

Essai

This volume is the seventh in the annual series and the second of its kind published with the Presses Universitaires de Liège. *The State of Environmental Migration* aims to provide its readership with the most updated assessments on recent events and evolving dynamics of environmental migration throughout the world. Each year, the editors select the best graduate student work from the course "Environment and Migration", taught by François Gemenne and Caroline Zickgraf, at the Paris School of International Affairs (PSIA) of Sciences Po. Presented in this edition are displacements induced by some of the most dramatic disaster events of 2016, including Hurricane Matthew, as well as analyses of migration flows related to a variety of environmental occurrences throughout the year spanning the globe. SEM 2017 thus represents another stepping stone towards understanding the broad spectrum that is environmental migration.

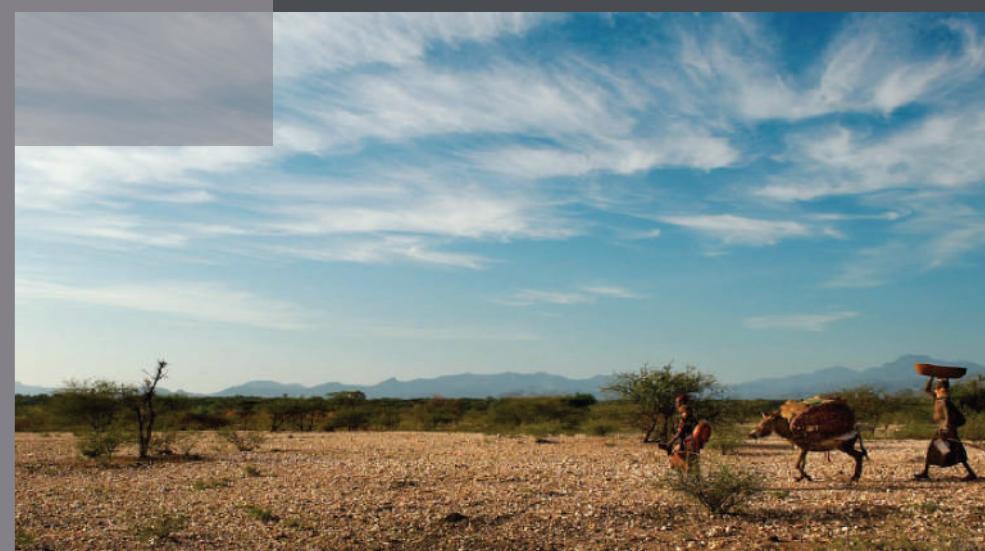
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F. Gemenne, C. Zickgraf, L. De Bruyckere (eds.) - The State of Environmental Migration 2017

Essai

The State of Environmental Migration 2017

A review of 2016



F. Gemenne, C. Zickgraf, L. De Bruyckere (eds.)



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The State of Environmental Migration

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The State of Environmental Migration 2017

A review of 2016



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Introduction

2016 presented yet another year in which millions of people were displaced by natural disasters. According to the Internal Displacement Monitoring Centre (IDMC), the assemblage of natural catastrophes forced a total of 19.6 million people to flee their homes globally (GRID, 2017). This figure does not, however, include those displaced across international borders, a frequent occurrence in borderland areas and areas affected by both conflict and disaster. Nor does it account for those people who leave pre-emptively or are forced to in response to development projects or other progressive environmental changes. We are far from the fist to assert that quantifying environmental migrants, in response to rapidly occurring disasters or progressive environmental changes, is not an easy task (if even a possible one). Certainly, getting accurate figures in the immediate aftermath of crisis in order to analyse these events poses challenges to the research community, including our authors. Yet, admirably, the students of the course “Environment and Migration” at the Paris School of International Affairs (PSIA) of Sciences Po, endeavoured to collect the most up-to-date available figures, reports, and information linking environmental changes (disasters or otherwise) to migration and displacement flows and outcomes.

This is not merely a question of the accessibility of figures. One of the reasons ‘environmental migrants’ are difficult to count is due to the challenge of definition. Indeed, environmental migration frequently faces criticism for being too vague and lacking a consensual, precise definition or legal category. However, we take quite the opposite position—environmental migration is purposely broad because it incorporates such a huge array of links between the environment and human mobility. We assert that like ‘economic migration’, environmental migration as a field is not meant to isolate the environment as a driver or present a singular, causal link between the environment and migration; here we simply privilege cases in which the environment played a key role in driving mobility or was majorly affected by population movements.

The State of Environmental Migration 2017: A review of 2016, therefore, quite intentionally includes such heterogeneity. As seen in previous editions, students’ freedom of choice resulted in a range of case studies representing only a sliver of the diversity of the environment-migration nexus. Authors analyse a range of environmental threats and subsequent

mobility responses across the continents—from air pollution in China to earthquakes in Italy and hurricanes in the Caribbean. Importantly, authors do not stop at detailing the environmental event and describing mobility patterns. They incorporate, and often privilege, the projects, policies and programmes that pre-empt and/or follow. One chapter, for example, analyses the forced eviction of cocoa farmers in Côte d'Ivoire. The inclusion of politics and policies illuminates their essential role in shaping mobility (and immobility), not just as a response to environmental change or disaster (e.g. evacuation systems) but also as they drive displacement and migration (e.g. development policies and projects).

Shedding light on the various contexts in which environmental change impacts migration and displacement patterns, while evaluating the associated environmental and migration policies, this volume once again demonstrates the key role of political and social scientists in the domain.

East Asia

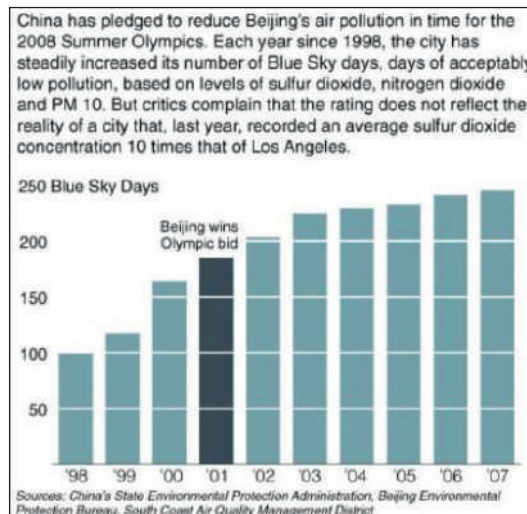
'Airpocalypse'

Smog induced migrations in Beijing

Yubai Wu

On an early morning of December 2016, the residents of Beijing awoke to a world engulfed in a suffocating thick layer of nicotine-smelling haze hovering over the city's skies. Looking out of a window in an apartment building located in one of the city's numerous densely populated resident complexes, the looming grey world outside makes it almost impossible to even distinguish the outlines of the building across the street, no more than 20 meters away. This was a scene that the approximately 22 million residents of this monstrously colossal and still rapidly expanding mega city has been regularly witnessing over the past few years with increasing level of frequency. On this particular morning, in addition to the putrid smell of burning coal mixed with nicotine and the curtain of greyish-white smog, the city was also stricken by a massive wave of cold air—adding just that slight amount of desolation into the already gloomy atmosphere. This indeed, feels like a prologue to an “airpocalypse”.

Graph 1. Beijing's Official Blue Sky Count



Source: The New York Times

Air quality has always been an issue that plagued the Chinese capital for years, with annual massive sandstorms striking the city around spring time in the past. However, over the past decade, the frequency of sandstorms hitting Beijing has experienced a significant decrease, along seemed to be gone the ambiance of apocalypse—a city engulfed by waves of muddy brown sand-air. In addition to this, the city officials had begun releasing data on the annual number of “blue sky days” (*lan tian shu*)¹ to the public since 2001, which presented a tendency of a yearly quantitative increase in the number of blue sky days. This has been an important method in reassuring the public of Beijing in the overall progress of improving city environment, creating the illusion of healthy, clean and constantly improving air quality. However, since early 2010, the actual air quality in Beijing had already started heading towards a downhill path with growing days of a fog like texture lingering over the city sky. But at that time, this so-called “fog” had not yet been widely acknowledged as the deadly smog we know of nowadays. One of the primary reasons leading to the general lack of awareness on the deteriorating air quality, or even the very existence of smog itself before the end of 2010 was due to lapses in the Air Pollution Index (API) adopted by the Chinese Ministry of Environmental Protection (MEP), which failed to include the deadly pollutant known as PM 2.5—the primary component of smog—into the national air pollution monitoring system (Li & Pan, 2013).

November 2010 was the turning point in this issue. Since 2008, the American Embassy in Beijing has been conducting its own evaluation of the city’s air quality with monitors set up on the embassy’s rooftops. But starting from November 2010, the U.S. embassy began releasing the data of its daily monitoring results on twitter, which repeatedly presented higher levels of pollution than those stated by official numbers according to the Beijing government. This quickly attracted public attention at both national and international levels, as people finally began to suspect that the thickening layer of greyness surrounding the atmosphere around them contained more than just harmless fog.

From that moment on, increasing demand from civil society, in particular domestic and international medias have been pressuring the Chinese officials to release data and information about the mysterious pollutant matter hovering over the capital and surrounding regions. Questions evolving

¹ It is important to clarify that “blue sky days” are defined without taking into consideration the level of PM 2.5 pollutants. In other words, even sunny yet smog stricken days are accounted into the total number of “blue sky days”. The method was officially abandoned in 2012 and replaced by air quality measurements of PM 2.5.

around air pollution that the authorities were not prepared to respond to at the time began accumulating heat on social media platforms: "What is smog?", "How deadly is PM 2,5?", "What is causing this pollution and how is the government dealing with it?" The existence of smog and its potential hazardous affects on urban life could no longer remain hidden under a false coat of fog. In response to rising public concern on the matter of smog, Chinese officials have initiated a series of policies regarding the release of smog-related information and implemented regulations of pollutant control. Yet in the face of China's rapid economic development and its inevitable demand for high-polluting industry production activities, that lie at the fundamental basis of air pollution, the effects of policy measures are minimal and slow. Aggravating levels of air pollution, along with the recognition of the series of threats imposed upon human health and quality of life as consequence of residing in these smog stricken regions, induced a phenomenon of population movement that is the direct outcome of environmental issues. In major Chinese cities suffering from air pollution such as Beijing, smog induced migration has become a trend that no longer remain isolated cases.

In the light of this, this paper will present the growing phenomenon of voluntary population movements induced by air pollution in China, with a particular focus on Beijing. It is necessary to highlight that these trends of migration due to smog pollution present itself with different characteristics than enforced population displacement as consequence of natural disasters. In a nutshell, the smog migration phenomenon in Beijing is an on-going voluntary trend of population movement that is in general small scale with families as units; limited within certain social classes, namely those with adequate economic resources; with both permanent and short-termed or "seasonal" relocation and are mainly considered as non-emergencies.

Hence, firstly the paper will introduce the concept of smog and the aggravating severity of smog pollution in Beijing within the past few years. Secondly, it will briefly analyze the cause of smog and its negative impacts upon human health and urban life quality. Hereby it is imperative to emphasize that despite the expanding trend of smog induced migration in Beijing and all of China, it remains challenging to provide definite numbers of population movement in this matter due to the unique characteristics of smog migration itself, but also limits and lapses of official measures in acquiring and releasing such information. As a result of the lack of adequate statistics on smog migration in China, the paper will thus examine the phenomenon in Beijing largely based upon case

studies build on interviews with participants in the migration movement. However, these cases are by no extend isolated incidents as they represent a greater trend that is becoming increasingly common in Chinese cities like Beijing. Finally, the discussion will move on to policy responses of the Chinese government with a short analysis of the limitations of such policies, notably the lapses in acknowledging the air pollution induced migration as an on-going trend in China.

Smog, not fog

December 2011. Grey became the main theme of this winter for the residents of Beijing. As smog levels reached astonishing and terrifying levels far exceeding the safety limit, public outcry for official acknowledgement of the gravity of the issue and for government measures to be taken against smog pollution finally reached the peak of breakpoint. Online petitions were initiated where individuals and civil society organizations voiced their demands, advocating for authorities to publish new standard of national air quality, with particular demand of including PM 2,5, the main component of particular matter pollutant in smog engulfing cities around China, into the air quality monitoring standards. The battle was won with a small victory, in the following month—January 2012—authorities of major cities in China including Beijing began taking PM 2,5 into air quality measurement standards, but monitoring data was not released to the public until 2013. In the long term, the war against air pollution had just begun.

PM 2.5, how deadly is it?

Ambient air pollution ranked 5th on the list of highest human mortality risks factors in the year of 2015. Data from the 2015 Global Burden of Diseases Study shows that in that year alone, PM 2,5 exposure resulted in the deaths of and estimation of 4,2 million people worldwide, with around 103.1 million “disability-adjusted life-years” (DALYs). In other words, air pollution, particularly the deadly pollutant known as PM 2,5, was to be held accountable for 7.6% of global deaths in the year of 2015 (Cohen *et al.*, 2017).

What is PM 2,5 and what makes it as deadly as it is? “PM”, also known as “particulate matter” is a form of air pollutant that can be composed of various mixtures of both solid and liquid matters that exist in the air we breathe. PM 2,5 particles are generally less than 2,5 micrometers in

diameters and invisible to the human eye (approximately 30 smaller than the average diameter of a human hair), making it inhalable and thus highly fatal when entering the human lung and bloodstream. The main sources of PM 2.5 are from emissions of industrial and urban activities such as city construction, coal burning, power plants, industry production and car emission (Luo *et al.*, 2016).

In the case of China, the same study conducted in the year of 2010 concluded that ambient air pollution was the perpetrator of 1,2 million premature deaths in the nation that year (accounting for 40% of the global total) and a loss of 25 million healthy human life years (Wong, 2013). This placed outdoor air pollution fourth on the list of risk factors leading to death in China, ranking right after smoking. Similar studies conducted by the World Bank, the Chinese Academy for Environmental Planning and the World Health Organization show that the annual premature death rate due to air pollution in China lies between 350,000 to 500,000 (Cohen *et al.*, 2017). In addition, a domestic study conducted by Guo *et al.* (2017) pointed out that ambient PM 2,5 caused an approximate 51,000 deaths in China in 2005, mainly fatal consequences of air pollution induced lung cancer. However, despite the acute circumstances of air pollution, authorities responded by warning the authors on the publication of the report, as calculations of premature deaths of air pollution presented itself as a potential threat of social unrest to the officials (Luo *et al.*, 2016).

Beijing, city of airpocalypse

Beijing isn't the only city in China facing a dooming future due to air pollution. Smog has long become a regional issue for China. The daily average level PM 2.5 in 2013 China was 75, exceeding the safety limit established by US and the World Health Organization.² However, cities in the northern and north-eastern regions of China face the most eminent threats of smog, as major numbers of power plants and activities of steel and cement production are concentrated in these regions. Beijing, one of the most populous cities in the world, sits right in the center of this smog-stricken region. The massive number of people residing in the city, combined with the severity of smog pollution, makes Beijing one of the cities where the issue of smog has become one of the most eminent threats of daily life. Since 2013, Beijing and surrounding regions have undergone a series of "smog alerts". The highest limits of smog pollution reached a peak on December 2015, when the city announced its first "red alert" of

² WHO standard: 30 and less.

air pollution ever, as air quality monitoring systems produced alarming numbers exceeding the highest monitored limit in recorded history: a dangerous level of over 900. 22 million people residing in this mega city were urged by the government to take precautions against the deadly wave of smog suffocating the city. Outdoor activities were advised to be limited, or even suspended in general. Greenpeace sources claim that the number of people affected by this calamity exceeded over 460 million over 24 cities in China, which accounts for “an equivalence of the total population of the United States, Canada and Mexico combined”. The red alert lasted during a period of three days, contrasting to data published by the officials, the actual level of dangerous pollutants in the air was 6 times higher than the guidelines set up by the WHO (Greenpeace, 2012).

Since then, Beijing officials have begun putting in place a set of new standards to alert the public of different levels of PM_{2.5} pollution, this system came into effects in March 2016. According to this system, the air pollution red alert is the highest level of a four-tier alert system established by city officials, it is triggered under circumstances when daily average index of PM_{2.5} exceeds 500 in a single day, over 300 for two days in a row, or beyond 200 for a continuity of four days (Greenpeace, 2012). With this system in place, the once invisible threat of smog pollution now becomes more evident than ever.

Smog Refugees

Interrupted life routines

When speaking of smog induced “refugees”, it is important to keep in mind that they present very different traits than environmental refugees as consequence of natural disasters or other environment related enforced displacements. For the residents of Beijing who have chosen or are considering to leave the city due to smog pollution, the drive urging them to come to such decisions normally undergo a slow process of a series of daily life routines and quality affected by smog. This predates the official acknowledgement of the hazardous effect of smog by the city’s authorities.

Long preceding the red alert incident in late December 2015, with increasingly concurring hazardous strikes of suffocating smog throughout the recent years, the option of leaving, whether permanently or short-termed during the most severe days of smog, has already been taken into consideration by some of the residents of Beijing. The first red alert of air

pollution in December 2015 served as a trigger, or reminder for the public of this colossal city that the issue of air pollution was no longer merely about unforeseeable potential health threats. Smog had already imposed too much direct and indirect negative impact upon the daily lives of the millions of people residing and working in this city.

Image 1. Smog in Beijing

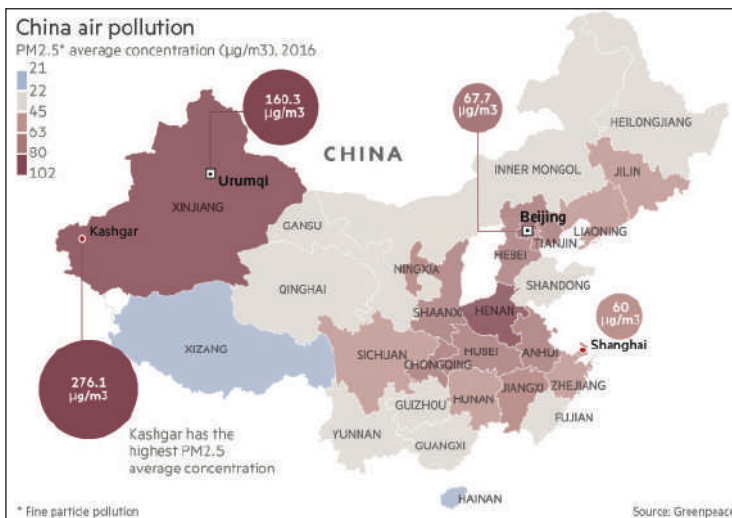


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During the first red alert, as well as the series of other air pollution alerts announced by city officials since then, schools were advised to shut down, unnecessary outdoor activities were strongly recommended to be avoided, people who had no choice to but to go out in the smog were compelled to wear thick custom made PM 2,5 masks to protect themselves against the dangerous, putrid air outside. The disruptions expanded into other aspects of urban life, as smog often became obstacles for both roadway and airway traffic transportations. On more than one occasion, airports in Beijing were paralyzed by the strike of smog. The city's Nanyuan airport, located in the southern part of Beijing and mostly accommodating domestic flights, was forced to cancelled all its incoming and outbound flight on December 7th, 2016. In addition, the Capital Airport cancelled 273 flights (Xinhua, 2016b). Within the city, private cars on the road were strictly limited by odd and even license plate control, which was initially a short-term emergency measure implemented during major events such as the 2008 Olympics, but now became an everyday routine regulation for the citizens of Beijing. Furthermore, numerous other aspects of daily life were affected by smog, express delivery systems underwent a short period of paralysis. Shunfeng Express, the country's

largest and most efficient express delivery company was compelled to sustain a two-day delay of all their services in the Jing-Jin-Ji area (major urban region in north-eastern China composed by the cities of Beijing, Tianjin and Hebei) that suffered the most of smog. Moreover, many restaurants in Beijing were ordered to suspend all their wood burning activities, making it impossible to continue with their usual business as the producing of traditional food such as the Beijing Duck requires specific procedures of wood smoking.

Map 1. China air pollution



Source: Greenpeace

Living in this once thriving, dynamic city now suffering from continuous attack of smog invasions was no longer an ideal way of life for growing numbers of residents in Beijing.

Fleeing the city: environmental “exiles”

General information

Currently, is it extremely difficult to find official data of mass movements of population induced by smog pollution in Beijing and throughout China. One of the main reasons of this, as briefly mentioned in this paper before, is that discussions of air pollution induced migration remains in a somewhat sensitive political domain for the officials of China, with the

government still reluctant to release all relevant data of the issue. The second reason for the lack of sufficient data lies within the phenomena itself—smog induced migration remains in general a small scale trend of population movement that is highly restricted within certain socio-economic classes of the society, therefore making it extremely difficult for large scale census to be conducted. Hence, further examination of the issue will be largely based on individual case studies conducted through private interviews of residents of Beijing and other alternative means of data gathering.

The Huren Research Institute based in Shanghai conducted a study in July 2015 stating that environmental pollution has become one the top drives for the middle class and the wealthy in China to emigrate out of the country for good. This statement is supported by another set of official data. A year prior, the annual Chinese Investment White Paper Report referred to 2014 as “the first year of an era (*yuan nian*) of smog”, announcing that among the top three reasons for Chinese emigration, environmental pollution ranked second. Education remained on top of the list, with 21% of Chinese emigration to foreign countries due to pursuit of access to better education resources; concerns about environment and pollution followed on the ranking, accounting for 20% of emigration, while food security ranked third (Hurun Research Institute, 2015).

Studies directly linking the cause correlation between air pollution and population movements in terms of migration remain limited at this period due to similar reasons of why there lacks sufficient data on smog migration. However, there exists researches that indicate an existing correlation between smog and migration. A study facilitated in Singapore based on search data from internet users of 153 major cities in China on the most popular domestic search engine Baidu discovered that the relationship between the level of pollution and the number of hits on key words related to “migration” presents itself in a positive correlation, in other words, the worse the air pollution, the more people searched for migration related information online.

Using daily air quality index, or AQI, data published by cities, the researchers found out that when smog worsens, search keywords like mask, haze, and PM 2.5 increase by as much as 12.7 percent, 27.1 percent, and 32.1 percent, respectively. When a city's AQI increased by 100 points, residents' searches on topics related to moving away rose by 2.3 to 4.7 percent the next day”(Liang, 2016).

During the red alert periods in December 2015 and January 2016, China's foremost online travel agency Ctrip stated that it expected 150,000 travelers to head abroad during that time to flee from smog. Top destinations were listed as: Australia, Indonesia, Japan and Maldives (Zhou & Zhang, 2016).

Individual case studies of smog migration

In the process of composing this paper, in order to further comprehend the state of smog migration, 7 interviews were conducted with residents in Beijing who are participating or potential participants in this on-going trend of smog migration. 2 of the subjects of the interview were introduced to the author by an acquaintance who was himself considering to move out of the city to flee from smog, the remaining were respondents to an online interview request. It is interesting to state that these interviewees all come from similar socio-economic backgrounds: middle/upper-middle class, well educated with high income professions. We will hereby present details of two of the cases whose situations can highly represent those of their similar backgrounds.

One of which is Mr. Xie, a resident of Beijing for over 30 years. He holds both a Beijing "hukou"³ and a well-paid job in the city. Yet, with aggravating smog pollution and his personal status of reaching retirement age, he and his family are considering to purchase an apartment in the southern vacation resort island of Hainan. Mr. Xie states:

Before the air pollution got this bad in Beijing, I have never considered the idea of leaving this city. This is where my life is, my job, my family and my friends are. My entire social circle lies within this city. Yet now it is no longer possible to ignore the affect of smog on my daily life, and especially the negative impacts on my health. In the past year or so, I have been suffering from severe coughing issues that my doctor diagnosed as bronchitis caused from air pollution. With my children growing up and moving away, my wife and I are considering to purchase an apartment in Hainan, where we will be spending a couple of months each year after our retirement. But even before we retire, we won't hesitate to take refugee in Hainan or elsewhere when situations of pollution becomes unbearable here in Beijing (personal communication, April 2, 2017).

The case of Mr. Xie is not an isolated one, he further provided a rather astonishing number on the issue. 80 percent of Mr. Xie's frequent social

³ Chinese household regulation system, official document stating that Mr. Xie is a recognized resident of Beijing with access to local welfare policies, etc.

circle (to which he states are approximately 60 individuals and their families), including his friends and family have either purchases or are already considering purchasing an estate in the other parts of China such as Hainan or Yunnan where smog is currently not an eminent threat. During the interview he added:

I know at least 60 families living in Beijing either from work or my friends that have bought or are going to buy apartments or houses in less polluted areas in China or even abroad (personal communication, April 2, 2017).

As for younger professionals residing in Beijing, the idea of purchasing investing in real-estate in other cities or moving either permanently or for long periods of time each year to avoid smog Beijing seems less like a less applicable option. The second case is that of a young professional mother in her mid thirties working a well-paid job in an international firm in Beijing (who wished to stay anonymous), she expressed her opinions as following:

For me and my family, smog has become a major issue interrupting the quality and routines of our daily lives. My son is just 8 years old and during days of severe pollution, I worry about letting him go outside. Although we have considered moving to places with better air quality and environment in general, currently, it is impossible for both me and my husband as we would lose our jobs. But since two years ago, we have been taking short vacations, fleeing from this city with our son whenever smog got too heavy (personal communication, April 10, 2017).

When asked if her situation was a common phenomenon among peers of her social circle, she provided a positive reply.

Yes, a lot of my friends and colleagues are also ready to pack their cars and drive away to a nearby resort, or fly away to a further destination for short periods of time during bad days of pollution. But similar to my condition, the idea of permanent emigration is unrealistic at the time (personal communication, April 10, 2017).

Inevitable social issues

As can be seen from the cases and data provided above, smog induced environmental "refugees" in the case of Beijing are in general well educated, middle or upper class citizens with necessary economic means to "take refugee" from smog. This consequently results into a series of negative social impacts upon both outgoing cities and incoming destinations.

China's miraculous speed of economic development in the past few decades has transformed the nation into the world's second largest economy, with an ongoing rate of GDP growth of approximately 10% per year. This of course, has created tremendous amounts of opportunities for both enterprises and individuals within the Chinese economy and abroad. However, environmental pollution, notably air pollution, has become a major cause of both domestic and international brain drain.

Environmental issues and the resulted health outcomes arguably become one of the biggest obstacles for attracting and retaining top brains and talent both internally...To date, air pollution in Beijing and other major cities of China has become an enormous challenge facing global firms located there. Severe air pollution has also made many locals aware of the trade-off between amenities and employment opportunities, and they choose to relocate to less polluted cities outside Beijing or abroad (Chao *et al.*, 2015).

In addition to this, these "smog induced migrations" have created new social problems for their places of destination. Without doubt, the incoming flow of "smog refugees" from major urban cities like Beijing to less developed regions, but with better environment quality such as Hainan, will bring positive drives for local economic development. But on the other hand, increasing flows of population moving into these areas will at the same time impose additional pressure on local resources in terms of both natural and social resources. Taking Hainan as an example, the island will be facing serious problems in the course of competition between local residents and new incomers regarding social resources like public transportation, education and health care etc., imposing additional pressure on local authorities. For the "smog refugees" themselves, the move will not be completely smooth either, this was also a concern expressed by Mr. Xie during his interview:

The biggest problems that I am worried about when eventually making the move to Hainan are the cultural environment and health care issues. Of course, people in Hainan will have different culture backgrounds than us here in Beijing in terms of social activities and lifestyles. I don't mean to be rude, but local residents there are generally less educated, thus we will have fewer opportunities in finding good concerts and cultural events there. I am worried about experiencing difficulties integrating into the local society. Last but not least, health care is another major concern for me. Because of course local health care facilities in Hainan are incomparable to that we have in Beijing (personal communication, April 2, 2017).

The clash between people originating from two different worlds, would with no doubt lead to potential risks and conflicts of integration. Yet what are the responses by Chinese authorities at both local and national levels to the issues caused by smog?

Policy responses to smog

In March 2012, shortly after PM 2.5 was included into the National Air Quality monitoring system, as required by decisions made during the National People's Congress and the Chinese Political Consultative Conference (NPC & CPPCC), the state officials took a further step towards expressing its determination in fighting air pollution by integrating the goal of controlling GHG emission and PM 2.5 into the national government's working reports for the first time in history.

A year following this, in September 2013, the National Air Pollution Prevention and Control Action Plan was published by the state council. The plan introduced ten different measures to be implemented on a national scale with the ultimate goal of controlling air pollution. Key actions will be taken place in fields of improving industrial infrastructures, reducing GHG emissions, and regulating regional management with the ultimate goal of tackling air pollution. In 2014, the New Environmental protection law was established and scheduled to be effective from January 2015. The Law has set higher standards and stricter regulations for air pollutant emission, at the same time granting the state and law enforcement agencies with additional power of regulating pollution control.

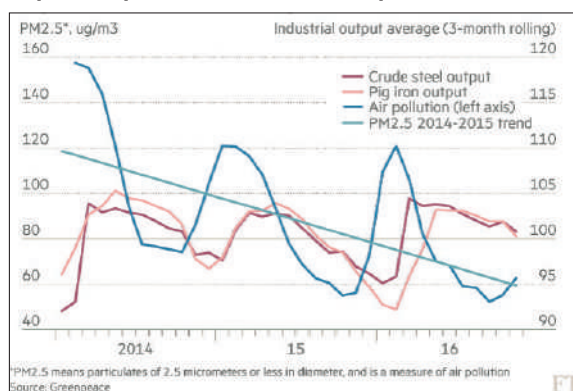
However, in light of all the measures taken by both national and local governments, the ultimate test lies in the fact of whether the Chinese government is willing and able to tackle the fundamental roots of air pollution: industrial coal burning. "Industrial coal use is the main source of energy in China and accounts for 67% of the country's total energy consumption" (Chen *et al.*, 2013).

In the year of 2012 alone, China consumed 50 percent of the world's total coal consumption, an amount of 1,63 billion tons of equivalent oil. State owned heavy polluting industries such as heavy chemical and petrochemical enterprises have also experienced flourishing growths in the past decade.

This corresponds with the demand of China's rapid economic growth, bringing in lucrative income to state revenue. Logging and regulating GHG emissions from these sectors is a crucial step in securing air

pollution management transparency China tackling the issue itself. The real challenge is for the state to find a balance between sustaining economic growth and protecting the environment. As the Chinese economy experienced a recent slow-down, the government has additionally taken some measures in setting limits on the use of coal in several populous regions in the country's eastern areas.

Graph 2. Air pollution and industrial output in northeast China



Source: Greenpeace

Limits in policy responses

Nonetheless, lapses do exist in the current policies measures taken by the state. According to the World Health Organization, the safe level of ambient PM 2.5 should not exceed the level of 10, while Chinese authorities increased the official limit to 35 in China. For instance, both the 11th and 12th Five Year Plan only mentioned “emission reduction targets” and failed to specify detailed goals and numbers of reduction. This has granted authorities at the local level with room to play number games, thus resulting in limited achievements of controlling air pollution. In the 13th Five Year Plan, the state council finally announced its goals to reduce GHG emissions levels by 18% in 2020 (in regions that exceed the state-set limit of PM 2,5 pollutants). Another important policy progress is that this document acknowledged the rights of the public to have access to all air pollution related data concerning their daily lives.

