster-induced displacement in South Asia: http://www.internal-displacement.org/assets/publications/images/2015/201504-ap-south-asia-disaster-induced-displacement-risk-en.pdf

Illustration 1. Tamil Nadu- flood affected districts.



Source: Sphere India, 2016

displacement (The Floodlist News, Dec. 2016). In parallel, the research demonstrates that the population that has suffered the greatest impact from disaster is the most vulnerable part of the community. The majority of the affected population migrated in the past to the urban areas of Tamil Nadu in the search of better economic opportunities and a higher standard of living.

The paper focuses on events occurring in the Tamil Nadu state, with special attention given to its capital city, Chennai. The rainfall from the end of October until the end of December has caused the displacement of 1.8 million people in the Tamil Nadu and southern Andhra Pradesh (IDMC, 2016). There has been severe damage to farm livelihoods, with at least 382,000 hectares of agricultural crops affected across the State (Sphere India, 2015).

The first part of the paper describes the events that occurred during the last two months of 2015 in Tamil Nadu. It focuses on the damage produced by the flood and emphasizes the population displacement along with an example of a "trapped population"[2] that has been particularly affected by flooding and

[2] Trapped populations is defined as "Populations who do not migrate, yet are situated in areas under threat, [...] at risk of becoming 'trapped' [or having to stay behind], where they will be more vulnerable to environmental shocks and impoverishment." This applies in particular to poorer households who may not have the resources to move and whose livelihoods are affected by environmental change (MECLEP,2014).

neglected by the government in a relief operation (NCDHR, SASY 2015). In the next section, the research provides an analysis of the causes of the flood, and finally, it presents the aftermath of the disaster and policy implications.

This research is based on variety of sources, mainly secondary literature resources, including NGO reports, studies, news articles, online media and on various interviews undertaken with journalists and a social activist. Due to lack of access to official authorities, the report does not include any perspective of local governmental bodies.

Flood in Tamil Nadu

Geographical Characteristics of the Region

Tamil Nadu is the eleventh-largest state in India by area and the sixth-most populous. It has a coastline of about 1,076 km (669 mi), making it the country's second-longest coastline. The capital of Tamil Nadu is Chennai, which is the fourth-largest city and fourth-most populous metropolitan area (with a size of 1,189 sq km). The Chennai Metropolitan area consists of eight districts, including the Chennai city district. It is bounded by Bay of Benegal on the east and Andra Pradesh state in the north. It is characterized as a low-lying area, called a "pancake city," with its average elevation estimated at 6.7 meters above sea level (Chennai District., n.d.). There are two main rivers intersecting the district, the Cooum and Adyar. Both of them are nearly stagnant and do not carry enough water to sustain communities, except during rainy seasons (Chennai District, n.d).

The Monsoon Season With Extreme Weather Conditions

The flood in Tamil Nadu resulted from the heavy precipitation brought on by a low-pressure system during the annual northeast monsoon of 2015. The winter monsoon contributes annually up to 30 percent of total rainfall in the south of India (The Indian Express, Dec 2015). However, this time, the region had been affected by three spells of heavy rainfalls that caused flooding.

The first period of intensive rainfalls took place on the 8th and 9th of November. The second spell of heavy showers lasted three days; it started on the 15th and ended on 17th of November. Throughout November, Chennai, capital of state, received almost 1,200mm of rainfall, which was a 329 percent increase from average November rainfall measurements and

the highest observed measurement in the last 100 years (Down to earth, Jan 2016). However, the most affected area by the first two spells of rain was Cuddalore district. It is located in the proximity of water bodies that breached after reaching its capacity, affecting nearby communities and damaging a number of homes, infrastructure, and crops. The third spell of rain took place in the beginning of December and had a devastating impact on Chennai and other parts of the northern Tamil Nadu, such as Kancheepuram, Thiruvallur, Villupuram, and Cuddalore. On 1st of December, over the course of 12 hours, the amount of rain received by Chennai was estimated to be 272mm, while the average amount of rainfall received during the whole month is approximately 191mm. It was the wettest December day in the history of the city.

December 1St: The Day When Chennai Got Inundated

The unexpected weather conditions led to situation where, on the morning of December 1st, houses situated in the small location of southern Chennai-Jafferkhanpet began to submerge. By five o'clock am, almost 80% of the city was covered by four meters of water. This situation carried on for the next three days, producing massive destruction and death.

A series of events and man-made errors aggravated this catastrophic outcome. One of the direct causes of the Chennai flooding that affected part of the city was a release of water from the Chembarambakkam reservoir by the Tamil Nadu administration (Centre for Science and Environment, 2016). Chennai's reservoirs reached their full capacity due to unforeseen amounts of rain throughout the month of November. The continuous rain led the main reservoir and water source in Chennai, Chembarambakkam to reach its limit on December 1st. The Adyar River originates from Chembarambakkam Lake. Under the threat of breach in the boundary of the reservoir, the discharge was increased from its normal level, 900 cusec (regular flow in terms of cubic feet per second), to more than three times that limit. This exceeded the capacity of Adyar's channel to carry water and led to the inundation of an area of more than 4 kilometers surrounding it. When the released water reached already-waterlogged Chennai, it produced a major flood (The Indian Express, Dec 2015).

Failures In Disaster Management

Since the Indian Ocean Tsunami in 2004, the Indian government has worked on improving early warning systems in order to build resilience to natural disasters.

An important milestone in Indian disaster management was establishing the National Disaster Management Authority in 2015. It is an agency responsible for policy creation and coordination with the State Disaster Management Authorities (SDMA) and for "ensuring timely and effective response to disaster" (NDMA, n.d.). The first board meeting of State Disaster Management Authorities in Tamil Nadu was held in 2012 when the initial steps have been taken to implement disaster prevention and management activities with accordance to state and national disaster management authorities (The Hindu, May 2012). Furthermore, coastal districts set up wireless-linked public address system to inform local communities how to behave during the crisis and improve early warning (ACAPS, 2015).

As regards the November-December 2015 floods, government had issued warnings about heavy rainfall to state authorities over 48 hours before disaster. However, the analysis conducted by the Union Ministry of Earth Sciences outlined that the reaction of Tamil Nadu authorities was too slow what deepened the negative effects of the disaster (*The Economic Times*, Feb 2016).

According to Nityanand Jayaraman, a journalist and a social activist:" local government didn't warn people early enough and didn't offer a speedy response, hence good evacuation plan in the face of the crisis. Both of the instruments were lacking and if both of them were better implemented, more lives, livelihoods and properties could have been saved" (Interview, May 2016).

Evacuation And Other Relief Operations

The Government of India officially declared Chennai a National Disaster zone on December 2nd (India Today, Dec 2015). Nevertheless, throughout November, continuous rainfalls caused inundation in low-lying parts of Chennai and resulted in the evacuation of thousands of people from their households and the suspension of classes in schools and colleges across various districts of Tamil Nadu (The New Indian Express, Nov 2015). Dhanya Rajendran, a journalist who covered the events for The News Minute, declared, "In fact, there were two floods in Chennai: one in November, one in December. A lot of households and other buildings in Chennai are on the shore of the lakes and the rivers, so naturally all of these places were affected. However, in the beginning of December we saw almost every single area in the Chennai getting flooded" (Interview, Apr 2016).

By November 17th, relief operations in Chennai consisted primarily of deployment of the Indian Air Force to help the affected population, together with establishing relief camps and distributing food packets. Local government indicated that, by that time, more than 5,300 people had been rescued from flooded areas (Hindustan Times, Nov 2015). The Indian Coast Guard and other divisions of the Armed Forces were carrying out rescue and relief operations on November 20th in Kancheepuram and airdropping 5,000 kg of supplies (Business Standard, Nov 2015). On the other hand, in Cuddolore, a region suffering from lack of power and drinking water, water was supplied to village pachayats[3] with tanker lorries. "While 40 medical camps were functioning in the district, 121 special camps had been held for cattle stock. Through 70 relief camps, 58,000 food packets have been distributed" (The New Indian Express, Nov 2015).

The rainfall at the beginning of December caused inundation in 40% of the Chennai's districts (The Indian Express, Dec 2015). The rain and subsequent overflow of the Adyar River and Cooum River produced severe flooding and large-scale evacuations in the city and surrounding areas, as well as significant damage to homes and farm fields. Additionally, it generated a cut-off of road access in some districts, making it difficult to reach affected areas. 432 relief camps opened in three highly affected districts outside of Chennai city, with approximately 72,000 people evacuated to the camps. The government carried out evacuations in other damaged areas (Sphere India, 2015). After the declaration of Chennai as a disaster zone, National Disaster Response Force was involved in the rescue operations in the city. Nevertheless, the relief response was uncoordinated in the northern part of Chennai, obligating the population to evacuate on their own (The Hindu, Dec 2015). The impressions of Dhanya Rajendran are as follows: "There was no proper evacuation plan, it looked like the government assumed that the rain should stop and people didn't expect that this amount of water would come... People were caught completely unaware of the threat; some people were stranded inside their houses and could not come out. In fact, by the time, the army and air force reached out; chaos already reigned in the city" (Interview, Apr 2016).

The lack of coordination by the rescue service led the population to offer help to those most in need. Abishek Venkat, a student from Chennai, describes the situation as follows: "We had thousands of people stranded on their terraces with no access to food or water. This is where the city came to life at a time of distress. Thousands volunteered and packed food

[3] Pachayat refers to the village level governing body.

packets and clothing kits for the people in need. Selfless volunteers swam across buildings to give these kits to the ones suffering. It was wonderful to see people from all kinds of families caste and social status to come together to do something to help the suffering people" (Interview, Apr 2016).

Table 1. State highlights the damage produced by flood.

Chennai Urban- Total population: 4.646.732	
Affected population	More than 6 M
Houses affected	More than 1,5 M
Thiruvallur District-Total Population: 3.728.104	
Affected population	Approx. 175.000
Houses affected	More than 51.000
Total no. of households	946.949
Total no. of families who lost their houses (fully damaged)	6.964
Total number of livestock lost	2.218
Crop damaged (ha)	24.870
Land submerged in water (ha)	15.000
Kancheepuram District -Total Population: 3.998.252	
Affected population	More than 1 M
Houses affected	More than 190.000
Cuddalore district- Total population: 2605914	
Affected population	More than 600.000
Houses affected	More than 90.000
Blocks affected	11 blocks affected out of 13
Total no. of huts	5409
Huts damage	Fully damage-837 Partially damage- 2487
Villupuram District- Total Population: 3458873	
Population affected	More than 80.000
Houses affected	Approx. 20.000
Blocks affected	22
Deaths	56
House damage	Fully-971 (as per information received from local NGO) Partially-15204
Cattle died	2442
Crops damaged	3661- Agriculture 1548- Horticulture
Irrigation tanks damaged	263
Supply channel damaged	208

Source: Sphere India, 2015

By December 5th, the rainfall was less intense and relief operations had escalated. Already, more than 1,100,000 citizens had been rescued and transferred to safer places and thousands were allocated to temporary houses in relief camps across the city and in neighboring districts. "On the relief front, government efforts were supplemented by thousands of volunteers of NGOs and well-meaning individuals flooding Chennai with food packets, drinking water, clothes, blankets, and medicines" (Hindustan Times, Dec 2015).

A Joint Detailed Need Assessment report prepared by Sphere India indicates that the humanitarian assistance provided in Tamil Nadu was offered to approximately 1.7 million people who had been temporarily housed in 6,605 flood relief camps in Chennai, Cuddalore, Thiruvallur and Kancheepuram Districts. In addition, "600 boats had been mobilized for relief operations. 12.29 million food packets were distributed, 26,270 medical camps organized and 2.56 million persons treated in those camps. In addition, 97 mobile medical units were pressed into service through which 49,329 people benefited" (Sphere India, 2015). The same report assessed the damage in five districts of Tamil Nadu based on information received during coordination meetings from members of Sphere India (see table 1).

Relief operations were completed by December 19th (The Hindu, Dec 2015).

Migration Patterns And Disaster-Induced Displacement

Previously Economic Migrants, Now Disaster-Displaced Population.

Rapid growth of urban areas in the region of Tamil Nadu was accompanied by an increase in the population living in either slum or squatter settlements. The majority of slums are located on the edge of the rivers, along railway tracks and in low-lying areas, what augments the risk exposure of flooding. The slum dwellers of Chennai and other rural areas that constructed their houses on the shore of various water bodies such as rivers and lakes were the most impacted by the heavy rains and wind occurred in the end of 2015. Nityanand Jayaraman indicates that, "in terms of displacement, people who were the worst affected, are people who migrated previously to the city in the search of livelihood or other economic benefits. These are people who are generally considered marginalized... Those marginalized people tend to live on the margins of society, on the margins of roads, on the margins of rivers, on the margins of lakes and margins of the sea and these are the places who got the most affected during the floods" (Interview, May 2016).

The Census of India conducted in 2001 showed that 20.02% of the total population of selected 63 municipal towns in Tamil Nadu region lived in slums. Additionally, a survey carried out by Tamil Nadu Slum Clearance Board (TNSCL) demonstrates an increase of 51,85 % in the number of slums in Chennai from 2001 to 2014 and estimates more than 1 million slum dwellers as for 2014 (TNSCL, 2015).

The location of the majority of slums was on or around waterways such as the Adyar and Cooum rivers. Other common characteristics of slums in Chennai include open defecation areas, lack of sewage drainage systems, lack of garbage collection processes, and a common ignorance of environmental problems (Kumaran, 2012).

The economic migration of populations from rural areas to Chennai is influenced by its size (the fourth-largest city in India) and importance as a port. Additionally, Chennai has experienced accelerated commercial and industrial growth over the past several decades due to the development of the outsourcing information technology sector that enabled services in the region. Chennai, in terms of investment, was the top destination for domestic migrants in 2007 (Kumaran, 2012).

A study conducted by K. Vinayakam and S.P. Pekar analyzed additional factors that contributed to rural-urban migration in Tamil Nadu. This paper investigated the socio-economic characteristics of migrants in Chennai and the results indicate that the factors contributing to rural-to-urban migration include, "less employment opportunities, low wages, drought, lack of basic amenities, landlessness in rural areas and in urban areas more employment opportunities, higher income, better wages, better facilities activities as pull factors towards the rural to urban migration." Nityanand points out that another reason for rural-to-urban migration within the Tamil Nadu region is an agricultural distress. "India is going through a very bad span of drought, so there are people leaving from once fertile areas to nearby cities in search of jobs. These are farmers or agricultural workers who leave their place because of the lack of water or for a variety of other reasons" (Interview, May 2016).

Tamil Nadu Slum Clearance Board in the report " Slum free city plan of action-Chennai Corporation" outlines further causes of slums' formation in Chennai like: low-income level and low paying capacity of the migrants, proximity of the houses to source of employment—high transportation cost and absence of comprehensive development planning (TNSCL, 2015).

The extent of the disaster that took place during November and December 2015 in Tamil Nadu was a product of unauthorized construction of households along water bodies and their exposure to flood-related events. "The

communities living in slums, who were mostly rural migrants, decided to construct their homes on the river bed, because the local authorities offered them no other choice", comments Nityanand (Interview, May 2016).

A report prepared by Oxfam concludes that the overall destruction caused by the flood totaled 117,000 huts across Tamil Nadu. "Mud huts with thatch roofs have been severely affected in the floods. Walls have melted away, the flooring made of mud remained damp and sludgy weeks after the floods. Households have lost their utensils, stoves, clothes, and other belongings in the flood. Debris from the floods around the settlements in some rural areas has affected the mobility of residents. Stagnant water and debris from the floods have become a health risk for the communities living in the flood-affected areas" (Oxfam, Mar 2016).

Dalits- Trapped Population

The Dalits population located in the Cuddalore district was the most affected by flooding and at the same time, the most neglected by government in relief operations in Tamil Nadu (Hindutimes, Dec 2015). The name "Dalits" invokes a former "untouchable" caste in Indian society, a low status in the Hindu caste system, which in the past was dedicated to occupations regarded as unclean and despised (Judge, 2012).

Till the date, Dalits face discrimination and largely remain landless. Dalit population accounts for 21 percent of the total population in the Tamil Nadu and for one forth of all households. A study showed that 92% of Dalits in rural areas of Tamil Nadu were landless (The Times of India, May 2016). Furthermore, this part of society is considered as "unable to migrate to cities as a result of the lack of education and resources." (The Hindu, July 2015).

The National Campaign on Dalit Human Rights (NCDHR) and the Social Awareness Society of Youth (SASY) held a survey in Cuddalore in November after the first span of rainfalls in which they polled 1,500 households in the area. Of this total, more than 40 percent were Dalits. The results of the survey presented that 95 percent of damaged houses, 92 percent of livestock lost, and 86 percent of crops lost belonged to Dalits in the area[4] (NCDHR, SASY, 2015).

[4] Read more: Tsunami to 2015 floods " No respite for dalits in disaster response, Tamil Nadu" Report of Initial Findings from immediate needs Assesment and Monitoring response towards Affected Dalit Communities http://www.ncdhr.org.in/publications/Report%20of%20Initial%20Findings%20from%20Immediate%20Needs%20Assessment%20and%20Monitoring%20Responses%20towards%20Affected%20Dalit%20Communities.pdf

Dalits' households are mostly located in low-lying areas, either on the edge of or close to the river, which makes them more vulnerable to destruction caused by floods, cyclones and other type of natural disasters. In addition, the socio-economic condition of these village people is very low. The report outlines that water washed away the poorly constructed mud houses. Of the "1,026 mud houses that collapsed in Cuddelore, 971 belonged to Dalits, and of the 311 concrete houses that were damaged, 305 belonged to Dalits." In response to the disaster, a medical camp was established in a nearby village, Alamelumangapuram. However, the Dalit population didn't use the help offered in the camp for fear of violence and discrimination since it was located in a higher caste community, outlined the report.

The paper informs that people were not warned about the arrival of flooding by neither local authorities nor other officials. The houses belonging to the Dalit population were constructed from mud and thatch and were quickly washed away by the water and those who lost their houses looked for shelter in the concrete houses within their neighborhoods. Others, who struggled to live in their deteriorated houses, used all material available, including clothing items, to cover and reconstruct walls around house. The media reported that no officials paid a visit to the villages. As the report shows, "the major problem of this village is health and sanitation, there were no provisions of distributing any sanitation material in village; no health camps have been organized. The village is located almost 5-6 km away from the main road; therefore it's very difficult for villager to access any public transport. The schools and public health centers are also more than 5 km away for villagers to access in an immediate need. Most of the people of the Dalit community in this village worked as laborers in the farmland of the dominant community where males are getting wages of 300 R.s per day and females are getting 100 R.s per day as laborers. But due to this flood, they have lost that only source of income; they are not able to go for their jobs" (NCDHR, SASY, 2015).

Nityanand, who visited Cuddalore after the flood, shares the opinion that the Dalit population was left out of the process and has faced discrimination. He claims that part of the "systemic discrimination in Indian society is represented by the infrastructure, where unintentional discrimination happens. As the effect, the Dalit villages or hamlets have always been further away from the roads than the upper cast villages are, and when relief trucks come, they have to pass the upper cast villages (...) within the Dalit colony, the households located on the streets far away from main street didn't receive any help, so there was a discrimination within the discriminated population" (Interview, May 2016).

Due to lack of access to official authorities, it wasn't possible to include a perspective of local governmental bodies.

The Causes Of The Flood

Climate Change

The phenomenon of El Niño[5] is cited as one of the primary contributors to the record-breaking rainfall in Tamil Nadu. It is described by The National Oceanic and Atmospheric Administration (NOAA) as "the large-scale ocean-atmosphere climate interaction linked to a periodic warming in sea surface temperatures across the central and east-central Equatorial Pacific" (NOAA, n.d). El Niño phenomenon increases the possibility of extreme weather conditions like flooding. However, the Center for Science and Environment in India indicated that further investigation is needed in order to attribute a direct link between the Chennai disaster and climate change, notwithstanding, "climate change-induced unnaturally heavy rains might have exacerbated the problem manifold" adding that existent scientific studies on climate do establish the possibility of a connection (CSE India, Dec. 2015).

Rapid And Unplanned Urbanization

Tamil Nadu is classified as the first on share of urban population among large states in India and third on absolute urban population. As per estimates of 2011 census, approximated urban population of Tamil Nadu accounts for 34.9 million, what means that 48.45% of its population lives in the cities. The level of urbanization in Tamil Nadu has increased by 4 percentage points from 44.04% in 2001 to 48.45% in 2011 (CSE, 2016). The main cause of rapid urbanization, as mentioned previously in the research, is migration of people from rural areas in search of economic opportunities and the presence of industrial estates in all districts (The Hindu, July 2015). The most urbanized city in the state is Chennai Metropolitan Area. The average rate of population growth of the city is a 25% increase each decade, a rate that has caused a dramatic loss of green areas, water bodies, and drainage systems. Collectively, these losses have weakened the natural protection system of the city in the face of flooding (Arunprakash et al., 2014).

[5] The word "El niño" means "the child" in Spanish.

Environmental Damage Caused By Rapid Urbanization

The importance of water bodies is frequently underestimated, however, lakes and wetlands are significant component of an urban ecosystem. They provide social, economic and environmental benefits. They are simultaneously sources of drinking water and home to biodiversity, and they supply humans with fuel, food, recreation, and employment. Additionally, wetlands act as a sponge, absorbing rainfall and controlling its flow into stream and rivers, which prevents the disastrous consequences of flooding.[6] (CSE, 2016). The function of water bodies in the modern context is even more critical as cities face the challenge of rapid increase in urban population and lack of appropriate urban planning. Among the most important hydrological effects of urbanization, we can distinguish: (1) increased water demand, often exceeding the available natural resources; (2) increased wastewater, burdening rivers and lakes and endangering the ecology; (3) increased peak flow; (4) reduced infiltration and (5) reduced groundwater recharge, increased use of groundwater, and diminishing base flow of streams (Gupta, Nair, 2011).

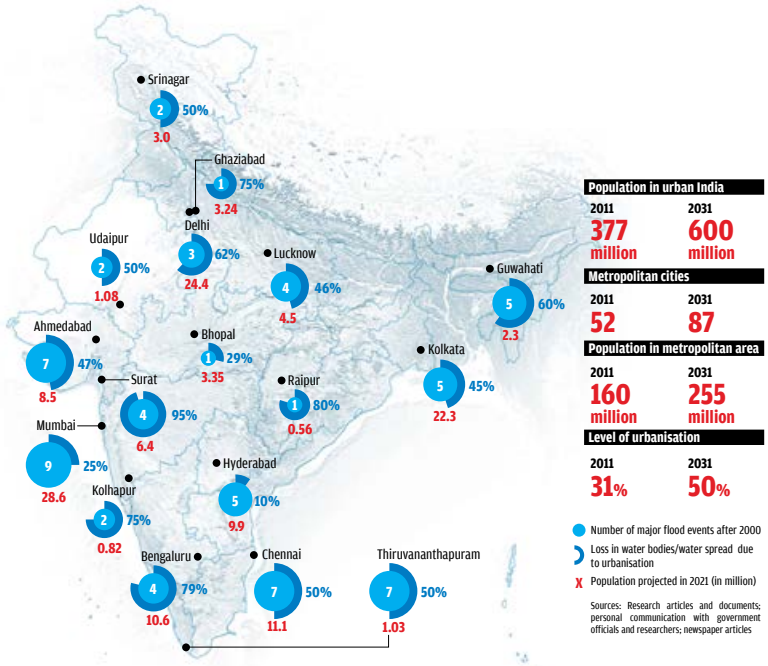
The Center for Science and Environment in India published a report on the state of India's urban water bodies, where they outline that for the past 20 years urban water bodies have been victims of unplanned urbanization in India. Among the threats to water bodies posed by the rapid growth of urban areas are "encroachment, disposal of sewage, groundwater decline leading to fall in the level of lake, unplanned tourism, and the absence of an administrative framework" (CSE, 2016).

The Center for Environmental and Water Resource Engineering, IIT Madras determined that the Chennai Region contained approximately 650 water bodies in the 1980s, however, only small portion of these remain (Srivathsan and Lakshimi, 2011). In addition, 19 major lakes have decreased in size over the past two decades by almost 50%, from a total of 1,130 hectares (ha) in the 1980s to nearly 645 ha in early 2000s. The smaller size of water bodies leads to a reduction in their storage capacity CSE, 2016).

The magnitude of flooding in Tamil Nadu at the end of 2015 was due to a decrease in the area of water bodies, which served as a natural drainage system for the region and a sink for the city of Chennai. The Pallikarni marshland, located 20 km from Chennai, has for a long time acted as a natural sponge absorbing the rainfall. However, due to the decrease in its size during the December floods, the marshland could do little. As a result

[6] Read more: WWF (2016) The wonder of wetlands: http://wwf.panda.org/about_our_earth/about_freshwater/intro/

Figure 1. Loss of water bodies due to urbanization in India



Source: CSE (2016) State of India's urban water bodies

of unplanned and rapid urbanization, the area of marshland is used now as a waste disposal site and also contains several residential and commercial projects. Another part of it has been assigned to government projects including the Mass Rapid Transport System of the Ministry of Railways, the National Institute of Ocean Technology, the Chennai Corporation, and the Centre for Wind Energy Technology (CSE, 2016).

Another really important issue of rapid urbanization in Tamil Nadu is the lack of garbage management. There has been an increase in use of non-degradable garbage like plastic which has led to clogged waterways, channels, and rivers and reduced the capacity to drain the rainwater, effectively producing flooding.

The Aftermath Of The Flood And Policy Implications

The political reaction to the massive destruction and support offered by authorities was focused mainly on post disaster response. As the

consequences of devastation caused by flooding fall principally on the slum dwellers and necessitate their relocation, the Tamil Nadu state government initiated a slum clearance program on December 29th, 2015. This program focuses on a massive clearance of encroachments along the Adyar River and holds the promise to provide alternative accommodation to families who lost their homes during the flooding events (The Hindu, Dec 2015). By March of 2016, first 4,044 housing units were inaugurated in order to resettle families who had lived in illegally encroaching construction regions and had been cleared away by the city corporation (The Times of India, Mar 2016). The government offered as well a monetary compensation to each family that lost their house in the floods and to those who lost their crops.

However, the lesson learnt from the events occurred in Tamil Nadu by the end of 2015 proved the importance of pre-disaster activities and the need of changing the region's urban governance approach to disaster management. A significant improvement is required in the areas of disaster preparedness—how to respond to natural hazards and mitigation—how to minimize its effect. It includes, among others, the effective early warning systems, preparedness plans, and emergency exercises together with public education and vulnerability analysis. An effective disaster risk reduction initiative should also involve actions related to climate change mitigation, which outcomes might be already observed in the region and that it is likely to produce, more frequently and with increasing magnitude, extreme events including floods, droughts and tropical cyclones.

Another urgent policy initiative is required in the field of urban planning and regulations related to environmental degradation. The negative effects of increase in urban population should be mitigated by strategic city planning, that satisfies the housing demand and other infrastructural, social and economic requirements of new inhabitants including drainage and sewage systems, transport and health services and so forth. In terms of environmental degradation, authorities with the help of other stakeholders should enforce regulations related to building codes and prohibit construction on existing water bodies. The growing awareness and political action is also required in the field of environmental restoration and preservation.

Conclusion

Over the last twenty years, the Indian southern state of Tamil Nadu has been affected multiple times by natural disasters like floods, cyclones and earthquakes. However, during the last two months of 2015, unexpected

weather conditions together with other inter-related determinants produced flooding that caused 354 fatalities, heavy damages to livelihoods and displacement of 1,8 million people.

The November-December 2015 floods demonstrated many complex linkages between human vulnerability and exposure to risk in the context of a changing climate and environmental degradation and supported the hypothesis of the Internal Displacement Monitoring Center about exposure of urban population in India to disaster-induced displacement caused by rapid growth and unplanned development.

The present study shows that the causes of flooding were multiple, and not only due to extreme weather conditions originating in the strongest-ever El Niño, but also emerged from environmental degradation generated by rapid growth of urban areas and unplanned development. Among the most important consequences of rapid urbanization faced by Tamil Nadu was a decrease in the area occupied by bodies of water, which served as natural drainage systems for the region. It may also be attributed to inadequate drainage systems and increase in garbage generation that clogged the waterways and reduced rainwater drainage capacities. However, poor disaster management and the series of man-made mistakes exacerbated the negative effects of flooding.

This natural disaster demonstrated as well that the part of the community with the lowest social-economic status, in majority previous economic and environmental migrants, who live in slums, is the part of the population with the highest exposure to negative impacts of natural disaster and therefore the most displacement-prone part of society.

Unquestionably, the Tamil Nadu 2015 floods showed that a comprehensive policy package is required in areas of disaster risk management with special attention to pre-disaster responses together with regulations to address urban planning and the environmental degradation. The better understanding of risks and effective disaster management of all active stakeholders is crucial to reduce the vulnerability of communities, build regional resilience and achieve sustainable development.

BIBLIOGRAPHY

Reports

ACAPS (2015, Nov 15) India: Floods in Tamil Nadu, Briefing Note, Retrieved from: http://www.acaps.org/sites/acaps/files/products/files/b-acaps-start-bn-india-floods-in-tamil-nadu-15-nov-2015.pdf

Center For Science and Environment (2016) State of India's Urban Water Bodies. Why urban India floods, A Down to Earth Publication.

Internal Displacement Monitoring Center (2015) Risk of disaster-induced displacement in South Asia, Geneva.

Internal Displacement Monitoring Center (2016). Annual report 2015, Geneva.

Oxfam (2016 Mar 2) Oxfam Situation Report Number: 15 (Tamil Nadu cyclone 2015).

Sphere India (2015) Joint Needs Assessment Report Tamil Nadu Floods-2015.

Retrieved from: http://reliefweb.int/sites/reliefweb.int/files/resources/jna-report-tamilnadu-december-2015.pdf

NCDHR, SASY (2015) Tsunami to 2015 floods " No respite for dalits in disaster response, Tamil Nadu" Report of Initial Findings from immediate needs Assesment and Monitoring response towards Affected Dalit Communities.

Articles and Books

Chandramouli, Dr.C (2003) Slums In Chennai: A Profile in Martin J. Bunch, V. Madha Suresh and T. Vasantha Kumaran, eds., Proceedings of the Third International Conference on Environment and Health, Chennai, India, 15-17 December, 2003. Chennai: Department of Geography, University of Madras and Faculty of Environmental Studies, York University. Pages 82-88.

Gupta A.K., Nair S.S., (2011) Urban floods in Bangalore and Chennai: risk management challenges and lessons for sustainable urban ecology, CURRENT SCIENCE, VOL. 100, NO. 11, 10 JUNE 2011.

International Organization for Migration (2014) Migration, Environment and Climate Change: Evidence for Policy (MECLEP) Glossary, Geneva

Judge P.S. (2012) Between Exclusion and Exclusivity: Dalits in Contemporary India, Polish sociological review, number 178, pages 265-279.

Kumaran T., Vasantha; S.D., Rajeswari; N., Annammadevi; J., Nandhini; (2012) Community Engagement in Chennai Slums A Reflection from the Field; Internationales Asien Forum. International Quarterly for Asian Studies.

Vinayakam K., Sekar S.P. (2012) A Study on Characteristics (Socio-Economic) Of Migrants In Chennai City, IOSR Journal Of Humanities And Social Science.

Press Articles

Business Standard (2015, Nov 20) Indian Air Force (IAF) Winds up Relief and Rescue Operations in Flood Hit Tamil Nadu and Andhra Pradesh, Retrieved from: http://www.

business-standard.com/article/government-press-release/indian-air-force-iaf-winds-up-relief-and-rescue-operations-in-115112001064_1.html

CSE India (2015, Dec 3) Chennai in crisis, Retrieved from: http://www.cseindia.org/content/cse-press-note-chennai-crisis

Down to earth (2016, Jan 15) Chennai apart, Retrieved from: http://www.downtoearth.org.in/news/chennai-apart-52265

Floodlist News (2015, Nov 16) India-Tamil Nadu Floods Continue as Death Toll Rises, Retrieved from: http://floodlist.com/asia/india-tamil-nadu-floods-continue-as-death-toll-rises

Floodlist News (2015, Dec 11) The Cost of the Tamil Nadu Floods—347 Lives, 3 Billion Dollars. Retrieved from: http://floodlist.com/asia/cost-tamil-nadu-floods-347-lives-3-billion-dollars

Hindustan Times (2015, Nov 17) Rain batters Tamil Nadu: Rs 500cr relief announced, IAF in action, Retrieved from: http://www.hindustantimes.com/india/rain-batters-tn-jaya-announces-rs-500cr-relief-iaf-in-action/story-RQIQUQzbTUIk7QTcVYRuEN.html

Hindustan Times (2015, Dec 6) Ex-gratia for Tamil Nadu flood victims; focus shifts to relief work, Retrieved from: http://www.hindustantimes.com/india/ex-gratia-relief-for-tamil-nadu-floods-victims-receding-water-brings-trouble/story-809qDsfxZL2176olpu2jfN.html

Hindustan Times (2015, Dec 7) Dalits suffered more than others in flood-hit Cuddalore: Report, Retrieved from: http://www.hindustantimes.com/india/dalits-suffered-more-than-others-in-flood-hit-cuddalore-report/story-TQfazyjyzWfD2tUjZ6qJyM.html

India Today (2015, Dec 2) Chennai declared disaster zone, airport to remain shut till December 6, Retrieved from: http://indiatoday.intoday.in/story/chennai-rains-crisis-may-worsen-as-more-heavy-showers-predicted/1/536708.html

Raghavan, T.C.A. Sharad (2015, Jan 15) Linking urban India to drive growth, Livemint. Retrieved from: http://www.livemint.com/Opinion/VZ2ZW6DSRqTj7PIxbVLcIK/Linking-urban-India-to-drive-growth.html

The Economic Times (2015, Dec 5) Chennai floods echo at Paris climate meet.

India Times, Retrived from: http://economictimes.indiatimes.com/articleshow/50049602.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

The Economic Times (2016, Feb 2) Tamil Nadu response to flood was slow, says central analysis, Retrieved from: http://economictimes.indiatimes.com/news/politics-and-nation/tamil-nadu-response-to-flood-was-slow-says-central-analysis/articleshow/50814594.cms

The Hindu (2012, May 31) District Disaster Management Authority holds its first sitting, Retrieved from: http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/district-disaster-management-authority-holds-its-first-sitting/article3475160.ece

The Hindu (2015, July 5) What drives urbanisation in Tamil Nadu, Retrieved from: http://www.thehindu.com/news/national/tamil-nadu/what-drives-urbanisation-in-tamil-nadu/article7386961.ece

The Hindu (2015, Dec 3) Thousands of residents flee north Chennai ,Retrieved from: http://www.thehindu.com/news/national/tamil-nadu/chennai-floods-latest-updates-relief-rescue-operation-underway-imd-predicts-more-rains/article7944477.ece

The Hindu (2015, Dec 30) Corpn. to spend Rs. 110 crore on road restoration. Retrieved from: http://www.thehindu.com/news/cities/chennai/chennai-rains-chennai-corporation-to-spend-rs-110-crores-on-road-restoration/article8044455.ece

The Hindu (2015, Dec 30) Removal of huts along Adyar river begins, Retrieved from: http://www.thehindu.com/news/cities/chennai/removal-of-huts-along-adyar-river-begins/article8043536.ece?ref=relatedNews

The Indian Express (2015, Dec 14) Chennai floods: The day city went under, who did what—and who did not, Retrieved from: http://indianexpress.com/article/india/india-news-india/chennai-floods-the-day-city-went-under-who-did-what-and-who-did-not/

The Indian Express (2015, December 4) Why Chennai is seeing its worst floods, The Indian Express. Retrieved from: http://indianexpress.com/article/india/india-news-india/chennai-floods-rains-jayalalithaa-imd-reasons-rescue-news-updates/

The New Indian Express (2015, Nov 17) The Day Chennai Drowned: City Experiences 'Sunk Monday', Retrieved from: http://www.newindianexpress.com/cities/chennai/The-Day-Chennai-Drowned-City-Experiences-Sunk-Monday/2015/11/17/article3131878.ece?service=print

The Times of India (2016, May 4) Mind the Dalit-OBC gap in TN, Retrieved from: http://timesofindia.indiatimes.com/elections-2016/tamil-nadu-elections-2016/news/Mind-the-Dalit-OBC-gap-in-TN/articleshow/52103820.cms

The Times of India (2016, Mar 1) Jayalalithaa opens 4,044 Slum Clearance Board tenements, Retrieved from: http://timesofindia.indiatimes.com/city/chennai/Jayalalithaa-opens-4044-Slum-Clearance-Board-tenements/articleshow/51207135.cms

Web Pages

Chennai District, Retrieved from: http://www.chennai.tn.nic.in/

WWF Global, Retrieved from: http://wwf.panda.org/about_our_earth/about_freshwater/intro/

National Oceanic and Atmospheric Administration. What are El Niño and La Niña? Retrieved from: http://oceanservice.noaa.gov/facts/ninonina.html

National Disaster Management Authority Government of India, Functions and Responsabilities, Retrieved from: http://www.ndma.gov.in/en/about-ndma/roles-responsibilities.html

Global Giving, Flood Disaster Response at Tamil Nadu, S. India, Retrieved from: https://www.globalgiving.org/projects/flood-disaster-response-at-tamil-nadu-s-india/

Interviews

Abishek Venkat (2016, Apr 26) Student.