However, in 2016, Beijing authorities officially categorized smog as a natural disaster, listing it alongside spring sandstorms and summer rainstorms that used to frequently visit the nations capital. This was officially stated in the Beijing Municipal Meteorological Disaster Prevention

Stature, an act that caused immediate public outrage. The primary concern expressed by the public and media is that if smog and PM 2.5 are categorized as natural disasters, it would create excuses and legal cracks for heavy pollutants to dodge the obligations and responsibilities of reducing GHG emissions; in addition, this act would also relieve pressure and responsibility from the government in tackling the problem at its roots. In response to public protests on announcement of classifying smog as a natural disaster, the official government media published a statement, warning that (...) serious consequences caused by mistakes in broadcasting about meteorological disasters will be punished. The draft prohibits organizations and individuals from publishing reports on meteorological disasters, punishable by fines (People's Daily report, 2016).

Conclusion

Nonetheless, no matter how policies reform and regulations change, the public's greatest demand is for authorities to find fundamental solutions to resolve smog pollution that greatly undermine the quality of life and impose unknown and unforeseeable threats against public health. People are fully aware that short term emergency measures with limited effects are not the ultimate solution to tackling the problem at its roots.

Despite the fact that the authorities have been taking measures in attempting to shift China's economy from heavily dependent on industrial overcapacity towards the service sector, the gradual process of economic reform will require decades of transition. However, improvements can be seen. Less than a decade ago, the existence of smog was a fact that was denied by the government, nowadays, China is taking on various steps towards declaring war on controlling air pollution. From a global perspective, the Trump administration's policies in regards to climate change has put China in the foremost position of leading the world against the ultimate war fighting global warming and climate change. It can be therefore anticipated that policies and measures tackling climate change will provide co-benefits to domestic issues of air pollution and smog.

In fact, not long ago, the existence of ambient particulate matter itself and its harmful impacts upon human health generally lacked sufficient public awareness globally and was not (officially) monitored before the year of 2013. Hitherto, the situation has made significant progress as PM 2.5 levels are now being monitored in over 400 cities around the world.

However, coming back to the case of smog induced migration in Beijing and greater China, no current policies or government measures at both local and national levels have taken the phenomena nor its social and economic consequences into consideration. As result of such circumstances, smog migration in Chinese cities like Beijing remains an ongoing and growing trend of voluntary population displacement, as each year during peak periods of smog invasion, large numbers of individuals and families chose to leave the city to flee from the pollution. Some of them, never return. At this stage of development, it is only the fortunate ones who have the capacity to make the choice of becoming a voluntary “smog refugee”, while the majority of less fortunate residents in smog stricken cities like Beijing have no choice but to become “refugees” trapped under the deadly hazardous carpet of smog.

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South Asia

Cyclone Rouna and Displacement in Sri Lanka

A natural disaster and its underlying patterns of vulnerability

Maximilian Friedrich

On 14 May 2016, tropical cyclone Roanu struck Sri Lanka, causing major flooding and landslides (UNOCHA, 2016). The cyclone had serious consequences for the entire Bay of Bengal in South Asia, destroying the homes of some 125,000 people and costing an estimated USD 1.7 billion in reconstruction (Malo, 2016). Sri Lanka was one of the hardest hit places by the disaster that caused damages and losses in excess of USD 570 million (World Bank, 2016). The storm led to the displacement of over 493,319 persons and caused over 200 casualties (Ministry of Disaster Management, 2016). The resulting floods have been described as the worst in 25 years (Ministry of Disaster Management, 2016).

This case study will examine the consequences and effects of cyclone Roanu on the Sri Lankan population. It will illustrate how disaster displacement caused by natural disasters is becoming increasingly challenging in Sri Lanka, and will continue to get worse. Historically, Sri Lanka's population has suffered from large-scale displacement due to civil conflict. Natural hazards have also always played an important role in the country's displacement history. Most notably, the Tsunami in 2004 that killed over 30,000 people and displaced over 400,000 more has engraved itself on to the public memory. Roanu and the subsequent displacements have once again highlighted Sri Lanka's vulnerability to natural disasters.

The purpose of this paper is to closely analyse the displacements caused by cyclone Roanu within the conceptual framework of disaster risk. In order to make sense of the displacements that occurred in May last year it is crucial to understand the underlying disaster risk facing the Sri Lankan population, comprising both natural and human factors that led to the large-scale displacements. This paper will therefore begin with an overview of the various natural hazards that Sri Lanka is exposed to on a regular basis. While exposure to natural hazards plays an important role, the high disaster displacement risk cannot be fully understood without also looking at human (political, social and economic) factors. Disaster risk, taking into account human and natural influences that determine

the outcome of a disaster, will therefore be introduced as a conceptual framework for this case study.

Having examined Sri Lanka's vulnerability to disaster risks, the following section will then turn to the events of May 2016. More specifically, it will focus on the disaster-induced displacement that occurred during and after cyclone Roanu. It will firstly provide a description of the events and the subsequent relief operation. The section will focus on the two worst affected areas, the urban zones of Colombo and Gampaha districts and the rural zones of Kegalle district. Based on the conceptual framework of disaster risk, the displacement caused by cyclone Roanu will then be examined in greater detail. The displacement analysis will demonstrate how patterns of vulnerability such as land-use and housing, socio-economic factors and livelihoods, and disaster preparedness contributed to the exposure of the most vulnerable populations during cyclone Roanu and led to the displacement of thousands of people. Both the immediate and long-term consequences for the affected population in Colombo, Gampaha, and Kegalle district will be discussed. Based on the displacement analysis the last section will situate the case study's findings in the broader institutional landscape of Sri Lanka's disaster reduction policy. The analysis will conclude with a final discussion of the shortcomings revealed by last year's events and will point to possible future avenues for closing the gaps.

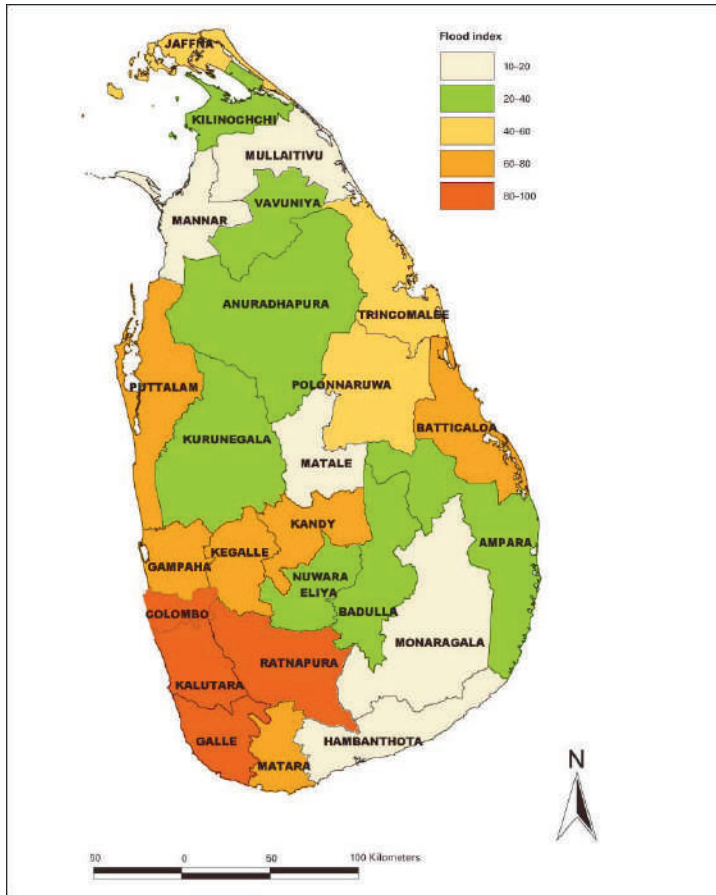
Disaster Displacement in Sri Lanka

Exposure to Natural Hazards in Sri Lanka

Sri Lanka is located in the Indian Ocean, southeast of the Indian sub-continent. There are 21.3 million people living on the island. Sri Lanka is mainly comprised of coastal plains, and lies slightly above sea level. The mountain massif in the southern central part of the island divides the island into three geographical areas: the plains, the coastal belt and the central highlands. The geography translates into different climate patterns and hence varying levels of exposure to natural hazards across regions according to the different monsoon seasons.

The island is prone to a number of natural hazards: floods, cyclones, landslides and droughts regularly expose Sri Lanka to significant disaster risks. In the dry zones in the north and east of the country, weather patterns in recent years have led to more frequent and longer droughts. In

Map 1. Frequency map of flood disaster incidence

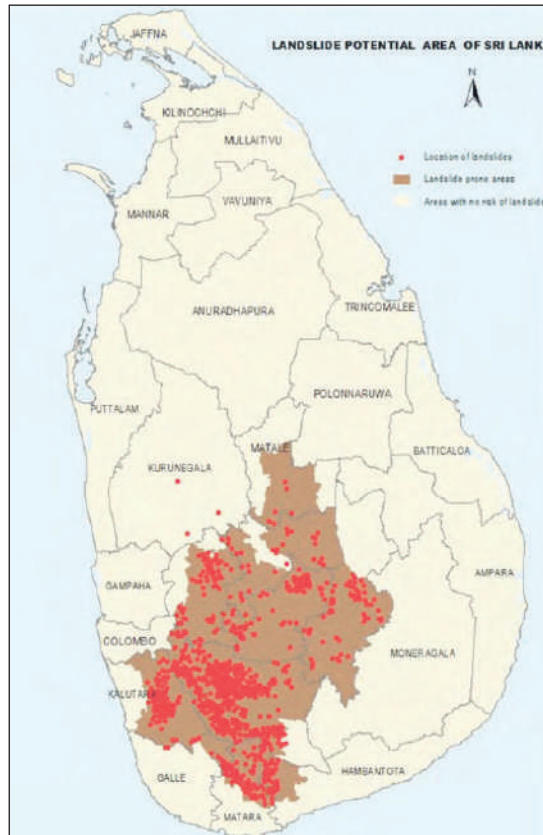


Source: Zubair *et al.* 2006

the wet zones in the southwest, higher and less predictable rainfall has triggered frequent and intense flooding. A World Bank study recently concluded that annually an estimated USD 380 million is lost due to disasters in Sri Lanka (World Bank, 2015).

Above all, floods and landslides have continued to pose significant risk to the Sri Lankan population. During the monsoon season, heavy rainfall causes river beds to overflow, resulting in major flooding (riverine, flash floods, etc.). The most flood-prone districts are located in the southwestern part of the country, with the districts of Kegalle and Colombo amongst them (Zubair *et al.*, 2006) Geography and land use patterns play

Map 2. Landslide Potential in Sri Lanka



Source: Sri Lanka Disaster Management Reference Handbook

a crucial role in how rainfall affects the local population. In the district of Kegalle, drainage and topographical features are also significant factors. In this area, people have settled mostly in the flood plains and steep hill slopes, which exposes them to considerable risk of flooding (Zubair *et al.*, 2006, p. 126). Heavy rains during the cyclone seasons may not only cause floods, but also landslides. These most commonly occur in the central highlands, where again, Kegalle district is most exposed to a very high risk of landslide-related hazards (Zubair *et al.*, 2006).

In general, the island's climate, geography and topography frequently expose the Sri Lankan population to a range of different natural hazards. Climate change may even further increase these risks by altering the

frequency and intensity of extreme climatic event and storm surges. This is particularly true for the El Niño phenomenon, which amplifies drought periods and causes more intense storms and cyclones (Glanz, 2017). Sri Lanka thus has a high exposure to natural hazards. In the context of disaster risk, however, it is important to understand that natural hazards do not produce risks in isolation of anthropogenic factors (Ginneti & Lavell, 2015, p. 13). In order to explain the disaster risk facing Sri Lanka it is equally important to understand human factors.

Taking Human Factors into Account: The Risk of Disaster Displacement

The high exposure to natural disasters naturally increases the likelihood of disaster-induced displacement in Sri Lanka. Disaster-induced displacement refers to a situation in which “people are forced or obliged to leave their homes or places of habitual residence as a result of disaster, or in order to avoid the impact of an immediate and foreseeable natural hazard” (Nansen Initiative, 2015). Displacement may vary in duration (temporary or permanent), in distance, and regarding subsequent patterns of movement. Due to its natural climate and the intensifying impacts of climate change, Sri Lanka faces a relatively high level of exposure to the risk of disaster displacement.

However, the impacts of natural disasters do not unfold in a neutral setting, but are in fact dependent on various human factors. Accordingly, academic and policy discussions have recently shifted in terms of their understanding of disaster displacement risks. Disaster displacement risk is no longer considered as purely climate-induced, but rather as a ‘human’-influenced phenomenon (Wisner, 2004, p. 471). The risk of disaster displacement must thus be understood as the sum of natural and anthropogenic factors: the natural hazard itself, the level of exposure of the affected communities, and their underlying vulnerability (Ginnetti & Lavell, 2015, p. 13). Increased exposure to natural hazards increases the risk of disaster displacement. At the same time, the risk of displacement also depends on the vulnerability of the population. Vulnerability is defined as the predisposition to be adversely affected by a hazard and includes different economic (e.g. household income), social (e.g. family and community networks) and political (e.g. government support) factors (IPCC, 2012). As a consequence, the scale of displacement caused by disasters is largely determined by communities’ underlying vulnerability to shocks or stresses. So while natural hazards are the trigger, the scale

of disaster risk is dependent on a range of human-influenced factors. In return, disaster-induced displacement increases “the risks associated with future natural hazards and makes pre-existing vulnerabilities” (Zhou & Braam, 2015, p. 9).

This new way of thinking about disaster displacement also involves a shift away from a retrospective (post-disaster) approach towards a more anticipatory (or pre-disaster) way of thinking about confronting disasters (Ginneti & Lavell, 2015, p. 8). As a result, post-disaster/displacement responses are increasingly complemented with efforts towards reducing future risk in advance of natural disasters (Ginneti & Lavell, 2015, p. 13). Disaster risk reduction (DRR) has therefore become the new focal point in thinking about disaster displacement.

This conceptual shift towards disaster risk reduction has also been mirrored by developments in the sphere of international policy-making. In 2005, 165 UN member states adopted the Hyogo Framework for Action (HFA), which succeeded the United Nations Strategy for Disaster Risk Reduction (UNISDR) in formulating DRR policies until 2015. Taking a more anticipatory approach to disasters, its objective to reach a “substantial reduction of disaster losses was supposed to be achieved through decreasing communities vulnerability” (UNISDR 2007, p. 25). The 2011 mid-term review of the UNISDR noted that some improvements in the mainstreaming of DRR have been achieved. However, it also highlighted several gaps, for example in the area of early warning systems, and identified difficulties in increasing resilience to hazards, especially in the most vulnerable segments of society (UNISDR 2011, p. 10).

Adopted in 2015, the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) further pursues the strategy of disaster risk reduction. This framework aims to bridge the gap between pre- and post-disaster governance, for example through the ‘Build Back Better’ principle (UNISDR, 2015, p. 32). This approach attempts to integrate strategies that help to reconstruct communities struck by disaster, while simultaneously decreasing their vulnerability to future disaster risks (Yonetani, 2017).

A recent study by the International Displacement Monitoring Centre (IDMC) highlighted the increased risk of disaster displacement in South East Asia. On the basis of a probabilistic risk modelling method, the study projected future displacement risks of different countries in the region. With an estimated average level of annual displacement of 325,800 people Sri Lanka will have a high absolute level of displacement risk over the next 10 years. The per capita displacement risk is even more alarming,

amounting to 15,100 habitants per million at risk of displacement- the highest rate of all countries in South East Asia (Ginnetti & Lavell, 2015, p. 43). However, Sri Lanka does not rank lowest in terms of human development among countries in the region. On the contrary, in 2010 it was elevated to the status of a middle-income country as a result of years of sustained economic growth. What are thus some of the factors explaining Sri Lanka's high risk of disaster displacement?

Vulnerability and Resilience to Disaster Displacement

Sri Lanka's increased risk of disaster displacement can be explained with a range of political and socio-economic factors.¹ In part, an examination of the country's past sheds light on its vulnerability to disasters. Sri Lanka has a longstanding history of conflict-induced displacement. Since 1983, the civil war between the government and the rebel group, the Liberation Tigers of Tamil Eelam (LTTE), has led to the internal displacement of millions of people (Zhou & Braam, 2015, p. 49). Even though the conflict formally ended in 2009, IDMC estimates from 2015 indicate that 44,000 people remain internally displaced due to the conflict (IDMC, 2017). The internal armed conflict and its socio-economic effects on the population thus continue to increase people's vulnerability to hazards, especially in the northeast of the country. As a result of the conflict, many Sri Lankans have been forced to resettle, some of them migrating to urban areas and southern regions.

Besides the civil war, natural disasters have also played an important role in the country's history of displacement. As outlined in chapter 2.1, Sri Lanka faces multiple natural hazards with relative frequency such as flooding, landslides and droughts. The most tragic event in recent history was the 2004 Tsunami. The Tsunami had a devastating impact on the population, especially in the northern and eastern regions, causing more than 35,000 deaths and resulting in about half a million displaced persons (Zhou & Braam, 2015, p. 49). Tragically, those communities with a high vulnerability due to the civil conflict were struck hardest by the disaster. After five years, 217,000 people were reportedly still living in relief camps and an estimated 22,600 were living with relatives (Ginnetti & Lavell, 2015, p. 44).

However, less extreme cases of natural disasters, such as floods, landslides and droughts, repeatedly affect an increasing number of Sri

¹ This section will limit itself to explaining the main factors of disaster risks, particularly those relevant for the analysis of the event of cyclone Roanu.

Lankans. The increasing frequency and intensity of “disasters caused by natural hazards over the past few years has resulted in major socio-economic impacts in both urban and rural areas, especially in disaster prone provinces” (Ministry of Disaster Management, 2016, p. 158).

The risk posed by natural hazards is further amplified by human factors. Since the 1980s, Sri Lanka has experienced decades of rapid urbanization. The country’s capital, Colombo, has witnessed population growth of 31% between 1981 and 2002 (Ministry of Disaster Management, 2016, p. 157). These urbanization trends changed the natural landscape, land use and also created new patterns of vulnerability. In the case of Colombo, urbanization trends led to the construction of so-called ‘under-served settlements’ on the outskirts of the city (Ransinghe, 2011). These settlements are located in the wetlands along the Kelani river basin, an ecosystem serving as a natural flood protection mechanism. As population growth and urban development have led to a serious environmental degradation of the area, the flood control services of the wetland ecosystem have deteriorated. This has exposed the entire city to increased risk of flooding and makes the local population more vulnerable to floods (Hettiarachchi, 2014, p. 79-89). In another disaster prone area, the district of Kegalle, human influences have increased the population’s vulnerability in a similar manner. Zubair *et al.* remark that the frequency of landslides in the central highlands has increased due to human influences such as expanding cultivation zones, large constructions, and blocking of drainage ways (2006, p. 126).

It thus becomes clear that a multitude of factors, ranging from the political to the socio-economic may explain the high level of disaster risk in Sri Lanka. The increased vulnerability of the Sri Lankan population to disaster-induced displacement was demonstrated by the events of cyclone Roanu in 2016.

Cyclone Roanu hits Sri Lanka

The 2016 flooding and landslides

On 14 May 2016, tropical cyclone Roanu struck the Gulf of Bengal, heavily affecting the island. On 15 and 16 May, low pressures unfolded across the entire island with strong winds and torrential rains. The rainfall was the heaviest recorded in 18 years, and the precipitation caused several rivers to overflow and led to flooding on a massive scale,

particularly in the urban areas of Colombo and Gampaha (Ministry of Disaster Management, 2016, p. 19). In several divisions of the Kegalle district, the torrential rains caused fatal landslides. The western part of the island was hit especially hard, particularly the districts of Colombo, Kegalle, and Gampaha.

Overall, 24 out of 25 districts in Sri Lanka were reportedly affected by the extreme weather. 493,319 people were (temporarily or permanently) displaced by the disaster according to government figures (Ministry of Disaster Management, 2016, p. 19). More than 58,925 houses were adversely affected, of which 6,382 were destroyed and 52,543 were damaged. The National Disaster Relief Services Centre (NDRSC) reported 93 deaths, 33 injuries and 117 missing persons as a result of the cyclone.

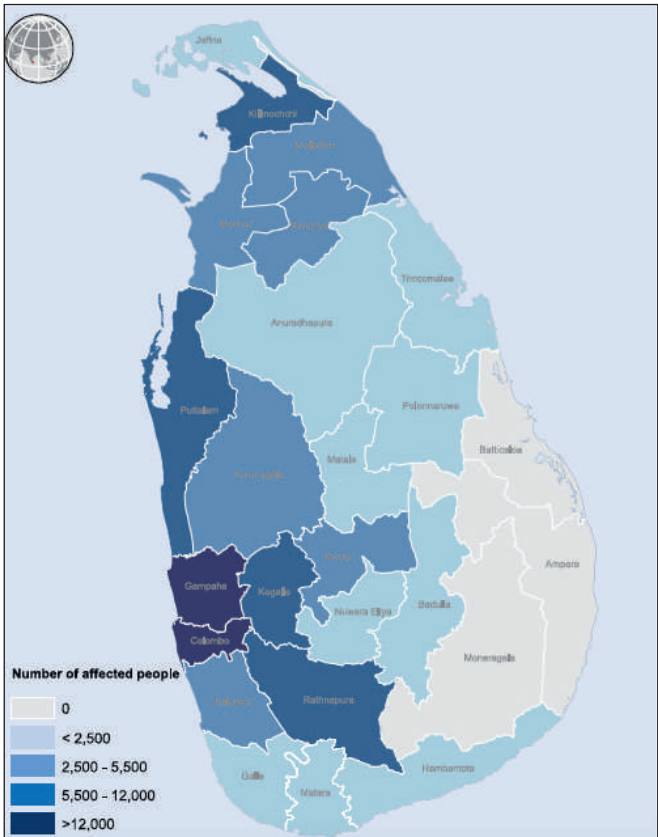
Landslides

Most of the fatalities were caused by the massive landslides that occurred in the Kegalle district. In the division of Aranayake, the heavy rainfall caused a massive landslide destroying the villages Siripura, Pallegage and Elagipitya and burying dozens of people (Ministry of Disaster Management, 2016, p. 3). The landslides were the worst-ever recorded in Sri Lanka (Ministry of Disaster Management, 2016, p. 22). In the Kegalle district alone, the floods and landslides affected more than 14,024 people, partially damaged over 3,754 houses and destroyed 158 completely (IOM, 2016). The people were evacuated as the landslide warnings remained in place in Kegalle and other neighbouring districts. Most of the displaced people had to remain in safe centres, since their houses were either damaged, destroyed, or inaccessible due to the landslide warnings.

Flooding

The district of Colombo, the country's capital and economic hub, as well as the district of Gampaha were the worst-affected areas by the flooding. The torrential rains caused the Kelani River to overflow and resulted in the blocking of the drainage system. Riverine and urban floods affected 228,871 people in the Colombo district alone (Ministry of Disaster Management, 2016, p. 22). Among the worst affected areas was Kolonnawa division, with 155,062 people affected. In the Gampaha district, the flood affected 74,003 people.

Map 3. Number of People affected by floods and landslides



Source: United Nations Office for the Coordination of Humanitarian Affairs

Table 1. People affected by landslides

Date	District	AGA Division	Affected Families	Affected People	Deaths	Missing
15 May 2016	Kegalle	Dehiowita	832	3,342	4	1
16 May 2016	Kandy	Udunuwara	292	1,360	6	0
17 May 2016	Kegalle	Aranayake	996	2,766	31	96
17 May 2016	Kegalle	Bulathkohupitiya	758	2,758	15	2
18 May 2016	Kegalle	Yatiyantota	997	3,810	0	0
Total			3,875	14,024	56	99

Source: Ministry of Disaster Management

Cyclone Roanu also had severe effects on the Sri Lankan economy. The total damage and losses amounted to an estimated LKR 105 billion (roughly EUR 630 million), according to the Post-Disaster Needs Assessment (PDNA), carried out by the Sri Lankan government and international organizations (Ministry of Disaster Management, 2016, p. 27). A sectoral assessment showed that housing was the most heavily impacted sector, followed by industry and commerce, as well as livelihoods and agriculture. In total, 58,925 houses were affected by the disaster of which 6,382 were heavily damaged, 25,958 were partially damaged, and 26,585 suffered minor damage.

Disaster Crisis Response: Relief Operations and Humanitarian Assistance

The Sri Lankan government was quick to react to the floods and landslides. The Disaster Management Centre (DMC), together with the Sri Lankan Armed Forces and Police, started search and rescue operations immediately after the onset of the cyclone (Sagar, 2016). In total, 373 safe centres were established, where 115,000 people found refuge from the flooding and unsafe areas in the landslide-affected regions (Ministry of Disaster Management, 2016, p. 22). Relief items were distributed, but this proved difficult, since many people remained trapped in their houses, surrounded by water (Ministry of Disaster Management, 2016, p. 22). The Sri Lankan army mobilized 1,500 personnel, dispatched 81 flood relief teams, and deployed helicopters for rescue and relief operations. As the water receded, the army, in cooperation with civil society organizations, engaged in clean-up operations that took until June to be completed (WHO, 2016).

The operations were coordinated with international organizations, such as UN agencies—UN-Habitat, UNICEF, and the International Organization for Migration (IOM)², the Sri Lankan Red Cross Society (SLRCS), the World Health Organization, (WHO), the World Food Program (WFP), and other civil society organizations as well as local NGOs. The agencies worked closely together in order to provide shelter, health, food, water and sanitation for 220,000 of the most vulnerable people (Ministry of Disaster Management, 2016, p. 22). The Federation of Red Cross and Red Crescent Societies (IFRC) mission together with other humanitarian organization engaged in the distribution of household items, provision of

² IOM officially became a UN agency in September 2016.

shelter and medical camps, cleaning and hygiene, and restoring family links (IFRC, 2016).

The weather improved in the days following May 27th and the water level of the Kelani River slowly began to recede. As the water regressed, some people were allowed to leave the evacuation sites and return to their homes. However, many were faced with extreme difficulties, having lost their houses and livelihoods, particularly in the worst affected regions.

Analysis of Displacement

The cyclone led to the displacement of people on a massive scale and caused serious economic damage. Much of the displacement was temporary, as most people could return home as the waters receded after being evacuated to the various safe centres across the country. However, there were a number of people that were permanently displaced due to urban flooding in Colombo or due to the fatal landslides in Kegalle district.

This section will focus on the worst affected districts: the urban areas in Colombo and Gampaha and the rural areas of Kegalle district. It will try to explain the underlying disaster risk patterns that led to the disaster displacements. Firstly, particular attention will be paid to the vulnerability of the population prior to the disaster (pre-disaster) focusing on patterns of land use and housing, socio-economic factors (livelihoods), and disaster preparedness and management. Secondly, on the basis of the preceding conceptual framework, the disaster-induced displacement will be analysed in closer detail, focusing on the developments after the disaster occurred (post-disaster).

Colombo & Gampaha

According to IOM project manager Mr. Sulaimalebbe, cyclone Roanu was perhaps the worst urban flood in the history of Sri Lanka (personal communication, April 19, 2017). This assessment is echoed by the PDNA report that concluded that Roanu “is predominantly an urban disaster” (Ministry of Disaster Management, 2017, p. 32). The impact of the floods was mostly felt in the urban and peri-urban areas of Colombo and Gampaha along the Kelani river basin, which are densely populated and have the highest proportion of people living in poverty nationally (Ministry of Disaster Management, 2016, p. 32). The PDNA report estimated that 25,289 flood-affected housing units in these areas

would have to be relocated as a result of the events (Ministry of Disaster Management, 2016, p. 41). But why were these urban areas so vulnerable to natural disaster?

Colombo and Gampaha districts are the economic hubs of the country. As a result of economic and employment opportunities, both areas have the highest in-migrant ratio (about 16%) and the highest population density in the country (Ministry of Disaster Management, 2016, p. 43). However, land scarcity and high land prices have forced low-income urban dwellers, especially recent migrants, to settle in informal settlements. These are often situated in the urban areas bordering the Kelani River and are thus especially vulnerable to flooding. A high density of informal settlements characterizes the area, and house construction is often carried out without authorization, meaning houses are improvised or semi-permanent and of poor quality. Urbanization patterns thus play a vital role in the interplay of natural and human factors that render these populations vulnerable to disaster displacement risks.

The particular vulnerability of Colombo district is in part due to secondary effects of urbanization and land use patterns, mentioned above in section 2.3.³ The increase in settlements in the wetland areas led to a degradation of local ecosystems and reduced its natural flood control capacity. These trends were further amplified by riverbank erosion triggered by sand mining (Ministry of Disaster Management, 2016, p. 49). The deterioration of the natural flood protection mechanism has increased the intensity and duration of urban floods (Ministry of Disaster Management, 2016, p. 49). The negative impacts of environmental degradation are specifically felt in the wetlands, but have also led to a general increase in flood risk in the entire capital (Hettiarachchi, 2014).

The majority of the poor as well as the bottom 40% of Sri Lankan society live in urban areas such as Colombo and Gampaha, which were heavily impacted by the disaster (Ministry of Disaster Management, 2016, p. 32). Many households in these areas are low income and active in the informal sector, industrial zones or own small businesses (Ministry of Disaster Management, 2016, p. 49). The difficult socio-economic situation of the population living in these urban areas clearly exacerbates their vulnerability.

Another factor aggravating the impact of the flooding is the lack of disaster preparedness. Early warning systems were insufficient and flood modelling systems completely absent (Ministry of Disaster Management, 2016,

³ The Kolonnawa division was particularly affected by these secondary effects.

p. 43). As many residents were not forewarned by the DMC, household assets could not be secured and were consequently lost in the floods. Awareness of flood risk was particularly low among newly arrived urban dwellers, who were unaware of the risk of flooding and unfamiliar with evacuation routes and other disaster procedures.

The high (pre-disaster) vulnerability of the population living in the urban and peri-urban areas of Colombo and Gampaha can be explained by the interplay of natural and human factors. Urbanization and land use patterns resulting in housing prone to flood risk combined with the lack of disaster preparedness and the socio-economic situation of urban communities led to the population's increased vulnerability to disaster displacement.

In addition to revealing the underlying vulnerability patterns and the lack of resilience in the heavily affected urban areas surrounding Colombo and Gampaha, cyclone Roanu also exacerbated the vulnerability of urban communities. To begin with, the disaster had a large impact on the socio-economic and livelihood situation of the affected urban areas. Above all, the biggest economic impact for households was the loss of housing and the destruction or damage of assets (Ministry of Disaster Management, 2016, p. 43). The disaster disrupted the livelihoods of many as it impeded people from going to work, with those who work in the informal sector and thus live on a day-to-day income hardest hit. According to the PDNA, the average time of interruption in industry and commerce was three months, thus affecting the large number of laborers working in these sectors (Ministry of Disaster Management, 2016, p. 180). Women and female-headed households (FHH), who often engage in home-based economic activities (e.g. gardening), were particularly vulnerable to the economic consequences of the disaster. In the post-disaster environment many households were forced to take out loans and subsequently faced the risk of debt for repairing their houses, sustaining their livelihoods, or restarting their businesses. Cyclone Roanu has thus worsened the socio-economic resilience of households and pushed many families further into poverty and debt, as the PDNA report underlines (Ministry of Disaster Management, 2016, p. 180).