Dhanya Rajendran (2016, Apr 12) Journalist.

Nityanand Jayaraman (2016 May 9) Journalist, Social activist.

Assistance in reconstruction
after the Badakhshan earthquake.

Impacts on displacement and labour mobility in the Pakistani Hindu Kush Mountains.

Arnaud Gilles

Introduction

"Though I live in a tent but I come here every day and sit on rubble of my house. I still feel it and am confident that my sons will rebuild this for me again."

Ms. Gul Nara, Phander, Ghizer District, Gilgit-Balistan, FOCUS, November 2015.

"Pakistan is home to some of the most resilient people I have met; people who have not lost courage and hope in the face of adversity despite having to overcome tragedy and rebuild their lives time and time again. My colleagues and I are confident that they will persevere on this occasion - and we stand ready to support them as they do."

Neil Buhne, Humanitarian Coordinator and UNDP Resident Representative in Pakistan, OCHA, October 2015.

In his statement on the 7.5 magnitude Badakhshan earthquake that struck Pakistan and Afghanistan on 26 October, the UN Resident and Humanitarian Coordinator in Pakistan paid tribute to the Pakistan people's historical resilience to tragedy. Echoing Neil Buhne's words, Ms. Gul Nara, whose house was one of the 500 that collapsed in the Ghizer District of Gilgit-Balistan, highlights the perseverance—even confidence, of Pakistani people in their capacity to recover from disasters.

Although this dialogue rightly suggested that Pakistani livelihoods are particularly prone to diverse tragic phenomena, such as the earthquake on 26 October, it appears to omit the migratory dimension of such phenomena, which often remains hidden behind the strong attachment of the Pakistani to their native area, as shown by rapid reconstruction and recovery in disaster-affected and disaster-prone sites.

Frequent natural hazards such as earthquakes, floods and debris flows, glacier lake outburst floods, and avalanches, are responsible for a large part of what Neil Buhne describes as "tragedy". Since 2010, floods in Pakistan have damaged about 3 million houses and displaced 17 million people. Today, 1.2 million internally displaced persons (IDP) remain in northwestern Pakistan, displaced by complex cumulative and overlapping emergencies (IOM, 2016). This migratory context contrasts with the immediate humanitarian assistance prioritizing the delivery of shelter (tents) and non-food items (NFIs) in the Chitral, Upper Dir and Swat Districts, where estimates of damaged houses reach 47,810 damaged houses, making Khyber- Pakhtunkhwa one of the most affected provinces in Pakistan (PDMA, 2016).

This paper seeks to study the relationship between humanitarian assistance (preparedness, emergency response and recovery programs) and post-disaster mobility: how have government and international humanitarian assistance affected access to mobility for the Pakistani Hindu Kush mountain populations affected by the October 2015 earthquake?

The paper focuses on the Hindu Kush mountain populations affected by the earthquake on 26 October living in the Pakistani Chitral, Upper Dir and Swat Districts, in the Khyber—Pakhtunkhwa province of Pakistan. It begins with a narrative of the events on 26 October, an assessment of the context of natural hazards and disasters in the year 2015 and a presentation of humanitarian challenges for government & international organizations. It then analyses the diverse migratory dimensions of the Pakistani Hindu Kush mountain areas to show that the population of Chitral, Dir Upper and Swat districts, situated at the junction of a diverse vulnerabilities, rely on temporary labour migration as a livelihood strategy A third section (a) analyses the impact of the need for immediate reconstruction on displacement and its temporal & spatial scales; it then (b) examines humanitarian assistance for on-site reconstruction as a promotion of both immediate immobility and access to further labour mobility. The section then (c) reviews the shortcomings of the response of the government and district authorities, in that it created inequalities in the access to reconstruction, the quality of reconstruction, and access to further labour migration. The final part draws general conclusions on the complex context of labour migration in the Pakistani Hindu Kush mountains.

The government and districts authorities' response appeared to mimic the earthquake's effects. By focusing on immediate reconstruction, humanitarian aid-delivery (i) favored immediate immobility and (ii) temporarily shortened the distances and duration of labour migration, in an area where livelihoods usually rely on temporary labour migration. The governments' inadequate compensation policy and aid-delivery created uneven access to reconstruction, hence restricting the prospects of further labour migration. In a risky disaster-prone region where populations rely on labour migration for livelihoods, immobility remains a reality.

The 26 October 2015 Badakhshan earthquake in the context of 2015 natural disasters: a heavy toll and humanitarian challenges

The year 2015 in Pakistan: the heavy toll of natural disasters, and the formation of complex humanitarian challenges.

The 26 October earthquake that struck the Badakhshan province of Afghanistan and affected the Pakistani populations living in the Hindu Kush mountainous region should be viewed in the context of recurrent natural hazards affecting the region, which is particularly prone to hazards such as earthquakes, avalanches, landslides, and other hazards directly related to the climate, such as monsoon floods and droughts.

In both mountainous Afghanistan and Pakistan, natural hazards in 2015 turned into real disasters since they affected vulnerable mountain populations.

On 26 April, a "mini-cyclone" struck Peshawar city and the Khyber—Pakhtunkhwa province, causing the death of 49 people. In July 2015, 100 events of floods and debris flows, and glacier lake outburst floods affected 90 villages in less than 20 days, damaging 80% of Chitral District's infrastructure, resulting in 10,000 new IDPs and leaving 300,00 people stranded, as access roads and bridges were eroded or destroyed. As suggested in reports, many houses in northwestern Pakistan were affected by both flash floods and the October earthquake. Among those houses damaged by the July floods, some collapsed due to the earthquake on 26 October. This made it difficult for humanitarian assistance to distinguish between those populations affected by flash floods and the earthquake (FOCUS Pakistan, 2015).

Between January 2015 and May 2015, a total of 50,000 persons were displaced in 21 Afghan provinces by diverse events, such as heavy snowfall, avalanches, floods and landslides. This exacerbated the natural disaster, with the affected total population in need reaching 235,000 as of September 2015, of which 80,000 were located in the northeastern province of Afghanistan, Badakhshan (IOM, 2015; OCHA, 2016). In Badakhshan, heavy rainfall and snowfall increased the risks of landslides during the three days before 26 October.

Although it occurred soon after the anniversary of the terrible Kashmir earthquake that killed thousands of Pakistanis in October 2005, the 26 October 2015 earthquake occurred in close proximity to the 5.9 magnitude earthquake that struck Badakhshan province on 23 November 2015 and damaged houses in Zebak and Shignan districts, as well as with the 6.2 magnitude earthquake that affected the Afghan Hindu Kush region on 25 December 2015, damaging 16 houses (OCHA, 2015).

The year 2015 was thus particularly notable in terms of natural hazards striking the vulnerable Afghan and Pakistani communities living in the Hindu Kush mountain range. These disasters are expected to increase in intensity and frequency as a result of climate change (PDMA, 2016). The 26 October earthquake must be viewed in the context of complex cumulative emergencies induced by frequent disasters, both sudden- and slow-onset.

A narrative of the 26 October Badakhshan earthquake in Pakistan

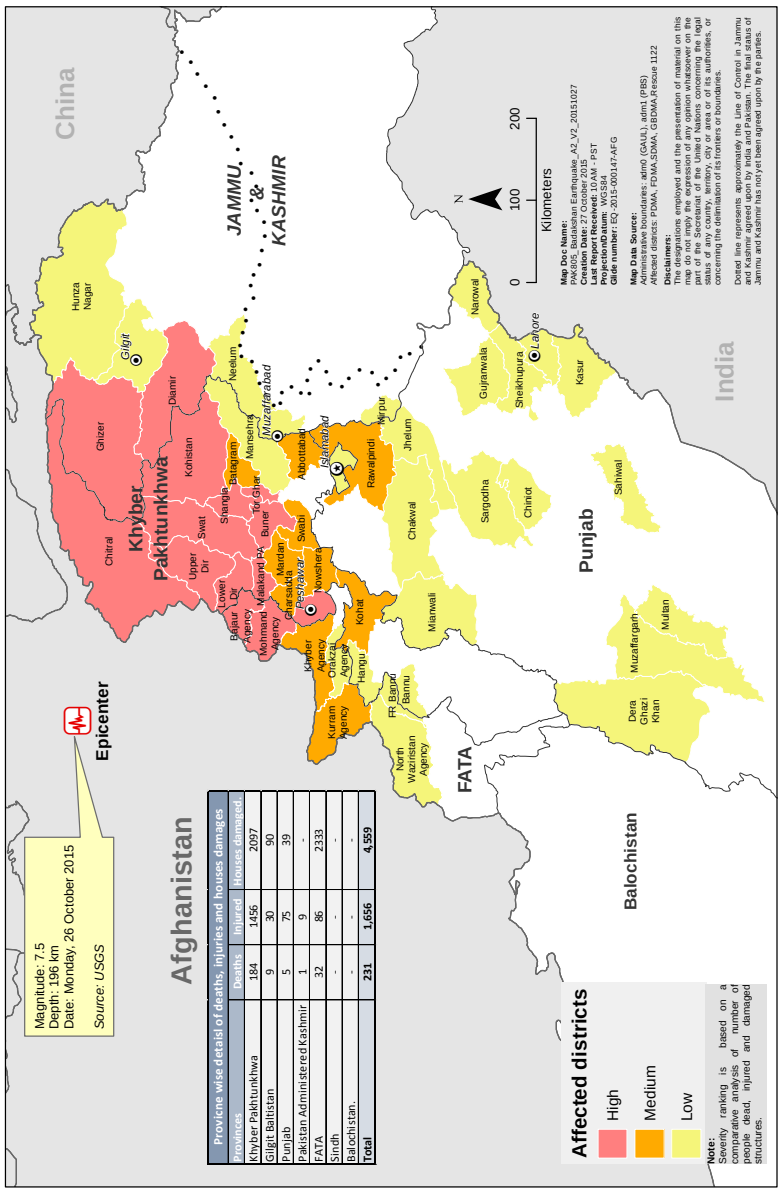
On 26 October 2015, at 9:09 UTC, while cattle were out grazing in the beginning of the afternoon in the northwestern Hindu Kush mountains of Pakistan, an earthquake of magnitude 7.5 on the Richter scale occurred, centred about 200km under the surface of Jurm District in Badakhshan province, in northeastern Afghanistan. The depth of the epicentre, more precisely situated 82km away from Fayzabad, capital of Badakhshan, limited damage since it allowed for the diffusion of the tremors before reaching the surface. The earthquake was felt in all Afghan provinces, but brutally affected the Badakhshan and Khyber-Pakhtunkhwa populations living in the Hindu Kush mountain range. Tremors were felt as far away as India, killing 4 people in Srinagar, triggering panicked scenes and created cracks in buildings in north Kashmir, and leading the New Delhi authorities to evacuate public offices and schools.

Deaths, injuries, and damage to private and public infrastructure in Chitral, Dir Upper & Swat Districts

The toll was much heavier in Pakistan than Afghanistan, particularly for populations living in the Hindu Kush Mountains of Badakhshan and Khyber—Pakhtunkhwa. The national government, district authorities and representatives, working in close cooperation with international humanitarian agencies, launched initial assessment missions as early as the evening of 26 October, in order to assess the damage, humanitarian needs and gaps to be addressed. Although assessment teams met with difficulties when trying to reach remote mountainous areas, against the backdrop of conflict insecurity and the coming harsh winter conditions, they progressively collected precise data on death, injuries, and damage to infrastructure and livestock, covering most of the areas affected by the earthquake in the Hindu Kush mountains.

The 26 October earthquake affected 16 of Afghanistan's provinces (OCHA, 2016). Although local authorities initially reported 5,700 affected families, 105 deaths and 405 injuries, the International Organization for Migrations (IOM) in Afghanistan, had assessed 14 provinces and 17,288

Map 1. Affected districts in Pakistan (as of 27 October 2015).



Source: OCHA, 2015.

families as of 5 November 2015, with 102 deaths, 487 injuries, 10,165 houses destroyed and 6,547 partially damaged houses (IOM, 2015). By the end of December, the UN Office for the Coordination of Humanitarian Affairs (OCHA) reported that the earthquake had completely or partially damaged 18,600 houses, leaving 130,100 people required humanitarian assistance in Afghanistan (OCHA, 201).

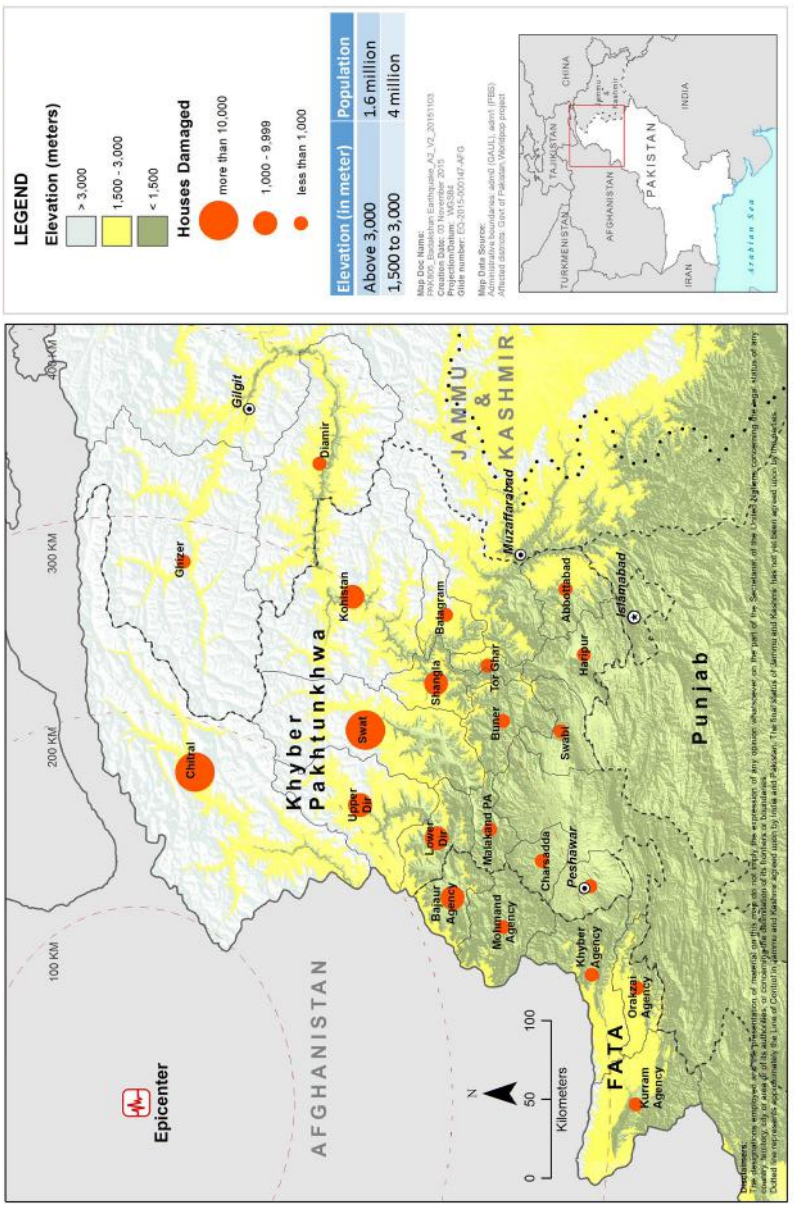
In Pakistan, the Federally Administrated Tribal Areas (FATA), Gilgit—Balistan and Khyber—Pakhtunkhwa provinces were the most affected. As of 4 November, the estimated number of damaged houses reached 94,548, while 30% of Khyber—Pakhtunkhwa populations were reported to be affected by the earthquake (NDMA, 2015). Damage in Chitral district was significant, and 34 people died due to rock falls (FOCUS Pakistan, 2015) and 18,000 houses were reported to be damaged (NDMA, 2015). 8 valley roads and bridges were destroyed or eroded, while many schools buildings, health facilities, shops and irrigation water systems collapsed or sustained significant damage. In both Chitral District and Giglit-Balistan province, 1,200 cattle sheds collapsed, burying winter stocks of fodder for livestock. Cattle loss was limited since the earthquake occurred when they were out for grazing (FOCUS Pakistan, 2015). The earthquake affected the Dir Upper and Swat Districts in a similar fashion, with 16 and 36 deaths, and 16,352 and 12,159 damaged houses, respectively.

Northwestern Pakistan and Hindu Kush mountain populations at the junction of vulnerabilities.

Geography, climate and population distribution in Chitral, Upper Dir and Swat Districts.

Chitral, Upper Dir and Swat Districts, which constitute the geographical scope of the present study, all show specific common geographical features: they are districts touched by the Hindu Kush Mountain range which plays a great role in the region's population distribution. The districts affected by the 26 October earthquake are located in northern and central Khyber—Pakhtunkhwa and in eastern Gilgit—Balistan. They are together home to 4 million people living at an altitude ranging between 1,500 and 3,000 meters. 1.5 million people live at and above an altitude of 3000 meters (OCHA, 2015). The land in these three districts is covered by rocks, forest and in much greater proportion by glaciers. The winters are especially harsh and long in northwest mountainous Pakistan: negative temperatures, heavy snowfall and the increasing risk of avalanches and land-slides cause the closure of

Map 2. Population by elevation in affected areas.



Source: OCHA, 2015

the main roads connecting Chitral Districts to the rest of the country, such as the Lowari Pass.

Populations living in the Hindu Kush range in Chitral, Upper Dir and Swat Districts hence also share common vulnerabilities. They all experienced the direct impact of the earthquake, which was particularly damaging in northwestern mountainous areas, and the humanitarian assistance delivered. As shown by the OCHA map below depicting the elevation and the number of houses damaged per district, the vulnerability of buildings to the earthquake seems to go hand in hand with elevation and remoteness.

Temporary labour migration as a lifestyle: the diversity of migratory patterns.

The particular geographical and climate conditions of the Hindu Kush Mountain range in Pakistan, which lead to the degradation of resources and food insecurity, offer limited livelihood options and encourage diverse labour migratory patterns.

If labour migration from the Hindu Kush highlands appears to be an old phenomenon, the context and drivers of temporary labour migration have significantly evolved over time. The dynamic demographic growth of mountain populations, the resulting pressures on arable lands, the highlands' lack of employment and limited agricultural productivity, and the lowlands' significant employment opportunities have long driven the inhabitants of the highlands to look for temporary employment in lowland urban areas, or to permanently settle elsewhere. Seasonal cattle grazing has also been a historical driver of temporary labour migration (Olimova and Olimov, 2007). Today's widespread internal and international mobility is a phenomenon that also applies to the Hindu Kush mountain populations in northwestern Pakistan: the development of roads, bridges, electricity grids and resulting advances in communication technologies have connected mountain villages to lowland urban areas. In this light, mountain workers' temporary migrations should be seen as an output of both historical trends and the globalization of migratory schemes.

Temporary labour migration should also be seen as part of mountain livelihoods. As highlanders have traditionally relied on livestock and agriculture for livelihoods, labour migration has become a critical input for local mountain development, through financial and social remittances. Labour migrants from mid-altitude regions such as the Pakistani Northern Punjab tend to have a medium level of professional skills, with some of them employed in trade activities. On the contrary, migrant workers from higher altitudes, such as the lands of the Hindu Kush region, tend to have lower

levels of education and professional skills, and thus occupy manual professions. Although they receive a fraction of local workers' wages, workers from the highlands still appear to play a significant role in the mountains' livelihoods, reducing poverty and promoting socio-economic development. In the Afghan and Pakistani Hindu Kush mountains, labour migration allows mountain households to acquire new knowledge, skills and technologies. "Social remittances" are evident in improved gender equality, and in the higher prioritization of education and healthcare observed in migrant households (UNAMA, 2008; IOM, 2005). "Financial remittances" appear to be one of the most important income contributions to mountain livelihoods, and are often directly used by migrant households to provide themselves with basic food, water, clothing and houshold needs. Half of households in Khyber—Pakhtunkhwa rely on financial remittances to survive, while remittances constitute the exclusive source of income for some (Steinman, 2005; ICIMOD, 2009). Historically, social and financial remittances have appeared to be less volatile than development aid, and to reach local communities more directly than foreign aid and as such plays a key role in improving mountain people's resilience to prepare to and recover from frequent natural disasters. In Khyber—Pakhtunkhwa province, households receiving remittances were able to invest in safer housing (cement instead of mud) that made their houses more resilient to the Kashmir earthquake in October 2005. Migrant households' livelihoods were also less affected than other households (Steinman, 2005; ICIMOD, 2009).

Temporary migration from Pakistani Hindu Kush mountain areas comprise a significant diversity of patterns. The literature on labour migration in the Hindu Kush tends to emphasize the cyclicality and seasonality of migrations. However, expertise provided by the IOM Shelter Coordinator in North Pakistan, Badel Awan,[1] showed that labour migration is diverse, occurs throughout the whole year, and corresponds to both short and long-term strategies: while many migrant workers leave their homelands for several weeks, some migrate daily to relatively close work places, and others migrate for much longer periods. The duration of migratory patterns not only depends on the distance to the closer main city, but also on the employment opportunities encountered by workers once they arrive, as Badel Awan explains "if they got a good job, then they will prefer to live in the city but without their family". However, these diverse patterns share certain common trends: (1) Migration is firstly urban, with people from Chitralese and Dir Upper/Swat mostly going to the Peshawar urban area. (2) Cultural attachment to the native area very often prevents

[1] Interview with Badel Awan, IOM Shelter Coordinator for North Pakistan, conducted on 30 March 2016, Skype.

workers from settling permanently in urban areas, making labour migration often temporary. (3) As Badel Awan notes, labour migration is strongly gender oriented: "only men migrate, due to cultural constraint", as "the decision is mostly taken by men, the head of the family". (4) Last but not least, migrant workers tend to send most of their savings to their families, after their daily life expenditures (Ali et al., 2014).

Conflict affected mountainous areas.

The diverse migratory patterns described above should be considered in the context of significant internal and transnational conflict-induced flows of people, especially between Afghanistan and Pakistan. The term AfPak, introduced by the American diplomat Richard Holbrooke to provide the Obama administration with a theoretical framework for military strategy, could be helpful in thinking about conflict-associated migration in north-western Pakistan. Conflict displacement has long generated migratory flows across the Durand line, making it necessary for government and humanitarian strategies to consider the region as one single migratory system. Conflict-induced displacement was particularly significant in 2015, both in terms of people fleeing violence and returns of Afghan refugees from Pakistan to their native country. As of July 2015, 1,800,000 were estimated to be internally displaced by conflict in Pakistan (IDMC, 2015). From January to September 2015, 197,000 Afghans left their homes fearing violence and insecurity, which constituted an increase of 64% compared to 2014. At the end of 2015, 225,000 Pakistani and Afghan people fleeing North Waziristan had congregated in southeastern Afghanistan (OCHA, 2016). The number of Afghan returnees from Pakistan was particularly high in 2015: as of November 2015, 83,128 undocumented Afghans had returned voluntarily from Pakistan to Afghanistan while 11,914 had been deported from Pakistan (IOM Afghanistan, 2015). In November 2015, IOM was able to assist 46% of returnees and deportees crossing the Torkham border from Pakistan. As of January 2016, 235,000 people were displaced by natural disasters, while refugees and vulnerable returnees from neighbouring countries, such as Pakistan, numbered 362,000. Conflict and natural disasters hence together explain the situation of food insecurity and poor healthcare, resulting in 82% of the Afghan population being in need of humanitarian assistance (OCHA, 2016).

In this light, the 26 October earthquake occurred in a context of diverse overlapping and intertwined vulnerabilities, comprising both the background of temporary labour migration and specific displacement in 2015. The challenge for government and humanitarian organizations appeared to

be two-fold: to recognize migration in the Hindu Kush as a complex multi-causal phenomenon, and not to attempt to settle down populations that would usually migrate temporarily for labour purposes, as such mobility is critical to mountain livelihoods and disaster recovery.

Earthquake and humanitarian assistance: direct and humanitarian-induced shifts in temporary labour migrations.

The Pakistani government, supported by the army, national and provincial agencies, international organization humanitarian coordinator offices, and both local and international NGOs took many steps to provide the affected populations of Chitral, Upper Dir and Swat districts with humanitarian assistance. The shift in the temporal and geographical patterns of labour migration is the result of both (1) the need for immediate reconstruction before the advent of harsh winter conditions and (2) governmental compensation strategies to promote reconstruction. This third section assesses both the immediate and indirect impacts of the October earthquake on labour migration, through humanitarian response strategies.

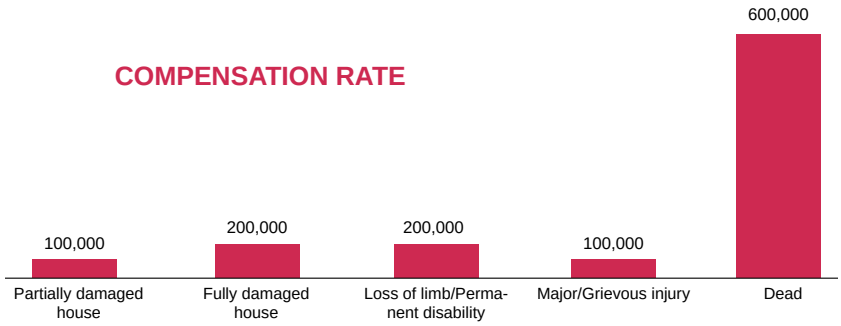
Humanitarian assistance: actors and difficulties of aid-delivery.

Early response to the 26 October earthquake involved a wide range of different actors, especially in Chitral, Upper Dir and Swat districts, where the number of governmental, non-governmental and international organizations was relatively high, varying slightly according to the severity of the damage and the number of deaths and injuries. In Chitral and Upper Dir, 7 NGOs were involved in aid delivery. In Swat district, between 5 and 6 NGOs were involved in earthquake response. Among the main NGOs involved in field assessment and assistance delivery were Aga Khan Development Network (AKDN), Muslim AID, Care International, Human Concern International, Custom health Care and Relief International (OCHA, 2015).

At the national level, the government mobilized the Pakistani Army as well as the National Disaster Management Authority (NDMA) and the Khyber-Pakhtunkhwa Provincial Disaster Management Authority (PDMA KP). While the Pakistani Army provided technical and material support to the relief operations, the NDMA played an important role in coordinating the assessment of damage and the delivery of humanitarian assistance. At the Provincial level, the Khyber-Pakhtunkhwa PDMA's Operation Centre authorized Districts Disaster Management Units (DDMAs) to mobilize relief funds, assess damage and estimate needs for financial compensation. This allowed the government of Pakistan to announce, on 28 October, at

the Governor House of Peshawar, the details of a compensation package for households affected by deaths, injuries and structural damage (PDMA KP, 2016). Provided on a 50/50 basis by national and provincial authorities, compensation for death and injuries, of 600,000 and 200,000 rupees respectively, was announced, to be distributed before 31 October. Compensation for partially or fully damaged houses was supposed to be distributed once Districts and Pakistani Army representatives had verified compensation needs case by case.

Table 1. The government's compensation package in detail



Source: PDMA Khyber—Pakhtunkhwa, 2016.

Although the government did not make any official requests for international assistance in relief efforts, international relief agencies such as the Office for the Coordination of Humanitarian Affairs in Pakistan (OCHA) and the International Organization for Migration Pakistan (IOM) quickly launched assessment and aid-delivery teams. OCHA teams were sent to Upper Dir and Swat districts to assess damage and gaps in response, conduct interviews with those affected and meet local officials. In Chitral district, FOCUS Humanitarian assistance (an affiliate of the AKDN) deployed Disaster Assessment Response Teams (DARTs) and supported the Community Emergency Response Teams (CERTs) who had been trained to provide first aid in remote areas, by distributing tents and blankets (FOCUS Pakistan, 2015).

The main obstacle to assessment and relief efforts came from the remoteness of scattered affected villages of Chitral, Upper Dir and Swat districts, with damaged roads and bridges making it more difficult to access these areas. Extreme weather conditions both constituted an additional obstacle to humanitarian assistance and added to the risks for affected populations: hygiene, health risks and food insecurity (PDMA KPM, 2016).

The impact of the earthquake on labour migration: returning, staying or working closer to home.

As the Humanitarian Operations Manager at the IOM in Islamabad Ammarah Mubarak, stated "significant displacements were not reported following the 2015 EQ in Pakistan".[2] This statement is fully coherent with the study of the literature on the 26 October earthquake, from which very little can be found on mobility associated with the earthquake, as of March 2016. However, this may be the result of both a lack of hindsight due to the temporal proximity of the earthquake, and incomplete situation assessment due to the difficult nature of the terrain for relief operations.

Local & temporary displacements: the need for reconstruction

A study of situation reports from relief operations and discussion with humanitarian operation professionals helped to identify two trends in migratory patterns associated with the earthquake: displacement from damaged houses was local and temporary (FOCUS Pakistan, 2015; PDMA KP, 2016). Ammarah Mubarak explained that "critical needs highlighted by data collection exercises and needs assessment indicated damage to housing and other infrastructure with families continuing to reside within their community or locality in most instances".[3] November 2015 assessments from FOCUS' DARTs in Chitral district reported that "many not directly affected families warmly welcome the affected families to host them in their houses for weeks to months".[4] While people were physically displaced by the loss of their house and the need to find new, at least temporary, accomodation, most of them seemed to remain in the same village. The local scale of displacement is confirmed by Badel Awan, who explained that most of affected people "stayed in the same village with their relatives or nearby villages".[5] Hence displacement induced by the earthquake's damages was mostly internal to villages, and have to be studied through a very local approach.

Responding to the question "Why did the Chitral flash floods of July 2015 displace 10,000 people while the 26 October earthquake did not cause

[2] Discussion with Ammarah Mubarak, IOM Humanitarian Operations Manager in Islamabad, 31 August 2016, email.

[3] Discussion with Ammarah Mubarak, IOM Humanitarian Operations Manager in Islamabad, on 31 August 2016, email.

[4] Focus Humanitarian Assistance Pakistan, Earthquake Rapid Damage and Need Assessment Report, District Chitral in KP and Gilgit-Balistan, November 2015.

[5] Interview with Badel Awan, IOM Shelter Coordinator for North Pakistan, conducted on 30 March 2016, Skype.

significant displacement?", Badel Awan answered: "during the floods (*of July*), they lost their home places (*building ground)*, they shifted to nearby villages and came back after a few weeks. With the earthquake, they haven't lost their place". This last sentence could also relate to the cultural attachment of people to their land. Damage or the loss of homes, described by the government's binary compensation system as "partially/fully damaged", did not prevent affected families from staying in their homeland. As long as the land had not been destroyed, and as long as new houses could be built on the ground, people in North Pakistan seemed to chose to stay. This is precisely the perspective of reconstruction that seems to make displacement temporary, ranging "from two to four weeks" according to Badel Awan. It appears that mountain people's long term perspective of a sedentary lifestyle led to temporary and local migratory patterns.

Reconstruction and impacts on labour migration

The perspective of reconstruction, all the more critical for mountain people as it needed to be done before the coming of the harsh winter conditions, did not only induce short term and short distance displacements; reconstruction itself also triggered a shift in labour migration in the region.

As stated in Khyber-Pakhtunkhwa PDMA's Earthquake Recovery Plan 2015, "Most of the migrant workers have returned home to take care of their family members and rebuild houses" (PDMA KP, 2016). This assessment of migration associated with the 26 October earthquake raises awareness regarding migration that needs to be distinguished from local (internal to village) temporary displacement: the need for reconstruction appears to have affected labour migratory schemes, out of affected villages.

On the poorly documented subject of post-disaster labour migration, Badel Awan's observations provided a greater degree of clarity on the shifts in labour migration directly associated with the earthquake. The need for post-disaster reconstruction had multiple effects on labour migration: (1) it led migrant workers to come back from urban areas to help in reconstruction. (2) Reconstruction also induced temporary immobility among migrant workers: although they would usually move to find employment opportunities in urban areas, labour migrants had to help with reconstruction before leaving their village. (3) Migratory patterns, for those who continued to migrate for work, shifted to shorter distances and shorter periods. Following his visits to Chitral and Swat districts to assess and coordinate IOM Pakistan' shelter assistance program, Badel Awan

explained, "As they (*migrant workers*) lost their house, they preferred to work nearby".[6]

Although these shifts were empirically observed in the context of the IOM Shelter Coordinator's visits to Chitral and Swat districts, there is still no clear estimation of the number of post-disaster labour migrants returning to mountain villages, staying to support reconstruction efforts and moving to urban areas. There is also great uncertainty regarding the middle to long-term effects on labour migration. On the grey area surrounding long term migration, Badel Awan contends that patterns will depend on employment opportunities encountered by workers: "if they get a good job then they will prefer to live in city", which could reflect the return of employment opportunities as the dominant driver of labour migration. In this respect, the 26 October earthquake's main impact on migrant workers would be to deviate migratory patterns from their main drivers; as long as damaged houses were being reconstructed and affected populations were adapting to post-disaster environment, it appears that labour mobility was driven by the need to help with their homeland's reconstruction efforts.

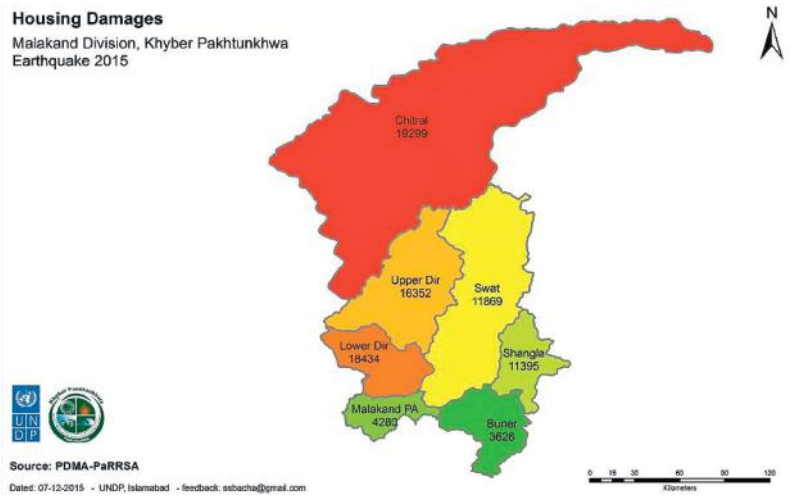
Housing conditions and challenges around reconstruction.

Different housing conditions were reported by humanitarian assessment teams in Chitral, Upper Dir and Swat districts: OCHA assessment teams reported that almost all the buildings visited in Swat districts were poorly resilient structures, with walls entirely made of mud, and roofs made of wood frames covered with mud. In the villages in Dir district visited by assessment teams, a much greater proportion of houses had been built using bricks and concrete, although the majority of buildings were made of mud. Differences in construction methods impacted the way houses were affected by the earthquake: as observed by assessment units in Dir districts, "all the collapsed houses (...) observed in the village are mud houses".[7] Hence poorly resilient mud structure vs. concrete/bricks buildings was a critical criterion when explaining the differences in damage to house between districts mapped below (OCHA, 2015).

[6] Interview with Badel Awan, IOM Shelter Coordinator for North Pakistan, conducted on 30 March 2016, Skype.

[7] OCHA, November 2015, OCHA Mission Report to earthquake affected areas of Dir (Lower & Upper) and SWAT, 11-13 November 2015.

Map 3. Housing damage across affected districts



Source: PDMA KP, 2016.

While the vulnerability of housing to tremors depends on construction methods, the materials and methods used for construction must themselves be seen in the context of financial and social conditions: knowledge, awareness and financial means are critical determinants of housing structures. Socio-economic conditions are all the more important when it comes to reconstruction, as reconstruction of a mud-made room is less expensive than using brick/concrete, and requires ten days of labour only. Lack of financial means and low awareness combined with the advent of harsh winter conditions explains why 60% of the houses spontaneously reconstructed by Dir inhabitants in early November were made with mud (OCHA, 2015).

In light of building conditions in the mountains, the objective of humanitarian assistance in reconstruction was to (1) provide affected populations with adequate compensation packages along with education campaigns that promote safe reconstruction methods, and (2) to create an environment favouring labour temporary migration that was shown to increase populations' resilience to disasters. These objectives seemed difficult to achieve when OCHA teams observed in November 2015 that Swat villages as Akhoun Baba showed almost exclusive mud-reconstruction as compensation was assessed as being low and ineffectively distributed (OCHA, 2015).