Another aggravating factor was the insufficient level of disaster preparedness, as well as shortcomings in the government's disaster response. Most of communities did not receive any warning and were only informed through the media (Ministry of Disaster Management, 2016, p. 214). As a result of the lack of information about the flooding and the inadequacy of disaster preparedness (no knowledge of evacuation paths or safe

shelters etc.) many people were not able to evacuate quickly enough. Others chose to stay due to the fear of looting or concerns about the poor conditions in the safety shelters. In total, 78 safe shelters were established in schools, places of worship and community centres. Many safe shelters were reported to be often in poor condition, overcrowded, and lacking space and privacy, proper sanitation facilities and adequate equipment. Facing deteriorating living conditions and a low level of sanitation, in the aftermath of Roanu a massive dengue fever outbreak occurred, which mainly affected those worst hit by the disaster (WHO, 2016). The government's immediate response to the disaster also highlighted certain shortcomings. Due to the lack of knowledge of the area, search and rescue missions were not coordinated well enough, and relief supplies, such as NFI kits and sanitary packs, were reported to be insufficient. In sum, both the disaster preparedness of communities as well as the management of the disaster by the Sri Lankan government proved to be inadequate.

Cyclone Roanu destroyed or damaged most of the informal settlements along the Kelani riverbank. In the aftermath, the Sri Lankan government together with experts announced a relocation strategy to be the "only option to reduce future disaster risk not only for affected persons but also for neighbouring communities" (Ministry of Disaster Management, 2016, p. 51). The planned relocation scheme aimed to resettle 25,289 flood-affected housing units located in the Kelani River basin.

However, contrary to initial announcements, the government relocation scheme was never implemented. Instead, people stayed at the safety shelters or with their families immediately after the disaster. The government had designated the areas along the Kelani River, which was one of the worst affected urban areas, as high-risk, and therefore as no-build zones. Given the lack of action by authorities, soon after Roanu the vast majority of people started to return to their partly destroyed houses even if they were located in the no build-zones. According to Buddika Hapuarachchi, UNDP disaster expert and author of the PDNA report, the main difficulty for the government in implementing the relocation scheme in the urban areas was the scarcity of suitable land (personal communication, September 4, 2017). Also, politics played a role in the government's inactivity, as pressure came from local politicians, who did not want to lose their electorate over an unpopular resettlement decision. Finally, relocation and reconstruction schemes are very costly and it would have needed strong political will to implement such measures. Though the government failed to implement the relocation scheme, it did support the people affected by the disaster with financial means. An estimated

LKR 4 billion (around EUR 22 million) has been paid out in compensation. Hapuarachchi is of the opinion that despite some inefficiency, the government made an overall effort to help compensate people affected by displacement (personal communication, September 4, 2017).

One year after the disaster, the situation for the affected urban communities has not significantly changed. This is mainly due to inaction by the same authorities that failed to take decisive action to prepare affected communities for future disasters risks, according to Hapuarachchi (2017). Relocation would have been only one of several disaster risk reduction strategies, including building upstream reservoirs, elevating houses or building river dams. But the authorities have not envisaged any of these different policy options to tackle disaster risk. Risk reduction policies have not been implemented in the “Megapolis development plan”, a development scheme for the Colombo area and its surrounding urban areas. However, plans for mitigating flood risks by constructing three upstream water reservoirs are currently being developed by the World Bank.

Hapuarachchi is concerned that the lack of decisive government action to reduce disaster risks will increase people’s vulnerability to disaster-induced displacement in the future (2017). Having moved back to the land along the Kelani River basin, people are exposed to similar, if not worse levels of vulnerability to disaster risk and disaster displacement. Just one year after the disaster, new floods hit Sri Lanka and the urban communities. Although they spared the communities adversely affected by Roanu this time, the renewed flooding highlights the urgent need to implement disaster risk reduction measures.

Kegalle

Between 14 and 16 May 2016 heavy rains destabilized the hillsides in many areas of Kegalle district, triggering at least seven landslides. The worst landslide occurred in Aranayake district division. Kegalle lies in the western centre of Sri Lanka and is characterized by mountainous areas prone to landslides. The land in the district is highly unstable and has previously been marked as high-risk by the National Building and Research Organization (NBRO). Normally, this means that the construction of houses in the area is prohibited. However, as the existing guidelines have not been enforced, people started to settle in the high-risk zones nonetheless. This naturally exposes them to an increased risk of landslides. Moreover, intense agricultural use and widespread plantations limit the available construction land. Besides the natural exposure, unsustainable

agricultural practices (e.g. slash farming) have further aggravated the risks of landslides in these areas, according to IOM project manager Sulaimalebbe (personal communication, April 19, 2017). The main economic sector in Kegalle is agriculture and considerable proportions of the population sustain their livelihoods with the cultivation of export crops such as coffee, cloves, pepper and tea plantations. These people often rely on daily wages to provide for their food and other needs.

Regarding the disaster preparedness and early warning systems in this area, Sulaimalebbe expressed “mixed feelings”. Every year during times of heavy rainfall the government has issued early warnings of landslide risks in Kegalle. However, these were largely built on assumptions and were often not followed by landslides, contributing to a lack of responsiveness by the communities living in landslide-prone areas. While the government, due to limited capacities at the local level, did not undertake enough measures to understand the risk of landslides, Sulaimalebbe believes that the task of identifying landslide risk remains difficult. At the same time, government measures (e.g. training programmes, installation of rain gauge systems) in other areas of the country have contributed to greater community awareness. Therefore, while acknowledging the different gaps in disaster preparedness, Sulaimalebbe could nonetheless see “a way forward” in government disaster preparedness policies.

As the heavy rains unfolded over the area, most villagers did not receive any advance warning about the risk of landslides, as post-disaster consultations have shown (Ministry of Disaster Management, 2016, p. 214). In some cases the warning arrived only after the heavy rainfall had already started. The absence of any pre-disaster warning as well as a lack of information of the locations of safe shelters prompted many people to stay put during the disaster.

In Kegalle district, cyclone Roanu caused floods and landslides that affected 34,833 people and displaced around 20,000 people. During and after the cyclone, the displaced people were relocated to the different evacuation centres (located in schools, temples or public facilities) across the district. Around 10,000 people (an estimated 3,000 families) were accommodated in 97 evacuation centres following the events, while others stayed with their families and relatives. A total of 3,754 houses were damaged in the floods and landslides in the district. Some people were forced to seek refuge in the evacuation centres as their houses had been destroyed or severely damaged. Others were requested by the government to leave their houses as they were residing in high-risk areas along

the steep hills. For the victims of the Aranayake district, unfortunately, evacuation efforts came too late.

After the cyclone, the government relocation and reconstruction plan aimed to build 1,682 new housing units in the district (Ministry of Disaster Management, 2016, p. 50). The relocation scheme was welcomed by most citizens (Ministry of Disaster Management, 2016, p. 213). Families that were not open to relocation were proposed a compensation package of LKR 400,000 (roughly EUR 2,177) and assistance in finding another site for construction, according to the PDNA (Ministry of Disaster Management, 2016, p. 213).

In the aftermath of the disaster, the main hurdle to the implementation of the relocation and reconstruction scheme was the lack of suitable land near the former villages. In the steep and mountainous area, locating sites that were not high risk turned out to be a challenge for the government policy (Sulaimalebbe, R. personal communication, April 19, 2017). Government authorities therefore had enormous difficulties in locating safe areas and resettling the displaced populations, most of whom stayed at the evacuation centres (Perera, 2016b). The delay put the population in a difficult position, as many evacuation centres were reported to be inadequately equipped, with poor sanitation facilities and a lack of space (Darmarathna, 2017). Therefore, a number of people in the landslide affected areas of Kegalle preferred to stay with other family members (IOM, 2016). To make things even worse, the accommodation of the displaced populations in local community centres, temples or schools created tensions between the host community and those displaced, as reported by local media (Ministry of Disaster Management, 2016, p. 48).

The landslides (and flooding) in Kegalle district resulted in huge economic losses, particularly for those in the agricultural sector, where most people are self-employed and dependent on daily wage activities (Ministry of Disaster Management, 2016, p. 178). The landslides either directly destroyed assets (e.g. crops, houses) or forced people living in high-risk areas to leave their assets behind. For many there was no possibility to continue working on their land, as it was either destroyed or too far away from the evacuation centres where they were residing. As a consequence, the disaster undermined livelihoods and made the affected population dependent on humanitarian assistance. The loss of assets and livelihood opportunities also increased food insecurity among agricultural labourers and their families in the region (Ministry of Disaster Management, 2016, p. 82).

One year after the disaster, the situation remains difficult for the displaced population. According to the government, the cumbersome process of finding suitable land has now come to an end. “1,960 families in high-risk areas in Kegalle District have been identified to be provided 305 acres of land and 200 acres have already been provided, while another 105 acres of land will be provided soon”, government officials claimed (Department of Government Information, 2017). The construction of houses and the allocation of 1.2 million LKR (roughly EUR 6,532) to the selected families have already begun.

Other reports and articles contradict the government’s account of the situation. A year after the disaster, 469 out of the 1,960 families reportedly still live in tents or semi-permanent housing. Although between 54 and 62 houses have already been built (mainly by private foundations), most of the construction has yet to begin. Some of the displaced communities lamented the “lethargic” attitude on the part of the authorities regarding the delay of the relocation process (Darmarathna, 2017).

Other reports have called into question the comprehensiveness of the government scheme. In fact, the scheme does not cover all of the 3,000 families who were affected by the extreme weather and evacuated to the different camps in the district. The government identified only those families who were affected by the landslide itself or who lived in high-risk areas as being eligible for the relocation and reconstruction scheme. Yet, there are reports that another 1,000 families left their houses as they were demarcated vulnerable to disaster risks and subsequently took up residence in the evacuation centres. These families are also demanding housing land, but have not been included in the government scheme so far (Warakapitiya, 2017). There were also complaints about alleged uneven distribution of monthly financial compensation (Darmarathna, 2017).

In conclusion, this analysis indicates that the disaster-related displacement in the wake of cyclone Roanu can be explained by underlying vulnerability in both the urban flood-prone districts and rural landslide districts. In both cases housing and land use patterns, socio-economic factors and inadequate disaster preparedness contributed to the vulnerability of the communities. One year after the tragic events the situation remains difficult for those displaced by the cyclone. Most of the populations displaced by the landslide still reside in semi-permanent housing and their situation has not significantly changed. The relocation scheme has not been implemented in urban areas, and the process of resettling the people affected by the landslides in rural areas is proving slow, hampered by land scarcity and other challenges. The situation has been exacerbated

by drought and the historic dengue outbreak, making the post-disaster work of governments and international organization considerably more difficult.

Disaster Risk Reduction: Policy Challenges for the Sri Lankan Government

Cyclone Roanu was a natural disaster on a massive scale. As the previous section has illustrated, although the response by the government and international actors might not have been entirely sufficient, they nonetheless reacted quickly to the events in terms of the immediate humanitarian effort. This section will evaluate the capacity of the Sri Lanka government to deal with cyclone Roanu within the framework of disaster risk reduction. Which gaps can be identified in the disaster risk policy framework, against the backdrop of last year's events?

Institutional Landscape and Legal Framework

Despite its history of displacement, Sri Lanka has not had a systematic disaster (risk) policy for very long. It was only after the Indian Ocean Tsunami in 2004 that a major institutional reform regarding Sri Lanka's displacement policy was initiated. Following the tragedy, the *Disaster Management Act* paved the way for a more systematic policy approach on the issue. In 2005, the government established the National Council for Disaster Management, which is the country's highest authority in disaster policy, together with the Ministry of Disaster Management. In the same year the Disaster Management Centre (DMC) came into existence with the goal of developing a disaster information management system, collecting data on disasters and disseminating information about climate hazards. In order to supervise and coordinate the dialogue on the implementation of the Hyogo Framework, the ministry also established the National Disaster Management Coordination Committee (NDMCC) in 2007 (Weerisenghe & Hettiarachchi, 2014).

The establishment of several government bodies and agencies was accompanied by a new set of disaster risk policies. In 2005, the Ministry of Disaster Management enacted the "Road Map for Disaster Risk Management", which created a comprehensive disaster risk management approach (DMC, 2005, p. 121). This policy was followed up with the "Sri Lanka National Report on Disaster Risk, Poverty and Human Development Relationship" in 2009 (DMC, 2009). Most recently, this policy process

was renewed in 2014 with the enactment of the “Disaster Management Reference Handbook 2014” and the “Sri Lanka Comprehensive Disaster Management Programme (SLCDM) 2014-2018 (DMC, 2014 and Centre for Excellence in Disaster Management & Humanitarian Assistance, 2014).

In general, over the course of the past decade “there has been considerable progress in integrating DRR into development at all levels” (Weerisenghe & Hettiarachchi, 2014, p. 1). However, as the next section will show, there are persistent challenges facing the government’s DRR policy.

Cyclone Roanu and Policy Challenges Linked to Disaster Risk Reduction

The PDNA carried out by the Sri Lankan government critically contends that “[t]he disaster highlighted a series of shortfalls in the disaster risk management in Sri Lanka, which includes last mile early warning dissemination, disaster response at local level, community preparedness in urban areas, information management and coordination among stakeholders” (Ministry of Disaster Management, 2016, p. 165). Based on the previous analysis of cyclone Roanu, the following section will examine a number of policy gaps and challenges facing Sri Lanka’s DRR policy and the risk of future disaster displacement.

Cyclone Roanu exposed different gaps in the disaster preparedness of Sri Lanka that rendered the population more vulnerable to disaster-induced displacement. To begin with, the events exposed a number of shortfalls in the government’s early warning system. At the onset of the rainfall, the Department of Irrigation informed the DMC about rising water levels in Kelani River. The DMC alerted the general public via mass media and mobile phone messages. However, these did not reach the entire population. Similarly, in the landslide risk areas the NBRO issued warnings based on automated rain gauge systems, which the population did not respond to.

The alerts issued on the day of the rainfall by the Department of Meteorology did not necessarily specify the severity and extent of the flooding (Perera, 2014). Public authorities therefore did not have sufficient information to issue warnings that adequately explained the scope of the disaster. The lack of reliable information also made disseminating information more difficult. Thus, the public did not take the messages particularly seriously. The lack of confidence in early warning mechanisms, contradicting traditional knowledge about floods and lack of awareness further aggravated these shortcomings. Due to the absence of feedback

systems of early warning messages at the community level, the DMC could not confirm receipt of the message. A more effective early warning system might have perhaps prevented some of the fatal consequences of cyclone Roanu in Kegalle district. In the urban districts of Colombo and Gampaha it certainly could have helped the population to secure economic and household assets, mitigating some of the socio-economic impacts on the most vulnerable segments of the population.

According to journalist Amantha Perera, a specialist in natural disasters and the impacts of climate change, the absence of an effective public dissemination body for early warning is one of the greatest challenges facing Sri Lanka's disaster policy (personal communication, April 12, 2017). In fact, gaps in the warning mechanism are a recurring theme in regard to Sri Lanka's difficulties with disaster management (Ahangama & Prasanna, 2014). In 2014, for example, the landslides in the village of Meeriyabedda illustrated "glaring lapses" in early warning systems (Perera, 2014). Already then, the need for better dissemination mechanisms and greater public awareness were identified. Perera argues that the Sri Lankan government could implement more effective disseminating mechanisms without any greater hindrance. Having said that, Sulaimalebbe claims that some progress regarding the installation of early warning mechanisms has already been made. He suggests that the difficulty lies in the interplay between ineffective and imprecise early warning mechanisms and the lack of community awareness and corresponding responsiveness. One option to enhance the disaster communication could include making broader use of already existing telecommunication mechanisms, which were not used comprehensively during the cyclone (personal communication, April 19, 2017). Besides conventional communication channels, social media (e.g. Twitter and Facebook) has been suggested as an effective tool for broader public dissemination (Perera, 2016). The SLRC for instance used its social media accounts to inform the public during the storm. The need to enhance existing communication channels was acknowledged in the PDNA as well as the need to adopt new tools, such as social media (personal communication, April 12, 2017).

In Perera's view, reform of the disaster warning systems should be accompanied by measures building community awareness (2014). The knowledge gaps regarding the wider public is one of the biggest "stumbling blocks" in the face of changing weather patterns and intensifying natural hazards due to climate change (UNDP, 2013). Community awareness is of great importance since it allows for disaster preparedness. In

the case of the peri-urban settlements in Colombo district, for instance, knowledge and information gaps left many locals unaware of flood emergency procedures, evacuation routes and safe centres. It also rendered the evacuation and relief efforts more difficult.

Disseminating information and raising awareness in communities is also difficult due to persistent knowledge gaps in DRR policy on the part of the government. In 2011, the DMC developed hazard profiles for major natural hazards, which were limited in scale (national level) and scope (only for certain scenarios) (DMC, 2012, p. 264). For example, only one flood hazard scenario that covers four river basins was developed. Moreover, vulnerability assessments have not been conducted so far, and comprehensive risk profiles are still unavailable at the national as well as the local level. These knowledge gaps render the formulation of an effective disaster response more difficult. Particularly at the local level, closing the knowledge gaps could contribute to enhanced disaster preparedness of communities, and thus lead to better-conceived policies for coping with disasters. However, this is where capacities are most often constrained, as Sulaimalebbe contends (personal communication, April 19, 2017).

The interplay between knowledge on disaster risks and vulnerabilities at the local level and effective policies could have contributed to a more anticipatory approach. In both the urban and rural contexts, the risks of disasters were relatively well known. The high vulnerability of the urban and peri-urban areas in Colombo, for example, has been studied by a number of scholars.⁴ The challenge thus not only involves a lack of information, but also the fact of translating existing knowledge into tangible policies at the local level. Bridging the gap between knowledge and action is also difficult due to the institutional setting in Sri Lanka. Ransinghe remarks that the distribution of responsibilities and lack of clear-cut duties complicates each policy process (2011). This is particularly salient in the context of urban wetlands in Colombo, in which the government's urban development policy has undermined efficient environmental policy (Hettiarachchi *et al.*, 2014). Better coordination between agencies is therefore essential when it comes to the development of mainstream disaster risk reduction in policies, programs and plans (Ransinghe, 2011).

In its recovery and reconstruction plan formulated in the PDNA, the Sri Lankan government draws on the 'Build Back Better' principle established by the Sendai framework. The corresponding objective of the Sri

⁴ See for example Ransinghe (2011) Hettiarachchi (2014 *et al.*) and Ahangama & Prasanna (2016).

Lankan government to go beyond mere recovery and reconstruction in order to address the “longstanding and underlying risks that cause economic losses and loss lives” is certainly one of the greatest long-term challenges (Ministry of Disaster Management, 2016, p. 226). Addressing “exposure and vulnerability to hazards and increasing resilience will reduce disaster losses and displacement in the future”, and is therefore crucial in order to break the vicious cycle of disaster displacement (Ginnetti & Lavell, 2015, p. 8). Based on these considerations, the Sri Lankan government has already begun with reconstruction and relocation schemes in the rural areas, as the previous section has illustrated. However, in the urban districts of Gampaha and Colombo authorities have failed to implement a comprehensive scheme that addresses the underlying vulnerabilities of the affected populations. Having said that, relocation schemes also entail certain risks of increasing people’s vulnerability; resettling to a different area may interrupt livelihoods, social circles and economic structures thereby potentially further increasing people’s vulnerability.

At the same time, while it is crucial to support those hit hardest by events, it also carries the risks of leaving behind other vulnerable populations. This seems to be the case in Kegalle, where people adversely affected by the cyclone have not been included in the relocation schemes. Current government policy only aims to compensate for property damages and damaged housing structures. However, in the urban context, there are a number of urban dwellers who as tenants are not eligible for compensation, even though they have lost household assets (Ministry of Disaster Management, 2016, p. 210). Moreover, the storm had serious impacts on the livelihoods of thousands of individuals, households, farmers and small businesses. According to the government’s rapid needs assessment 12,000 households were reportedly living in severe food insecurity. However, the government assistance scheme only provided for the 10,000 poorest households for a period of three months (Ministry of Disaster Management, 2016, p. 211). The question will thus be how to secure and restart the livelihoods of these groups that have not been (thoroughly) addressed in the government recovery plan, but who nonetheless face hardship. Yet, addressing the short-term needs of affected populations will be unsustainable if authorities fail to implement a long-term vision of how to reduce vulnerability and thereby the risk of disaster displacement.

Against the background of cyclone Roanu, this discussion has illustrated the different gaps and shortcomings of Sri Lanka’s DRR policy. It has also sought to provide insight into how the Sri Lankan government is currently addressing some of these issues, and to identify paths that could further

develop Sri Lanka's DRR policy. Whether or not cyclone Roanu has thus far served as "a wakeup call" with regards to the Sri Lankan DRR policy remains doubtful, given the government's inaction, and remains to be seen in the future (Ministry of Disaster Management, 2016, p. 226).

Conclusion

This paper has sought to analyse the disaster-induced displacements caused by cyclone Roanu in May 2016. The storm severely impacted the island and resulted in the loss of lives, economic damage and the displacement of around 427,000 persons. The purpose of this paper was to examine these displacements within the conceptual framework of disaster risk.

Sri Lanka is confronted with a range of natural hazards that will likely increase through climate change. Nevertheless, natural hazards are only the triggering point of disaster-induced displacement. Natural together with human factors, conceptualized in terms of vulnerability, resilience and exposure, together determine the extent to which populations will be affected by disasters. In the case of Sri Lanka, the country's high disaster risk profile can be explained by its exposure to natural hazards and the underlying patterns of high vulnerability amongst its population.

The analysis addressed disaster-induced displacements caused by cyclone Roanu through the lens of disaster risk, focusing on the two worst affected areas: the floods in the urban areas in the district of Colombo and Gampaha, particularly the informal settlements in the Kelani river basin, and the landslides in the rural Kegalle district. The vulnerability of the affected communities prior to the landslides can be explained through underlying issues linked to housing and land-use, socio-economic factors and a lack of disaster preparedness. Analysis of the events during and after the cyclone demonstrates how these risk patterns led to the displacement of the most vulnerable populations. Against this backdrop, the last section examined the policy response by the Sri Lankan authorities. A number of shortcomings were identified, embedded in the broader context of disaster risk reduction policy in Sri Lanka. The study also outlined some of the ways in which Sri Lanka's disaster risk reduction policy could be enhanced. Without a more comprehensive disaster risk reduction policy, the tragic events of May 2016 are likely to be repeated and the vicious cycle of vulnerability and disaster-induced displacement will continue unbroken.

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Southeast Asia

Stories of 'No Escape'

Unravelling the unrevealed displacement patterns of Indonesia's forest—peat fires and haze crisis

Sairindri Gita Christisabrina

In the year of 2015 to 2016, two major Indonesian regions—Sumatra and Kalimantan—experienced massive forest and peat fires that burnt 2.6 million hectares (ha) of land (UN-OCHA, 2016). The fires affected more than 22 million people in these regions, including 19 deaths, and 50 million were affected in neighbouring countries such as Singapore, Malaysia, Thailand and the Philippines due to the thick smoke haze (IFRC, 2015; The World Bank, 2016). The fires initially broke out in July 2015 in Riau Province, Sumatra, just prior to the United Nations Framework Convention on Climate Change (UNFCCC) COP 21 in Paris. It spread quickly to six provinces on Kalimantan and three on the island of Sumatra and lasted until early 2016 (WHO, 2015). Forest fires have become a recurring event in Indonesia, striking various regions of the country more and more frequently over the past 50 years, particularly in provinces of the islands of Sumatra and Kalimantan. The fire events are initially associated with the El Niño-Southern Oscillation (ENSO) phenomenon.¹ Twenty-six out of twenty-eight drought years in Indonesia since 1877 have in fact been associated with ENSO, along with all of the major fire events (Applegate *et al.*, 2002). However, forest and peat fires are no longer restricted to ENSO or drought periods, but rather most of the fire events are increasingly fuelled by human activities due to on-going forests and land conversion activities (CIFOR, 2015; Rieley, 2007). This significantly contributes to the interconnected issues of environmental change, human activity and people's vulnerability to disasters.

Fire events are not only an environmental issue; they are also detrimental to human livelihoods and contribute to population displacement. The smoke generated from the fires produces widespread air pollution, commonly known as 'haze'. In particular, during the 2015-2016 fire events, the haze spread throughout and beyond the region, as the monsoon winds carried it north and east (Pollock, 2015). According to the Pollutant Standard

¹ During ENSO event, there is an escalation of cloud convection over Indonesia and in the Pacific Ocean that intensifies drought, fire activities and haze issues.



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Index (PSI), the worst-affected areas reached around 2,000 mg/m³, with extremely low levels of visibility (within a range of 20 to 500 meters); any PSI over 300 mg/m³ is considered dangerous to human health (see the classification of PSI level²) (IFRC, 2015). There were in fact over 500,000 cases of acute respiratory illnesses reported across the region, particularly among children, pregnant women, elderly people, and people with pre-existing medical conditions (Manafe, 2015; IFRC, 2015). Due to this, thousands of people were evacuated and fled their homes, especially those residing near the burning areas. The data from the website of the Indonesian National Disaster Management Agency (BNPB) indicated that in 2015-2016 alone, 2,634 people were displaced in the two regions due to forest and peat fires (BNPB, n. d.).³ However, as the haze was widespread, it made the option to move within the region an unsafe choice for some people residing in the Kalimantan and Sumatra regions (AFP, 2015). Indeed, some people decided to remain in their homes

² PSI: Normal: 0 to 50 mg/m³; Very Unhealthy: 200 to 300 mg/m³; Hazardous: above 500 mg/m³. For more detailed information, refer to Khanna, 2000, p. 193.

³ It is important to note that 1) the data may not be comprehensively reliable, as data collection concerning forest fires is highly limited and conducted sporadically; 2) the BNPB online platform does not automatically provide an aggregated number of evacuated or displaced persons; 3) for that reason, as an initiative, for the purpose of the paper, the number of evacuated or displaced people has been summed up manually.

instead of fleeing (personnal communication, 2017, April 25), a fact which raises various questions related to the nexus between the environment and migration which will be further explored in this paper.

From a perspective relating to the environment and migration, Indonesia's forest and peat fires and the resulting haze crisis are an example of environment-related displacement, in which environmental changes, human activities and disaster response measures affect the magnitude of people's vulnerabilities and the severity of the disaster and displacements generated by it. However, despite a strong connection between human livelihoods, the environment and displacement, there is still a lack of focus on the areas of population displacements in relation to forest fires, both in the literature and the policy making processes. Thus, this case study specifically seeks to provide insights into the link between forest and peat fires and displacement issues to fill some of the information gaps related to environmental displacement resulting from Indonesia's forest and peat fires. It aims to forge a link between the aforementioned issues and government actions by producing policy relevant conclusions on the issues and to call for further attention to environmental displacement caused by the fire events and the resulting haze. The data and information in this paper is derived from a final report of Friends of the Earth Indonesia (WALHI), secondary sources such as reports from international organizations like the Office for the Coordination of Humanitarian Affairs (OCHA) and the International Federation of Red Cross (IFRC), academic research, Indonesia's national and provincial-level government authorities, and local, national and international media coverage, and interviews with those affected by the fire events and haze.

This paper specifically examines the recent fire events of 2015-2016 in Sumatra and Kalimantan—two fire-prone regions—and their impacts on human mobility. First, the paper begins by exploring the environmental characteristics and vulnerabilities of Sumatra and Kalimantan, in order to develop insights into the fire and haze events. Second, it briefly describes the 2015-2016 fire and haze events, highlighting their major economic and health impacts. Third, the paper addresses stories of unreported displacements and immobile populations caused by the events in order to highlight further issues with displacement data. Fourth, it outlines key government policies and response measures to date in addressing displacement (e.g. evacuation efforts) caused by the fire and haze crisis. The paper concludes by underlining major areas for action by governments and other actors in addressing forest fires, peat fires and displacement-related issues.

Environmental Characteristics: Kalimantan and Sumatra

Kalimantan and Sumatra are the two largest islands in Indonesia with populations of 13.7 million and 50.6 million respectively. Sumatra consists of ten provinces: Aceh, North Sumatra, Riau, West Sumatra, Riau Archipelago, Jambi, Bengkulu, South Sumatra, Bangka Belitung Archipelago, and Lampung; Kalimantan consists of four provinces: West Kalimantan, Central Kalimantan, South Kalimantan and East Kalimantan (BPS, n. d.).

Map 1. Administrative Map of Indonesia

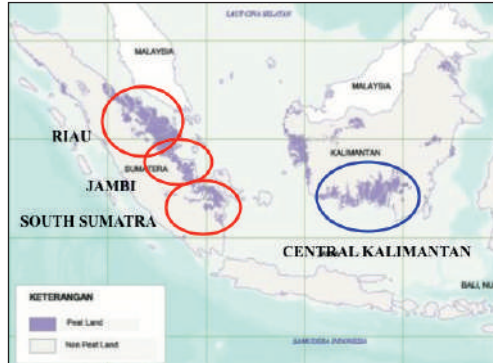


Source: Nations Online

Over half of the total population of Kalimantan (57.9%) and Sumatra (60.9%) live in rural areas, where local livelihoods depend on agricultural activities and forest resources (BPS, n. d.; Schewithelm, 2015). The two regions have the largest share of forest and peatland areas in Indonesia (Dommain, 2014). Kalimantan has a total peatland area of 4.78 million ha and 31.5 million ha of forests, while Sumatra has 6.44 million ha of peatland and 16.6 million ha of forest areas (Dommain, 2014; FWI, 2002; Osaki, Nursyamsi, Noor, Wahyunto, & Segah, 2016).⁴

⁴ Please note that the cited area of forest coverage is for the year 1997 as there is no more recent available data on forest coverage.

Map 2. Peatland map of Indonesia in 2014⁵



Source: Indonesian Center for Agricultural Land Resources Research and Development

Map 3. Forest Coverage in 1980s - 2000



Source: Stibig, 2006

Those relying on agricultural and forest activities generally live in peatland-rich provinces such as Riau, Jambi, South Sumatra, Central Kalimantan⁶ (Sabiham, Winarna, Pulunggo, & Bandung, 2016; Osaki *et al.*, 2016). Moreover, forests in Kalimantan and Sumatra are rich in hardwood species (dipterocarps), and they account for 75 per cent of the commercial log production of Indonesia, making forestry one of the major revenues for these two regions (Guizol & Aruan, 2004). Due to their

⁵ Red circles (for Sumatra) and blue circles (for Kalimantan) have been manually added to highlight particular peatland-rich regions.

⁶ Around 90.6% of farmers in peatland areas on these islands are highly dependent on the agricultural sector. This includes food production (rice, corn, sago, cassava, durian), fruits (durian, rambutan, mango etc.) and spices. For additional information please refer to Sabiham *et al.*, 2016.

richness in agricultural and forest resources, the two regions are important for Indonesia's economic growth (Guizol & Aruan, 2004; The World Bank, 2012; Sosilawati., Handayani, Wahyudi, Mahendra, Massudi, Febrianto, & Suhendri, 2017; Henstridge, De, & Jakobsen, 2013).⁷

State of Environmental Vulnerabilities

Since the 1970s, Indonesian forests and peatland have been rapidly logged, burnt and converted to human activities for various purposes (i.e. agriculture, large-scale plantations- particularly for palm oil, and commercial logging⁸) (Adinugroho, Suryadiputra, Saharjo, & Siboro, 2011; Osaki *et al.*, 2016). There has been a growing need for food and agricultural products for both domestic consumption and export (Osaki *et al.*, 2016). In fact, the rate of deforestation has significantly increased over the past 50 years. In 2002, an analysis of the data from the Ministry of Forestry concluded that over 20 million ha of Indonesia's forest coverage was lost over a twelve-year period starting in the 1980s.⁹ In particular, this includes 6.7 million ha in Sumatra and 8.5 million ha in Kalimantan (Tacconi, Moore & Kaimowitz, 2015; Holmes, 2002).

A combination of land clearance and droughts has resulted in massive uncontrolled fire events in forest and peatland areas of Kalimantan and Sumatra, exacerbated by an increasing intensity and frequency of El Niños (Qadri, 2001; Osaki *et al.*, 2016).¹⁰ Particularly for the forest areas, massive deforestation has resulted in ecological changes that have decreased humidity levels and degraded the land, making forests more susceptible to fires, especially during the dry season (Colfer, 2002). Ever since the major forest fires in the region, fire events in Sumatra and Kalimantan have become cyclical, including the previously-burnt areas. Burnt forest, in principle, possesses more available spaces and light for grasses and other vegetation to grow, in addition to logging residues or dead wood, but this

⁷ This also includes plantation activities including rubber, cocoa and palm oil (located on production forests). For more information please refer to Ellis *et al.*, 2012; Sosilawati *et al.*, 2017.

⁸ 99.9% of Indonesia's fire occurrences are generated by human activities such as land conversion for agriculture and plantation, industry, road constructions, irrigation, among others.

⁹ In 1950, Indonesia's forests totaled about 162.3 million ha, or 84% of the land, yet by 1997, the forest areas had significantly decreased to around 95.6 million ha, or 50% of the land.

¹⁰ There have been some recent studies indicating that the intensity and frequency of El Niño are on the rise; from the seven-and-a half-year average occurrence in the XIX century to occurrences less than every five years.

vegetation dries out more quickly, thereby becoming more flammable (Tacconi *et al.*, 2015).

Nevertheless, when discussing fires on peatlands, it is important to highlight that peatlands have specific properties within their composition that cause more severe impacts when burned. Peatland consists of the accumulation of decayed prehistoric vegetation and partially decomposed materials (Adinugroho *et al.*, 2015).¹¹ It has a high capacity to absorb water, meaning that even when the upper part of the soil is dry, the lower part remains damp or wet (Adinugroho *et al.*, 2015). However, coupled with the changing intervals of El Niño, the impacts of climate change and increased human activities could reduce the water table in peatlands and make peatlands more susceptible to fires, especially during the dry season (Turetsky, Benscoter, Page, Rein, Werf, & Watts, 2015; The World Bank, 2015a).¹²

Fires in peatlands are categorized as 'ground fires,' which are difficult to detect as the depth and extent of the fires are not immediately visible (see Supplementary information¹³) because as an internal fire, wind does not carry the smoke (Adinugroho, 2015). Once it burns, the fire in the peat will combine with steam produced by the fires and the dampness of the peatland (Adinugroho, 2015). The fires can eventually cause an ignition of peat deposits (see Supplementary Information¹⁴), leading to a smouldering combustion inside, which results in a substantial amount of smoke being emitted (Davies, Gray, Rein, & Legg, 2013; Adinugroho *et al.*, 2015). It thus becomes difficult to extinguish the fires because smoke will only appear at the surface without any visible fires (Adinugroho *et al.*, 2015). Even after the flames on the surface are extinguished, peat fires will continue to burn, smouldering underground for years (Adinugroho *et al.*, 2015).

Furthermore, Indonesia's state of environmental vulnerability is also influenced by extensive land use change that has continuously contributed to fire events in the country since the 1980s. It was initially marked by a large-scale land clearance by burning, which was promoted through government policies, particularly in the early 1980s (Indrarto, Murharjanti,

¹¹ Peatland has a minimum organic carbon content of around 12-18%, and a minimum depth of 50cm.

¹² e.g. draining and peatland conversions which are driven largely by palm oil production such as margarine, cooking oil, and soap.

¹³ i.e. how deep the fires can spread down to deeper levels or to more distant areas.

¹⁴ Supplementary information: containing past vegetation, buried logs and other organic materials.

& Khatarina, 2012). The changes in land use change involve various purposes that include converting tropical forests into timber plantation (e.g. mainly acacia—a tree used for pulpwood—and eucalyptus), oil palm plantation and transmigration settlements (Casson, Muliastira, & Obidzinski, 2014).¹⁵

“One of Indonesia’s worst environmental disasters occurred in the “mega-peat area” in Central Kalimantan. A 1 million ha project was launched in 1995 to guarantee rice self-sufficiency; however, the scheme quickly turned into an environmental catastrophe as peat forests were stripped, burned, drained and rendered unusable” (Indrarto *et al.*, 2012, p. 50).

The topography and hydrology of the projected land areas were not taken into account, leading to poor design of the construction and channels, thereby causing peatlands to become severely drained (Casson *et al.*, 2014). The fact that the cleared lands are mainly intended for plantations such as Acacia, Eucalyptus and oil palm plantation, means that they will accelerate any blaze. Acacia and eucalyptus plantations are particularly vulnerable to fires, as their leaves have a high oil content (Clay, 2004). Planted eucalyptus is considered susceptible to fires as it is often cultivated on land that is covered with grass, weeds or brush, which is highly flammable, especially in a dry climate (Davidson, 1993). In particular, ten percent (38,451 ha) of all burned areas were located in areas where mature Acacia trees are planted, and eighteen percent (54,870 ha) were in oil palm plantations (Gaveau, Pirard, Salim, Tonoto, Yaen, Parks, & Carmenta, 2016).

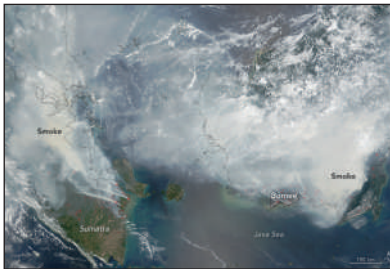
Additionally, even when the cleared lands are not planted with timber plantations, previously deforested areas of Indonesia have often been covered with alang-alang grass (*Imperata cylindrica*), which is also highly flammable (Ghazoul, 2015). In view of the issues of land use change, there seems to be a direct relationship between unsustainable land use change and forest loss (e.g. through fire events) in Kalimantan and Sumatra (Casson *et al.*, 2014). In other words, if land use change is not underpinned by thorough assessments and in-depth planning, it becomes unsustainable and irresponsible, which can significantly contribute to cyclical fire events in Indonesia.

¹⁵ Starting in the 1980s, the government passed a policy of transmigration projects where people from highly populated islands (e.g. Java and Bali) were to be relocated to less populated areas such as Kalimantan and Sumatra to accelerate economic growth and modernization (for more detailed information see Casson, Muliastira, & Obidzinski, 2014).

The 2015-2016 Forest and Peat Fires: Cost of Fires

Considering the forest's cyclical burning and peatland's vulnerability to fire, fires in these areas will inevitably generate a substantial amount of smoke and haze. As the haze generated will likely be affected by wind direction and flows, it eventually travels across and beyond the regions in which it originates, affecting an even larger segment of the population (Pollock, 2015). Thus, between 1995 and 2016, forest and peat fires accounted for 37 per cent of Indonesia's total economic damages from disaster, the most economically damaging of all natural disasters—followed by earthquakes (24%) and flooding (23%) (EM-DAT, n. d.).¹⁶

Figure 1. Heavy smoke blanketed Sumatra and Borneo in September and October 2015 (as observed by NASA's Terra satellite)



Source: NASA image by Jeff Schmaltz, LANCE/ EOSDIS Rapid Response (Voiland, 2015)

Figure 2. Active fires (14 October – 21 October 2015)



Source: Global Forest Watch (Butler, 2015)

The fire and haze events in Kalimantan broke out in July 2015 and lasted until mid-November 2015; though the large-scale fires were mostly extinguished by November 2015, fires in some areas, especially peatlands, were still detected and generating haze (IFRC, 2015). The fires burnt 2.6 million ha of land in seven provinces: four in Kalimantan (West, East, South, and Central Kalimantan), and three in Sumatra (Jambi, Riau and South Sumatra), and the estimated loss and damages from the events was around USD 16.1 billion (IFRC, 2016). According to World Bank on the cost of fires, Kalimantan was the worst-hit region, with GDP declining by 1.2 per cent in the third quarter of the year (July—September 2015) (The World Bank, 2015a). In Sumatra alone, the financial losses caused by the events from June to October 2015 reached IDR 8.4 trillion (USD 6.1 billion).

¹⁶ Data obtained from the EM-DAT website concerning Indonesia and disaster damages. As EM-DAT does not provide a share or percentage of the damages that each disaster causes, the calculation was done manually.

A significant share of the losses were also caused by travel and transport disruption (i.e. air, land and sea travel), which also greatly affected economic activities in the region (The World Bank, 2015b).

Table 1. Summary of Land and Financial Losses Due to 2015 Forest and Peat Fires

Region	Province	Land Loss	Financial Loss
Kalimantan	East Kalimantan	388 ha (15%)	IDR 37.7 trillion (USD 2.6 billion)
	Central Kalimantan	429 ha (16%)	IDR 33.8 trillion (USD 2.3 billion)
	South Kalimantan	292 ha (11%)	IDR 27.8 trillion (USD 1.9 billion)
	West Kalimantan	178 ha (7%)	IDR 16.2 trillion (USD 1.1 billion)
Sumatra	South Sumatra	608 ha (23%)	IDR 53.8 trillion (USD 3.9 billion)
	Jambi	123 ha (5%)	IDR 11.9 trillion (USD 866 million)
	Riau	139 ha (5%)	IDR 18.9 trillion (USD 1.3 billion)
Papua		268 ha (10%)	IDR 21.3 trillion (USD 1.5 billion)
Others		186 ha (7%)	undefined
		Total: 2,611 ha	Total: IDR 221.4 trillion (USD 16.1 billion)

Source: The World Bank, Indonesia Economic Quarterly, December 2015

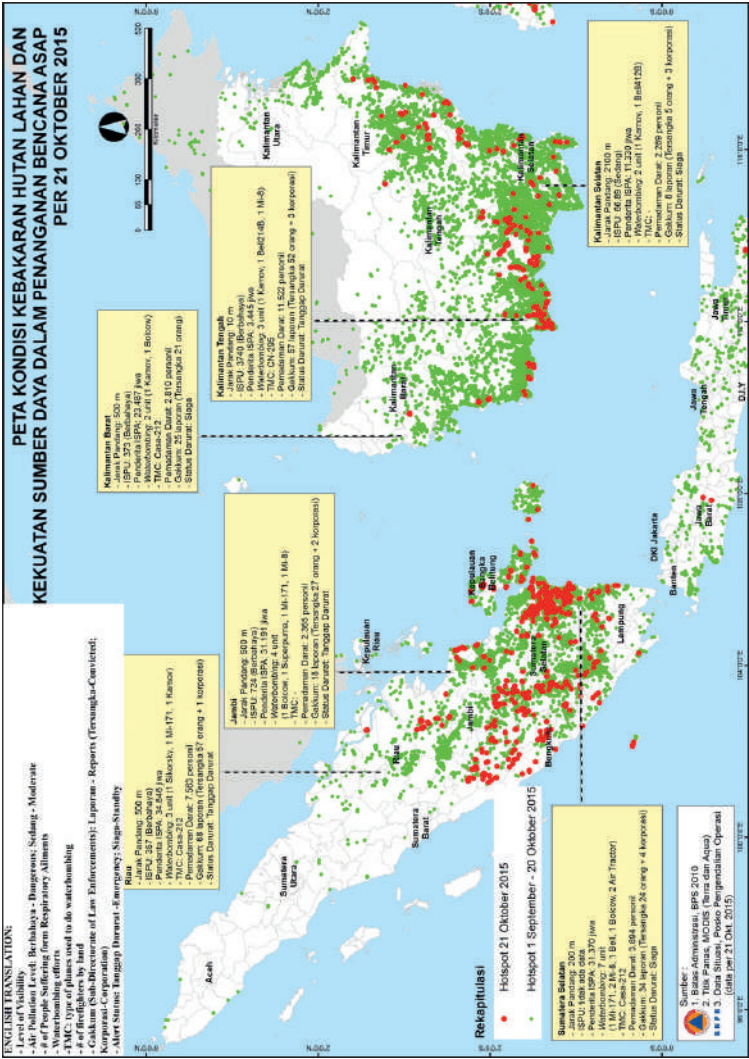
Furthermore, due to the long-lasting and thick yellow smoke generated by the fires, local populations in the region became more vulnerable to upper respiratory tract infections (URI), eye irritation, pneumonia, asthma, skin irritation and even death (IFRC, 2015). Over 500,000 cases of respiratory tract infections have been reported since the events broke out; the official death toll reached 19 people (Balch, 2015).

The long period of thick haze was one of the major factors that forced thousands of people to flee from their homes in order to seek better air quality, which eventually drew attention to the nexus between fire events, the resulting haze and environmental displacement as well as health issues (personnal communication, 2017, April 25).

Data and Information Gap on Displacements

Environmental displacement is not a new issue in Indonesia, which is one of the most heavily affected countries by natural disasters and the impacts of climate change; this includes irregular droughts and forest fires,

Map 3. Situation Map: Forest and Land Fires (21 October 2015)



Source: BNPB, Indonesia's National Disaster Management Agency

particularly in Kalimantan and Sumatra—the two fire-prone regions, frequently generating haze crises in the country. However, despite being ranked as the major disaster with the most economic damages and significant impacts to human health since the 1990s (EM-DAT, n. d.), fire and haze-related displacements have not been as proportionately reflected in official data as other disasters such as flooding, landslides, tsunami or earthquakes. For instance, the data concerning displaced populations due to flooding and landslides have been available since 1975 and 1977, respectively; displacement data on tsunami and earthquakes was available between 1979 and 2012, and has been available regarding tornados since 1978 (see Table 2). Comparatively, the data on forest and peat-fires related displacements has only been available since 2003, even though the country experienced a number of major fire and haze events dating back to the 1980s (Rieley, 2007).¹⁷

Table 2. Aggregated Number of Disaster-related Displacements in Indonesia

Type	Data Available From:	# of displaced people
Flooding	1975 - 2017	5,446,731
Earthquake	1977 - 2016	2,852,957
Landslides and massive flooding	1975 - 2017	654,562
Tsunami and earthquakes	1979 - 2012	462,510
Tornado / storm	1978 - 2017	100,622
Forest and peat fires / land fires	2003 - 2016	7,211

Source: Data portal of Indonesian National Disaster Management Agency (BNPB), Data dan Informasi Bencana Indonesia

Moreover, when referring to population displacement caused by fire and haze crises in Indonesia, it is crucial to bear in mind that the available data concerning fire and haze-related displaced populations is not entirely trustworthy for all regions that have been affected by the fire events and the resulting haze. For example, the major forest and peat fires in 2015 flared up between July and late November 2015, and they were mainly concentrated in the Kalimantan and Sumatra regions (BBC Indonesia, 2016; IFRC, 2015). However, the available official data concerning environmental displacement from the 2015-2016 forest and peat

¹⁷ In Indonesia, the major fire and haze crisis can be traced back since 1982 (e.g. 1982-83, 1987, 1991, 1994, 2000, 2005, 2006 and 2009), with particularly severe haze episodes in 1997-98 and 2003, and recently 2015-2016.

fires are only derived from the North Sumatra region, mainly from Aceh province between September and October 2015 (see Table 3).

Table 3. Aggregated Number of Displaced People by Forest and Peat Fires and the Resulting Haze (2003 – 2016)

No	Province	Regency	Date	# of Displaced People/Evacuated
1	Kalimantan Timur (East Kalimantan)	Berau	03/05/2016	4
2	Pemerintah Aceh (Special Region Of Aceh)	Aceh Timur	23/10/2015	460
3	Pemerintah Aceh (Special Region Of Aceh)	Bener Meriah	22/10/2015	16
4	Sumatra Utara (North Sumatra)	Kota Medan	19/10/2015	450
5	Pemerintah Aceh (Special Region Of Aceh)	Aceh Tamiang	27/9/2015	504
6	Pemerintah Aceh (Special Region Of Aceh)	Aceh Barat Daya	13/9/2015	1,200
7	Maluku Utara (North Maluku)	Kota Ternate	16/7/2015	1,788
8	Sulawesi Selatan (South Sulawesi)	Enrekang	1/2/2015	50
9	Riau	Bengkalis	28/2/2014	125
10	Kepulauan Riau (Riau Islands)	Kota Batam	25/2/2014	48
11	Riau	Indragiri Hilir	22/2/2014	300
12	Kalimantan Selatan (South Kalimantan)	Hulu Sungai Utara	19/10/2013	2
13	Kalimantan Timur (East Kalimantan)	Kota Samarinda	13/8/2009	4
14	Pemerintah Aceh (Special Region Of Aceh)	Aceh Timur	16/2/2009	800
15	Kalimantan Tengah (Central Kalimantan)	Gunung Mas	19/1/2003	210
16	Kalimantan Tengah (Central Kalimantan)	Kapuas	5/1/2003	1,250
Total:				7,211

Source: Indonesian National Disaster Management Agency (BNPB), Data dan Informasi Bencana Indonesia

For example, in Riau-Rokan Hulu Regency, around 716 households were still displaced in Bonai Darussalam district in August 2016, as the

fire events continued in Riau province into early 2016. They resided in an open field situated four kilometres away from their homes, in which there were also other evacuees from two other districts in three different regencies (Pujud district, Rokan Hilir, Mandau district and Benkalis regency) (Tarmizi, 2016; BNPB, n. d.).¹⁸ However, this information was not included in the official data, but rather only reported in the media. As a result, this paper cannot derive a solid conclusion on the extent of displacements by provinces or regions; merely looking at the official number of displaced populations produced by the government is insufficient. Nevertheless, the paper provides a range of unrevealed data and personal stories regarding 'the uncaptured displacements' which resulted from the fire and haze events in 1997-1998, 2003, and specifically in 2015-2016 to help to compensate for the lack of data and information on fire and haze-related displacements.

Forest and Peat Fires, and Related Displacement and Immobility

Past Experiences: The 1997 – 98 Fire and Haze-related Displacements

Between September 1997 and June 1998, the fire events burned one million hectares of forest and peatlands (roughly the size of Western Europe), producing hazardous haze that led to the deaths of 527 people, particularly in areas such as Central and South Sumatra, and Central, South and West Kalimantan (Aiken, 2004). It affected roughly 70 million people in both regions (Applegate *et al.*, 2002). At one point, as most economic and social structures came to a halt due to the thick haze blanketing the Kalimantan and Sumatra regions, there was a call to conduct mass evacuations (Swinbanks, 1997). As reported in September 1997, the Indonesian government considered evacuating Rengat city in Sumatra region in certain areas where visibility dropped to just a few meters, and people were experiencing difficulties breathing (Swinbanks, 1997). However, the evacuation plans were later abandoned as the situation was perceived to have improved with changing wind directions (Swinbanks, 1997). There were large movements of populations reported to have fled the fire events and the generated smoke, and also an increase in the number of emergency visits to hospitals during the crisis (Keim, 2015). However,

¹⁸ No information is available about the total number of displaced persons from the four areas.

there is unfortunately no specific data available indicating the number of displaced people and their movements for the 1997-1998 fire and haze event.

Past Experiences: The 2013 Fire and Haze-related Displacements

In the 2013 fire and haze crisis, the fire events broke out in January 2013 and mainly affected the Riau Province, Sumatra (Harahap, 2013; Sizer, Anderson, Stolle, Minnemeyer, Higgins, Leach, & Alisjahbana, 2014). It is reported that since June 2013, nearly 50,000 Indonesians (see Additional information¹⁹) have suffered from respiratory infections, eye diseases and coughs (Sizer *et al.*, 2015). Riau province was later put on Level I State of Alert on June 17, 2013, due to the haze resulting from the fire events (Sizer *et al.*, 2015).

In late June 2013, the haze emergency alert was raised to high both in Riau and in Bengkalis regency on West Sumatra region. By mid-July, the Pollutant Standard Index (PSI) reached 831 mgram/m³ (OCHA, 2013).²⁰ It eventually led to an evacuation of children, the elderly and other vulnerable populations (Harahap, 2013). The local fishing industry was also affected, and the forest fires threatened the houses of around 270 people, who were also later prompted to evacuate.²¹ Specifically in Dumai City and Bengkalis Regency in Riau, the haze created major upheaval as local residents evacuated their children (Harahap, 2013). According to an interview conducted by the Jakarta Post team with Jonly Manurung, a local resident of Dumai, he explained that he would send his children to Medan—a city in North Sumatra—to flee the haze (Harahap, 2013). In his words, “if they stayed here, it would be hard to prevent them from playing outdoors, so it is better to send them to Medan where they would be safe” (Harahap, 2013).

Looking at the stories and examples given from the 1997-1998 and 2013 fire and haze crises, it can be said that the Indonesian government indeed attempted to look into possibilities to evacuate the populations to safety during the fire and haze period. However, this raises two questions regarding the scope of displacements themselves: 1)

¹⁹ Additional information: There is no specific data and number available concerning displacements that had taken place since July 2003.

²⁰ Above 300 mgram/m³ is considered dangerous.

²¹ Yet, the data regarding destinations of the evacuations or people's movements is not available.

considering the lengthy haze period that blanketed the two regions, was the information on a displacement or evacuation plans not readily available due to governmental inaction on the issue?; 2) What would happen to those who could not afford to move or to send their families or kids somewhere else?

The 2015 -16 Recent Forest and Peat Fires: A link between socio-economic conditions and displacement activities

A link between poverty and the environment can be closely seen in times of disasters such as earthquakes, droughts, floods and forest fires, particularly when investigating human-environmental vulnerability in developing countries such as Indonesia (Scott, 2006). Such links depend on people's socio-economic situations that influence their coping ability (Scott, 2006). It often reflects an important question of whether migration activity in environmental contexts represents a failure to adapt, an adaptation strategy, or a mixture of the two. The case of fire events and their resulting haze, however, seems to provide a unique example where migration is both an adaptation strategies and a result of failure to adapt. This phenomenon is best reflected in the 2015-16 fire and haze crisis.

By December 2015, around 409,664 people had been affected by upper respiratory tract infections (URI) (IFRC, 2015). According to an interview with Dr. Nursyam Ibrahim conducted by Greenpeace, fire events and their resulting haze can severely affect people's health in both the short-term (e.g. respiratory ailments, wheezing) and in the long-term (e.g. death from brain damage because of anoxia—an absence of oxygen²²) (Johnston, Henderson, Chen, Randerson, Marlier, DeFries, Kinney, Bowman, & Brauer, 2012; Zamzani, 2015). This vulnerable situation is partly due to the characteristics of Indonesian houses in general, which are often built with more open ventilation systems, meaning particles can easily penetrate indoors (Wright, 2016). Therefore, during the fire events and haze crisis that lasted for months, despite remaining indoors and keeping the windows shut, the smoke could easily enter houses, affecting people's health. Poor communities also do not generally have facilities such as air conditioning that could help filter the air, meaning the levels of air pollution inside and outside homes were fairly similar. This meant that poorer communities were more severely affected by the disaster and exacerbated haze-related displacement issues (Brauer, 2001).

²² It has been previously estimated that the fires could result in more than 100,000 premature deaths in the long term.

The 2015-2016 Forest and Peat Fires and the Uncaptured Displacements: Individual and Sporadic Displacements.

Patterns of displacement in 2015-2016 caused by forest and peat fires, and the resulting haze have been coordinated sporadically and mainly at the individual level, rather than through collective government action. As the aforementioned health issues, particularly respiratory ailments, became prevalent, it forced many people to flee from their homes by themselves—particularly those who resided in the worst haze-affected areas—to other parts of the region that were less exposed to the haze (personnal communication, 2017, April 25). However, not all people had this freedom of mobility. Kartika Sari, a mother of a five-year old girl from Palangkaraya City in Central Kalimantan, explained in an interview how she had to evacuate her daughter to Banjarmasin city in South Kalimantan province, an area that was less exposed to the haze. She emphasized that evacuation and migration to a safer place was mostly sporadic and only at an individual level (personnal communication, 2017, April 25). This makes destinations and choices for migration dependent on whether or not people have the means to live in other less affected areas. Those who do have the means could flee from their homes to either hotels or to their relatives who have better air quality (Nofitra, 2015). However, those who do not have such means remained in their homes, and they had to try to survive as best as possible in their homes despite the rapidly worsening air conditions and low levels of visibility (personnal communication, 2017, April 25).

Norhadie, a local resident and the father of three children from Kapuas Regency, Central Kalimantan whose daily activities are rubber gardening and farming (e.g. vegetables, local rice with zero-burning system²³), was also affected by the resulting haze (Personnal communication, 2017, April 10). In his interview he explained that in early October 2015, when health conditions worsened, he tried to coordinate with local health authorities to request health masks and basic medical supplies for the people in his community, particularly for children and pregnant women. However, they could not provide enough help to the people in each village due to the limited medical personnel and supplies. Due to this situation, Norhadie, who dedicates his spare time to volunteering in various NGOs on community-based land mapping, undertook a personal

²³ "The zero burning technique is a method of land clearing whereby the tree stand, either logged over secondary forests or an old area of plantation tree crops such as oil palm are felled, shredded, stacked and left in situ to decompose naturally" (ASEAN, 2003).

initiative to reach various NGOs—mainly *WALHI*—and civil society organizations (CSOs) to help distribute masks, which received numerous responses from individuals and the NGO community.

This personal initiative later led to a creation of an anti-haze civil coalition called *Gerakan Anti-Asap (GAAs)*, which is comprised of a number of the affected population (e.g. students, volunteers), CSOs (e.g. *Serikat Tani Mangantang Tarung*²⁴) and NGOs (e.g. *WALHI*, Save Our Borneo), along with other support from people and charity organizations in the country. This civil coalition was initially intended to open a number of health posts or what *WALHI* calls “*Aksi Layanan Sehat*”, to provide basic supplies free-of-charge (e.g. masks and oxygen bottles).

Image 1 and image 2. Situations in Central Kalimantan in late September-October 2015



© Norhadie (Interviewee)²⁵



© Franky Acil Zamzani

Another purpose of the coalition was the creation of an evacuation centre and a safe house in Banjarmasin, South Kalimantan, and providing transportation to get there (Personnal communication, 2017, April 10). In the interview with Aryo—the Advocacy Manager of *WALHI* in Central Kalimantan, who is also involved in the anti-haze coalition—he provided an analytical report indicating the coalition’s activities on evacuation measures (Norhadie, 2017). The *GAAs* coalition managed to conduct

²⁴ *Serikat Tani Mangantang Tarung* is a civil-led association consisting of local populations of Mantangai Districts, Kapuas Regency in Central Kalimantan. Created in December 2010, it aims to promote rural development and empowerment with the main principle that a sustainable environment is a societal responsibility, particularly for locally-based people.

²⁵ This photo was taken by a mobile phone camera in the river area situated at Norhadie’ village, Mantangai hulu, Kapuas Regency, Central Kalimantan.

two rounds of evacuations for the affected population in Palangka Raya. The first evacuation occurred on October 22, 2015, evacuating eleven people, while the second was conducted on October 25, 2015, evacuating 30 people from Mantangai Hulu village in the Kapuas Regency in Central Kalimantan (GAAs, 2016). In total, there were 41 people (twenty of whom were children) evacuated to Banjarmasin (GAAs, 2016). As emphasized by Norhadie, although the free-of-charge health initiative was eventually staffed by some health officers from the Community Health Center (*Puskesmas* and *Poskesdes*) to assist local populations, the local authorities at Kapuas Regency level only responded when the news about the personal evacuation initiative to Banjarmasin had gained media attention (Personnal communication, 2017, April 10).

From the stories and testimonies outlined above it is clear that displacement caused by fires and haze crises is sporadic and occurs at an individual level because of the lack of government action in establishing a collective evacuation mechanism.

Trapped by the Haze and Immobile Populations

Although sporadic evacuation is usually an initiative of individuals seeking a better environment and safety, displacement stories in Kalimantan and Sumatra did not end there. Some people's attempts to migrate elsewhere did not guarantee a better environment and safety. An interview was conducted by the Kompas team with a local resident of Rokan Hilir regency (in Riau-Sumatra), Satieli Zaluhi, who had to flee from his house because of the fire events in August 2016 (Damanik, 2016). Zaluhi, a worker at a palm oil company called Andhika Permata Sawit Lestari (PT Andhika Permata Sawit Lestari), reported that the fires spread quickly to the plantation area and to local neighbourhoods where his family lived (Damanik, 2016). Therefore, he could not bring anything from his home before rushing to an evacuation centre with his family. The temporary evacuation site was only equipped with a 36 square-meter blue plastic tent with a plastic rug inside, in which there were around 50 people in total (Damanik, 2016). Some other evacuees decided to create their own basic tents to avoid overcrowding.

Hasrat Najara, another evacuee who worked for the Andhika Company, also reported that she and other evacuees had to move three times due to the worsening haze conditions (Damanik, 2016). First, when the fires broke out in the plantation area, they had to flee to the Division Office of the company. The next day they moved to another office of the

company, and on the third day, as the air quality worsened, they were asked to move to an evacuation site near the banks of the Rokan Kiri river (around 210 km from northwest Pekanbaru, Riau province), which was helped by the police and the army. Setiyono, the head of Bonai Darusalam regency, admitted that the choice of the location by the riverside was the best possible site, as there was a stream that people could use for washing and sanitation. Nevertheless, at one point, as supplies provided from the local authorities arrived late, food supplies were lacking, and when the supplies finally arrived there was not sufficient food to cover all the evacuees. As Wati Zebua, one of the evacuees from the site explained, only those who had the means could go to the village across the river to buy food, while those who did not had to look for their own food; some children and young people had to look for shellfish in the river (Damanik, 2016).

Image 3 (left) and Image 4 (right). Riau's affected populations in evacuation site



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No escape, nowhere to leave, no safety to leave

Furthermore, although many fled to safety, such as to evacuation sites or moved in with families and relatives elsewhere, many others decided to remain in their homes despite the worsening air pollution caused by the hazardous haze. Reasons for this include socio-economic situations, different perceptions of adaptive strategy, and information dissemination regarding the dangers of the fire events and their resulting haze. An interview with Kartika Sari who had to resign from her marketing job at a pharmaceutical company in early 2016 due to the smoke and worsening health conditions, highlighted that one of the biggest challenges in conducting evacuations is the willingness of the local populations to move (personnal communication, 2017, April 25). Many of them were worried about how they would continue to have their sources of income if they left their area of residence (personnal communication, 2017, April 25).

Kartika provided her own example where she often struggled to ask for permission from her employer for a leave of absence (LoA) to temporarily move to another city (i.e. Banjarmasin) for health reasons. However, she elaborated that some of her colleagues decided not to seek LoA from the employer; they forced themselves to stay for the job despite their personal complaints regarding the health issues (Sari, 2017).²⁶ In another example, Rahmah, a local resident of Palangkaraya who works as a street vendor, explained that despite the effects that she experienced from the haze, she could not leave her job as it was her only source of income to pay for her children's school fees (AFP, 2015).