Humanitarian assistance in reconstruction and mixed consequences on temporary labour mobility.

"Many of the villagers with capability in terms of available work force and finance do initiate repairing or constructing their houses within days of aftermath of the disaster". Although this observation from FOCUS DARTs is fully consistent with what Badel Awan calls a "very high self-recovery rate", it appears that many villagers benefited from humanitarian assistance in Chitral, Swat and Upper Dir districts, although "just didn't wait in these areas for external help" (FOCUS Pakistan, 2015). The relationship between humanitarian assistance, affected mountain populations and labour migration was not uniform, but made up of complex interactions between the "usual" determinants of migratory phenomena (geography, employment opportunities) and new conditions disrupted by damage. In this respect, it appeared that the government response, through material and financial support for reconstruction, created uneven access to recovery and to further labour migration, a critical part of mountain livelihoods.

One natural hazard, a two-fold disaster?

Different geographical conditions induced varying degrees of access to reconstruction and to assistance in reconstruction. As observed by OCHA teams when visiting Upper Dir district, damage suffered by inhabitants of the high altitude Koti Bastu village were more significant "because there was no 'neighbor' to provide shelter, and at the same time bringing construction material and food items was very difficult and in most cases only possible using mules and donkeys."

As a consequence of the difficult access to mountainous terrain, OCHA team reports noted, as of November 2015: "the level of assistance from the government to Upper Dir has been very limited so far".[8] An interview with IOM's Shelter coordinator for North Pakistan highlighted that the expectation of humanitarian assistance was playing a role in determining both migration and migratory perspectives, and expectations seemed to depend on the geographical location: "the villages down (*in the valley*), they think they will get assistance and mostly they shifted their families with their relatives".[9] As they assumed there was going be quick and effective humanitarian assistance in reconstruction, some migrant workers in low-lying

[8] OCHA, OCHA Mission Report to earthquake affected areas of Dir (Lower and Upper) and SWAT, 11-13 November 2015.

[9] Interview with Badel Awan, IOM Shelter Coordinator for North Pakistan, conducted on 30 March 2016, by Skype.

mountain areas appeared to pursue temporary migration as usual, while the rest of the family was "unusually displaced" from their damaged house.

Differing degrees of remoteness and accompanying means of communications created uneven humanitarian assistance delivery, and led to different perspectives on labour migration and the actual ability to move; in remote and damaged mountainous terrain, reconstruction would require more time and material/financial means. However, the impact on temporary labour migration appeared to be unclear. As explained by the interviewee, families living in remote areas with scattered houses, having no place to shelter "preferred to migrate towards main cities", where men—"the head of the family"— "shifted their families to rental houses". The lack of access to shelter and reconstruction hence seemed to induce a shift from exclusively male labour temporary mobility to long-term displacement of the whole family. Analyzing such impacts on migration requires more data, which is currently being collected by IOM and the Food and Agriculture Organization (FAO) in Chitral and Swat districts.

All things considered, the 26 October earthquake—one single natural hazard—caused several different disasters, since it affected mountain populations in many different ways. This suggests that material and social vulnerabilities are critical determinants of a natural hazard's scope of damage.

Inadequate government compensation packages

In addition to the vulnerability of mountain populations, the government's inadequate response provided uneven assistance in reconstruction. It also set the scene for unequal access to further labour mobility.

This firstly had to do with the difficulty in accessing remote rugged terrain; affected families in remote high altitudes with no social support from neighbours or geographically close relatives could not rely on humanitarian assistance, which, as a result of harsh weather conditions and rocky and icy terrain, stuggled to reach scattered, sometimes not clearly located populations. As seen above, reliance on humanitarian assistance could be a critical determinant of labour mobility.

However, the mixed effects of humanitarian assistance on labour mobility mainly came from the inadequate compensation package proposed by the government. Announced in Peshawar on 28 October, the compensation package showed shortcomings in its attempt to compensate every household, and in its distribution. The "one-door" compensation policy allocated one compensation package per house. Whether the houses were fully or partially damaged, resulting in a level of compensation of 200,000

and 100,000 rupees respectively, compensation did not take into account the number of families or houses found behind one single common door. In Swat district, the house in the village of Akhoun Baba are often gathered into family compounds of between two and four houses, thus, as a result of the single shared entry door, several families received one single compensation cheque. The "one-door" policy was also an issue in that it ignored the size of the room. As reported by OCHA assessment teams in November 2015, this created conflicts and disputes, sometimes internal to families, for instance between married brothers living in separate houses of the family-compound (OCHA, 2015).

Even for one family, the compensation of 200,000 rupees for fully damaged houses, and of 100,000 rupees for partially damaged houses, was observed to be insufficient. This triggered the development of negative coping strategies, such as the reduction of food consumption to be able to buy construction material, or re-building of houses with cheap and unreliable material (using mud instead of bricks).

The binary system of compensation distinguishing between *fully* and *partially* damaged houses did not account for the reality of damages and further risks for affected households.

Among the non-collapsed houses, considered as partially damaged, some were heavily damaged, and needed to be fully reconstructed, as they were no longer safe for habitation. The level of compensation of 100,000 rupees appeared largely insufficient in these cases.

Finally, a lack of coordination between the government and district authorities constituted a significant shortcoming in the implementation of a package that was supposed to be supported on a 50/50 basis by both national and provincial governments. As explained in reports by OCHA teams on 13 November 2015, "district authorities informed that they *were* not aware of any written guidelines/ rules / policy governing (...) the compensation process." (OCHA, 2015).

By providing unequal, inadequate and insufficient access to reconstruction, humanitarian assistance may have promoted unequal access to further labour mobility. More data on post-disaster labour migration needs to be collected in order to assess the way post-disaster reconstruction affected long-term labour migration.

Labour migration and natural hazards in Pakistani Hindu Kush: conclusions.

The humanitarian response to the earthquake, from both government and relief agencies, focused on the distribution of winterized shelters, clothes,

blankets and tents (non-food items, or NFIs), as well as food items, to compensate for the loss of food stock that had been buried under the debris by the earthquake. The humanitarian response addressed the challenge of urgent reconstruction before the onset of the harsh winter weather conditions in quite a mixed way. An analysis of the humanitarian response, along with its identified shortcomings, allows us to make several conclusions, in particular in the Hindu Kush context of overlapping vulnerabilities and reliance on temporary labour mobility.

Migration as a multi-causal phenomenon, requiring inclusive response to natural disasters

An analysis of aid delivery following the earthquake suggests that migration seemed to be considered as being beyond the scope of the humanitarian mission to assist victims. Mobility did not appear to be a phenomenon to take into account nor to accompany, promote or inhibit. The 26 October earthquake indeed induced limited immediate displacement, often internal to villages.

In the context of the overlapping vulnerabilities of Pakistani Hindu Kush areas, migration is often more associated with populations fleeing violence and insecurity. As an illustration, OCHA Afghanistan's Humanitarian Needs Overview 2016 begins with the case of the "September (2015) battle for the provincial capital Kunduz".[10] The introduction made no mention of natural disasters, although 235,000 Afghans were affected by natural hazards at the time (OCHA, 2016). Mobility in northwestern Pakistan is the result of diverse intertwined factors ranging from the Taliban insurrection to sudden damaging natural hazards, including climate-related slow onset phenomena as well as regional conjunctures, leading 1.5 million Afghan to take refuge in Pakistan. As a consequence, humanitarian emergencies including malnutrition, health and public health risks are built on interrelated factors, including migratory flows, which are themselves already multi-causal. Humanitarian assistance strategies must thus also address risks, needs and migration as multi-causal. Efforts to identify drivers of migrations and factors of crisis are critical to construction an effective humanitarian response.

Migration covers diverse patterns, some being critical to mountain livelihoods

Migration in Hindu Kush mountain areas covers different spatial and temporal scales, including some which are micro-local and daily. Families

[10] OCHA Afghanistan, Humanitarian Needs Overview 2016, January 2016.

whose house collapsed after the earthquake were either hosted by their neighbours in the same village or moved to rented houses, can be considered as internally displaced persons, since they met the criterion of "people who have been made homeless by natural disasters", "considered as IDPs" by the UN High Commissioner for Refugees.[11]

Temporary labour migration plays a key role in supporting mountain livelihoods. Although the losses induced by people's departure can negatively impact local living standards, labour migration has been shown to be a critical contributor to economic and social development in mountain regions, which also improves communities' resilience to natural disasters. Labour migration can thus be seen as a disaster adaptation and recovery strategy.

Interlinked migratory and sedentary perspectives: labour migration and immobility as response strategies

If migration should be promoted as an adaptation strategy, so should immobility, here understood as the temporary interruption of a migratory lifestyle. By staying, moving closer and for shorter periods to help in reconstruction, populations usually moving for work appeared to temporarily change their migratory lifestyle in order to secure a long-term sedentary lifestyle while ensuring their future ability to move. Such responsiveness of immobility and migration strategies calls into question the binary representation of sedentary vs. mobile lifestyles.

Preparedness and education are particularly beneficial to vulnerable remote areas.

High altitude areas appeared to be more severely impacted by the earthquake, since remoteness made it more difficult to shelter and re-build. Humanitarian delivery of food and NFIs took a great deal of time and remained difficult for most relief operations, in the context of the onset of winter. Preparedness hence appears critical in helping communities to react quickly, and reduce their reliance on uncertain aid-delivery. The pre-positioning of stockpiles of relief items (blankets, tents, clothes, and winter equipment) is a first step that has already been shown to critically improve mountain communities' recovery capacity. Education also provides mountain communities with the ability to identify risks, and safe and unsafe sites for sheltering and re-building. Both two DDR measures implemented by relief-agencies and authorities, after the 26 October earthquake, are especially critical to recovery in high altitude areas.

[11] UNHCR Internally Displaced People website: http://www.unhcr.org/pages/49c3646c146.html

Migration is a widespread phenomenon covering a wide range of diverse events. Of all the drivers and realities it encompasses (displacement, evacuation, relocation or sheltering in neighbours' houses), governments and international agencies working on migration governance have long largely restricted their focus to displacement across borders induced by persecution, only recently extending its scope to the internally displaced people. This paper's analysis of the 26 October earthquake in Badakhshan highlights the need for a better understanding of micro and local displacements, and of the impact of reconstruction assistance on labour mobility. Further research on labour mobility in the Pakistani Hindu Kush Mountain will be critical in order to provide adequate and effective humanitarian response to hazards magnified by climate change.

BIBLIOGRAPHY

Articles & Reports

Akhtar Ali, Rashid Khan and Mussawar Shah, December 2014, Socio-Economic Analysis of the Migrant Laborers in District Chitral, Pakistan, PUTAJ—Humanities and Social Sciences, Vol. 21, N°2.

Boone, Jon, 2015, "Strong earthquake in Afghanistan kills more than 150 people", The Guardian, Monday 26 October 2015 http://www.theguardian.com/world/2015/oct/26/earthquake-of-77-magnitude-strikes-in-northern-pakistan (Accessed the 29 March 2016).

Central Statistics Organization, ICON Institute, 2016, Afghanistan Living Conditions Survey 2013-14 -National Risk and Vulnerability Assessment. Kabul, CSO.

FOCUS, August 2015, Rapid Need and Damages Assessment Report District Chitral.

FOCUS, November 2015, Earthquake Rapid Damage and Need Assessment Report District Chitral in KP and Gilgit-Baltistan.

HFU, OCHA;AGCHO, January 2016, Afghanistan Common Humanitarian Fund 2015.

Brigitte Hoermann, Michael Kollmair, 2009, Labour Migration and Remittances in the Hindu Kush-Himalayan Region, ICIMOD Working Paper, Kathmandu, Nepal.

IDMC, 2015, Pakistan, Country Overview, http://www.internal-displacement.org/south-and-south-east-asia/pakistan/ (Accessed the 15 August 2016).

IMDC, 2015, Pakistan IDP Figures Analysis, Figures Analysis, http://www.internal-displacement.org/south-and-south-east-asia/pakistan/figures-analysis(Accessed the 15 August 2016).

IDMC, 2016, Afghanistan, Country Overview, http://www.internal-displacement.org/south-and-south-east-asia/afghanistan/ (Accessed the 28 March 2016).

IMDC, 2016, Afghanistan IDP Figures Analysis, Figures Analysis, http://www.internal-displacement.org/south-and-south-east-asia/afghanistan/figures-analysis (Accessed the 25 March 2016).

IOM, 2001, Glossary on Migration, International Migration Law Series No. 25.

IOM, June 2015, Afghanistan Newsletter, Spring 2015.

IOM, September 2015,Afghanistan, North Waziristan Displacement Response.

IOM, October 2015, Afghanistan Earthquake, Situation Report 28th October 2015.

IOM, October 2015, Afghanistan Earthquake, Situation Report 30th October 2015.

IOM, October 2015, IOM Completes Flood Protection Walls in Afghanistan's Nangarhar, Kunar, Press Release. 20 October, https://www.iom.int/news/iom-completes-flood-protection-walls-afghanistans-nangarhar-kunar

IOM, November 2015, Afghanistan Earthquake, Situation 5th November 2015.

IOM, November 2015, Return of Undocumented Afghans from Pakistan - Update as of 30 November 2015.

IOM, USAID, November 2015, Humanitarian Weekly Report—IOM Afghanistan Humanitarian Program, 26 October-15 November 2015.

IOM, December 2015, Ministry of Refugees and Repatriation and IOM Mark International Migrants Day in Kabul, Press Release. 18 December, https://afghanistan.iom.int/

press-releases/ministry-refugees-and-repatriation-and-iom-mark-international-migrants-day-kabul

IOM, December 2015, IOM Humanitarian Compendium Afghanistan, Last update 12/10/2015 http://humanitariancompendium.iom.int/afghanistan/2015

IOM, February 2016, 125 Afghan Nationals Voluntarily Return Home from Germany with IOM Support, Press Release. 24 February, https://www.iom.int/news/125-afghan-nationals-voluntarily-return-home-germany-iom-support

IOM, March 2016, IOM Humanitarian Compendium Pakistan, Last update 03/08/2016 http://humanitariancompendium.iom.int/pakistan/2016

Mullen Jethro, Struggle to reach hard hit areas as death toll from South Asia quake tops 340, CNN, October 28 2015, http://edition.cnn.com/2015/10/27/asia/afghanistan-pakistan-earthquake/ (Accessed the 10 March 2016).

OCHA, September 2015, Afghanistan Third Quarter Report Jan- Sep 2015—HRP financing, achievements and response challenges.

OCHA, October 2015, Resident and Humanitarian Coordinator (designate) Neil Buhne Statement on the Badakshan Earthquake 29th October 2015.

OCHA, November 2015, OCHA Mission Report to earthquake affected areas of Dir (Lower & Upper) and SWAT, 11-13 November 2015.

OCHA, November 2015, Afghanistan-Pakistan Earthquake Flash update: #6 - 5 November 2015.

OCHA, November 2015, Common Humanitarian Fund 2nd Reserve Allocation 2015—Earthquake Response Guidance on Eligible Partners & Activities.

OCHA, January 2016, Humanitarian Needs Overview—November 2015.

Saodat Olimova and Muzaffar Olimov, May 2007, Labor Migration from Mountainous Areas in the Central Asian Region: Good or Evil?, Mountain Research and Development, 27(2):104-108.

Olivier Roy, « Afghanistan: les raisons d'un conflit interminable », Cultures & Conflits, 01 | hiver 1990, http://conflits.revues.org/70, (Accessed the 21st February 2016).

UNAMA, 2008, Press Conference With Unama, UNHCR And ILO, https://unama.unmissions.org/press-conference-unama-unhcr-and-ilo (Accessed the 10 March 2016).

Maps

OCHA, October 2015, Pakistan: Earthquake Affected Districts (as of 27th October 2015).

OCHA, November 2015, Afghanistan/Pakistan Earthquake: NGOs Who, What, Where - (17 November 2015).

OCHA, November 2015, Pakistan: Population by Elevation in Earthquake affected districts.

OCHA, December 2015, Afghanistan - Earthquake on 25 December 2015, Initial Report.

OCHA, March 2016, Afghanistan: Cross border movement from Pakistan (as of 20 January 2016).

IDMC, June 2015, Numbers of Internally Displaced People in Afghanistan, from UNHCR Conflict Induced Internal Displacement Monthly Update 2015.

Policy & Legal Documents

Government of India, A report on the impact of the Afghanistan Earthquake in India 27th October 2015.

Government of Pakistan, National Disaster Management Authority, 2016,National Strategy for Disaster Management Preparedness, http://www.ndma.gov.pk/new/preparedness/stratigy.php (Accessed the 30 March 2016).

PDMA, Government of Khyber Pakhtunkhwa , January 2016, 2015 Earthquake Recovery Plan Khyber Pakhtunkhwa.

PDMA, Government of Khyber Pakhtunkhwa, January 2016 Overview of Natural Disasters 2015 Impact, Response and Managing Risks, Peshawar.

Interviews

Badel Awan, IOM Shelter Coordinator for North Pakistan, and IOM Information Management Associate, Peshawar , 30th March 2016.

Ammarah Mubarak, IOM Pakistan National Programme Officer, questions and request for IOM documentation, 21st March 2016.