Likewise, Nurjanah, a local resident of Palangkaraya who shares a small house with her seven other family members, also decided not to evacuate, despite expressing a sense of desperation (AFP, 2015). However, when asked by Agence-France-Presse (AFP) about her reasons for staying, she revealed "Leave? Where to? The smoke gets everywhere, so what is the point of evacuating when there is no escape?" (AFP, 2015). The research conducted by Pulse Lab Jakarta suggests that people's decisions to relocate during fire and haze crisis are related to the lack of public awareness about the dangerous level of pollutants and the hazardous effects of haze in both the short and long terms. However, from this example, it seems that information regarding evacuation sites and any assistance was also not widely disseminated to all segments of the population. Thus in addressing environmental displacement issues, dissemination of information regarding the disaster, evacuation measures, and displacement-related strategies become crucial. In other words, providing access to displacement sites or to a range of services is not sufficient without mainstreaming information about such access.

As a matter of fact, means of communication are one of the principal obstacles affecting a displacement-related decision-making process. An example is the testimony from Norhadie: when asked for further interviews with other local populations in his village, he mentioned that "I know all of the local people here who were evacuated, but how could they provide information [to you] because in general they are not in possession of mobile phones" (Personnal communication, 2017, April 10). This becomes highly significant in defining another set of immobility causes, not just within the socio-economic context, but also regarding government efforts to mainstream the dangers of the haze and the proper evacuation measures.

²⁶ Kartika Sari is currently working as a women's rights activist to help to enhance understanding about worker's rights for rural and urban women.

Having looked at various stories and testimonies from other local residents who were affected by the fire and haze events in 2015-2016, it can be concluded that fire and haze-related displacements did indeed occur sporadically and individually as a means of seeking safety. As such, displacements can be considered as an adaptive capacity. However, as this capacity is not equally shared, displacements are still predominantly linked to socio-economic contexts, which may also represent a failure to adapt. Nevertheless, due to the government's passivity on environmental displacement caused by the fire and haze, instead of finding a middle ground for adaptive capacity against the failure to adapt, the government's lack of action has in all probability created a bigger gap in the nexus between fire, haze and human impacts.

Responses to Fires and Haze Displacements

Government Frameworks and Policies

In light of various displacement issues caused by fire and haze events in Indonesia, this paper intends to explore a range of policy frameworks and actions that have been proposed and implemented on the link between fire and haze crises and the resulting population displacement. However, this paper does not aim to explore all-encompassing measures at the local, provincial, national and international levels. Rather, it is tailored to underline the key actions that have so far been prioritized to deal with haze-related displacement.

Specifically, when discussing the frameworks and policies of the Indonesian government concerning fire, haze and displacement issues, there are four major legal foundations on which the link between fire and haze crises and the resulting population displacement can be emphasized, namely:

1. Ministerial Decree of the Ministry of Health No. 424/MENKES/SK/IV/2003 on the Stipulation of Severe Acute Respiratory Syndrome (SARS) as a Disease That Causes Epidemics and its Management Guide;
2. Ministerial Decree of the Ministry of Health No. 289/MENKES/SK/III/2003 on Management Procedures of Air Pollution Impacts from Forest Fires against Human Health;
3. Presidential Decree No.111 / 2001 on The Change of National Coordinating Body on Disaster Relief and Handling Displaced Populations (BAKORNAS PBP);

4. Ministerial Regulation of the Ministry of Home Affairs No. 27/2007 on Guidelines for Preparing Suggestions and Infrastructure in Disaster Management.

Both Ministerial Decrees No. 424 and No. 289 are in line with one another, insofar as they outline three phases of fire events, namely: Pre-fire disaster event, Fire event, and the Post-fire disaster event (Ministry of Health, 2003a; 2003b).

1. On the Pre-fire disaster event, these include: Monitoring, Problem Identification, Preparation of Working Plan, Reporting, and Dissemination of Information;

2. On the second phase, as fire events are marked as instances where the Pollutant Standard Index (PSI) exceeds 200 mgam /m³, tasks to be conducted include Monitoring, Quick Response, Partnership, Reporting and Dissemination of Information (Ministry of Health, 2003a);²⁷

3. The third category of response—the Post-fire disaster event—commences when the PSI has dropped to less than 200 mgam/m³.

Based on the two ministerial decrees, the fire and haze events that broke out in July 2015 were considered disasters, as the PSI level reached around 2,000 mgam/m³, which exceeded the government's minimum PSI requirement. Complementing these decrees, as mandated by the Presidential Decree No. 111 / 2001 on the change of the National Coordinating Body on Disaster Relief and Handling Displaced Populations, it stipulates that any displacement problems arising as a result of disasters (whether they be natural or man-made) or social or political incidence requires "immediate, appropriate, integrated and coordinated preventive measures, rescue and rehabilitation efforts as well as reconstruction mechanisms". Such measures and efforts will be headed by the Vice-President of Indonesia and supervised by the Coordinating Minister of People's Welfare, while being implemented by the various ministries.²⁸ In parallel, the Ministerial Regulation of the Ministry of Home Affairs No. 27/ 2007 specifically outlines displacement mechanisms in the country (Ministry of Home Affairs). It recognizes that geographically, Indonesia is vulnerable to disasters (both natural and man-made) that eventually

²⁷ In this phase, monitoring frequency is conducted every day for 24 hours. For more detailed information, please refer to Ministry of Health, 2003a.

²⁸ Ministry of Home Affairs (including Ministry of Health, Social, Settlement and Regional Infrastructure) and Ministry of Transportation (including Ministry of Finance, Commander of the Indonesian National Army, Chief of Police of the Republic Indonesia, and Governor whose area is affected by the disaster).

lead to human suffering, displacement, financial loss, and thereby outlines various basic provisions of materials, support and aid to be provided to those populations who are displaced by disasters such as forest fires.

Displacement-related Response Measures During the 2015-16 Fires and Haze

In addition to the major governmental frameworks and policies, during the 2015-2016 fire and haze crisis, the President of Indonesia—Joko Widodo—passed a Presidential Decree No 11 / 2015 on Improving Forest and Land Fire Control (Presidential Decree, 2015). It aimed to better regulate and control forest and land fires across Indonesia through mitigation, firefighting, and handling the post-fire event. The Decree is intended to outline a multi-ministerial coordination process specifically focused on improving the controls against forest and land fires in Indonesia.²⁹ Displaced populations caused by the crisis will be handled by the Ministry of Social Services to develop measures and policies, as well as support, to deal with social issues that arise due to the fire events; such measures include providing evacuation centres, burial areas, and trauma healing and counselling activities (i.e. relief projects).

As a result of the decree, by late October 2015, Indonesia had deployed navy ships—docked in Banjarmasin, South Kalimantan—to carry material supplies such as face masks, tents and medical supplies to the affected populations (McKirdy, 2015). According to Edi Hariyanto, Commander of the Navy cargo ship KRI Banda Aceh, despite no mandatory evacuation order in place, the ships were available for use by anyone who wanted to come on board as they could hold over 2,000 people if required (McKirdy, 2015). However, unfortunately, there was no clear detailed plan for the use of the ships for evacuation nor regarding the communication that was put in place concerning the evacuation procedures, including transportation and focal points.

Nevertheless, some local governments had put in place efforts to address displacement issues by establishing a number of evacuation sites for the affected people. For example, in Sumatra, and specifically in Riau, Helda Suryani Munir, head of the Health Division in Pekanbaru, stated that evacuation sites had been established in two big rooms in the Mayorol Office of Pekanbaru city (in the VVIP room and meeting rooms

²⁹ There are 18 ministries, Attorney General Office, National Army, Police, National Disaster Management Agency, Head of Meteorology, Climatology and Geophysics, Governors, Mayors, and other agencies.

for pregnant women and children), in a number of community health centres and in a gymnasium (Nofitra, 2015).

However, according to Helda, while food, health and baby supplies, and transportation were provided during the evacuation processes, local people were not making much use of them. For instance, there were only seven families who used the evacuation room in the Mayor's Office (Nofitra, 2015). Some of the reasons explained by the local populations range from an inability to leave household activities, the distance to the evacuation sites, and the inadequate quality of the evacuation sites (Nofitra, 2015). According to Dodi, a local resident in Pekanbaru, giving his opinion about the evacuation centre in the gymnasium, he said that "in the gymnasium, all of the windows are opened, and haze can easily enter. If so, it is better for us to stay at home if the evacuations centres look like that" (Nofitra, 2015).

Looking at the two examples given, it can be understood that although evacuation is seen as a possibility, this strategy does not seem to be people's first choice when faced with the reality of actual displacement that is heavily dependent on people's socio-economic backgrounds and capabilities. In the case of fire events and the resulting haze, environmental displacements are inevitable. However, if alternative measures are not aligned with the actual reality of the affected populations and aforementioned shortcomings on the ground, and if the measures are not closely followed in line with clear plans, any proposed solutions will not effectively address the needs of the affected populations.

Conclusion

Indonesia's forest and peat fires and the resulting haze crises are an example of environmental displacement that has been an annually recurring problem, and yet has been completely overlooked. Environmental change, the impacts of climate change, and irresponsible human activities are the main factors that trigger the fire and haze crises. However, the link between the fires, haze and displacement has not been established within either preventive or disaster-response measures. This ultimately contributes to an increase in the severity of disasters and displacement as it exacerbates existing vulnerabilities. The trends from the 2015-2016 fire and haze events are characterized by late responses by the government, and sporadic and individual displacements. Thus, in line with protecting forest and peatland, there needs to be complementary action aimed at the affected populations. Three key areas in this respect are revision of

the conceptualizations of displacement measures, centralized data and information, and bottom-up partnerships.

Revising the conceptualizations and perceptions of fire and haze-related displacements

Fire and haze crises seem to present a rather unique type of disaster whose characterisation falls in between rapid and slow onset events.³⁰ They are rapid-onset as the fires spread quickly to other forests, peat-land areas and to areas in which local populations reside. Yet, they are slow-onset as the resulting haze travels beyond the burnt areas and accumulates over a long period of time (i.e. fire and haze events have become recurring events), severely affecting populations and forcing many to be displaced.

However, there seems to be a tendency to focus on environmental displacement that is most tangible and visible, such as displacements caused by floods, tsunamis, earthquakes and landslides, which are notably rapid-onset disasters. With fire and haze events, a general tendency of the government is to focus on merely monitoring situations and dousing fires in the hope that the situation will improve in the coming days, without making much effort to carry out direct interventions to support the affected and displaced populations. This may have resulted in a slow response to the health and displacement impacts. In overcoming these tendencies and considering the impacts of the fire and haze events, it is incredibly important for the government to revise its conceptualization and perception of environmental displacement, particularly concerning fire and haze crises, both within its legal framework and work plans. Specifically, there need to be clear targets regarding the time frames to monitor, preparation for aid and assistance, intervention through evacuations, and the implementation of recovery measures.

Better analysing displacement realities on the ground to bridge the gaps between the actual needs of the affected populations, the required responses and potential shortcomings on the ground by providing well-structured humanitarian protection, framework and follow-up actions, as outlined in United Nations Guiding Principles on Internal Displacement.

³⁰ "A rapid onset event may be a single, discrete event that occurs in a matter of days or even hours, whereas slow onset events evolve gradually from incremental changes occurring over many years or from an increased frequency or intensity of recurring events": For more information, refer to Siegele, 2012.

Broadening evacuation frameworks, assistance and more effective provision of materials in response to disasters are also necessities. However, these strategies need to be tailored to actual displacement realities among the populations with various capabilities and socio-economic backgrounds. In particular, it is important to bear in mind that there is a concern of immobility, particularly for those who have fewer means to relocate than others and also for those who move to an evacuation site. Just because someone leaves his or her home to flee a disaster does not make them any less 'immobile' or any less 'precarious' than those who stay in their homes. Specifically, as can be seen in the 2015-2016 fire events, even when the affected populations flee from their homes to evacuation sites, there is no guarantee that their basic needs will be adequately met. Some people could not even move beyond the sites to buy food or other supplies in case of shortages, and even when they wish to move somewhere else to seek more adequate help after residing in the evacuation sites, some could not do so as they simply do not have the means.

In addressing these gaps between government and the affected people, the government should revise the policies and guidelines on disaster management to align them further with the United Nations Guiding Principles on Internal Displacement.³¹ It should focus more on the actual realities of affected and displaced populations by better assessing their basic needs and any potential shortcomings of realising humanitarian responses, as the disaster broke out. There is an urgent need for a better framework for humanitarian protection such as: better provision of evacuation sites with sufficient and necessary equipment (e.g. air filter, air conditioning, adequate food, water as well as sanitation supplies, among others), particularly as a contingency of fire and haze events.

Centralized data and information is required to address a missing link between fire and haze impacts and resulting displacement issues

One of the underlying problems for displacement issues is the lack of data and information regarding fire and haze-related displacement, particularly for policy making processes. As policy makers frequently rely only on available data and information to draft policies and regulations

³¹ Principle 7 and Principle 18, in particular: For more detailed information refer to UN "Guiding Principles on Internal Displacement", OCHA, United Nations, retrieved from: <http://www.unhcr.org/protection/idps/43ce1cff2/guiding-principles-internal-displacement.html>

and to set their priorities and agenda, without comprehensive data and information regarding fire and haze-related displacements, displacement issues can potentially be overlooked and deemed 'inexistent'. In addressing the lack of visibility of displacement issues, the government needs to strengthen its data collection platforms for displacement-related issues, particularly with fire and haze crises.

One of the recent innovations made by Pulse Lab Jakarta is to use social media as a real-time platform to track, monitor and identify the current situations of the haze, forest fires and affected communities (e.g. health conditions, haze-related injuries or deaths). The government could thus either establish or adopt similar and potential real-time platforms to track, monitor and collectivize updated data and information to create a centralized real-time data platform on displaced populations. This will potentially help to identify a better framework for humanitarian assistance during the fire events, which will make responsive measures more effective. It will also significantly contribute to shaping future policies, not only in terms of well-conceived responses to fire events, but also in addressing humanitarian needs for affected and displaced populations.

Strengthening external partnerships with civil society and NGOs and internal inter-ministerial coordination

As previously mentioned, possession of mobile phones is not a privilege commonly shared by everyone who was affected by the fire and haze crises. However, it should not become a barrier for the government in handling issues linked to haze-related displacement. One of the strategic actions that could be undertaken by the government is to strengthen partnerships with civil society and non-governmental actors, not only to fight the fires, but also to provide better assistance for affected and displaced populations. These kinds of organisations can provide physical and material aid and assistance, as well as facilitating the dissemination of information to all segments of the population given that civil society organizations often work directly on the ground and in closest contact with the individuals affected.

Due to the government's inaction, various civil society organizations and individuals came together to create an anti-haze coalition and to facilitate aid and assistance during the fire and haze crises. Instead of downgrading this coalition, the government should seek to better cooperate with civil society and civil-led coalitions in addressing the issue of displacement, not only to fight fires, but also to provide better protection for the affected

populations. As a first step, the government should not be reluctant to solicit recommendations from civil society or to work more closely with it. Such a course of action does not mean that the government is incapable of doing its job to protect its citizens; rather, it means that the government makes use of a pooled strategy in collecting information and mobilising resources. In this case, local governments become the most dominant actor in establishing cooperation in addressing the issue.

However, as a preliminary requirement, establishing a systematically robust multi-ministerial and inter-agency coordination body among government entities is a prerequisite to civil society and government partnerships. The government should primarily encourage and integrate efforts, knowledge and resources of other ministerial entities, particularly in disaster management agencies and local authorities, to collectively address fire and haze-related displacement issues.

In short, the 2015-2016 fire and haze crises signals that nearly all of the population of Indonesia is constantly vulnerable to the ever-increasing risks and impacts of climate change, regardless of their capacity levels. The event also demonstrates how human activities could have detrimental effects on the environment and human populations on larger scales. It shows that if human activities are allowed to maintain the status quo, many people will be forced to face adverse impacts and an increasing risk of displacement, and the number of people affected will gradually multiply. While the Indonesian government must continue its efforts to protect the environment and its population, there are still gaps that it must address to progressively improve the adaptive capacities of local populations to respond the impacts of climate change, thereby reducing the risks of displacement.

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Adapting to Food Insecurity in Timor-Leste

Exploring the vulnerability of rural households impacted by the El Niño induced drought in 2016

Michael Twigg

Since gaining independence in 2002, the Government of Timor-Leste has struggled to tackle the issue of food security despite most of the population continuing to be vulnerable to environmental change. Irregular rainfalls and shallow, rocky soil bases have caused arable land to be more susceptible to erosion, placing strain on the continued agricultural production capacity of the state (Molyneux *et al.*, 2012). With over 80 per cent of the approximately 1.17 million East Timorese directly dependent on the agricultural sector, the assessment at independence that the country is “unlikely to ever be self-sufficient in food” has been punctuated in recent years by intermittent famines, erratic food prices and local populations struggling to adapt to declining agricultural production capacity (Hill, 2001, p. 1142; UNDP, 2013). Coping with seasonal drought conditions during a period locally known as the *hunger season* has caused many communities in Timor-Leste to adapt to the reality of a persistent lack of nutritious food (Barrit 2016).

Chronic malnutrition, child stunting and food insecurity place many East Timorese communities directly at risk to environmental change. Although these communities have a long history of coping with recurrent environmental variability, the legacy of maladaptive policies and administrative barriers stemming from subsequent periods of occupation have placed restrictions on their adaptive capacities. Farming practices developed during the early twentieth century perpetuate the use of bush-fallow crop rotation and, with the recent introduction of chemical fertilizers in some areas, these practices are exacerbating soil erosion and increasing the vulnerability of crop yields to environmental change (OCHA, 2016; Molyneux *et al.*, 2012). With the impact of warming temperatures from climate change projected to increase the frequency and severity of environmental events, these conditions will increasingly push many agrarian communities past the limits of their adaptive capacities. Temperatures in the region are projected to increase by 1.5 degrees Celsius by 2050, which will reduce the already declining amount of arable land and,

Map 1. Map of Timor-Leste



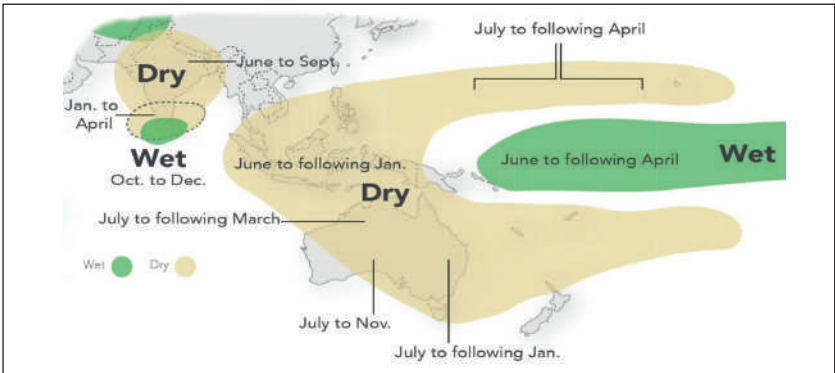
Source: Ian Macky, 2013

consequently, the subsistence capacities of many communities dependent on agricultural production (Molyneux *et al.*, 2012). With approximately 936,000 East Timorese considered vulnerable to environmental change, current farming practices, declining arable land, and the increasing frequency of erratic environmental events associated with climate change threaten the persistence of many communities across the country (UNDP, 2013).

In 2016, the population in Timor-Leste experienced the latest challenge to adapt to environmental change when an El Nino-Southern Oscillation (ENSO) event reduced rainfall to 25 per cent of the seasonal average during the beginning of the critical planting season (see Map. 2) (Barrit, 2016).

This led to the slow onset of drought conditions in the regions of Oecussi, Covalima, Viqueque, Baucau and Lautem, whereby water scarcity caused widespread crop failures, significant reductions in household income and eroded the value of their existing assets: livestock, seed stores, soil fertility (Barrit, 2016). With pre-existing high levels of malnutrition, food insecurity (20%) and vulnerability to being food insecure (44%), the ENSO induced drought conditions caused many households in these regions to be pushed beyond the limits of their adaptive capacities, resorting to their reducing food intake and switching to unsafe water supplies to cope with the negative impacts of this acute environmental change (Barrit, 2016).

Map 2. The impact of the 2016 ENSO event in Southeast Asia



Source: Food and Agriculture Organisation (FAO), 2016a

Map 3. Drought affected districts during the 2016 ENSO event



Source: United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)

This paper intends to examine the adaptive strategies and coping mechanisms of communities in Timor-Leste affected by the 2016 El Niño event, focusing on the (im)mobility of communities and households in response to the worst environmental shock since independence. With many households having become accustomed to adapting in situ to environmental change, this paper proposes the theoretical framework furthered in the Foresight (2011) report to examine the impact of this event on the drivers of (im)mobility. Addressing the socio-political and economic situation in Timor-Leste will then provide the background to examine the 2016 El Niño event and identify vulnerable population groups in exploring the correlation between environmental change and (im)mobility of populations

in Timor-Leste.¹ A final section will evaluate the response of the national government and identify policy pathways to reinforce the adaptive capacity of communities vulnerable to environmental change based on the proposed alternative framework. Ultimately, this paper will demonstrate that the 2016 El Nino event in Timor-Leste exposed both the complex socio-political relationships and the economic impact of environmental change as factors limiting the ability of households and communities to use migration as a tool for adaptation.

Case Study: Timor-Leste

Historical Background and Context

Contemporary kinship and social support networks in Timor-Leste trace their origins to Pre-colonial Timorese society where communities developed based upon extended family ties within the larger mythological concept of all Timorese coming from a single common ancestry (Kingsbury, 2009). Community kinship and traditional power structures were based on the loyalty to a *liurai*, whose authority was embedded in their ability to manage both their people and the environment, reflecting the conceptualization in Papuan culture of community subsistence being tied to the land (Kingsbury, 2009).² The Foucauldian expression of power in traditional community structures provided the *liurai* with the legitimacy to rule through their effective management of land resources, a power that the Portuguese sought to coerce while developing colonial institutions during the 15th century. Although these values would be directly challenged during the period of Indonesian occupation immediately following the withdrawal of the Portuguese in the 1970s, opposition to these challenges would also concretize the political independence movement (MacWilliam, 2013). Consequently, the value of working land in modern Timor-Leste continues to transcend the monetary worth of farming as it forms a “sense of place, of social, cultural and ecological identity” for many communities across the country (Batterbury, 2015, p. 623).

Despite the transcendental nature of these values, attempts by the Indonesian authorities to break the social-political identities—derived

¹ The Foresight (2011) report conceptualizes environmental induced migration as one of many potential responses that are influenced by a multi-faceted set of environmental, political, demographic, economic and social drivers.

² A *Liurai*, which means “surpassing the earth” in Tetun, was the traditional leader in pre-Colonial Timorese society.

from households being both beneficiaries and stewards of the productivity of their land—would prove to have long-term psychosocial ramifications in Timor-Leste. The Indonesian occupation limited the value of a local traditional narrative that encompassed ancestral migration as a necessary tool to establish communities in lands suitable for ensuring their survival. This developed a feeling of helplessness for many East Timorese households, serving as a catalyst toward the adoption of many *in situ* maladaptive practices in dealing with environmental change—reducing food intake, using unsafe water resources, selling long-term assets to purchase food (Molnar, 2010). The institutional fetishizing of local agricultural production during this period, coupled with the forced relocation of households away from their ancestral lands, caused entire communities to become dependent on government support for survival (Miyazawa, 2013). When the Indonesian occupation withdrew in 1999, the strategy of the TNI ensured that an independent Timor-Leste would be “born in flames and blood”, limiting the capacity for the new state to address both the legacy of chronic food insecurity and the need to support dependent communities during the transition to independence (Grenfell, 2009, p. 183; Hill, 2001; Molnar, 2010).³

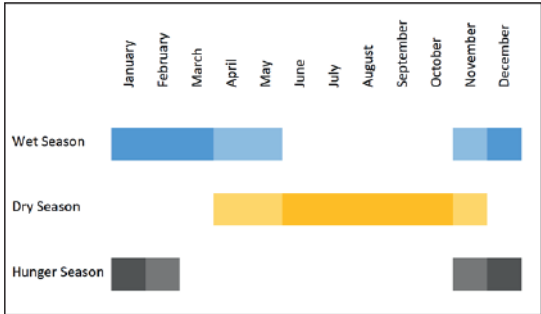
Since achieving full independence in 2002, Timor-Leste has been marked by chronic political insecurity, illustrated by subsequent UN interventions to address populations displaced by internal conflict (Molnar, 2010). However, the situation has since stabilized and the state economy has been able to achieve incredible success with an 8% annual growth in GDP per capita, reaching 2,908 USD\$ by 2013 (McKechnie, 2013). Rapid economic growth has been driven by the oil and gas sector, leading to substantial infrastructure development in the capital Dili and other urban areas (McKechnie, 2013). However, in a country with a primarily rural population, the benefits of recent economic growth are not translating into building the adaptive capacity and resilience among agrarian households that are still suffering from food insecurity. Approximately 75% of the population is engaged in subsistence and near-subsistence agriculture using rain-fed dryland farming to grow maize, rice, cassava, taro, sweet potato, and various vegetables (Batterbury, 2013). Being dependent on this type of agriculture means these populations are highly vulnerable to an erratic, regional rainfall system that is periodically affected by either an ENSO or a La Nina Southern Oscillation, which can either reduce rainfall

³ The TNI engaged in a “scorched earth” policy, destroying environmental resources, infrastructure and expelling approximately 300,000 East Timorese.

leading to catastrophic drought conditions or increase rainfall leading to catastrophic top soil erosion, landslides, and flooding.

The resolve of these communities is challenged on an annual basis during the *hunger season* between November and February, when most of the previous harvest is consumed before the cultivation of the next years' crops. The severity of these seasonal droughts can be illustrated by the fact that the majority of these households may be forced, toward the end of the *hunger season*, to begin consuming *akar*: a dry palm bark crushed into a fine powder and mixed with water to form a consumable jelly (Castro, 2013). The inherent lack of nutrients and protein vital for the development of young children, and sustenance in adults, in consuming *akar* is evident from the widespread levels of malnutrition among vulnerable populations forced to use these coping mechanisms to survive (Castro, 2013). Levels of malnutrition and wasting are particularly high among the most vulnerable subsections of the population, including farming communities who produce close to subsistence levels, women who are typically the bearers of maladaptive and negative coping strategies and children and youth that are forced to restrict dietary intake to cope with the reduced availability of food resources (Barrit, 2016).

Graph 1. Average seasonal distribution of wet/dry months in Timor-Leste



Source: Barrit, 2016

The 2016 drought

Timor-Leste consistently ranks as one of most food insecure countries, underlined by it having the third highest rate of child malnutrition in the world, *critical* levels of chronic malnutrition and *serious* levels of wasting (WFP, 2016). When the ENSO event occurred in late 2015, the reduction of seasonal rainfall at the beginning of November created significant hardships for many communities already at risk of food insecurity.

The severity of the ENSO event induced drought conditions that affected all aspects of livelihoods, including food production, access to water resources, health, and nutrition levels and even the ability of children to continue their education (OCHA, 2016). Between September 2015 and March 2016 rainfall was recorded being at between 25 and 75 per cent of the total volume that the country typically experiences during the critical wet season, after farming communities have planted crops for the following year (Barrit, 2016). The immediate impact of the ENSO event was felt across the country through the reduction in crop production and increasing water scarcity for subsistence agricultural households, a situation that was described by a female resident of the central Ermera district:

The today's weather affected our corns and vegetables that we planted, as they are all gone bad, as well as our food and water, this resulted in us to collect water from a far distance or to start digging to find water (Barrit, 2016, p.17).

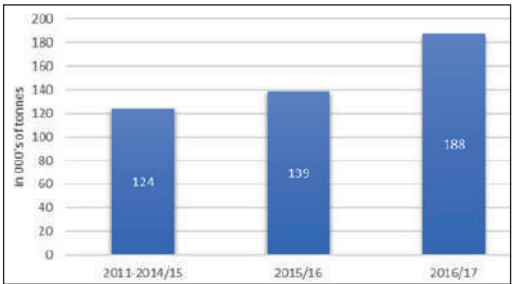
As the months progressed, in the districts of Oecussi, Covalima, Viqueque, Baucau and Lautem, the wet season never truly began and the slow onset of drought conditions began to severely impact the communities and households struggling to adapt to the extreme weather conditions (Barrit, 2016). The crops that had begun growing under the intermittent rainfall in October were now left either stunted or beginning to decay in the fields under the severe drought conditions (WFP, 2016). With over 400,000 East Timorese identified as being directly affected by the ENSO induced drought – 120,000 of whom were immediately at risk of starvation—the Government of Timor-Leste, with the support of key international non-governmental organization's (INGOs), performed a rapid assessment in December 2015 which identified a 7 per cent reduction in maize and rice production compared to the previous year (FAO, 2016b; GOTL, 2016). Since the previous year was also a period of reduced agricultural productivity with an identified shortfall of 129,000 tonnes of cereal, an additional shortage of 188,000 tonnes predicted for 2016 created a desperate situation in Timor-Leste (OCHA, 2016). Household food insecurity in the five regions had reached 40 per cent by January 2016 and was expected to increase to close to 50 per cent by June, meaning half of all households would be unable to access sufficient food resources (GOTL, 2016). The Government of Timor-Leste immediately procured 9,000 tonnes of rice in January 2016, distributing the imported food at a subsidized price through the local markets of the affected areas (FAO, 2016a).

Image 1. Crops stunted during the beginning of the wet season due to low rainfall in 2016



© HPA Timor Leste

Graph 2. Annual amount of food imported by the Government of Timor-Leste to meet local demand



Source: FAO, 2016a; OCHA, 2016

Unfortunately, this distribution scheme was based on the ineffective monitoring of household needs in affected areas, which influenced the distribution of limited subsidized food resources (WFP, 2016). Households were being provided access to these food sources through the distribution of food vouchers, or direct cash transfers, based on their geographic location (GOTL, 2016). These programs and the opportunity to access even a limited amount of food within the ENSO drought affected areas caused many households to persist with *in situ* coping mechanisms (Barrit, 2016; GOTL, 2016). Many Timorese households began selling off small assets and livestock to be able to purchase the subsidized food offered by the government at the local markets (Barrit, 2016; WFP, 2016). Nevertheless,

food insecurity remained high across the country as the severe drought conditions persisted into February of 2016; the severity of the situation illustrated by a respondent from Bonobaro addressing eating patterns resulting from the ENSO induced drought: “no breakfast in the morning, lunch depends on if there is food or not, we eat at night” (Barrit, 2016, p. 22). A member of the Humanitarian Partnership Assessment team in Timor-Leste further described the severity of the unfolding situation in a country with a population accustomed to coping with environmental change as follows:

We are used to hungry times in Timor-Leste. But this year, the lack of rains has made the situation much worse. Families are eating less, selling their assets and borrowing money to survive. Children are especially vulnerable, with high numbers already malnourished (Plan International, 2016).

With many rural households unable to afford food at the local markets, and with the limited supply of food procured by the Government of Timor-Leste, reports of maladaptive coping strategies began to appear across the country: “We consumed our corn seed because we had limited food” said one female respondent from the Bobonaro district (Barrit, 2016, p. 23). With households and communities reporting eating less food and selling livestock as the primary coping strategies, when the lack of rainfall began to affect livestock resources, the prospect of surviving the upcoming dry season without assistance did not seem possible (Barrit, 2016). In Lautem families reported significant losses of livestock, with those resilient enough to survive becoming too sick to be sold (Saikal & Julmiro, 2016). Communities were increasingly turning toward alternative employment to supplement the failure of their crops and the death of livestock due to the persistence of drought conditions. However, these opportunities were often insufficient to provide households with enough money to buy food to feed their entire families. The result was that the prospect of work, coupled with the socio-political attachment to the land, merely became sufficient to prevent people from moving to new areas in search of opportunities. In fact, surveys among the worst affected populations identified economic migration as an available adaptation tool among male respondents, although few households reported a member moving due to the impact of drought conditions (Barrit, 2016).

The Government of Timor-Leste and INGOs stepped up operations as the dry season approached with several organizations passing out additional food resources and unconditional cash transfers to support communities affected by the ENSO caused drought (IFRC, 2017). In addition,

the Government of Timor-Leste, supported by international partner organizations, implemented several emergency programs to tackle acute malnutrition, including scaling up the distribution of emergency food supplements *Timor Vita* and Plumpy'Doz™ (WFP, 2016). These programs targeted the most vulnerable populations, focusing on children, new mothers, and pregnant women as those most susceptible to environmental induced malnutrition. However, the programs also suffered from a lack of funding, with a funding gap of approximately 22.51 million USD constraining efforts to reach all of these vulnerable population groups (OCHA, 2016). High global demand for Plumpy'Doz™ and slow production of *Timor Vita* products limited the ability of vulnerable populations to access these emergency supplies, with some wait times being reported at up to four months, with the continued promises of the government delivering relief further encouraging immobility (WFP, 2016). Furthermore, the coordination of efforts to produce, store and distribute the emergency food resources to households suffering from food insecurity overwhelmed the local capacity to address the situation, illustrated by the 9 mt of Plumpy'Doz™ and 0.2 mt of locally produced *Timor Vita* that spoiled in warehouses prior to delivery (WFP, 2016). As a result, the program to deliver emergency food resources to these populations achieved only one third of coverage relative to the identified need: only 4,388 individuals received the supplies compared to 20,650 planned recipients (WFP, 2016).

Follow up surveys performed by INGOs exposed the fundamental deficiencies in the previous reporting regime evaluating needs of the affected communities as door-to-door consultations identified an unanticipatedly high level of acute malnutrition among the most vulnerable of these populations: 21 per cent of children under age two and 37 per cent of targeted women were found to display signs of acute malnutrition (WFP, 2016). The severity of the chronic malnutrition experienced by those worst affected by the ENSO induced drought is best understood through the observation of a Humanitarian Partnership Assessment (HPA) worker in Timor-Leste discussing the level of nutritional deficiency in a household in Oecussi:

This household suffers indeed from lack of nutritious food especially for the mother and child, hence it is affecting her breastfeeding and resulted in her not producing enough milk, so the child cannot get enough milk and is getting skinny (Barrit, 2016, p. 29).

Unfortunately, negative coping strategies have persisted despite coordinated efforts at the national and international level to alleviate the

stress on households affected by the drought. The cultural resilience among agricultural communities in Timor-Leste is being stretched to the limit as these households continue to reduce the number of meals, switch to less safe water resources, and sell assets vital to their long-term survival (Barrit, 2016). A male member of a household from Cova Lima district framed the increasing difficulty of many communities affected by the ENSO event to adapt to the slow onset of the severe drought conditions:

We can respond... (to the long dry season) ... through selling our animals to the market in order to get food. However, now we can't do anything because there are no animal. Even to get money, we have to sell some of our agriculture product such as betel nut, vegetable, candle nut... in order to get money. Right now we are depending on the government help (Barrit, 2016, p. 32).

This sentiment is being echoed by households and communities in the worst hit areas that are experiencing the increasing inability of their existing coping mechanisms to address the drought conditions caused by the extreme ENSO event. A legacy of dependence on centralized administration structures to provide relief to populations unable to produce enough food for subsistence may be influencing the persistence of households and the decisions to engage *in situ* coping strategies. However, as the conditions continued to deteriorate and options became increasingly less available, most households were either trapped or rendered immobile by the limited support of government and INGO programs to provide relief to the worst hit areas. These programs provided basic survival levels of support and, as the assets of agricultural households were decimated by the ENSO induced drought, the minimal amount of aid provided the impetus for these communities to further stretch their already overburdened adaptive capacities, further reducing food intake to dangerous levels, traveling long distances to access water and unsustainably spending household assets on nutritionally insufficient food resources.

The Impact of Government Aid on Mobility During the 2016 ENSO Event

Although the Government of Timor-Leste has worked tirelessly to mainstream disaster risk reduction (DRR) under the national policy making regime—recognizing the severity of the influence of climate change on the

regional climate system—these efforts have consistently fallen short (Mercer *et al.*, 2014). Since independence the government has allocated only one per cent of the entire annual budget to DRR programs, despite most of the population engaging in rain-fed dryland subsistence farming and being inherently vulnerable to changes in weather patterns (Mercer *et al.*, 2014). Rural areas continue to suffer from high levels of infant mortality, malnutrition and stunting due to food production that remains heavily dependent on unreliable weather patterns (WFP, 2016). Instead of investing in rain fed irrigation to improve the distribution of water resources to be more equitable over the entire year, policies addressing food insecurity at the national level continue to be reactionary. Although procuring emergency food resources to distribute to populations facing severe food insecurity will be essential over the short to medium term, the legacy of depending on imported food does not address the inherent problem of diminished local agricultural production capacity, which is exacerbated by periods of acute environmental change.

With 41% of the population considered below the poverty line prior to the ENSO induced drought in 2016, the ability of many households to access the limited amount of subsidized food at the local markets is questionable, leaving the negative coping strategy of limiting intake as the only viable option (Barrit, 2016). The limited economic capacity of these populations further suggests that most vulnerable households do not possess the requisite liquidity of assets to enable them to migrate out of drought affected areas. Furthermore, the strong socio-political connection of rural populations to their land—in the context of the legacy of the “denial of the values of the customary and indigenous management of natural resources” experienced by many East Timorese—further reduces the propensity of vulnerable households to voluntarily abandon their *uma lulik* (McWilliam, 2013; Miyazawa, 2013, p. 513). The reality is that the promise of government aid to the affected areas, coupled with the socio-political identity derived from the connection of rural households to their land, significantly affects the drivers for certain populations to migrate as they choose instead to develop *in situ* coping strategies. In contrast, for other populations, the same dynamic effectively tied them to their geographic location as the slow onset impact of drought conditions eroded their socio-economic assets, disconnecting their eventual desire to migrate from their capacity to use migration as an adaptation tool. In this case, inequitably addressing the impact of environmental change on the drivers for migration caused these populations to become trapped in a dependency

on the government for support. For both voluntarily immobile and trapped households, the prospect of alternative, although infrequent, forms of employment and minimal government aid increases the risk of using migration as an adaptation tool just enough that households will continue to struggle to cope with increased food insecurity as it presents less of a risk in a region plagued by inherently erratic weather patterns.

During the ENSO induced drought in 2016, the Government of Timor-Leste had limited options other than continuing the same reactionary policies: providing subsidized food aid and emergency food supplements to those populations most affected by the severe weather conditions. However, these programs lacked the sophistication and capacity to identify the needs of vulnerable populations who were originally unaware of the severity of the threat they were facing from encroaching drought conditions (WFP, 2016). Furthermore, the government began distributing chemical fertilizers in certain agricultural regions in 2016 to address chronically low agricultural output (OCHA 2016). Although this policy may provide an increase in production over the short-term, intensification of agricultural practices has been shown to lead to increased rates of soil erosion, reducing the availability of arable land. This means that the use of chemical fertilizers would not necessarily reduce the impact of environmental change on the *en-viro-economic* drivers potentially influencing migration patterns over the long-term, and that the sustainability of this strategy to mitigate future impacts of environmental change are doubtful. Also, since the use of chemical fertilizers requires more water resources, without developing substantial rain fed irrigation systems to improve water distribution and equitably address the socio-political, economic and environmental impacts of environmental change, crops will continue to consistently fail under these reactionary policies and have extreme socio-economic consequences for vulnerable populations (Molyneux *et al.*, 2012). Several assessments were undertaken during the drought in 2016 and, with the support of INGOs, the Government of Timor-Leste possesses the tools to equitably address the potential impacts of future environmental change on the drivers behind current migration patterns (Barrit, 2016; GOTL, 2016; WFP, 2016). Understanding the link between environmental change and the vulnerability of immobile households in Timor-Leste will be important in the mitigation of future impacts of environmental change as current climate change patterns will likely increase the frequency of these stressor events across the country.

Conclusion

In the wake of the ENSO induced drought in 2016, complex socio-political and enviro-economic impacts that households faced were both clearly demonstrated as influencing the drivers for vulnerable populations to use migration as a tool for adaptation. Nevertheless, government support for households remaining within districts affected by drought did not address the potential reasons behind their immobility, overshadowing the fact that these groups may not have inherently possessed the capacity to use migration as an adaptation tool. Although government responses during the 2016 ENSO event exposed a contrast between voluntary and forced immobility, the severity of the situation being experienced by these vulnerable populations was not initially well understood. Coupled with the fact that a social-political importance toward maintaining ties to ancestral land presented a viable explanation for certain vulnerable populations not considering migration as a viable strategy, the severity of their situation was greatly underestimated. The result was that entire communities were effectively left paralyzed by the failure of reactionary drought relief policies that are inherently unable to consider the different drivers that affect (im)mobility.

The implementation of government drought relief programmes based on this limited understanding of (im)mobility in the future will only complicate matters, as those worst affected by these conditions will continue to wait months to receive drought relief. In the absence of the outward display of vulnerability to environmental change that using migration as an adaptation tool provides, understanding the different factors that affect these decisions will be imperative to prevent the amplification of vulnerability among these populations. Taking into consideration the legacy of chronic malnutrition, socio-political identities derived from community connections with their land, and a seemingly paralyzing dependency on government support, could reduce the propensity for these populations to slip through the proverbial cracks during the evaluation of vulnerabilities for different communities. Understanding the different factors that influence populations to either choose, or be forced into, immobility when facing environmental change will help prevent the adoption of dangerous maladaptive strategies as primary coping mechanisms in the future: eating less food, drinking from unsafe water sources, selling vital assets to purchase food.

Developing an institutional understanding of the complex variables affecting (im)mobility in Timor-Leste—and subsequently developing

balanced policy responses that reflect these different variables—will be integral to ensure that future climate change events do not disproportionately affect populations that may not be considered vulnerable based on a correlation with their (im)mobility. For example, policy makers should take care to remember that the *in situ* persistence and resilience of certain agrarian communities during the 2016 ENSO drought contravenes part of the traditional Timorese socio-political identity, and should be taken as an indication by different political actors that the simple, single cause, understanding of (im)mobility does not address the complex reality of communities facing these choices. A focus on empowering households to recapture the historical narrative of mobility as part of the wider socio-political identity, and working to erase the negative connotations of relocation that was established during the Indonesian occupation, would be the first step to recognizing the complexity of the drivers similarly influencing both migration and immobility as adaptation.

With climate change projected to have a significant impact on the distribution of arable land, migration must be considered as one among many of the possible adaptation strategies that signify the vulnerability of a population facing environmental change. Preventing future disasters for communities facing environmental change in Timor-Leste will require foreword thinking policies that first, equitably address the importance of the different drivers that might affect a households' decision to use (im) mobility as an adaptation tool. Second, evaluation efforts should aim to follow the development of the understanding of these different drivers to accurately profile the vulnerabilities of both mobile and immobile populations. Finally, these profiles could then be used to form the foundation for future DRR strategies in Timor-Leste that accurately depict the different vulnerabilities of populations based on the influences behind their (im) mobility in the face of environmental change. Understanding the importance of evaluating vulnerability to environmental change based on the drivers behind (im)mobility decisions will help prevent vulnerable populations in Timor-Leste from becoming trapped by environmental change events in the future. Consequently, this will also help reduce the need for many affected communities to resort to maladaptive strategies, which inherently places the survival of these communities at risk.

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Europe

Shaking Ground

Dislocation management and policy response to the seismic sequence in Central Italy

Rachele Miscioscia

Geological Background of the Region

An Unprecedented Natural Disaster

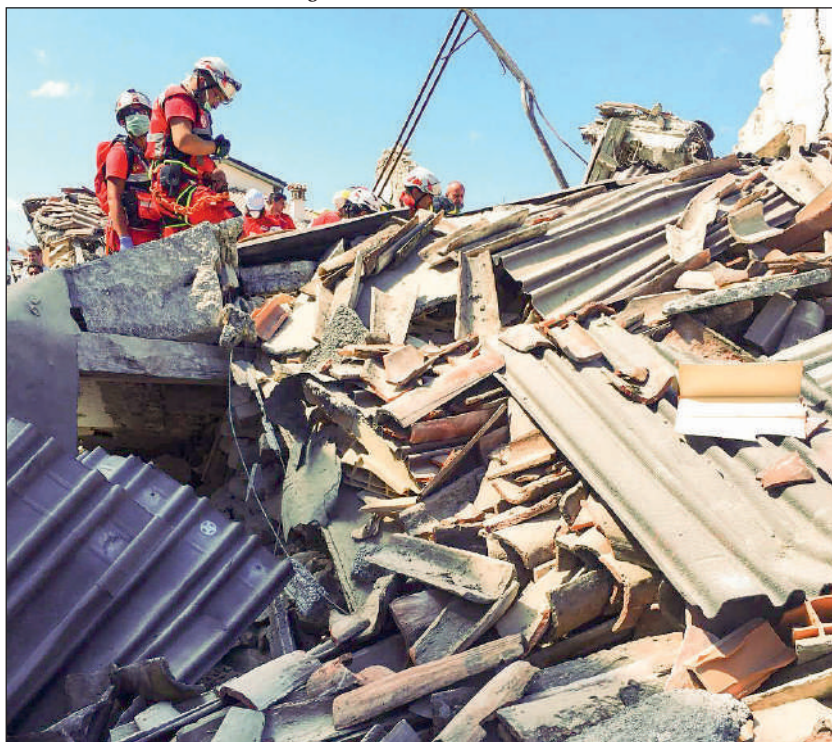
While earthquakes are not a new experience for the population living in central Italy, as the zone lies in a seismically active area, the seismic sequence that took place between August 24, 2016 and October 30, 2016 is one of the most disastrous seismic activities recorded since the start of the 20th century. With a magnitude of Mw 6.5, the October 30th, 2016 earthquake in Central Italy is second in terms of its degree of destructiveness behind the November 1980 earthquake of magnitude Mw 6.8, which struck l'Irpinia and Basilicata (Rovida *et al.*, 2015).

The seismic sequence was localized in an area historically known for being prone to seismic activity. As shown in the graph on the right, this area lies within the *Monti della Laga* and *Valnerina*, in which, according to the seismic catalogue, CPTI 15, the first known earthquake in the zone took place in July 2016 in Accumoli with a magnitude of Mw 5.3.

The October 30th earthquake disintegrated the urban centre of Amatrice, located in the *Monti della Laga* area, as well as the localities next to it. While the historical data on seismic activity in central Italy is very scarce and generic, it shows that the area of *Monti della Laga* has been prone to seismic shocks.

The seismic sequence that started on August 24th was scattered by the movement in the Tyrrhenian Basin, lying beneath the Mediterranean Sea. Due to the same geology, in 2009 the city of L'Aquila, 55 kilometres from the earthquake in question, was hit by a devastating quake. The seismic activity in L'Aquila in 2009 killed about 300 people, destroyed most buildings and infrastructure and forced around 70,000 people to leave their homes (Ciavoni, 2017).

Image 2. Terremoto centro Italia

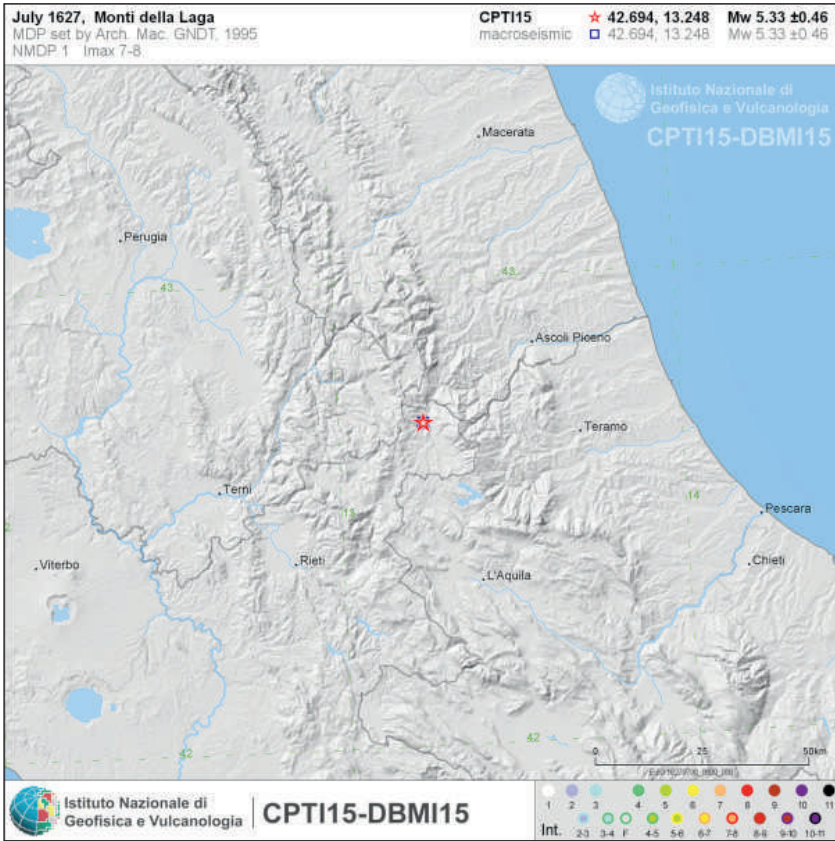


Source: © Wikimedia Commons

Damages, Casualties and Immediate Threats

Following the seismic event of August 24, 2016 a state of emergency was declared. The Civil Protection Department (*Dipartimento della Protezione Civile*)—the national body tasked with the forecast, prevention and intervention in response to natural disasters or other catastrophic events—was in charge of the coordination of the emergency in Central Italy (*Dipartimento della Protezione Civile*, 2017b). The state of emergency was extended after the severe earthquakes of the 26th and 30th of October, 2016 and again after the four earthquakes on January 18, 2017, which surpassed a magnitude of Mw 5. Moreover, due to the extraordinary snowfall in the areas in question, shown in the image below—Abruzzo, Lazio, Marche and Umbria—the state of emergency was further extended.

Map 1. First recorded earthquake in the Monti della Laga area (July 27, 2016)



Source: Istituto Nazionale di Geofisica e Vulcanologia (INGV)

The Mw 6 earthquake on August 24, 2016 affected thousands of citizens, causing 299 casualties and numerous injuries as well as serious territorial damage. Moreover, on the 26th and 30th of October 2016, violent seismic shocks again hit Central Italy, this time concentrated along the border between the regions of Umbria and Marche, which had already been harshly damaged by the events of August 24, 2016. While the event of October 26 was characterized by two powerful earthquakes of magnitude 5.4 and 5.9, the event on October 30 was concentrated in one earthquake of magnitude 6.5 that caused new damage and edifice collapses.

Furthermore, on January 18, 2017 new seismic activities, of magnitudes higher than Mw5, hit the regions of Lazio and Abruzzo. The registered

Map 2. Map showing the regions touched by the seismic sequence that hit Central Italy in 2016



Source: Map created by the author

earthquakes were of Mw 5.1 (10:25am), followed by Mw 5.5 (11:14am), Mw 5.4 (11:25 am) and Mw 5 (14:33 pm). The operations system of the *Protezione Civile* was already experiencing difficulties as a result of the exceptionally bad weather that had hit several regions, including Abruzzo, Lazio, Marche and Umbria.

The seismic sequence spread from the epicentre in Norcia, located in the image above, throughout the whole of Central Italy. It was felt in some Northern Italian regions such as Friuli, Venezia, Giulia and Veneto, and even reached as far as Austria (Matteucci, 2016). Major damage occurred in Amatrice (RI), Accumoli (RI) and Arquata del Tronto (AP) (Governo Italiano, 2017a). These severely hit locations are smaller communes composed of numerous hamlets. Overall, 131 communes are part of the list of zones damaged by the seismic sequence in Central Italy (Consiglio Nazionale dei Geologi, 2016). Of the 131 communes, 57 are situated in the region of Marche.

Overall, the seismic sequence that started on August 24, 2016 in central Italy caused damage amounting to 23.53 billion Euros (Giornale di

Map 3. The image below shows the epicentre of the seismic sequence of October 30, 2016 was located to the southeast of Norcia (in the province of Perugia)



Source: Wikimedia Commons

Sicilia, 2017). This figure includes both the structural damage, in the form of destruction of edifices, infrastructure, harvest, and cultural patrimony, as well as the cost of emergency response. Of this sum, damage to private buildings amounted to 12.9 billion Euros, while damage to public buildings added up to 1.1 billion Euros (Giornale di Sicilia, 2017).

Table 1. Earthquakes of magnitude 4.5 or above hitting Central Italy between August and October 2016

Date	Magnitude	Quake Epicenter	Depth (km)	N° of Victims
24/08/2016 03:36:32	Mw 6.0	Accumoli (RI)	8	299
24/08/2016 03:37:26	Mw 4.5	Accumoli (RI)	9	
24/08/2016 04:33:28	Mw 5.3	Norcia (PG)	8	
24/08/2016 13:50:30	Mw 4.5	Norcia (PG)	10	
25/08/2016 06:26:25	Mw 4.8	Amatrice (RI)	9	0
25/10/2016 19:10:36	Mw 5.4	Castelsantangelo sul Nera (MC)	9	0
25/10/2016 21:18:05	Mw 5.9	Castelsantangelo sul Nera (MC)	8	0
26/10/2016 23:42:01	Mw 4.5	Castelsantangelo sul Nera (MC)	10	0
30/10/2016 07:40:17	Mw 6.5	Norcia (PG)	9	0
30/10/2016 13:07:00	Mw 4.5	Pesci (PG)	10	0

Source: Istituto Nazionale di Geofisica e Vulcanologia (INGV)

Following the seismic sequences on August 24, 2016, the imminent needs and threats were the safeguarding of citizens, finding and saving those people buried under the ruins of buildings, the loss or impracticable

use of residential property due to structural damage, the need to provide new housing units to the unsheltered, infrastructure damage, the damage to and recovery of cultural heritage sites, the need to support citizens faced with a breakdown of economic activity and the resulting lack of economic self-sufficiency. In order to address all of these challenges, on the same day that the seismic sequence commenced, the whole National Service of the Civil Protection (*Servizio Nazionale della Protezione Civile*) was activated. This meant that several different organs, both national and regional, were put into action. These included administrative offices of the Central State as well as of the peripheries, operative structures, the national sanitary service, scientific agencies, and companies overseeing essential services, as well as volunteering (Dipartimento della Protezione Civile, 2016a).

Two months after the August 2016 events another violent seismic sequence occurred during the night of October 26, 2016. The areas of Macerata and Perugia were the most damaged municipalities (Protezione Civile, 2016). This seismic sequence was so violent that it was felt even in Austria. The two most severe earthquakes took place at 19:10 and 21:10, while another 200 earthquakes were registered by INGV¹ throughout the night of October 26. While causing no casualties, the earthquakes of magnitude Mw 5.4 and Mw 5.9 caused extensive structural damage. The municipalities closest to the epicentre of the quake were Castelsantangelo sul Nera (Macerata), Preci (Perugia), and Visso (Macerata). Over 4,000 people have been displaced from the approximately 15 municipalities touched by the earthquakes (Ananasso, 2016; Dipartimento della Protezione Civile, 2017d). The situation was further complicated due to harsh weather conditions and torrential rain.

Finally, the seismic sequence of October 30th reached a record high magnitude of Mw 6.5 on the Richter scale, the most violent earthquake in Italy since 1980. The earthquake was followed by two shocks of magnitude Mw 4,6 and 4,1 respectively, as well as another 200 earthquakes of a lighter magnitude. The earthquake was felt from Bolzano (in the North of Italy) to Bari (in the South of Italy). The epicentre was detected in a zone located southeast of Norcia, meaning the municipalities of Norcia, Castelsantangelo, Preci, and Visso were particularly affected. These municipalities are located in the provinces of Perugia, Macerata

¹ INGV stands for Istituto Nazionale di Geofisica e Vulcanologia, it is the National Institute of Geophysics and Volcanology. Its role is to disseminate information on the seismic activity in Italy. More information at: <https://ingvterremoti.wordpress.com/chi-siamo/>

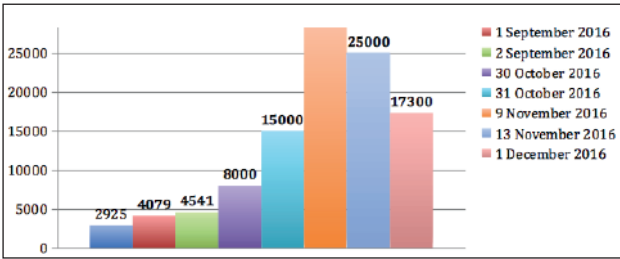
and Rieti. This seismic disaster was registered at a depth of only 9km. As a result forced displacement due to previous earthquakes, this earthquake did not lead to any casualties, but around 20 people were injured. Nevertheless, the number of displaced people rose dramatically from the peak of 4,800 assisted people in September to over 30,000 in the first weeks of November (Protezione Civile, 2017d). Additionally, inestimable damages have been made to the artistic patrimony of the Apennine Mountains as the artistic heritage has been affected (Redazione, 2016). A vivid example of the destruction produced by the seismic sequence is the damage to the municipality and the civic tower of Amatrice shown by image number four, below. Substantial structural damage also led to the collapse of the basilica of San Benedetto in Norcia, an artistic and cultural site constructed in the 19th century.

Image 2. Amatrice after the seismic sequence of October 30th, 2016



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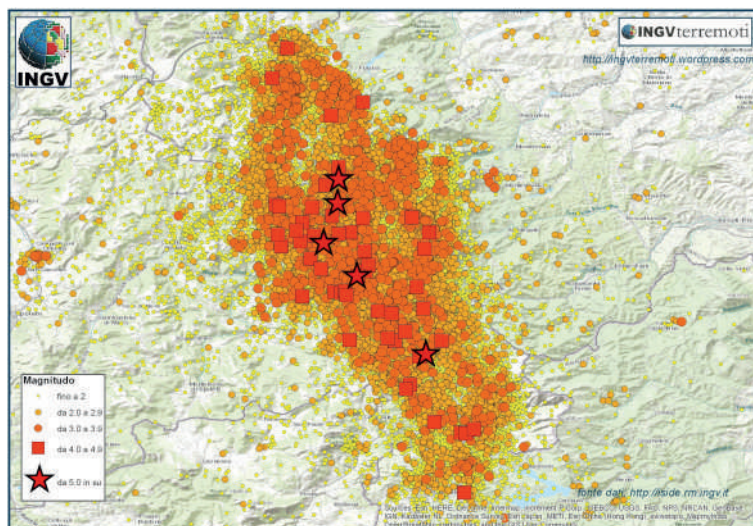
Graph 1. The graph shows the number of displaced people following the seismic activity in Central Italy. The number of people takes into account only residents. Rounded numbers are estimates



Source: Servizio Nazionale della Protezione Civile

Persistent Environmental Threats in a Weakened Region

Map 4. Number and location of seismic events registered in Central Italy starting on August 24, 2016



Source: Istituto Nazionale di Geofisica e Vulcanologia

The seismic sequence of August 24th, 2016, was comprised of over 300 earthquakes, the first of which at 03:36 was the most violent, with of magnitude Mw 6.0 . This event initiated a localized seismic sequence that lasted three months in the regions of Abruzzo, Umbria, Marche and Lazio. The most damaged locations, in the province of Rieti, and between the communes of Accumoli and Amatrice, registered approximately 45,000 earthquakes in 2016 (INGV, 2016).

According to the Italian National Institute of Geophysics and Volcanology (INGV) the area of the activity extended to about 80km in length and 20-25 km in width, covering four regions (Lazio, Abruzzo, Umbria, Marche) and seven provinces (Rieti, L'Aquila, Terni, Macerata, Ascoli, Teramo).

As the INGV map above shows, about 45,000 seismic events were registered in Central Italy starting on August 24th, 2016. The impact of these earthquakes has been very destructive, and throughout the months of August, September and October, over 90 per cent of the registered seismic events registered by INGV took place in the area described above. Almost 10,000 earthquakes in September and around 7,000 in October followed those of the last week of August 2016. While the most elevated

magnitude in August was registered at Mw 6.0, throughout the last week of October 2016 the growth in seismic activity became even more intense and destructive. The provinces of Perugia and Macerata were hit by earthquakes on October 26th, 2016 of Mw 5.4 at 19:10 hours and Mw 5.9 at 21.18 hours as well as a stronger earthquake on October 30th, 2016 of Mw 6.5.

The environmental issues provoked by the seismic sequence vary from area to area due to the highly diverse geological morphology of the region. In an interview with Fabrizio Curcio, an engineer and head of the Department of Civil Protection, he explains that the effects on the environment have been different in each of the localities hit by the earthquake and some are not readily recognizable. Moreover, Mr Curcio explains that the majority of the localities are characterized by high state of environmental fragility. For example, he explained that Arquata del Tronto and Castel Santangelo Sul Nera, which were both destroyed by the seismic sequence, were already vulnerable due to hydro-geological instability, which was exacerbated by the earthquake. The Department of the Civil Protection has deployed specialised scientific groups to evaluate the different environmental problems and identify the necessary responses (personal communication, May 11, 2017).

Displacement

Evacuation and Assistance

At the beginning of the seismic sequences in August, the evacuation management started out in a chaotic fashion. The response was not immediate due to the fact that the first earthquake occurred during the night and in localities in the mountains that are difficult to reach. Particularly, the mayor of Accumuli (Rieti), Stefano Petrucci, denounced of the amount of time it took for aid from the Civil Protection Department and other national support bodies such as firefighters, the Red Cross and the military, to arrive. In an interview with RaiNews24 he stated: "I asked for assistance at 4am, but we still have not seen anyone, it's scandalous" (Sarraz, 2017). Indeed, while the earthquake had hit at 03:36, the Civil Protection Department met at 04:30 and only announced a decree to operate on the ground with immediate effect at 07:30. Nevertheless, once the Civil Protection Department mobilised its resources on the ground, the evacuations were efficiently managed throughout the subsequent earthquakes.

The management of the emergency was subdivided between the entirety of the National Service of for Civil Protection (*Servizio Nazionale della Protezione Civile*), which includes state administrations at the national and local levels, operative structures, health services, as well as scientific centres and other providers of essential services including volunteers. The primary rescue services were principally devoted to the transfer of 392 injured people by helicopter to hospitals in the four regions that were hit by the seismic activity. Overall, 27 organizations, including the national fire service, the armed forces, the police, the Red Cross, the Alpine and speleological rescue services, as well as the national healthcare service jointly worked to search for and rescue victims, provide assistance to the population, verify compliance with safety standards of buildings, mitigate damage, and recover and secure damaged or endangered cultural sites and artefacts.

A month after the earthquake of August 24th that hit the regions of Lazio, Marche, Umbria and Abruzzo, around 3,000 people were accommodated in ad hoc facilities, compared to 4,800 people on September 5th, 2016. The intervention of the Civil Protection Department focused on helping citizens to leave the tent camps and find alternative accommodation together with the provision of economic aid from the state through the CAS program (*Contributo per l'Autonomia di Sistemazione*—a grant for accommodation autonomy for displaced people). Priority was also given to the recovery of cultural heritage and modes of transportation in order to resume normal activity in the affected areas. Around 72 per cent of public edifices and 47 per cent of residential housing was deemed usable.