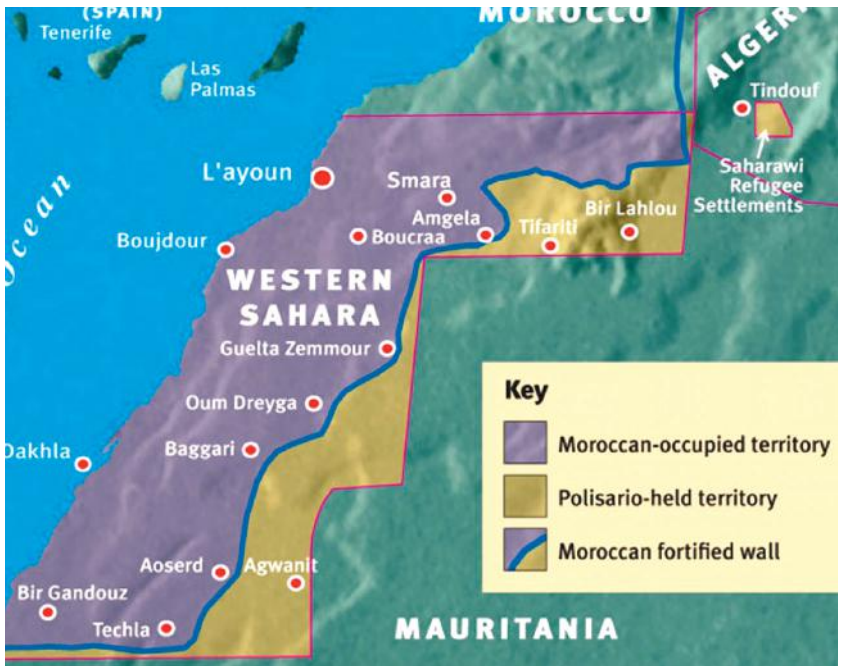
North Africa

Floods in Sahrawi refugee camps in Tindouf

Processes of mobility and immobility

Ludivine Lecat

Map 1. Map of Western Sahara with refugee camps in Algeria



Source: Lewis, 2013

Between 16th and 24th October 2015, exceptionally heavy rain caused major flooding in the Sahrawi refugee camps of Tindouf in southwestern Algeria. While heavy rain is a common occurrence in the area at this time of year, the scale of the flood was uncommon and led to unprecedented damage. Flooding affected both sides of the berm, a sand wall dividing Western Sahara, and devastated five Sahrawi refugee camps in Tindouf —Awserd, Dakhla, Laayoune, Boujdour and Smara. The first heavy rainfall affected four camps (Awserd, Laayoune, Boujdour and Smara). During the same week, Dakhla was affected by the second heavy rainfall. Of all the camps, Awserd and Dakhla were the worst affected by the floods. Although no casualties were reported, the devastation has been considered as widespread and unprecedented with regard to its impact on homes and infrastructure. The disaster also hit a population that had already been displaced forty-one years ago, namely Sahrawi refugees.

The Sahrawi, which in Arabic means literally 'people from the desert', are pastoralists who traditionally inhabited coastal areas of northwestern Africa, including Western Sahara, part of southwestern Algeria and northern Mauritania (Volpato, 2014). After Spain's withdrawal from Western Sahara, the Moroccan army occupied and partially annexed Western Sahara in 1975-76, forcing about 70,000 Sahrawi to flee and settle in camps in neighbouring Algeria. Morocco claims that before Spanish colonization, Western Sahara formed part of its territory. As a consequence, Morocco annexed Western Sahara by staging the 'Green March' —a procession of 350,000 Moroccans who walked into Western Sahara and claimed it as their own, as part of Moroccan territory (ICJ, 1975).[1] Between 1975 and 1991, a war ensued between Morocco and the Polisario Front —the Sahrawi's armed political organization.[2]

Throughout this period, the Sahrawi were excluded from most of Western Saharan territory by means of a wall erected by the Moroccans named the berm. This wall cuts through Western Sahara in a north–south direction and divides the territory between Moroccan-controlled territory

[1] Following Spain's withdrawal, Morocco sought the opinion of the International Court of Justice on the matter. In 1975, the ICJ issued an opinion: there were no ties of territorial sovereignty between Western Sahara and Morocco or Mauritania and the referendum prepared by Spain on self-determination should go ahead. However, the same year, Morocco effectively annexed Western Sahara by staging the Green March—a peaceful procession of 350,000 Moroccans who walked into the region and claimed it as their own. As a result, the Polisario Front launched a guerrilla struggle against what it saw as the Moroccan-Mauritanian occupation of its indigenous land.

[2] The Polisario Front is a Sahrawi movement founded in 1973 to campaign for the independence of Western Sahara.

and Polisario-controlled territory (see Figure 1). To date, the status and sovereignty of Western Sahara remain unresolved and numerous direct talks have failed to break the political deadlock.[3]

Today, between 158,000 and 165,000 Sahrawi live in four refugee camps located on the Hamada desert plateau near Tindouf in Algeria (Figure 2).[4]

The situation of Sahrawi refugees is one of the most protracted refugee situations in the world, as most of the Sahrawi refugees have been living for some forty years in the harsh Tindouf area (UNHCR, 2010). When they arrived in Algeria, they were recognized by the host State on a prima facie basis. Ever since, they have been living in five refugee camps —Awserd, Dakhla, Laayoune, Boujdour and Smara—and another more recent settlement named the "27th February settlement",[5] in the province of Tindouf. Their plight is also one of the most "forgotten crises" as it entails a protracted humanitarian crisis where affected populations are receiving insufficient international aid compared to their needs, and where there is no political commitment to solve the crisis, due in part to a lack of media interest (Horner, 2015).

This paper will present an analysis of the floods' impact on Sahrawi refugees with a particular focus on the diverse forms of displacement induced, as well as on the nexus between mobility and immobility, in light of this particular context of a disaster affecting an already displaced and vulnerable population. As Black and Collyer point out "*the problem is not people being in the wrong place in relation to climate change or other crises. The problem is people being in the wrong place and being unable to do anything about it*" (Black & Collyer, 2014). This resonates with the Sahrawi refugee situation and the 2015 flood disaster. Firstly, the paper highlights the specificity of the Sahrawi refugee situation from an environmental and political perspective. Secondly, it addresses how the flooding has affected the camps and its impact on the population in terms of migration. Thirdly, it analyzes policy

[3] The conflict lasted until a U.N.-brokered ceasefire was agreed in 1991, but UN diplomatic efforts have achieved nothing despite 10 rounds of informal talks between Morocco and the Polisario Front. Indeed, when the fighting ended the UN brought in a peacekeeping force (MINURSO) to enforce the ceasefire and oversee the scheduled referendum, which never took place. As an alternative the Moroccans have proposed what they refer to as an autonomy plan that would cede limited local control of the region to the Western Saharans. This plan does not satisfy the SADR mostly because the proposal is based on the presumption that Western Sahara is part of Morocco. Huffington Post http://www.huffingtonpost.com/stephen-zunes/obama-ignores-moroccos-il_b_4486108.html

[4] The issue of data on the Sahrawi population in the camps is further detailed in the first part of the article.

[5] This date refers to 27 February 1976, the proclamation of the Saharawi Arab Democratic Republic (SADR) by the Polisario Front in the liberated zone of Western Sahara.

Map 2. Localization of Sahrawi refugee camps

Source: PBS

responses that have been implemented to deal with the emergency situation provoked by the flood. Finally, recommendations with regard to existing policy challenges will be suggested as to how local authorities and actors can improve disaster and displacement management, in the particular setting of refugee camps.

The Sahrawi refugee situation: vulnerability and capacity

Approximately 158,800 refugees are currently distributed among the camps according to a first joint assessment made by the UNHCR and the WFP in 2004 (UNHCR/WFP 2004) and confirmed by subsequent assessments and reports (UNHCR, 2010; Rivlesrud, 2010; Fiddian-Qasmiyeh, 2011).[6] The SADR and the Algerian authorities have consistently stated that the camp population is around 165,000 (UNHCR, 2010). On the contrary, international agencies assert that there is no reliable census data on the Sahrawi refugee population. It is indeed important to note that these numbers fail to reflect the fluidity of household structures in the refugee camps, because Sahrawi people continue to be highly mobile; they travel

[6] Following an official preliminary registration exercise, the total camp population, including 'non-voters' living in the camps, was calculated by WFP and UNHCR in 1999 and 2000 as being 155,430. In 2004, the Joint WFP/UNHCR Assessment Mission to the camps noted that "an estimation carried out during the mid-term evaluation conducted in September 2003 using child vaccination records, primary school attendance levels and MINURSO list of eligible voters [...] comes with a total refugee population of 158,800 persons".

between the different camps, to the liberated territories, or badiya, but also abroad for various reasons—visiting family, to complete schooling, or for employment purposes (Fiddian-Qasmiyeh, 2011). The exact number of refugees is a sensitive issue with both political dimensions and consequences. [7] The issue surrounding the number of people in the camps also has humanitarian consequences. For instance, WFP provided food rations for 158,000 people until 2006 and for 125,000 after 2006 (Hidalgo, 2009). In its 2010 Algeria Fact Sheet, UNHCR stated that it was still negotiating with the Algerian government and Sahrawi refugee leadership to conduct registration in order to determine the exact number of refugees. UNHCR has been using a planning figure of 90,000 vulnerable refugees in the camps (UNHCR, 2010).

A population highly dependent on humanitarian assistance and with low prospects for self-reliance

Life in the camps is extremely difficult. Summertime temperatures regularly exceed 40°C and can easily reach 50°C, while winter temperatures can drop to zero at night. Sandstorms blast through the camps on a weekly basis. Because rainfall is scarce, with an average of 30 to 50 mm per year, the area is known as the "Devil's Garden" (OCHA, 2012). Additionally, rains are irregular and droughts are recurrent. As a result, the area has poor forage resources, few trees and there is no grass to provide for livestock, inherited from their ancestors' pastoral lifestyle, forcing pastoralists to use food waste and non-food waste to feed them (Volpato, 2014). Owing to the remoteness of the area and the harsh conditions, Sahrawi refugees remain highly dependent on humanitarian assistance for basic needs such as water, food, and medicine brought by air or by road. They depend on food assistance from the World Food Program and other organizations, but the aid delivery itself is irregular (Murphy, 2015). This means the population face recurrent acute food shortages (ICG, 2007a). As a result of this irregularity and of a

[7] According to an evaluation of DG ECHO's action in the refugee camps: "in 2005, WFP revised the Tindouf "caseload" downward from 158,000 to 90,000 citing "the absence of a census" of camp residents." In 2008, the WFP stated that it would "provide 125,000 general food rations to the most vulnerable refugees in the camps in the Tindouf area." It should be highlighted that the 2008 figure did not comprise the total population, but only the "most vulnerable refugees" in the camps. Algeria's official figure for the number of refugees in the camps is 165,000. Morocco alleges that these numbers are inflated and urges the UN to conduct a new census and UN agencies to limit their assistance to 25,000 to 30,000 people. For the Saharawi authorities, the census should only take place as part of the overall peace settlement process. Recalling that this is MINURSO's main mandate, they condition the exercise to part of a solution to the conflict. Authorities currently only share beneficiary lists with the most trusted organisations" (Hidalgo, 2009).

lack of product diversity, cases of malnutrition are reported in the camps, with malnutrition affecting nearly 8% of the children. The region's climate is also the cause of several health problems, including arterial hypertension, lung disease and eye conditions, as well as infections such as bronchitis (ICG, 2007a). The health facilities in the camp are also insufficient and poorly equipped. The water supply remains an issue as access varies and truck deliveries are rationed (Rivelsrud, 2010). Regarding housing conditions, some refugees live in mud-brick houses and others, a minority, in tents (UNHCR, 2015a). On the one hand, employment is limited in the camps and on the other hand the emergence of opportunities for paid jobs with NGOs in the camps has reinforced socio-economic inequalities amongst Sahrawi refugees (Fiddian-Qasmiyeh, 2011). The SADR is becoming less and less able to provide employment for the increasing number of educated Sahrawi returning from studying abroad (Refugee Studies Centre, 2005).

Moreover, there is little prospect of future self-reliance as the harsh desert environment makes income-generating activities scarce (Refugee Studies Centre, 2005), and it has only been a few years since small, informal, markets emerged in some of the camps' neighbourhoods. Therefore, the vulnerability of the Sahrawi population remains high, and though the occurrence of floods in the region is low their impacts can be devastating for a population that is already in need of assistance.

Self-governance and proactive management of the camps by the Sahrawi populations

This dependency is counterbalanced by the role Sahrawi refugees play in the management of their own camps. Aid workers have reported that there is a high level of self-organization and of proactive management of the camps by the Sahrawi community. Sahrawi refugees are described as "future-oriented rather than past-centered" (Huddleston, 2011). This self-governance is embodied by the Sahrawi Arab Democratic Republic (SADR), the name given to the Saharawi state, which is a partially recognized state. The SADR effectively controls a thin strip of area of Western Sahara (see figure 1) and claims sovereignty over the entire territory of Western Sahara. The SADR government calls the territories under its control the Liberated Territories and considers the Moroccan-controlled territory to be occupied territory. The SADR is closely related to Polisario and is currently a one-party state, but intends to implement a multi-party system in an independent Western Sahara (Rossetti, 2008, p. 7). The SADR oversees the administration of the refugee camps and the distribution of humanitarian aid among the refugees.

The camp organization well illustrates the role of the SADR in the camp management: the main camps are headed by a Sahrawi governor or *wali*, who is appointed by the SADR President and Polisario Secretary General. Each camp is then divided into districts or *dawa'ir*, themselves divided into neighbourhoods or *ahya'a*. Administrative and managerial tasks of these divisions and sub-divisions are undertaken by camp residents employed by the SADR (Fiddian-Qasmiyeh, 2011).

Sahrawi refugee camps are currently the only ones in the world administered by refugees themselves (Mundy, 2007). Indeed, the Algerian authorities ceded the administration of the camp to the Polisario Front and the SADR. Therefore, unlike other refugee camps, usually run and controlled by international organizations such as UNHCR, the camp is administered by the SADR and its representatives are the only authority with which Sahrawi population have regular contact (HRW, 2008), which according to the WFP enables them to "manage their own civil society and social systems without interference" (WFP, 2010).

Academic and non-governmental reports have underlined this self-management policy and described the refugee camps as "models of efficient local government" (Brazier 1997). Highlighting the Sahrawi refugee camps as a "success story" for their management and as the "best run refugee camps in the world", as Brazier did, became a mainstream idea in the 2000's (Brazier 1997). However, some academics have questioned these depictions arguing that they risk normalizing the political and humanitarian situation of the refugees (Fiddian-Qasmiyeh, 2011). The humanitarian field has also recognized that this high level of self-organization could be an impediment to properly monitoring aid delivery (ECHO, 2009). Nevertheless, the camps' self-governance also embodies a very important demand of Sahrawi people for their national future.

The flooding and its impact: material damages and human mobility

Scale and affected areas

Heavy rainfall occurred in the four camps of Laayoune, Boujdour, Awserd and Smara, starting on 17 October and two days later for the more distant camp of Dakhla. Awserd was the worst affected by the initial rainfall and then Dakhla by the second rains (UNHCR, 2015b). This heavy rainfall led to flooding in the area and immediately destroyed refugees' mud-brick homes. The rain continued for more than a week, leaving the

Smara and Boujdour camps in similar conditions to Dakhla and Awserd. The rain finally stopped on 26 October. While rain is expected at this time of year, the quantity of rainfall and the number of consecutive days of rain were uncommon and had not been seen in over a decade. Recent studies have shown that the scale of the flood corresponded to 10 to 12 years worth of rainfall.[8] According to UNHCR, 11,500 families—more than 57,000 individuals—were affected by the floods (UNHCR, 2015b) and the total number of damaged or destroyed houses was 17,841. In addition, 6,500 children had limited access to schooling (Unicef, 2015). Some 7,000 families were estimated as having been left homeless and 30,000 without access to health care (US Department of State, 2015). Nearly 85,000 people saw their food stocks reduced to nothing. UNHCR representative Hamdi Bukhari said that "the extent of devastation in Tindouf is overwhelming, with pooled water as far as the eye can see. Thousands of families lost their homes overnight and much of their personal belongings" (UNHCR, 2015c). With the floods came the associated risk posed by remnants of explosives. Indeed, the area is known for the presence of mines and other non-exploded devices. With flood waters the mines and explosive remains were likely to be displaced and to pose a risk to civilians and their livelihoods.

Housing and infrastructure

The joint multi-agency assessment implemented by UNHCR was finalized on 6 November in all five camps and concluded that the total number of destroyed/damaged houses was 17,841. These assessments indicate extensive material damages with 70% of houses destroyed or damaged and 60% of public buildings such as schools, clinics and dispensaries destroyed or damaged. The chart below (Table 1) provides a detailed description of the magnitude of the destruction of shelters in the five camps:

One of the main issues regarding housing was the material used to construct them. Most house are made of mud-brick and are therefore easily damaged or destroyed in cases of heavy rainfall or flooding. As well as schools, administrative offices and dispensaries were destroyed as they were built without foundations using traditional techniques.[9] The images below show how these houses were made and how they were not able to resist the flooding. The damage provoked by the floods was exacerbated by the infrastructural characteristics of the camps.

[8] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

[9] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

Table 1. Levels of destruction of house and infrastructures in the camps

Camps	Level 1 (Worst Damaged)	Level 2 (Highly Damaged)	Level 3 (Moderate Damaged)	Level 4 (Lightly Damaged)	Total per camp
Dakhia	2,466	1,077	149	59	3,751
Smara	2,049	1,565	1,020	842	5,476
Awserd	1,716	889	421	233	3,259
Boudjour	731	473	388	322	1,914
Laayoune	1,699	737	411	594	3,441
Total by level of destruction	8,661	4741	2,389	2,050	1,7841

Source: International Federation of Red Cross and Red Crescent Societies, November 2015.
Source: Oxfam (2015)

During the flooding, those living in traditional Sahrawi tents were spared the worst of the devastation, however only a minority of families possess such tents (International Federation of the Red Cross, 2015). The traditional tent or *al-khaima* is a must in the Sahrawi community and is resistant to storm and water infiltration thanks to its triangular shape. Even if families have houses, they tend to have traditional tents as sign of their socio-economic status rather than other displays of wealth.[10] Indeed, *al-khaima* has a broader social meaning because it is considered to be the central social unit in Sahrawi communities. It not only refers to a spatial unit reserved as a living space but also to all the relationships linking the members of a given family. However, even if the tents are strong and resistant the population using the tents still lost a majority of their belongings as everything was wet.[11] Several months after the floods, the emergency situation persists as many families have started to rebuild with the same fragile material—mud-brick (Oxfam, 2015).

Diversity of displacement patterns induced by the 2015 flooding

Nomadic tradition and pastoralist recovery

Before analyzing the different mobility patterns induced by the flooding, it is necessary to detail the regular mobility patterns of Sahrawi refugees.

[10] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

[11] *Ibid.*

The Sahrawi population is a Bedouin population who moves regularly between camps, the Free Zone and Mauritania mainly for trade purposes. Nonetheless, they live at least 8 months per year in the camps.[12] Indeed, before the war the Sahrawi were essentially nomadic, pasturing goats, sheep and camels in the low-lying plains of Western Sahara. For food, they relied on livestock products as well as vegetables, cereals, sugar and dates, which were exchanged for livestock in markets (Volpato, 2014). This nomadic tradition has lived on in and around the camps with the practices of livestock husbandry. However, in the camps, it appears to be a complementary activity whereas full-time or seasonal Sahrawi nomads practice extensive camel husbandry and are therefore highly mobile in the liberated territories across pasture areas and around the camps, which are their main commercial hubs. In the refugee camps, "livestock husbandry is one of the refugees' few endogenous activities developed and recovered without any consistent attention or funding from donors and development organizations" (Volpato, 2014). This activity was disrupted by the war when herds where bombed and abandoned and nomads had to settle in the refugee camps. The ongoing recovery of this lifestyle was triggered by economic, ecological, political, social and cultural drivers, which include the 1991 ceasefire, the safety and security guaranteed by the Polisario in both the camps and the liberated territories, and the willingness to construct a Sahrawi national and cultural identity. Nomadic refugees travel from the camps to the liberated territories, especially the northern areas, which are richer in forage plants and biodiversity than the area surrounding the camps. Refugees enjoy nomadic life on a seasonal basis. Each autumn or winter, thousands of refugees move to the liberated territories with their livestock, their *khaima* and food stocks so their livestock can graze, but also to get away from the camps (Mundy, 2007).

In addition to this nomadic tradition, another aspect must to be described to fully understand the mobility of Sahrawi refugees: the issue of freedom of movement for refugees. Moroccan authorities often refer to the Sahrawi refugees as the Polisario's captives, held in the Tindouf camps against their will (Human Rights Watch, 2008). It is true that SADR and Algerian authorities impose regulations on refugees' travel outside the camps. These regulations can complicate their ability to move freely. However, even though the SADR's constitution does not contain a specific provision guaranteeing freedom of movement, freedom of movement is actually guaranteed by the African Charter on Human and Peoples' Rights, to

[12] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

which the SADR is party. As a matter of fact, Human Rights Watch, in its 2008 report on the issue, concludes that there is no evidence of the SADR or Algerian authorities imposing significant or arbitrary restrictions on Sahrawi refugees' freedom of movement. The refugees have the possibility to travel between the Tindouf camps, or to Mauritania or Western Sahara, if they want to. Yet, this possibility remains dependent on the individual's social and financial status (Human Rights Watch, 2008).

This nomadic lifestyle and the recovery of pastoralist practices have to be taken into consideration to fully understand the mobility and immobility dynamic at work during a disaster event, such as the 2015 flood.

Mobility inside the camps: short-term and inside-camp mobility as a coping strategy

According to Samir Zemouchi, programme officer at Unicef, during the first weeks after the floods, many families moved from their original sites into the hills, due to fears of further flooding. This was a displacement inside the camps, where people moved from the place they lived to the surrounding hills. It was a short-distance temporary displacement as they stayed on the hills in tents for around a month and a half, until the water had been absorbed by the ground.[13] There is no precise number of people who have moved to the hills. Some news articles mention the number of 25,000 displaced without specifying from where they moved and where they went (The Guardian, 2015). Moving to a higher geographical area was a way to cope with the imminent danger of the flood with the water level rising and houses collapsing, by using the opportunities offered by the hills to overcome adverse conditions.[14] In this case, the households used short-term mobility to survive because there was no possibility of finding shelter with all the houses destroyed and no possibility of installing tents on flooded ground.

Mobility outside the camps: pastoralism and adaptation strategies.

Another mobility pattern occurred in the aftermath of the flooding: displacement towards the liberated territories of Western Sahara. This

[13] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

[14] The Intergovernmental Panel on Climate Change defines coping as: "the use of available skills, resources and opportunities to address, manage, and overcome adverse conditions, with the aim of achieving basic functioning of people institutions, organizations and system in the short or medium term."

mobility pattern concerned pastoralist Sahrawi. Indeed, according to Samir Zemouchi, approximately one month after the flooding, some pastoralist Sahrawi refugees moved to the liberated zone in order to move their animals to this area because there was more grass as a result of the floods.[15] Once again there is no data regarding the number of people who moved to the liberated zone after the flood for this purpose. This mobility is an indirect result of the flood. Pastoralists did not move to the liberated territories to flee the floods but to graze their livestock in an area that benefited from the rainfall and where they usually go to feed their animals. This migration is therefore an indirect consequence of the flooding compared to the previous forms of mobility mentioned above.

This mobility pattern corresponds more to an adaptation strategy than to a coping strategy because this migration pattern is a way to exploit beneficial opportunities induced by the disaster—the increase of grass in grazing areas (IPCC, 2014).[16] In order to exploit the benefits of the rainfall and to sustain their livelihoods and the livelihoods of their family members, the pastoral Sahrawi refugees engaged in this migration pattern, in a context of the recovery of pastoralist tradition in the refugee camps (Volpato, 2014). Indeed, Sahrawi refugees are increasingly turning to animal husbandry and trade to provide for themselves and their families and maintain basic living standards and nutrition. Animal husbandry and trade provide income, but also milk, meat, fruits and vegetables and household goods. It is worth noting that foods such as meat, fruits and vegetables are not usually included in humanitarian food aid (Human Rights Watch, 2008).

Immobility and the case of Dakhla camp: an example of trapped population?

In the Dakhla camp, which was worst affected with 90% of infrastructure destroyed or damaged, the Sahrawi population wanted to move to other camps but the local authorities refused. Without forcing them to stay, the Polisario did engage in a campaign to convince the refugees to stay in Dakhla, first for practical and logistical reasons as Dakhla is the farthest camp from Tindouf city (around 180 km away).[17] There were also more political

[15] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

[16] The Intergovernmental Panel on Climate Change defines adaptation as "The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects".

[17] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

reasons at work: the Polisario did not want them to leave for fear that they would not return to Dakhla, which has a particular historical weight in the construction of the Sahrawi identity for the SADR and the Polisario, as it is the first settlement of Sahrawi refugees in Algeria.[18] Moreover, the Algerian government had recently invested in supplying the camp with an electricity network, which cost the Algerian government billions of dinars. Therefore, the SADR and the Polisario saw the willingness of the refugees to move away as a risk posed to this investment and the arrangements made with Algerian authorities on the issue.[19]

In the case of Dakhla, the Sahrawi people needed to move because, as has been mentioned above, the damagesin this camp was extensive and almost all houses were destroyed. As a matter of fact, many people were left homeless with some being sheltered by relatives and neighbours (UNHCR, 2015a)[20]. Indeed, a primary assessment of the situation in Dakhla made by several NGOs and international organizations on the ground—UNHCR, Unicef, WFP, Echo, Oxfam, Triangle, Algeria Red Crescent, Spanish Red Cross, AFAD, Saharawi Red Crescent—and by the Saharawi authorities indicated that "people were all outside with no place to go and children running across collapsed houses" (Al-Saharawi, 2015). Some people were staying together in one single tent but the report also points to the limited number of tents (Sadr-emb-au.net, 2016). Thus, these people needed to move and wanted to move but could not move, finding themselves trapped—to be 'trapped', individuals must not only lack the ability to move but also want and need to move (Black & Collyer, 2014). The already vulnerable situation in which Sahrawi refugees found themselves coupled with the unwillingness of the local authorities to see them leave the camp—bearing in mind that it is hard to say to what extent they were deterred from leaving the camp—can lead to the conclusion that the Sahrawi refugees of Dakhla were experiencing forced immobility. Indeed, the ability to move is correlated with the availability of places to move to, the level of wealth and capital (Black, 2013). In other words, vulnerable people are less likely to move than others who are less vulnerable. For the Sahrawi refugees these resources are scarce and they are already in a situation of vulnerability. Sahrawi refugees in Dakhla are an example of "trapped populations [...] vulnerable to stress but without the ability or resources to move" (Black, 2013).

[18] *Ibid.*

[19] *Ibid.*

[20] There is no precise number of people left homeless in Dakhla camp. The only precise number available is the one 7,000 people left homeless for all the camps.

However, this idea of a trapped population can also be challenged by the fact that the decision to remain in the camp in general is a decision made seemingly more often for Sahrawi refugees in Algeria than it is for other refugee groups in the world (Huddleston, 2011). Staying in the camp is perceived as a political act, an "act of defiance of the Moroccan occupier and adversary, rather than one of desperation or helplessness" (Huddleston, 2011). It is in line with the historical and cultural weight of Dakhla camp in Sahrawi's history, mentioned above. Though this type of rationale might not come into play in the decision to stay or to leave the camp in the case of a disaster such as the 2015 flooding, it could be one of the many reasons explaining immobility, especially when considering that the Polisario can mobilize such rationale. Indeed, people may in fact be motivated to stay in vulnerable areas for many reasons—social pressures, cultural attachments, occupational dependence, macro-structural constraints for instance. In the case of Sahrawi refugees, the line between voluntary and forced immobility is even more complex.

Sahrawi displacement patterns: an example of the diversity and complexity of (im) mobility outcomes.

The case study of displacement induced by the 2015 flooding in Sahrawi refugee camps exemplifies the diversity and complexity of the forms migration can take. First, we are facing a case in which a disaster is hitting a population already displaced, in this case by a conflict. Then the impact of this disaster in terms of mobility is multi-faceted, showing that mobility and immobility categories are not fixed, that indirect and direct displacement can be induced by one event, that voluntary and forced immobility as well as voluntary and forced displacement can be present at the same time amongst a population and potentially for one individual in a different timeframe. The flooding in November 2015 showed that extreme environmental events can have different outcomes—mobility and immobility, voluntary and forced (im)mobility, short- and more long-distance displacement. Along with these different outcomes a multiplicity of drivers can be discerned—environmental drivers as a direct result of the flood, economic drivers with the case of pastoralism, or even cultural and social drivers with regard to immobility in Dahkla. This case study stresses "the multi-causal nature of migration influenced by environmental change" and "that whilst an environmental event may trigger migration, it is likely to be just one of a number of deeper causes" (Black, 2012). It also exemplifies the limitations of categorization between refugees, migrants and internally displaced people.

Policy responses and challenges

The humanitarian partners already present in the camps—UNHCR, WFP, Unicef, Handicap International, Oxfam, Triangle, International Federation of the Red Cross and Red Crescent Society, Sahrawi Red Crescent, AECID, Médecins du monde—conducted a rapid assessment of the situation and then quickly responded to the crisis. The first response of agencies and NGOs was to establish an emergency cell by sectors, mainly health and shelter sectors, then a quick evaluation of the damages was launched after the floods. Based on the impact and the assessment, the inter-agency humanitarian response prioritized the health, food security and shelter/non-food-item sectors in the emergency response (Oxfam, 2015; Triangle, 2015; ICRC, 2015; WFP, 2015; Unicef, 2016). The main objectives of the response were to provide emergency shelter and essential relief items, including drinking water; to replace lost food stocks and to secure food security and nutrition, and to provide emergency health care to the affected population. Achieving these objectives was challenging due to on going displacements of the refugees (Triangle, 2015). Regarding the implementation of the response, UNHCR is the leading agency in the humanitarian response.

The Sahrawi authorities supported the humanitarian community and recommended priorities according to the survey and evaluation. This cooperation went well as local authorities were significantly involved in the response and very cooperative.[21] One of the explanations for this strong implication of the Sahrawi community in the emergency response lies within another specificity of the Sahrawi refugee camps regarding its role in the construction of the Sahrawi national identity. Indeed, several academics have underlined the fact that the Sahrawi nation and Sahrawi national identity were created in the refugee camps as part of a national project (Rivelsrud, 2010; Shelley, 2007). According to Rivelsrud, "the Tindouf refugee camps are unusual because they are a result of a nationalist project. The refugees refer to the first years in the camps as the Sahrawi Revolution [...] The idea was to combine the broken identities of pre-colonial time and colonial time and to create a new, modern nation state." The Moroccan annexation and the flight to the refugee camps in Algeria led to the creation of a new community, which the Polisario Front and the SADR have mobilized to forge their nationalist project (Rivelsrud, 2010). The national cause to regain Western Saharan territories is in many ways

[21] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

present in the camps. First, the camps are named after important places of the SADR and more precisely of places inside occupied Western Sahara. Then, many places and institutional buildings are named after memorable dates that have played a role in the Saharawis' history (Rivelsrud, 2010). This is the case of the last settlement, named 27 February, which refers to 27 February 1976—the date of Spain's withdrawal from Western Sahara and of the proclamation of the SADR. Therefore, the Sahrawi authorities played an important role during the emergency response "because they are a very organized community" [22], they supported the creation of emergency cells and helped with more than 100 volunteers to help the populations in need and also supported the evaluation of damages. The NGO community, Polisario and the SADR were not the only actors in the response. The Algerian authorities also participated by sending civil protection, and the Algerian red crescent sent tents and food coming from the Algerian population.[23]

Regarding policies affecting mobility or immobility, the action of the local authorities in Dakhla camp can be considered as favouring immobility. It concerns the awareness-raising campaign led by the Sahrawi authorities to remain in Dahkla camp. As mentioned previously, the Sahrawi authorities did not want the refugees to leave Dahkla camp for historical and political reasons and for more financial reasons with the recent electricity network funded by Algerian authorities. The risk was that the authorities would have to find another way to finance the electrical network. Bearing this aim in mind, the authorities engaged themselves in an awareness-raising campaign, explaining the outcome of displacement to deter refugees from leaving the camp.[24] In addition, no relocation or resettlement solutions were implemented by the authorities. The issue of shelter was actually tackled with emergency tents distributed in the camps and installed in the camps, minimizing any other displacement of Sahrawi refugees. For instance, UNHCR distributed 1,705 tents as of 11 November to the refugees in the camps, and more the following weeks (UNHCR, 2015, 8 November). This immobility can also be understood from the national identity perspective, mentioned above. The importance of the camps for the Sahrawi community in the construction of their national identity can be considered as a driver for immobility and partly explain why some prefer to stay, even in case of disaster (Rivelsrud, 2010; Shelley, 2007). Indeed, the symbolic nature of the

[22] *Ibid.*

[23] *Ibid.*

[24] Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

camps for the community can explain why many Sahrawi while considering opportunities to leave the camp, prefer to stay as a political stand for the national cause. This national cause has been internalized and as a consequence leaving the camp can be perceived as betraying the national cause (Huddleston, 2011). The characteristics of the local community were not the only factor in the response and management of the emergency response and of the displacements.

One major element that has also affected the response and the management of human mobility is the lack of a preparedness plan. On 10-11 February 2006, the camps were struck by torrential rains and there was widespread flooding. Three of the Sahrawi camps were particularly affected: 12,000 families were affected and around 50,000 people were left homeless. Sahrawi people faced similar extensive damages and for the same reasons—infrastructure and housing were constructed with mud-brick materials (OCHA, 2006). Despite this event in 2006, no steps were taken to implement preventive measures and mitigation plans by learning from this event. Indeed, before the 2015 flooding, it appears that there was no mitigation or preparedness plan in the case of flooding. To better understand this aspect, we have to come back to the political and national project of the Sahrawi community, which was explained above. Though the camp was part of the construction of the national project and the identity of the Sahrawi community, the ultimate goal is to return to the land they left, the liberated territories and occupied territories of Western Sahara. For the Sahrawi authorities and community, the hope of returning to this land is significant and despite the fact that they have been refugees living in camps in Algeria for more than 40 years, this situation is perceived as temporary and has to remain that way. In this regard, they live in a state of temporariness, as the type of construction—temporary—illustrates. The same goes for the preparedness process: having such a preparedness plan and long-term construction plan would mean normalizing and anchoring the refugee situation, which they do not want, as it would seem for them like a form of permanent integration in the region of Tindouf.[25]

Conclusion and policy recommendations

This study has shown the extent to which the 2015 flooding in Sahrawi refugee camps has caused different outcomes in terms of mobility. The patterns of these outcomes are complex because they occurred both during and after the disaster and took different forms, including immobility.

[25] *Ibid.*

Furthermore, the impact of the flooding has affected a population that was already vulnerable and struggling to survive in harsh environmental, economic and political conditions. Based on the impact and on the policy responses implemented, policy recommendations are suggested below to address how to prepare and manage more efficiently similar future disasters and to address the needs of those displaced or trapped, particularly at a time when, as a result of climate change, these types of event are likely to be more frequent and more intense.

Implement preparedness measures

Preparedness measures should be implemented for every camp by the local authorities. In cooperation with other actors such as international organizations and NGOs, with the first step is the undertaking of a risk analysis assessing the vulnerability and capabilities of the community and of the actors involved in emergency response and the recovery mechanism. An analysis of the types of hazards that could be faced should also be conducted based on the environment and likelihood of the different types of hazards. Then, the resources at the disposal of the camps and response actors should be evaluated, identifying what—materials, safe areas, communication systems—and who—individuals with skills regarding emergency response and in mobility management—could be mobilized to intervene before, if the disaster is predictable, during and after the disaster. The preparedness phase should also include scenario building with a specific focus on the displacement induced or blocked by the disaster in order to determine the most appropriate policies to deal with this (im)mobility. The implementation of a preparedness and mitigation plan should be viewed not as an element anchoring and normalizing the refugee situation, but as necessary measures to prevent and/or manage the impact of such disasters by the local authorities, and as a further step towards the construction of the Sahrawi state.

Develop the construction of houses that are more resistant to flooding

As highlighted by the damage caused by the flooding on mud-brick houses, there is a need for better construction materials that could more efficiently withstand excessive rainfall and flooding. Some steps in this direction have already been taken, as during the reconstruction process, Sahrawi people are using stronger materials with the help of NGOs, as well as employing new construction techniques and material such as iron bars and mixed concrete and mud bricks. These materials are more sustainable and more resistant

to flooding. With these construction techniques, the roofs of the houses are now constructed at an angle of 20 to 30 degrees in order to avoid the water stagnating on roofs and deteriorating the walls.[26] In a similar vein, another example of preventive policies led by an NGO to avoid similar results of potential future flooding is the UNICEF Build Back Better concept. The goal is to rebuild schools and dispensaries in a better and, more importantly, stronger way. UNICEF Build Back Better adopts a community-based approach through a concept encouraging the community to give their point of view and advice on how the rebuilding should be carried out in order to make it more acceptable for children, parents, and authorities.[27] The concept revolves around using better materials and more sustainable techniques to avoid the collapse of housing in the case of further flooding (Unicef, 2015). While the example of this project is reassuring, the impact of future flooding on homes could still be significant due to the fact that many families are still using mud-brick to rebuild their houses (Oxfam, 2015). Therefore, a reconstruction plan with more resistant materials should be implemented on a large scale to avoid significant damage and homelessness in the event of a future disaster. Another solution could also be to relocate some housing on the hills where the Sahrawi took refuge during the flood. Indeed, during the reconstruction process, Sahrawi people have actually started to rebuild their houses on hills avoiding low-lying sites where houses were previously built and damaged during the flood. This could also be done for public infrastructure such as schools and hospitals.