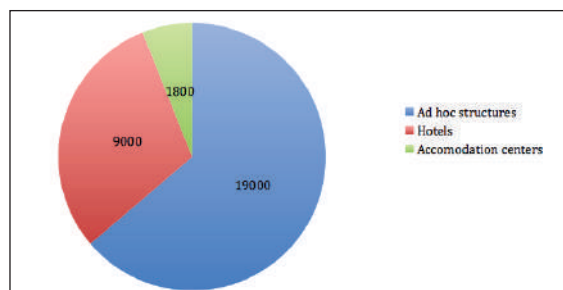
Image 3. A camp of tents organized by the Civil Protection Department in order to host the citizens of Central Italy remained homeless due to the seismic sequence



© Wikimedia Commons

According to the Civil Protection Department, the national body in charge of risk prevention and management, the number of assisted people following the strong earthquakes of August 24th, October 26th, and October 30th, totalled 30,200 (Cartolano, 2016). Of those displaced, 19,000 were temporarily accommodated in polyvalent centres and ad hoc facilities, such as tents. Another 9,000 people were provisionally accommodated in hotels along the Adriatic coast, while about 1,800 were provided with places in accommodation centres throughout the territory of Lake Trasimeno. Six months after the start of the environmental disaster, a Civil Protection Department report stated that over 11,700 people remained without a home. Of these, over 2,600 were accommodated in ad hoc facilities provided by the municipalities, and over 8,900 were taking refuge in hotels.

Graph 2. Approximate number of people hosted in the different types of facilities used to mitigate the homelessness caused by the seismic sequence



Graph created by the author

The management of essential services including electricity, gas, water and private roads also played a key role in the reinstatement of services and necessary assistance for the affected populations. Indeed, on August 26th, 2016 the energy authority approved the suspension of bills for electricity, gas and water for the people of the zones hit by the earthquake. This deferment was extended to the territories hit on October 27th after the new seismic sequences.

Displacement has also created social unease for these people who have lost their homes, their livelihoods and their incomes, due to the destruction of their workplaces by the earthquakes. While economic aid and ad hoc facilities provided by the state have enabled most of the displaced to find temporary housing solutions, the highest level of difficulty has been found within a small group of the population: breeders. Having to take care of their cattle and sheep, their only source of income and sole remaining possessions, these farmers could not make use of the temporary tents, as their animals were not welcome. Five months on from the first earthquake, breeders

of cattle and sheep were stuck in the middle of the countryside with destroyed homes and stables and unable to escape due to snowfall of more than one metre (Perilli, 2017). Breeders were the last to be rescued due to the difficulty reaching the places where they were residing with their animals. Moreover, due to the delay in deploying temporary stables, breeders have seen many of their animals die from lack of food and water. The story of Stefano Angeli, 50 years old, shows the harsh reality of breeders in Pieve Torino (Macerata). In February 2017, he was still living in a trailer in order to be near his animals, 45 of which had died due to the dire conditions (lack of food and cold temperatures) (Bartolomei, 2017).

From Temporary to Lasting Solutions

Once the immediate evacuations and rescue of injured citizens was complete, following the earthquakes in October 2016 and January 2017, the CROSS (*Centrale remota operazioni soccorso sanitario*), an organization committed to the management of healthcare assistance, was activated to coordinate the management of the healthcare resources in the regions affected by the event. Yet, as the regions in question were able to effectively manage the needs of the territory, no initiative by the CROSS was needed.

Another medium-term activity was the establishment of four PASS (*Posti di assistenza socio sanitaria*), office of social and health assistance, as well as a department of radiology on the field. The role of these offices was to substitute or strengthen the local healthcare centres that were disabled following the seismic events. Further, four camper vans and a shelter functioning as a pharmacy were also established to provide proper distribution of medicines throughout the affected territory. Similarly, 30 shelters were set up in order to provide further healthcare assistance, while thanks to volunteers working for the Civil Protection Department, psychological support was also provided to the victims who suffered trauma, such as the loss of loved ones and the complete destruction of their homes. Finally, thanks to the implementation of a system for surveying the immediate social and healthcare needs of fragile citizens or people with disabilities, SVEI (*scheda speditiva per la valutazione delle esigenze immediate delle persone fragili e con disabilità*) citizens underwent received personalized assistance.

The launch of a system of donations to support the population hit by the seismic activity was, from the very start, a strong signal of national and international participation. Thanks to the activation of a support help-line promoted by the Civil Protection Department, citizens could make

donations by calling the number 45500. The funds raised between the 24th of August and the 9th of October 2016 totalled €15,053,594. Between October 30th and November 30th 2016 the funds raised amounted to another €4,415,294, and between December 31st, 2016 and February 14, 2017 the funds added €3,473,710 for the project *Ricominciamo dalle scuole* (Let's start from the schools), dedicated to safeguarding the educational infrastructure. Another fundraiser, named *Emergenza terremoto Centro Italia* (Emergency earthquake Central Italy), raised just over eight million Euros. In total, about 29 million Euros have been raised to help the population and the territories hit by the seismic sequences. However, due to purely bureaucratic problems arising from the fact that the Civil Protection Department had signed a protocol with Rai, a television channel, and other telephone operators that participated in the fundraising effort, such as Tim, Vodafone, Wind, and 3, among others, the funds could be used only after the fundraising campaign closed. As this fundraising campaign remained active until January 29, 2017, these funds were not available for immediate assistance needs, but rather for the reconstruction of the territories affected by the earthquakes.

Following the rescue of injured people and the evacuation of the zones affected by the seismic activity, the firefighter's organization started a procedure of verification of buildings' compliance with safety standards starting on August 29th, 2016 for public buildings and starting on September 5th for private structures. This measure allowed citizens to return to house complying with safety standards. Nevertheless, after the October seismic sequences, many of the already verified buildings had to be checked again. Out of all the buildings verified, 57,355 units, representing only 45 per cent, were usable or habitable (Dipartimento della Protezione Civile, 2017a).

As a result, many citizens were relocated to tents, hotels or relatives that could receive them. Thanks to the CAS system of financial aid for housing, thousands of people independently found a place for temporary residence. Yet, following the seismic sequences, the localities that were hit were completely destroyed and a medium-term housing strategy had to be found in order to give the citizens a better option than tents and to repopulate the area. As a result, containers and temporary housing units were used as a transitory housing system before reconstruction was completed. Both the regions and municipalities hit by the seismic sequence had access to SAE (*Soluzioni abitative antisismiche*), anti-seismic housing solutions. Yet, in April 2017, the areas provided by the municipalities for the construction of SAE only numbered 80 throughout the four regions

hit by the event (Abruzzo, Lazio, Marche and Umbria). At the beginning of April 2017 the municipalities estimated a need for over 3,700 further SAE, and to date only 63 housing units have been distributed, causing distress to the populations affected that are still relocated in other parts of Italy in hotels or state-owned houses.

Despite the damage to schools as a result of the events in August and October 2016, many schools required only small interventions to become functional. Of 2,409 schools overall, 66 per cent (1,585) were deemed usable while the remaining 44 per cent could not be used or could not be used provisionally. In the cases of significant damage, support from a variety of organizations (public entities, banking groups, associations and businesses) made the construction of temporary facilities for schooling possible. For example, in the case of Amatrice, the region of Trentino in northern Italy funded the construction of temporary schooling units, shown in the image above. Subsequently, thanks to a donation by Sergio Marchionne, CEO of the FCA and Ferrari Group, the mayor of Amatrice will be able to substitute the temporary school offered by the region of Trentino with a permanent structure sponsored by Ferrari. Also, thanks to the coordination between the Civil Protection Department and the Ministry of Education, University and Research, between September and December seven educational facilities were constructed.

In the localities hit by the seismic sequence, agriculture and livestock farming are the principal sources of revenue. According to Coldiretti, the labour union for agricultural industries, the damage to agricultural businesses caused by the seismic sequence amount to 52 million Euros. Overall, the strategic plan includes 220 million Euros of state funding to reconstruct and re-launch the agricultural sector. Moreover, the Minister of Agricultural Policies made an additional 35 million Euros available in February 2017 to assist the livestock industry and its lack of revenue due to the earthquakes. Additionally, one million Euros has been dedicated to the industries within the localities affected that produce dairy products. The management of interventions to support the zoo-technical sector was initiated by the Ministry of Agricultural, Food and Forestry Policies and coordinated with the presidents of the regions of Lazio, Abruzzo, Marche and Umbria. The regions in question specifically had to construct stables, barns and temporary installations to restock provisions. The region of Lazio is also presiding over the auction for the provision of materials needed for these constructions. Furthermore, the regional governments provided for the examination of the needs for the construction of MAPRE (*Moduli abitative provvisori rurali*), which are provisional rural

housing structures as well as camper vans provided by the Red Cross (Dipartimento della Protezione Civile, 2017b).

Reconstruction and Relocation

Policies for Reconstruction and Relocation

Policies for the approval of the reconstruction of private and public edifices have only appeared recently. On April 7th, 2017 the government ordinance 19/2017 was enacted to establish the terms and modalities for the funds regarding the reconstruction and earthquake resilience of the buildings destroyed in the localities affected by the event (Commissario del Governo per la ricostruzione nei territori, 2017). This decree states that for private reconstruction, the costs will be covered by the state in their totality for both primary and secondary homes located within the designated scope of affected territories. Outside of this area, the contributions for the reconstruction of second houses amount to 50 per cent of the total cost. According to the decree, the restoration projects need to produce a seismic-proof improvement of the construction between 60 per cent and 80 per cent. Similarly, parameters on private reconstruction appeared on April 12th, 2017 thanks to the publication of decree 19, which outlines the modalities and timings of the interventions on private buildings (Commissario Straordinario Ricostruzione Sisma, 2016). Nevertheless, there is still a long road ahead in terms of reconstruction efforts and in the meantime the municipalities that have been destroyed are offering temporary housing solutions only. Reconstruction is being thought about only recently, and on April 11th the Council of Ministers approved a decree putting forward financial measures for the reconstruction and development of the zones destroyed. This decree has created a specific fund of one billion Euros per year over the period 2017-2019 in order to speed up the reconstruction process in the four regions (Governo Italiano, 2017a). Overall, while reconstruction is just starting to be spoken about, it remains the “first priority” as stated by Corina Cretu, European Commissioner for regional policies. Comm. Cretu’s presence in Norcia in February symbolized the solidarity of the European Union, and, as she stated in the name of the EU, “we will put forward all available resources to ensure a future to the populations that live in the regions hit by the earthquakes” (Ansa, 2017).

Generally, the reconstruction of places that were partially or totally destroyed by the seismic sequences that started on August 24th, 2016 has

been very slow. As Laura Guidotto, Chief of the Technical Department in Accumoli, stated in an interview, “We are still a long way from reconstruction, and this theme has not yet been tackled” (personal communication, April 27, 2017). The first step taken was to take care of the ruins. In this respect, the decree of the Department Chief n°391 of September 1st, 2016 designated the four regions affected by the seismic sequence (Lazio, Marche, Umbria and Abruzzo) in charge of the collection, transport and recovery or disposal of the ruins. Today the demolition and disposal of the ruins is still the main priority for many of the small villages destroyed by the earthquakes.

Accumoli, a small municipality in the province of Rieti, shown in the above image, is one of the worst affected sites by the seismic sequence. It offers a good case study for the understanding of the technical and bureaucratic difficulties arising from this environmental disaster. As illustrated by Laura Guidotto, head of the technical office in Accumoli, her office, composed of only herself, has been submerged by a variety of different tasks including the demolition of dangerous edifices. These tasks have been complicated by the fact that in this locality, most houses are vacation homes, hence finding their owners has been and continues to prove difficult for Ms Guidotto and her assistant, who has been newly hired to help her deal with the large number of bureaucratic tasks. Ms Guidotto stated that unfortunately progress is slow, sometimes due to the highly bureaucratized system. Yet, she underlines the importance of following the designated rules even if this means delayed responses. The most important take-away from the case of Accumoli is that this municipality, like many others hit by the seismic sequence, was completely unprepared to manage the levels of destruction, evacuation and reconstruction. Nevertheless, thanks to the policies put in place by the Italian government and the Civil Protection Department, such places have been assisted from the very beginning with the rescue of victims and are still being supported along the arduous path back to normality.

A Replication of the Poorly Managed Reconstruction Policy Experience in L’Aquila?

According to Fabrizio Curcio, head of the National Department for Civil Protection, “it is hard if not impossible to make comparisons [between the assistance and interventions in L’Aquila in 2009 and in Center Italy in 2016]: they are two completely diverging situations, as a consequence, also the type of intervention to assist the population has developed in

different ways. These events occurred at a distance, one from the other, of seven and a half years, in profoundly differing socio-economic contexts to look at a national reality that from 2009 to 2016 has notably evolved and has also modified the normative instruments available to manage the emergencies of civil protection.” In particular, Mr Curcio explains that while the situation in L’Aquila in April 2009 was restricted to a smaller area, the regional capital of Abruzzo, the seismic sequence that started on August 24th, 2016 has registered over 68,000 earthquakes and has instead involved four regions: Lazio, Umbria, Marche, and Abruzzo, comprising 131 communes and hundreds of municipalities. Hence the two events are different in scale and nature as the one in central Italy touched a less densely populated but nevertheless extremely large territory. While the quake in L’Aquila made approximately 70,000 people homeless, the total number of displaced people in central Italy is 31,000. Finally, a key element, explained by Mr Curcio, that distinguishes the two events is that the seismic sequence in central Italy involved more environmental threats as a greater number of earthquakes occurred as well as a wave of bad weather. The event in Central Italy is described by Mr Curcio as “a definitely complex intervention, both in terms of the vastness of the area hit [by the seismic sequence and then by the bad weather], and because of the fact that we had to manage more emergencies within the initial emergency, if we also think about the bad weather with intense and persistent snowfall in January in the areas destroyed by the earthquake”. In turn, Mr Curcio explained that unlike the situation in L’Aquila, the concatenation of events has made it necessary to frequently remodel the Department of Civil Protection’s plan of action in order to redefine the response to the various threats, always in conjunction with local institutions (personal communication, May 11, 2017).

Furthermore, the typology of the earthquake on August 24th, of magnitude 6 was different from the one that hit the nearby Italian city of L’Aquila in 2009. While both were superficial, taking place at a depth of around seven or eight kilometres, the one that struck L’Aquila was around two to three times stronger, reaching a magnitude of 6.3 (6Aprile, 2017). Secondly, while the event in L’Aquila hit a city inhabited by 70,000 people, the more recent series of earthquakes has displaced fewer people. At the start of the seismic sequences in Central Italy, seven years after the destruction of L’Aquila, the reconstruction is still a work in progress. In L’Aquila, thousands of families are still waiting for their homes to be rebuilt, construction machines still fill the city centre, and judicial inquiries are still ongoing regarding corruption and bribes (Il Tempo, 2016). As a result, the key question today is whether the reconstruction policy in

Central Italy will prove to be a similarly painful experience to the one that the inhabitants of L'Aquila are still dealing with.

The L'Aquila model is based on three parts (Parisse, 2016). The first two parts are composed of the role of the Civil Protection Department and the nominee from the government in charge of earthquake management. The third part is a task force in charge of the funding of reconstruction projects. The resulting effects from the L'Aquila model were the creation of disparities in the work carried out within the city centre and the towns surrounding it. While the city of L'Aquila received more money compared to the small villages surrounding it, these small villages, which had been completely destroyed by the earthquake, did not receive enough funding for reconstruction. Ultimately, the main challenge is the revival of the economy in such places. For this reason, the reconstruction within and around L'Aquila is today facing an issue of a lack of economic incentives for the social rebirth of these localities. The reconstruction project overlooked the social and economic dimensions of these places, thus leaving doubts as to whether the people that were originally displaced will want to return. Furthermore, during the 2016 seismic sequences in Central Italy, the inhabitants of the city of L'Aquila relived the fright they experienced seven years earlier as the houses that were reconstructed showed signs of cracks in the walls. Hence, the model of the response to the earthquake in L'Aquila has not only proved to be slow, but also flawed, as reconstructed houses are already indicating deficient seismic resistance. Today the reconstruction plan in L'Aquila, known by the acronym C.A.S.E. has placed a huge debt burden on the shoulders of the city's inhabitants, due to the costs of maintenance. Almost paradoxically, some reconstructed houses are proving uninhabitable (Parisse, 2016).

While reconstruction in Central Italy following the 2016 earthquake is proceeding very slowly due to the bureaucratic requirements in order to ensure holistic planning and corruption-free procurement procedures, the recovery efforts seem to be learning from those in L'Aquila. First, as the earthquake in Central Italy has caused damage in many municipalities, the money and effort being deployed for each and every location is in proportion to the extent of the damage. In L'Aquila, on the contrary, the city received all the financial support, leaving the small surrounding municipalities without enough aid. Second, reconstruction in Central Italy differs from that in L'Aquila insofar as it is not failing to account for the economic dimensions of the affected localities. Indeed, economic assistance for enterprises with headquarters in one of the affected territories is supplied by the legal decree *n°189 of 2016*. This decree provides for a

sum of 35 million Euros to help enterprises that have been damaged by the seismic sequence. In addition, temporary schools have been established in the locations hit in order to ensure continued schooling, and the construction of permanent school buildings began on April 18th, 2017. Finally, the reconstruction in Central Italy, overseen by the Extraordinary Commissioner for the Seism Reconstruction, Vasco Errani, will engage all parties involved, from state institutions to universities and including the citizens of these places (*Commissario Straordinario Ricostruzione Sisma* – 2016). While the reconstruction in L'Aquila has been slow and obscure due to corruption, leading to the arrest of public officials, project managers and entrepreneurs, Mr Errani recognises the need for the reconstruction procedures in Central Italy to be based on solidarity, fairness and transparency (*Commissario Straordinario Ricostruzione Sisma*, 2016; Tedeschini, 2016).

Conclusion

Overall, the management of the seismic sequences in Central Italy starting in the early morning of August 24th, 2016 has been exemplary. Assistance to the affected citizens was swift, especially, considering the fact that the emergency started while everyone was asleep. Thanks to the cooperation between the Civil Protection Department and other entities such as the fire service and the police, evacuation and the rescue of people trapped in the ruins of their homes was extremely fast. Despite bad weather conditions—there has been unusually heavy snowfall in the locations hit by the earthquakes—the operations of evacuation and removal of the rubble from damaged buildings has continued. However, people displaced by the evacuations of the earthquake have, and still are, living in temporary accommodation. This situation of provisional arrangements has generated unease and distress within the population that has lost both their homes and in many cases their economic activities. Hardship has been felt, especially in the case of farmers, who are living in destroyed areas and have had to find ways to protect both themselves and their cattle and sheep that were dying as a result of a lack of food and the exceptionally cold weather. Today “temporary” is the word that best describes the situation in Central Italy. Temporary characterizes the relocation of those people who lost their homes; the buildings that shelter these people during the night; and the schooling facilities. Now the greatest challenge for the Italian Government will be to transform these “temporary” conditions into lasting solutions that will take into account the geological specificity of the region in order to ensure these places are more resilient in the

face of similar future environmental incidents. The big question remains whether the management of the transition to a sustainable and resistant reconstruction will take place over a relatively short period of time so that those displaced can go back to “normality”, or if, on the contrary, the reconstruction of Central Italy will demonstrate the same inefficiency and lack of transparency as the reconstruction efforts in L’Aquila following the 2009 earthquake.

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North America

Rethinking Resettlement

Hurricane Matthew and Protracted displacement in Haiti

Kristiane Davidson

The passage of category 4 Hurricane Matthew saw the largest humanitarian event in Haiti since the devastating earthquake in 2010, and the strongest hurricane to make landfall in Haiti in over 50 years. In total, over 2.1 million people were affected by the storm: 546 were reported dead, 1.4 million required immediate humanitarian assistance and over 175,000 were displaced in evacuation shelters across Haiti (United States Geological Survey [USGS], 2016; Government of Haiti, 2017). Estimates taken six months after the hurricane indicated that over 15,000 of these people remained displaced—joining the 62,000 or more people who have remained displaced since the earthquake 6 years earlier (ACAPS, 2016; Haiti Libre, 2016).

Haiti has a long history of natural disasters and an equally long history of displacement. Generally, people displaced by a natural disaster return to their homes within a few weeks of being displaced, or stay in temporary dwellings whilst their homes are repaired or rebuilt (Long & Zetter, 2012). In Haiti, however, many people have not been able to return, because of, for example, the permanent loss of their property in the instance of erosion or landslide; a lack of funding for construction costs; or squatting and land disputes (Zetter, 2016; ACAPS, 2016). When people are unable to find permanent housing or another type of durable solution—such as absorption in their host communities or settlement in a third location—after three years of being displaced, they are considered to enter a state of protracted displacement (Crawford, Cosgrave, Haysom & Walicki, 2015). By this definition, tens of thousands of Haitians were experiencing protracted displacement at the time the hurricane hit Haiti in 2016, and thousands more could join them unless durable solutions are provided (Brookings, 2011).

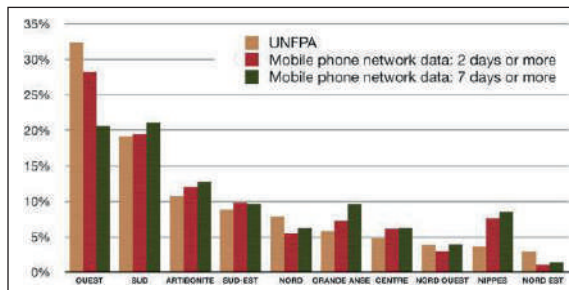
To be displaced is to be removed from your home and community; protracted displacement is to be removed from your home and community and remain disconnected for an extended period of time, whilst being deprived of economic, social and cultural opportunities as well as, in

extreme circumstances, of human rights (Brookings, 2011; Crawford, *et al.*, 2015). In this way, protracted displacement is a hindrance to the development of individuals, communities and nations, and its prevalence in Haiti means that the government need to institute immediate and sustained resolution. This chapter will explore the extent of protracted displacement in Haiti, the causes that need to be addressed to reduce this phenomenon and the potential challenges for doing so in the future.

Displacement before Hurricane Matthew

On 12 January 2010, a magnitude 7.0 earthquake hit Haiti, killing more than 200,000 people, destroying more than 300,000 buildings and displacing nearly 1.5 million people (Levine, Bailey, & Boyer, 2011). When the earthquake struck, Haiti was still recovering from the storm season of 2008, which resulted in the devastation of 22,000 homes, the deaths of 800 people, and the displacement of thousands more (Reliefweb, 2016), as well as the storm season of 2007, which displaced 7,500 people (USAID, 2007), many of whom would have been displaced again by the earthquake. Immediately following the earthquake, an estimated 630,000 people left Port-au-Prince in search of refuge, in either evacuation shelters surrounding the city or the homes of friends and family in various departments (provinces) in Haiti (Flowminder, 2017). This movement was tracked using anonymous mobile phone operator data that was collected and analyzed¹ - by comparing the number of calls made by inside Port-au-Prince the day after the earthquake to the number of calls made 3 weeks earlier—to estimate the size, direction and destination of flows of people (see Figure 1) (Flowminder, 2017).

Figure 1. Post-earthquake migration patterns, Haiti, 2010



Note: The beige bars show the results of the United Nations Population Fund household survey; the red bars show the proportion of the mobile phone subscribers absent from Port-au-Prince for at least two days after the earthquake; and, the green bars the proportion absent for at least a week after the earthquake. Source: Flowminder, 2017

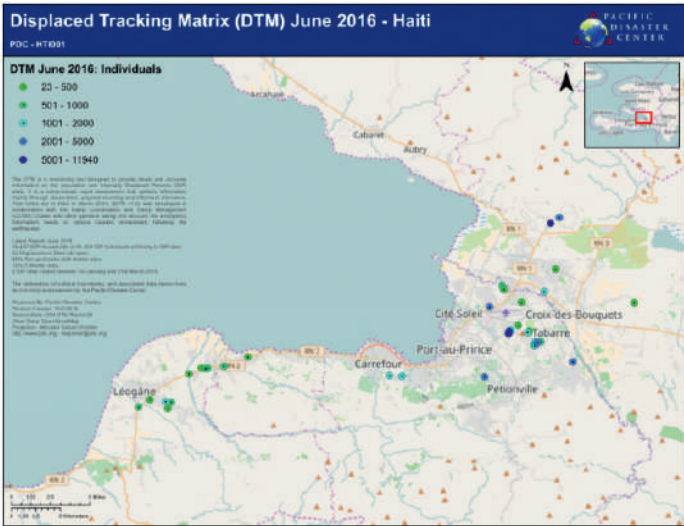
For those who stayed in Port-au-Prince, space was limited and displaced people set up tents in open spaces, like town squares and golf courses. In response, the Haitian Government and the International Organization for Migration (IOM) established transition camps for the Internally Displaced Persons (IDPs) (Government of Haiti, 2017). Camp Corail, the first transition or ‘displacement’ camp developed, was originally created to house IDPs who had been squatting on private land in the wealthy district of Pétion-Ville (Dupain & Nouvèl Gaye, 2014). The camp was situated 30 minutes from Port-au-Prince and contained hurricane-proof tents and basic amenities, like drinkable water and sanitation. However, due to underfunding and overcrowding, the government was not able to adequately support the camp, and it turned into one of the largest slums in the country (Dupain & Nouvèl Gaye, 2014; Nienaber, 2010).

Many of the camps established by the government in partnership with donor agencies suffered a similar fate and caused numerous problems for authorities as well as the displaced people living in them. With limited or no education and health facilities and few employment opportunities, life in these displacement camps was plagued by poverty, violence, and disease (Nienaber, 2010). Unemployment among IDPs was estimated to be 83 per cent, which was more than double the rate for the rest of the urban workforce (Internal Displacement Monitoring Centre [IDMC] and Norwegian Refugee Council [NRC], 2016). Further, the impermanence of the shelters in the camps put people at risk of being displaced again, through either forced eviction or additional natural hazards (IDMC & NRC, 2016). This vulnerability was unfortunately highlighted when, only ten months after the earthquake, Hurricane Tomas destroyed much of Camp Corail, displacing 5,581 of the IDPs (Nienaber, 2010).

By 2014, Camp Corail and its surroundings eventually transformed into a community of semi-permanent structures; however, the area remained underserved and without proper infrastructure or transport. This is because the Government of Haiti refused to recognize the settlement as anything other than ‘temporary’ (Haiti Recovery and Development Company, 2016; Dupain & Nouvèl Gaye, 2014). Those people displaced by the earthquake who remained in the camp had, by this point, entered a state of protracted displacement, as three years had passed. Although the original government mandate was to house IDPs in the camps for a limited period time as more permanent housing solutions were developed, due to a lack of funding, only 43,100 of the intended 111,240 homes were built, leaving thousands of displaced people in camps indefinitely (Regan, 2011).

As a result of these stagnations, over 55,000 people remained in displacement camps up to six years after the earthquake. These enduring IDPs were spread across 31 displacement camps—comprising 45 per cent tent or make-shift shelters and 55 per cent transition shelters—that were in areas originally deemed safe in the post-earthquake context. However, the locations of the camps were not protected from the impacts of cyclonic winds and flooding—as they were intended for short-term use only (see Figures 2) (International Organization for Migration [IOM], 2016a; IDMC & NRC, 2016). Accordingly, when Hurricane Matthew made landfall in Haiti, the IDP population was one of the worst affected.

Figure 2. Map of displacement camps in June 2016



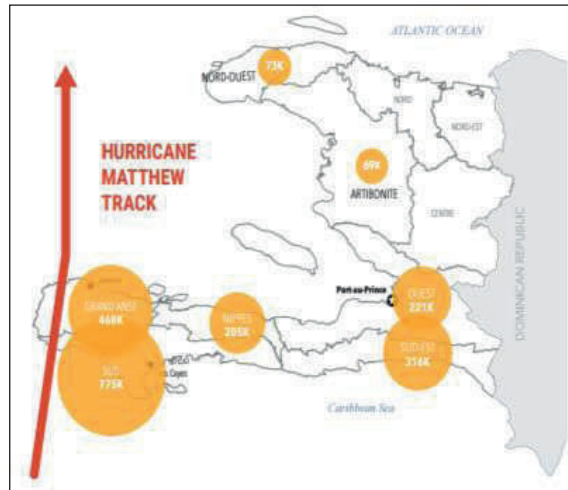
Source: Displacement Tracking Matrix Support, 2016b

Displacement after Hurricane Matthew

Hurricane Matthew was a category 5 Atlantic hurricane that made landfall in Haiti as a category 4 on October 4, 2016, with 230 kilometers per hour gusts of wind, up to 800 millimeters of torrential rain and storm surges of two to three meters (NASA, 2016). The Post Disaster Needs Assessment for Hurricane Matthew, released by the Haitian Government in February 2017, estimated damages at USD 2.72 billion, with the housing (USD 856.28 million) and agriculture (USD 573.53 million) sectors incurring the most damage (Government of Haiti, 2017). The report also

indicated that the most acutely affected populations were either in slums and displacement camps in and around Port-au-Prince or in coastal areas along the south-western peninsula of the country—where almost 90 per cent of the houses were destroyed and tens of thousands of people displaced (Government of Haiti, 2017; IOM, 2017) (see Figure 3).

Figure 3. People affected by Hurricane Matthew, by Department



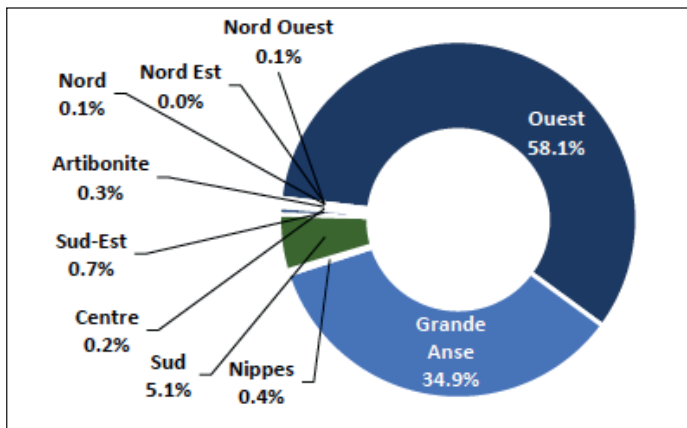
Source : United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)

The estimates released by the Haitian Government indicated that around 175,000 people were displaced by the hurricane; however, the total was likely much higher, as their numbers only accounted for the people located in 307 of the 711 evacuation centers that were setup across Haiti (Government of Haiti, 2017). There would have also been a significant group of people who evacuated to the homes of friends and family rather than to official evacuation centers and thus would not have been included in official estimates (IOM, 2017). As the evacuation centers—mainly schools and other government buildings—were not equipped for housing large populations for long periods, people had to return home or seek other forms of temporary shelter.