Implement short-term relocation

By using the experience of the 2015 flooding, one recommendation could be to implement short-term relocation for the refugees affected by the flood, in order to address the issue both of mobility and immobility. Residents of affected camps should be relocated to other camps (if not affected) or in the safer surrounding areas. This policy would guarantee shelter for those affected by the flood and avoid the migration to the hills, used as a coping strategy, as witnessed in October 2015. For trapped populations, short-term relocation would allow them to be settled in safer areas in a time of crisis, with the participation of the local authorities. The population should also be well-informed about the possibility of relocation and included in the decision-making process. Therefore, in the future, relocation should be considered and implemented as quickly as possible in order to avoid putting refugees at risk and exposing the population to inadequate temporary

[26] *Ibid.*

[27] *Ibid.*

solutions. The responses to the flooding in Tindouf have also shed light on the protracted situation of Sahrawi refugees and the chronic deficiency in funding.

Increase long-term funding for this "forgotten crisis"

Although international aid was critical in supporting the on-site emergency response, the 2015 flooding in Tindouf has revealed that chronic under-funding can have an impact on the resilience and the vulnerability of the community. Funding levels have greatly decreased in recent years, while the humanitarian needs of the Sahrawi refugees remain as pressing as ever. This decrease in funding can be explained by the protracted situation of Sahrawi refugees and the emergence of other large-scale humanitarian emergencies (UNHCR, 2016b). In the long run, the lack of funding has affected the delivery of life-saving assistance, limiting access to water, the diversity of food and leading to inadequate infrastructure for health and education services. The floods in October 2015 thus exacerbated an already dire situation, also revealing the scarcity of resources due to the lack of funding and to harsh environmental conditions. In addition to the damage caused by the flooding which must be addressed, the 2015 flooding has also highlighted the urgent need for additional funding for essential sectors such as water, food, sanitation, protection, health, education, shelter and non-food items. Moreover, Sahrawi refugees need long-term and sustainable funding to build resilience, reduce vulnerability and improve the living conditions of people who have been living in camps for more than forty years. Finally, in order to be able to extricate themselves from this permanent state of temporariness, they need a definitive resolution to the crisis in accordance with international law.

BIBLIOGRAPHY

Academic Articles

Black, R., Arnell, N., Adger, W., Thomas, D. and Geddes, A. 2013. Migration, immobility and displacement outcomes following extreme events. *Environmental Science & Policy*, 27 :32-43.

Black, R. & Collyer, M. 2014. Populations 'trapped' at times of crisis. *Forced Migration Review* 45: 52-56.

Bontems, Claude. 1987. The Government of the Saharawi Arab Democratic Republic. *Third World Quarterly*, 9 (1): 168–86.

Brazier, C. 1997. Special Edition: War and Peace in Western Sahara. *The New Internationalist*, Vol. 297.

Chatty, Dawn. 2010. In: Chatty, D. (ed) Deterritorialized Youth: Sahrawi and Afghan Refugees at the Margins of the Middle East.

E-International Relations. 2016. *The Case of the Western Sahara and its Struggle for Independence*. Available at: http://www.e-ir.info/2015/10/18/the-case-of-the-western-sahara-and-its-struggle-for-independence/ (accessed 7 May 2016).

Farah, R. 2009. Refugee Camps in the Palestinian and Sahrawi National Liberation Movements: A Comparative Perspective. *Journal of Palestine Studies*, 38(2): 76-93.

Fiddian-Qasmiyeh, E. 2011. Paradoxes of Sahrawi refugees' educational migration: promoting self-sufficiency or renewing dependency?. *Comparative Education*, 47(4): 433-447.

Fiddam-Qasmiyeh, E. 2011. Protracted Sahrawi displacement. Challenges and opportunities beyond encampment. *Refugee Studies Centre*. University of Oxford.

Fiddian-Qasmiyeh, E. 2009. Representing Sahrawi Refugees' 'Educational Displacement' to Cuba: Self-sufficient Agents or Manipulated Victims in Conflict?, *Journal of Refugee Studies*, 22(3): 323-350.

Huddleston, R. Joseph. 2011. Working Paper: "Sahrawi Refugee Youth between Ambition and Identity." University of Southern California.

Loewenberg, S. 2005. Displacement is permanent for the Sahrawi refugees. *The Lancet*, 365(9467): 1295-1296.

Mundy, Jacob. 2007. Performing the Nation, Pre-Figuring the State: The Western Saharan Refugees, Thirty Years Later. *The Journal of Modern African Studies*, 45 (2): 275–97.

Murphy, Anna. 2015. *The Case of the Western Sahara and its Struggle for Independence*.

Shelley, T. 2007. Resistance and Colonialism: Building the Sahrawi Identity. In K. Arts & P. P. Leite (Eds.), *International Law and the Question of Western Sahara*. Leiden International Platform of Jurists for East Timor (IPJET).

Rivelsrud, S. 2010. *The Sahrawi Refugees and their National Identity. A qualitative study of how the Sahrawi Refugees present their national identity in online blogs*. Oslo University, Master's Thesis in Peace and Conflict Studies. The Department of Political Science. The Faculty of Social Sciences.

Volpato, G. and Howard, P. 2014. The material and cultural recovery of camels and camel husbandry among Sahrawi refugees of Western Sahara. *Pastoralism*, 4(1).

Wilson, A. 2011. Cycles of crisis, migration and the formation of new political identities in Western Sahara. *Working Paper du CEPED*, number 25.

Book

Fiddian-Qasmiyeh, E. 2014. The ideal refugees: gender, Islam, and the Sahrawi politics of survival. *Choice Reviews Online*, 52(02): 52-1068.

Zunes, S. and Mundy, J. 2010. *Western Sahara*. Syracuse, N.Y.: Syracuse University Press.

Press And News Articles

Horner, S. 2015. *European Commission focuses on 'forgotten crises'*. Available at: http://www.fmreview.org/sites/fmr/files/FMRdownloads/en/FMRpdfs/FMR25/FMR2532.pdf (accessed 6 April 2016).

IRIN. 2016. *Western Sahara's moment in the sun*. Available at: https://www.irinnews.org/analysis/2016/04/14/western-sahara%E2%80%99s-moment-sun (accessed 7 April 2016).

Oxfam.org. 2016. *Flooding in the Sahrawi camps: "We haven't got time to wait" | Oxfam International*. Available at: https://www.oxfam.org/en/western-sahara/flooding-sahrawi-camps-we-havent-got-time-wait (accessed 16 April 2016).

Sadr-emb-au.net. 2016. *Imminent humanitarian disaster threats Saharawi refugee camps because of torrential rain and floods | SADR Permanent Mission in Ethiopia and African Union*. Available at: http://www.sadr-emb-au.net/imminent-humanitarian-disaster-threats-saharawi-refugee-camps-because-of-torrential-rain-and-floods/ (accessed 2 May 2016).

The Guardian. 2015. *40 years of suffering for Sahrawi refugees | Letter from Western Sahara campaigners*. Available at: http://www.theguardian.com/world/2015/nov/04/40-years-of-suffering-for-sahrawi-refugees-from-western-sahara (accessed 7 March 2016).

Trianglegh.org. 2016. *Algérie (réfugiés sahraouis)*. [online] Available at: http://www.trianglegh.org/ActionHumanitaire/Fr/MissionHumanitaire/AlgerieRefugiesSahraouis.html (accessed 7 May 2016).

US Department of State. 2015. *The U.S. Announces Additional Humanitarian Assistance for Sahrawi Refugees in Response to Severe Floods*. Reliefweb. Available at: http://reliefweb.int/report/algeria/us-announces-additional-humanitarian-assistance-sahrawi-refugees-response-severe (accessed 9 April 2016).

Un.org. 2016. *UN agencies boost aid efforts to flood-hit Tindouf refugees, call for urgent funding | Africa Renewal Online*. [online] Available at: http://www.un.org/africarenewal/news/un-agencies-boost-aid-efforts-flood-hit-tindouf-refugees-call-urgent-funding (accessed 10 March 2016).

Briefs And Reports

Al-Saharawi. 2015. *Imminent humanitarian disaster threats Saharawi refugee camps because of torrential rain and floods*. Available at: http://saharawi.net/en/?p=62 (accessed 11 August 2016).

DARA. 2016. *Evaluation of DG ECHO's Action In The Sahrawi Refugee Camps, Tindouf, Algeria (2006-2008)*.

Human Rights Watch. 2010. Western Sahara: Beatings, Abuse by Moroccan Security Forces. *Hrw.org*.

Human Rights Watch. 2008. Human Rights in Western Sahara and in the Tindouf Refugee Camps: Morocco/Western Sahara/Algeria. *Hrw.org*.

Human Rights Watch. 2014. Off the Radar Human Rights in the Tindouf Refugee Camps. *Hrw.org*.

International Court of Justice. 1975. *Summary of the Advisory Opinion of 16 October 1975 - Summary 1975/1*. Available at: http://www.icj-cij.org/docket/files/61/6197.pdf

International Crisis Group. 2007a. *Western Sahara: The Cost of the Conflict*. Cairo/Brussels: International Crisis Group.

International Crisis Group. 2007b. *Western Sahara: Out of the Impasse*. Cairo/Brussels: International Crisis Group.

ICRC. 2015. *Algeria: Floods DREF operations update n° 01 (MDRDZ002)*. ReliefWeb. Available at: http://reliefweb.int/report/algeria/algeria-floods-dref-operations-update-n-01-mdrdz002 (accessed 18 March 2016).

Inter-University Center for Legal Studies. 2009. *Group Rights and International Law: A Case Study on the Sahrawi Refugees in Algeria*. ISBN 978-0-578-03838-4.

Lewis, Martin. 2013. Stalled Negotiations in Western Sahara. *GeoCurrents* Available at: http://www.geocurrents.info/news-map/diplomacy-news/stalled-negotiations-in-western-sahara (accessed 11 August 2016).

OCHA. 2012. *Reporting From The Devils's Garden - SMS Reporting Systems In The Tindouf Refugee Camps*. 2012 OCHA Humanitarian Research and Innovation Grant: 4-11.

Refugee Studies Centre. 2005. *Children and Adolescents in Sahrawi and Afghan Refugee Households: Living with the Effects of Prolonged Armed Conflict and Forced Migration*. Queen Elizabeth House, University of Oxford.

ReliefWeb. 2016. *Algeria: Floods DREF operations update n° 01 (MDRDZ002)*. Available at: http://reliefweb.int/report/algeria/algeria-floods-dref-operations-update-n-01-mdrdz002 (accessed 7 May 2016).

ReliefWeb. 2016. *Algeria: Tindouf Floods OCHA Situation Report No. 1*. [online] Available at: http://reliefweb.int/report/algeria/algeria-tindouf-floods-ocha-situation-report-no-1 (accessed 7 May 2016).

UNHCR. 2016a. *Highlights Algiers and Tindouf (January 2016)*. Available at: http://www.unhcr.org/53cd1ec19.pdf (accessed 7 April 2016).

UNHCR. 2016b. *Humanitarian Needs of Sahrawi Refugees in Algeria 2016-2017*. Available at : http://reporting.unhcr.org/sites/default/files/Humanitarian%20Needs%20of%20Sahrawi%20Refugees%20in%20Algeria%202016-2017%20-%20June%202016.pdf (accessed 17 August 2016).

UNHCR. 2015a. *Devastating flooding affects 25,000 Sahrawi refugees in Tindouf camps*. Available at: http://www.unhcr.org/print/562a19706.html (accessed 7 April 2016).

UNHCR. 2015b. *Algeria-Tindouf Floods Response. Inter-agency operational update (9-15 November)*. Available at: http://www.unhcr.org/5649a97d9.pdf (accessed 8 March 2016).

UNHCR. 2015c. UNHCR airlifts emergency relief to Algeria flood victims, News Stories. Available at: http://www.unhcr.org/563338686.html (accessed 8 March 2016).

UNHCR. 2015. *Highlights Algiers and Tindouf (August 2015)*.

UNHCR. 2015. *Algeria-Tindouf Floods Response. Inter-agency operational update (2-8 November)*. Available at http://reporting.unhcr.org/sites/default/files/Inter-Agency%20Operational%20Update%20-%20Algeria%20-%20Tindouf%20Floods%20Response%20-%202-8NOV15.pdf (accessed 8 March 2016).

UNHCR. 2015. *Algeria-UNHCR Operational Update (1 August-30 November)*. Available at http://www.unhcr.org/50221e236.pdf (accessed 8 March 2016).

UNHCR. 2010. *Algeria Factsheet (August 2010)*.

UNHCR/WFP. 2011. *Joint needs assessment of Sahrawi refugees in Algeria (4 to 14 October 2011)*.

UNICEF. 2016. *UNICEF Saharawi Refugee Camps - Tindouf, Algeria, Humanitarian SitRep No. 7, 17 December 2015*. ReliefWeb. Available at: http://reliefweb.int/report/algeria/unicef-saharawi-refugee-camps-tindouf-algeria-humanitarian-sitrep-no-7-17-december (accessed 7 May 2016].

WFP. 2015. *WFP Algeria Brief. Reporting period: 01 October - 31December 2015*. Available at: http://reliefweb.int/sites/reliefweb.int/files/resources/Algeria%20Country%20Brief%20Jan%202016.pdf (accessed 2 Apr. 2016).

WFP. 2010. *Protracted Relief and Recovery Operation (PRRO) Algeria, PRRO 200034 -Assistance to Western Saharan refugees*. Available at: http://one.wfp.org/operations/current_operations/project_docs/200034.pdf (accessed 2 Apr. 2016).

Interview

Interview with Samir Zemouchi, Program Officer at UNICEF, Tindouf—Algeria, 6 April 2016.

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Simi Bhagwandass is a recent graduate of the Master in Development Practice program at Sciences Po's Paris School of International Affairs, where she specialised in emerging economies and the environment. She has gained extensive experience working on gender equality, natural resource management and economic empowerment projects in North Africa and Southeast Asia. More recently, Simi has explored her interest in international security, working within the public diplomacy and emerging security challenges teams at NATO. Moving forward, Simi hopes to contribute her experience to programs that focus on the nexus between minority community rights and resilience, particularly in the context of climate change.

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Before obtaining a Master's degree in Development Practice from the Paris School of International Affairs (PSIA/Sciences Po), Magdalena Szynskowska spent four years in Chile, working in the NGO sector and a social enterprise. She worked for two years as a consultant for an NGO, where her work was largely centered on a field work in the area of education and capacity building of the local population in one of the poorest areas in the south of Chile. Then, she went on to work in an innovative social enterprise, which objective was to raise funds for social institutions working with the most vulnerable people in Chile. Magdalena also holds a Master's degree in Economics from University of Lodz, Poland and hopes to further enhance her professional experience in the fields of migration and policy issues.

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Bérengère Sim completed her Master's degree in International Development and Migration Studies at Sciences Po Paris in 2016 and is now working as a research assistant for an internationally renowned journalist in Paris. She studied International Relations with French and Spanish at the University of St Andrews, where her thesis focused on memory and torture in the post-dictatorship societies of the Southern Cone. Bérengère interned at the UN in Mexico City, supporting the implementation of a project protecting the labour rights of female Central American migrants, the French Agency for Development and The New York Times News Service in Paris. She is passionate about the socio-economic challenges the world faces, particularly in human rights, gender equality, structural violence, forced migration and trapped populations. An enthusiastic photographer, videographer and writer, she is determined to mould a career as a foreign correspondent based in Latin America.

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Tamara, born and raised in Argentina, is a hands-on and research-oriented professional with over 7 years of diversified experience in public policy and international development. For the past years she has worked as a project manager and consultant for local, regional and international initiatives over Latin America, mostly focused on Monitoring & Evaluation, Knowledge Management and Social Investment projects. Currently working as a Research Consultant for the International Organization for Migration (IOM) mission in Iraq, she aims at focusing professionally on human displacement and social development issues in Latin America.

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Ludivine Lecat has recently completed a Master's degree in Human Rights and Humanitarian Action at Sciences Po Paris and a Master's degree in International Affairs at l'Insitut d'Etudes Politiques d'Aix-en-Provence. At Aix-en-Provence, she wrote a master's thesis on Frontex and its geopolitical stakes in Great Maghreb. At Sciences Po she specialized in Migration and African studies. In her previous position, she was an intern at Amnesty International Canada focusing on prisoners of conscience, Aboriginal rights and women's rights. She also worked at Handicap International, a humanitarian NGO, on emergency preparedness projects and geopolitical surveillance activities. Ludivine would like to pursue an international career in the field of human rights and particularly on refugee and migrant rights.

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She is the author of The Atlas of Environmental Migration (Presses de Sciences Po and Routledge, 2016) with Dina Ionesco and François Gemenne, a publication which brings together for the first time existing knowledge on the links between migration and environmental change, presented through comprehensive maps, diagrams and case studies. She has also authored and co-authored several articles, research papers and book chapters on migration, environment and climate change. She did her undergraduate studies in Oriental Studies and Social and Political Studies at the University of Cambridge, and her Masters studies focusing on environment, sustainable development and risks at Sciences Po Paris and Columbia University.

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Brittany Ebeling is an undergraduate student from the United States studying at the University of Notre Dame, where she majors in International Economics and Peace Studies. She has worked with organizations such as Asylum Access and Caritas International and has conducted research in Ecuador, Spain, Senegal, and at the U.S.-Mexico border. During the summer of 2016, she interned with the Governing Bodies Division of the International Organization for Migration in Geneva. Brittany contributed to the editorial work on this publication. She currently resides in Dakar, Senegal, where she interns with the IOM Senegal country office.

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ESSAI

The State of Environmental Migration 2016: Review of the Year 2015 is the sixth annual volume of the series, which selects and compiles Masters students' work from the course "Environment and Migration" at the Paris School of International Affairs (PSIA) of Sciences Po in an ongoing partnership with the International Organization for Migration (IOM). Each year, students detail and analyze the year's environmental events insofar as they have affected various forms of migration. This volume includes several important illustrations: landslides in Colombia, floods in India, an earthquake in Pakistan.

Overall, 2015 has been a key year with regard to policy developments relating to environmental migration issues. First, the Nansen Initiative, an intergovernmental process launched in 2012 by the governments of Norway and Switzerland, concluded in October with the adoption by 109 States of a Protection Agenda that outlines the rights of those displaced across borders by disasters. Secondly, the adoption of the Paris Agreement at the COP21 in December of 2015 was the key policy event of the year. The first universal agreement on climate change is mostly focused on greenhouse gas emissions reductions, but also addresses migration and displacement, as it created a task force to advise the UNFCCC bodies on these issues. The task force is expected to serve as a hub for the integration of research and policy on climate change and migration in the UNFCCC negotiations, and should be established as part of the Warsaw International Mechanism on Loss & Damage. This new edition of The State of Environmental Migration will hopefully serve as a reminder of the magnitude and importance of the challenges to come.

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