To better understand the movement of those displaced, in the weeks following the hurricane, staff from IOM were posted at transport hubs around Haiti where they interviewed 6,981 individuals about their intended travel plans. 58,1 per cent of interviewees indicated that they were moving towards the Ouest department, particularly to metropolitan areas like Port-au-Prince; 40.4 per cent to the southern peninsula

(Grande-Anse, Sud & Nippes); and, the rest towards the other regions (IOM, 2017) (see Figure 4). These trends resemble those observed in the post-earthquake migration patterns, calculated in 2010 (see Figure 1). This might suggest that displaced people have intended to seek shelter in one of the many legacy displacement camps located in the Ouest department (see Figure 2) or were seeking refuge with family and friends in the region. It is unlikely that the people who indicated they were moving towards the southern peninsula were intending to seek shelter with relatives, as it was the worst affected region. Instead, as suggested by IOM, these people may have been going to assist friends and family with recovery activities (IOM, 2017).

Figure 4. Post-hurricane movement patterns, by destination by department, after Hurricane Matthew



Source: IOM, 2017

Six months after Hurricane Matthew, using updated data and the Displacement Tracking Matrix—a monitoring tool used to track IDP populations in support of official emergency response and recovery efforts—IOM calculated that an increasing amount of people were moving away from the badly affected southern peninsula and towards the Ouest department (IOM, 2017). According to the data collected, this stock of people was predominantly moving from rural or remote areas towards the major urban communes of Delmas, Port-au-Prince, and Petion-Ville. IOM attributed this trend to the lack of support being provided to people in remote areas and the increasing need for people to secure either humanitarian assistance or employment, as the hurricane destroyed their crops and livelihood (IOM, 2017). However, due to existing housing shortages, these people likely ended up in one of the already overcrowded

evacuation shelters located in these communes—where 15,623 people remained displaced since the hurricane (IOM, 2017).

From the IDP data collected after the hurricane, it is difficult to distinguish between newly displaced people and those who had already been displaced before the hurricane, and thus difficult to determine the number of people in Haiti who were experiencing protracted displacement. Regardless, until the cause of this phenomenon is understood and addressed, thousands of Haitians are at risk of experiencing protracted displacement and its negative effects. To begin to understand the cause of protracted displacement in Haiti, requires an examination of the main challenges preventing Haitians from returning to or rebuilding their homes after being displaced.

Geographic Challenges

Due to its geographic position and topography, Haiti is susceptible to many natural hazards, including hurricanes, tropical storms, earthquakes, droughts, and landslides. Located between the Caribbean Sea and the North Atlantic Ocean, each year Haiti experiences the Atlantic Hurricane season, occurring June 1 to November 30, with an average of ten named hurricanes and tropical storms per annum (NASA, 2016). The heavy rainfall caused by tropical storms and hurricanes, results in several hazards for Haitians, including flooding and landslide. Flooding, due to the tropical storms and hurricanes is the most frequent hazard in Haiti, which, when combined with soil erosion, can result in damaging mudslides in mountainous areas and hillsides (Tieme Groen & Jacobs, 2012). The incidence of erosion in Haiti has been exacerbated by extensive deforestation, where only 3.6 per cent of the nation's land area was forested in 2011, compared to 40 per cent in 1940 (Than, 2010). This extensive deforestation has been the result of land clearing for cash crops as well as clear cutting for timber, which is a common and cheap source of energy (Than, 2010).

Almost half of the Haitian landmass consists of mountainous terrain, with two-fifths of the land above 400 meters in elevation and almost two-thirds of the land with a slope of more than 20 per cent (Howard, 1997). These conditions make hillside soil susceptible to landslide. Another cause of landslide in Haiti is seismic activity. The island of Hispaniola, shared by Haiti and the Dominican Republic, is located along the fault lines between the Caribbean and North American Plates, which experiences regular low scale seismic activity. Approximately twice a century,

the region will experience an earthquake that can cause large scale disaster, with the most notable events occurring in 1751, 1842, 1946, and 2010 (Tieme Groen & Jacobs, 2012). As with the other major earthquakes, the 2010 event caused a deadly tsunami with waves averaging three meters high inundating Haiti's coastline (ACAPS, 2016).

Each of these hazards poses a constant and serious threat of damaging or permanently destroying the property of Haitians who inhabit hillsides, valleys and coastal plains. This is why Haiti's long history of natural disasters has come at a great human as well as financial cost (ACAPS, 2016). Between 1990 and 2004 alone, Haiti suffered hundreds of millions of dollars of losses per annum, due to earthquake, wind, storm surge, tsunami, flooding and other damaging hazards (Prevention Web, 2014) (see Figure 5).

Figure 5. Average Annual Loss, by Hazard, between 1990 and 2004

Hazard	Absolute [Million US\$]	Capital stock [%]	GFCF [%]	Social exp [%]	Total Reserves [%]	Gross Savings [%]
Earthquake	119.53	0.423	0.000	32.525	6.887	6.196
Wind	46.65	0.144	0.000	11.061	2.342	2.107
Storm Surge	10.51	0.037	0.000	2.860	0.606	0.545
Tsunami	0.12	0.000	0.000	0.033	0.007	0.006
Flood	32.76	0.116	0.000	8.914	1.887	1.698
Multi-Hazard	203.57	0.720	0.000	55.392	11.729	10.552

Source : Prevention Web, 2014

Economic Challenges

Haiti is the poorest country in the Americas and one of the poorest in the world, with more than half of the Haitian population living under the national poverty line of USD 2.42 per day and a quarter living under the national 'extreme poverty' line of USD 1.23 per day (World Bank, 2017a). In 2016, the Gross Domestic Product (GDP) per capita in Haiti was USD 1,846, compared to the world average of USD 10,112 (World Bank, 2017a). In addition, Haiti has momentous inequalities in the distribution of income among its citizens, with a GINI coefficient of 60.8, where 0 represents absolute equality and a value of 100 absolute inequality (United Nations Development Program [UNDP], 2017).

These circumstances are likely to worsen, with Haiti's economic growth dipping to 1 per cent and the fiscal deficit widening in 2016 – due to an increase in public spending for post-Hurricane Matthew reconstruction and ongoing resource mobilization challenges (Government of Haiti, 2017; World Bank, 2017c). Internal revenues in 2016 reaching only 13 per cent of GDP, which can be partly attributed to Haiti's unique vulnerabilities as a small island developing State—having geographic limitations (remoteness and land restraints) as well as economic anomalies (smallness and a narrow resource and export base) (United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, 2013; World Bank, 2017c). It's relative isolation and small size also increases the costs associated with communication, energy, transportation, public administration and infrastructure development, and limits the opportunity to create economies of scale (United Nations, 2017).

When governments experience this level of hardship, they are unable to provide basic services, which, when combined with poverty and inequality, results in poor development outcomes. Haiti is ranked 163 out of 188 countries on the Human Development Index 2016, because its citizens were found to be experiencing a high level of deprivation in education, health and living standards (UNDP, 2017). Hardship also means that resources are scarce for activities like disaster preparedness and response—making people more vulnerable to the impacts of natural disasters.

Political Challenges

Since its independence in 1804, Haiti has experienced violence and oppression under a dictatorship; military coups; and, contested elections (Faubert, 2006). For these reasons, Haiti has long been considered a 'failed state'—unable to maintain control, perform basic functions, and provide basic public goods (Collier, 2008). This history of political instability continues to impact Haiti's overall development, as instability has been a deterrent to investors and certain aid agencies (Collier, 2008).

Although development partners have long worked with the Haitian Government to overcome its political challenges—through financial support, capacity building and coalition building—a lack of proper organization has resulted in disputes over funding and project ownership (Faubert, 2006). This was particularly true when the authorities were overwhelmed by the number of stakeholders offering their assistance after the 2010 earthquake (ACAPS, 2016). To overcome this challenge, the

Haiti Reconstruction Fund was formed by the government in partnership with the international community.

The aim of the fund was to coordinate funding and projects, in accordance with the recovery plan developed by the Haitian government (Government of Haiti, 2011). However, an external evaluation of the fund revealed that 80 per cent of funds were improperly allocated, in a way that ran counter to the government's recovery plan and the principles of the fund (Universalis, 2015). There was also lack of coordination between the government, the United Nations agencies, nongovernment organizations, state institutions and local authorities. This led to misinformation, delays in the provision of relief, the duplication of projects, and poor data collection (APACS, 2016). It also resulted in miscommunications that caused thousands of displaced people to move towards urban areas that were already overcrowded, in search of assistance and shelter that was not actually available (APACS, 2016).

Housing Challenges

Land and housing availability has been a longstanding challenge in Haiti, resulting in the unplanned formation of slums. According to the World Bank, 40 per cent of Haiti's population lives in urban areas - 75 per cent of whom live in overcrowded slums (World Bank, 2017b). This large slum population comprises the most poor and vulnerable people in Haiti, many of whom were previously displaced from their homes by a natural disaster and were then unable to secure housing (Government of Haiti, 2017). Slums have substandard living conditions and extremely high densities—making slum dwellers particularly vulnerable to natural disasters. According to the Global Report on Internal Displacement (GRID) 2016, “in Haiti, the establishment of overcrowded informal settlements and the authorities’ inability to enforce building and safety standards formed the backdrop to the mass displacement caused by the 2010 earthquake” (IDMC & NRC, 2016).

Poor or non-existence building standards as well as a deficit of licensed contractors, engineers and architects were blamed for causing mass displacement after the earthquake, as so many of the buildings in Haiti were unable to withstand the shocks (Levine, Bailey & Boyer, 2011). After the earthquake, the lack of standards was also problematic, causing donor agencies to be concerned about their reputational, legal and moral responsibilities should they fund low-quality houses, which resulted in funding delays of up to one year (Levine, *et al.*, 2011). Without adequate

funding, the construction that took place in the year following the earthquake was completed with cheap materials and without proper earthquake-proof standards. This provided much needed housing in the short-term; however, it will pose a long-term threat to the occupants of these buildings, in the instance of another earthquake (APACS, 2016).

Haiti's irregular and confusing laws and regulations pertaining to land tenure and land administration also caused concern amongst donors and resulted in significant reconstruction delays. This is because, prior to the earthquake, there was no proper land registry system and most land titles were passed down from one generation to the next, based on an oral agreement—making it difficult to definitively determine land ownership and therefore permit rebuilding activities (Levine, *et al.*, 2011). Aid agencies were concerned with the need to establish proof of land ownership before erecting structures, but with less than 5 per cent of Haiti's land officially accounted for in public land records, these agencies were forced to form ad-hoc agreements with landowners to proceed with building interim-displacement camps (Levine, *et al.*, 2011; Moloney, 2010). However, as these agreements were not supported by regulations, some disgruntled landowners evicted camp dwellers—with displaced people having no recourse under the law. An estimated 14,444 households were evicted from IDP camps between July 2010 and September 2016 (IOM, 2017).

In response to these challenges, the Haitian Government released a reconstruction and resettlement plan, titled *The Neighborhood Return and Housing Reconstruction Framework—A Recovery Plan for Haitian Families* (Government of Haiti, 2011). The plan outlined how the government would reform urban planning law, deliver more housing stock and fund reconstruction. It aimed to rebuild neighborhoods with safer housing and infrastructure, away from areas at high risk of future extreme weather events, and to relocate displaced Haitians into these new dwellings. However, the plan came with one core condition: reconstruction could not change the tenancy status of the households affected by the earthquake, “restor[ing] owners and renters to an equivalent status as before the earthquake, but in safer conditions” (Government of Haiti, 2011). This limiting condition had the adverse side effect of privileging wealthy landowners and excluding around 200,000 of the poorest citizens, who either did not own land or did not have the means of securing their unregistered land (Regan, 2011). The number of people excluded from receiving new homes under the plan was further reduced when funding ran out halfway through implementation, resulting in only 43,100 of the intended 111,240 homes being built and leaving thousands of displaced

people in camps (Regan, 2011). Without proper and swift reconstruction after the earthquake, Haiti's housing crisis worsened.

Future Challenges

In addition to the geographic, economic, political and housing challenges faced by Haiti, two new challenges threaten to worsen the problem of protracted displacement. The first challenge is the increasing influx of Haitians from the Dominican Republic. Between July 2015 and August 2016, at least 135,000 Dominicans of Haitian descent and Haitian migrant workers re-entered Haiti in a wave of deportations by the Government of the Dominican Republic (Human Rights Watch, 2016). This followed the government's enactment of a plan for regularizing foreigners in the Dominican Republic. Dominican authorities officially deported more than 27,000 people who did not meet the new standards; another 24,254 were deported without official mandate; and, many others fled to Haiti under pressure or threat of deportation (Human Rights Watch, 2016). According to the United Nations Office for the Coordination of Humanitarian Affairs, in January 2016, "[m]ore than 55,000 people, identified by IOM and the border network partners, were deported... which constitutes only a part of the populations deported or returned from the Dominican Republic to Haiti since June 2015" (United Nations Office for the Coordination of Humanitarian Affairs, 2016). In search of shelter and employment, these people will likely migrate towards urban centers, joining the already displaced people in slums and displacement camps, and entering a situation vulnerable to natural disaster and further displacement.

The second future challenge is climate change. The Intergovernmental Panel on Climate Change (IPCC) (Inter-Governmental Panel for Climate Change [IPCC], 2014a) stated that, "warming of the climate system is unequivocal" and "the existence or well-being of many small island states will be threatened by climate change over the next century." According to the Climate Change Vulnerability Index 2016 - an annual assessment of global vulnerability to climate change—Haiti is the fourth most vulnerable country in the world, and has been classified as having 'extreme' vulnerability, since the index's creation in 2011 (Verisk Maplecroft, 2017).

The IPCC and the Haitian Government have both indicated that Haiti is most seriously threatened by more severe hurricanes (greater wind speeds and rainfall), extended periods of drought and sea level rise, due to climate change (IPCC, 2013; Government of Haiti, 2017). Should

current trends continue, global sea levels are projected to rise to between 0.5 and 2.0 meters by the mid-twenty-first century (IPCC, 2013), which would pose a serious threat to the thousands of Haitians situated on or near low-lying areas, coastal areas and estuaries, which constitute 20 per cent of the nation's land area (IPCC, 2013; Tieme Groen & Jacobs, 2012). Low-lying environments in Haiti could also experience increased coastal erosion, flooding and saline intrusion, which would cause problems for infrastructure, water supply, human health and traditional livelihoods, such as fishing and agriculture (IPCC, 2014b). Consequently, climate change could result in the permanent displacement of large coastal populations, including much of the densely-populated Port-au-Prince.

Conclusion

During five major natural disasters in the last ten years an estimated 1.7 million people have been displaced in Haiti. Tens of thousands of these people have lived in overcrowded and underserviced displacement camps or slums for three or more years, as they have been unable to return to, rebuild or secure durable and permanent housing due to Haiti's geographic, economic and political challenges or because the urban planning and land tenure systems have failed them. Consequently, these people are in protracted displacement, and likely experiencing living conditions unfavourable to development.

Protracted displacement is both a symptom of and a contributor to Haiti's poor development outcomes: stagnant economic growth and political disorder prevent the government from providing suitable housing stock, a functioning urban planning framework and adequate disaster management—which leads to protracted displacement. People who have been displaced for an extended period are often unable to secure employment or attend school and thus are prevented from growing their personal wealth and contributing to the economy; they are often disconnected from their community and can cause instability and conflict or are not properly able to hold their political representatives to account—which can disrupt economic and social development.

It is therefore imperative that the Haitian Government and its development partners better prepare for climate change and natural disasters—to protect vulnerable communities from being displaced in the future. They also need to address the causes of protracted displacement and must improve Haiti's national capacity to deliver durable housing

solutions—acknowledging the prevalence of protracted displacement in Haiti, its relationship to climate change, and its role in development.

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Oceania

Relocation or Reconstruction?

Analysing population movements and reconstruction policies in Fiji Islands after the cyclone Winston

Christophe Picamilli

In June 2017, the first Ocean Conference organized by the United Nations took place in New York. Co-organized by Sweden and Fiji, this conference's objective was to encourage the implementation of Sustainable Development Goal 14, which supports the conservation and sustainable use of oceans, seas and marine resources. To prepare the conference, a meeting was organized in which the Fijian Minister of Fisheries mentioned the importance of oceans for island populations such as the Fijian community. In addition, he reminded the gravity of the tropical cyclone Winston, which hit Fiji one year before, and that his country was still recovering from the damage. This catastrophe acted as one more reminder that the frequency and the gravity of natural disasters have been steadily increasing in recent history, mainly because of climate change. Moreover, it showed how much South Asia and Oceania communities are vulnerable to extreme environmental events.

In February 2016, Fiji was hit by Cyclone Winston, the strongest in the country's history. Half of the population was directly impacted by this disaster (Hayes, 2017) and a total of 28,000 households needed emergency shelter assistance (IOM, 2016). In response to the cyclone, the Fijian government and the United Nations launched a USD 38.6 million emergency appeal. Shelter was defined as a priority, and important compensation measures were taken by the government.

Fiji is also characterized by a number of small islands, making emergency interventions and evacuation even more complicated. Facing climate change and rising sea levels, some communities even need to be relocated to improve their resilience to natural disasters. Accordingly, this study will study population movements in Fiji after the cyclone Winston. Patterns of evacuation and long-term displacement will be analyzed, as well as the consequences of this cyclone and the post-disaster policies. In addition, this study will try to compare relocation policies to emergency measures.

The first part will describe the cyclone and its damages, leading to important international assistance. Then, disaster management measures and evacuation patterns will be analyzed. To conclude, this study will focus on post-disaster policies and compare them to relocation policies, which were already in place before Winston hit Fiji.

Cyclone Winston and International Assistance

Winston began to develop in February 2016 before being classified as a category five cyclone on the Australian tropical cyclone scale—the highest level—and becoming the strongest in the South Pacific Basin recorded in history. On February 20th, it struck the two main islands of Fiji, Viti Levu and Vanua Levu, as well as numerous smaller islands (UNICEF, 2016), impacting immediately half of the population and up to 90 per cent by some estimates (UNICEF, 2016). Directly affecting 374 villages, 44 people died as a consequence of the disaster. Damaging at least 495 schools and 88 health facilities, the cyclone also disrupted basic public services and destroyed crops and livelihoods (Asian Development Bank, 2016). Among reconstruction issues, the disaster also raised concerns about water and sanitation.

The Republic of Fiji is an archipelago of more than 300 islands located in the South Pacific Ocean. Thus, the country and its population of 900,000 habitants are highly vulnerable to environmental disruptions and climate change. The geographic location and geological characteristics are the main cause of an important number of natural disasters. In addition, climate change is expected to increase their frequency and impact more, particularly for small islands with a higher risk of floods and rising sea levels. Tropical cyclones represent the main part of natural disasters impacting Fiji regularly (50%) but the country can also be hit by floods (33%) and earthquakes (8%) (Lal, Singh, & Holland, 2009). Relying strongly on its primary sector and tourism, the country's economy is highly sensitive to natural disasters. Moreover, its development strongly depends on international support and the government has limited capacity to invest in risk reduction services.

Aware of its need of international support, the Fijian government supports the Nansen Initiative which followed the launch of the Platform on Disaster Displacement. The objective of this platform is to help people displaced across borders because of natural disasters and natural change, to provide them protection and to establish an international legal framework concerning their situation. As one of the leaders of this initiative, the

government already provided land to the citizens of Kiribati and Tuvalu, threatened by sea level rise.

In consequence, the international and humanitarian community was asked to help and support the Fijian government after the tropical cyclone Winston. Even if it has developed a strong resilience to natural disasters, the country needed financial and logistic support. The UNOCHA (United Nations Office for the Coordination of Humanitarian Affairs) and the international community decided to appeal for USD 38.6 million to reach 350,000 people with life-saving assistance and protection (UNOCHA, 2016).

In addition, New Zealand and Australia were particularly active after the disaster. The Australian government provided USD 35 million as well as military support, including personnel and 60 tons of supply. These USD 35 million is broken down as:

- USD 5 million to provide lifesaving supplies;
- USD 10 million to help children return to school and prioritize vulnerable populations and;
- USD 20 million to assure long-term recovery and reconstruction (Australian Government, s.d.).

On the other hand, New Zealand launched a vast assistance operation. Between the disaster and April 2016, the government deployed 530 engineers, carpenters, electricians, plant operators and other technicians to help the country. In addition, they sent 570 tons of aid supply and more than 1,050 water containers.

International organizations also played an important role during the process. For example, the International Federation of Red Cross also provided assistance to the government thanks to the financial support of many countries such as the United States, China or the European Union. In addition, loans of USD 50 million were provided to Fiji by the Asian Development Bank and the World Bank. Thanks to all this help, the government was able to evacuate the population, implement emergency measures and launch reconstruction projects. Among the strategic objectives, two of them concerned displacement:

- providing emergency shelter for people whose houses have been partially damaged or destroyed;
- ensuring that people in evacuation centers and other temporary displacement sites have access to safe and secure spaces.

These measures concern about 113,000 people and are estimated to cost around USD 5.3 million. More than displacing people, they planned

to provide affected families emergency shelter such as tents or tarpaulins, and to provide information and education on safe building principles.

Surprisingly, most impacted communities were still undecided in June about whether they wanted to relocate or to stay in their villages after Winston, despite the risk and frequency of disasters. Out of the 374 affected villages, 169 are undecided, 197 wanted to continue living in the same village, 7 wanted to stay in their current living arrangement, and only one desired relocation itself (IOM, 2016). This desire can be explained by a deep attachment to their land, which is part of their culture and identity. The Fijian population is used to facing natural disasters and has built deep resilience to them. Relocation is not even seen as an option for most of them, especially older individuals. As a consequence, most of the rehabilitation projects only concern reconstruction. Before describing these projects, this study will focus on temporary displacement and patterns of evacuation.

Disaster Management and Displacements

Before the cyclone, many preparations were made by the Fijian government:

- it collaborated with the Fiji Red Cross Society and UNICEF to prepare 758 evacuation centers;
- the population was strongly advised to secure their homes, businesses and livestock;
- parents and guardians were urged to monitor their children's movement.

In order to take care of these measures, disaster managers were nominated. They were put in charge of the collection of names, birthdates, sex, home address and household or family affiliation of each disaster affected person, as well as sharing this information to disaster assistance providers (IOM, 2016). This task was appointed to traditional leaders (the Turaga Ni Ko) in 239 villages, while national and provincial representatives took care of it in 33 and 24 communities, respectively. In other communities, individuals or the armed forces were identified as disaster managers.

The following map shows the path Winston took when it hit Fiji. As previously mentioned, Vanua Levu and Viti Levu Islands appear to be the most impacted. This part will show Ra and the Lomaiviti provinces were the most affected, primarily because they are located on the direct cyclone road.

Figure 1. Cyclone Winston road



Source: European Union (EC-JRC)

As a consequence of Winston, the Fijian government declared a 30-day “state of natural disaster” and extended it until April 19th (ABC News, 2016). The extension, applying only to severely affected areas, allowed communities to continue receiving assistance and support from authorities and foreign services. The government also required the International Organization for Migration (IOM) to conduct tracking and monitoring to capture information about the evacuation. A survey was organised by the Displacement Tracking Matrix (DTM), which is a system by IOM, and 32 enumerators also trained by IOM.

According to this survey, more than 54,000 people were evacuated in response to the tropical cyclone (ABC News, 2016), the majority being relocated to 700 evacuation centers. Most of these evacuation centers were schools which resisted the cyclone. Other families were relocated to unofficial sites or remained with their relatives. As of February 24th, 35,000 people remained in 424 evacuation centers (UNOCHA, 2016), 46 per cent in the country’s western division and 41 per cent in the central division. By March 26th, 2016, only 26 evacuation centers were still recorded active by the government, sheltering 361 evacuees, as opposed to more than 700 immediately after the disaster.

First, these numbers should be taken with caution. Only people registered at evacuation centers were counted, so it is extremely difficult to estimate the number of people who were forced from their homes. Approximately 62,400 people were in fact forced to evacuate according to the Executive Director of UNICEF New Zealand (Holmes, 2016).

Then, it's important to explain the rapid decrease in the number of evacuees. Two reasons can explain this situation:

- a lack of assistance or supply in evacuation centers can incite people to leave them. If basic needs, like medical assistance, drinking water or hygiene products can't be satisfied, staying in these centers can become too difficult and people would rather be helped and housed by their families or relatives;
- it could appear that most houses are slightly damaged, hindering people's ability to return home quickly and safely.

As for Winston, the lack of supply explains why people rapidly left evacuation centers even if they were not able to return to their homes. Despite the importance of international assistance, the magnitude of the event slowed down the delivery and provoked rapid shortages in emergency supplies, and further funding was required (Holmes, 2016). In some centers, people had to wait at least two or three days until they arrived (Fox, 2016). As a consequence, even if evacuation centers closed, 38 per cent of the population in affected areas (i.e. 30,116 people), still remained unable to return to their homes in June 2016 (IOM, 2016). Among them, the situation of vulnerable groups such as women, children and disabled people was of particular concern, especially because of a lack of access to proper sanitation and drinking water.

Even if UNICEF, the Fiji Red Cross Society and the Government of Fiji worked together to prepare for emergencies, opening more than 700 evacuation centers and mobilizing emergency supplies (Goh, 2016), it seems the strength of the cyclone was underestimated. They didn't anticipate so many people would be affected and forced from their homes. In addition, transportation of supplies should have been made before the cyclone hit the country. Damages were indeed very important and prevented thousands of people from having access to basic supplies for many days.

The detailed numbers of affected people by province are shown in Table 1. In Lomaiviti province in particular, the proportion of people in comparison to the number of hit villages is striking, and can be explained by its location. Indeed, the province was located directly on the cyclone's path.

Table 1. Number of affected villages and individuals

Province Name	Number of affected villages	Number of affected people
Ra	84	9,925
Lomaiviti	44	6,499
Cakaudrove	90	5,087
Ba	59	3,436
Tailevu	40	2,339
Lau	15	1,186
Bua	24	1,123
Naitasiri	18	521
Total	374	30,116

Source: The Straits Times

While repair and reconstruction of the 13,448 destroyed or partially damaged houses was still ongoing, the population needed to make arrangements to find shelter. 6,803 people managed to stay in relatives' and neighbors' homes and in communal buildings (halls, religious facilities, schools) while 4,795 affected people stayed in make-shift shelters and 4,355 under tents and tarpaulins. This situation raised important concerns about sanitation and authorities feared disease outbreaks, mainly because only 40% of the USD 5.8 million requested to support the health and nutrition components of the response was committed in April (WHO, 2016). In terms of health and sanitation, the international assistance appeared insufficient or at least too slow to face these urgent challenges.

This situation also brought a lot of uncertainties in terms of relocation. According to the IOM, out of the 374 affected villages or communities, half of them remained undecided about their future and their post-cyclone situation months after the disaster. Even if they would stay vulnerable, 197 communities still wanted to go back to living in the same village while only one wanted to relocate and 7 wanted to stay in shelters.

As we mentioned before, the decision not to relocate can be explained by the attachment of people and inhabitants to their land. Relocation is seen as the least desirable solution, especially for older people, because the land is part of their culture and their identity (UNOCHA, 2014). In addition, Pacific Islanders are extremely resilient and very keen to rebuild their houses. Most of the time, instead of financial support, they even require material or tools for reconstruction.

But more than just attachment, this phenomenon can also be explained by a lack of insurance. In 2009, only 1 per cent of households and 12 per cent of businesses were insured (Narain, 2016). With the extreme level of poverty and the inability to buy a house or a terrain elsewhere, the only option left for recovery is reconstruction. Following the flood of 2012 in Nadi, improving access to insurance appeared as a recommendation to improve Fijian disaster risk management and population resilience. In October 2016, it appeared that the situation had slightly improved but 90 per cent of the population still remained without proper property insurance coverage (Consumer Council Of Fiji, 2016). Most of them are low-income families, who cannot afford or cannot meet the pre-requisites. Because of the complexity of this sector and high requirements, like security features or an engineer's certificate, it can become impossible to get full insurance coverage. In addition, most companies are not particularly interested in insuring low-income families, and do not provide adapted offers for them. Only one of them, the New India Assurance, provides the Housing Authority of Fiji a full cover for their mortgaged properties, including properties without valid engineer's certificate. Thus, without any insurance, the population mainly relies on the Fijian government, which does not have any choice but to step in and provide financial aid. As relocation possibilities are very costly, compensation for reconstruction appeared to be the only post-disaster measure rather than displacing populations. In the future, the Fijian government should improve and strongly facilitate access to property insurance to improve the resilience of their population to disasters. If not, most of the affected population will have no choice but to rebuild their houses and stay vulnerable to extreme events, which are more and more likely to happen.

Even if the government did not support migration after Winston, some displacements were identified as a consequence of the cyclone. It was already shown that disasters do not necessarily have negative impacts on the economy in the long run (Cavallo, Galiani, Noy, & Pantano, 2010) but they definitely have short-term economic impacts. The Fijian government published in May 2016 a post-disaster needs assessment. This report evaluates losses, estimating losses in the agricultural sector, which accounts for 45 per cent of total employment in the country, at FJD 542 million¹ (Esler, 2016). More specifically, this report mentions a decline in the sugarcane sector and urban migration of sugarcane farmers, which will probably be intensified by the cyclone damages. Damages and losses caused by Winston might worsen their situation and provoke more indirect

¹ USD 260 million.

migration. In order to avoid significant economic and social consequences, the government then put in place different policies and published a certain number of recovery needs (Esler, 2016).

Post-disasters Policies

After Winston, the Fijian government estimated total reconstruction would cost around FJD 2 billion (USD 1 billion). These costs include recovery, reconstruction and resilience for all sectors, such as social, productive or infrastructure sectors. Nevertheless, the country first identified reconstruction as a pre-requisite to recovery, deciding to focus primarily on public infrastructure and construction. Indeed, infrastructure, such as roads or airports, are key factors to the country's economy. Accordingly, they were identified as one of the priorities because they provide economic and social services to affected populations and facilitate movement. In particular, they allow the country to receive international assistance and the population to access economic opportunities. For example, the livelihoods of sugarcane farmers were impacted because of the three-week disconnection between Lautoka and Rakiraki.

Fortunately, airports and ports were only lightly damaged, which allowed the humanitarian supplies to be received. The Nadi, Taveuni and Savusavu airports were affected but most of the damages were only debris on the runways which needed to be cleared. As for ports, they only suffered minor damages. Most of losses in the transport sector were recorded in the land subsector. Debris on roads and bridge washouts caused significant losses to land transport and longer travel times for the population.

As a consequence, the government decided to repair bridges and crossings with higher and longer spans, and appropriate retaining structures to prevent washouts and withstand floods in the future. Seawalls also needed to be repaired with stronger foundations to fight coastal erosion.

Another issue we mentioned and raised after the disaster was the lack of insurance. As a response to individuals' losses, the government had no choice but to provide economic assistance to the affected communities. The country decided to fund partially damaged houses through the Government of Fiji Help for Homes Initiative (IOM, 2016). Out of the 7,214 concerned houses, 2,025 households received the FJD 1,500 Government of Fiji hardware assistance and 1,476 received the FJD 3000 Government of Fiji hardware assistance.

More than financial help, people also required the following items for reconstruction:

- material, including special material to build stronger houses;
- labour support to build houses;
- land clearing for relocation (in Koro and similarly affected areas).

Instead of relocating people, the Fijian government launched several rebuilding programs which were considered as the only option after Winston. As an example, the Building Back Safer program is planning to build cyclone-resistant houses. Currently, 50 houses are under construction. This initiative is funded by the European Union's Humanitarian aid budget and implemented by the International Federation of Red Cross and Red Crescent Societies (IFRC), in line with the Fijian Government's "Build Back Better" (Qalubau, 2016). On Koro, one of the worst-hit islands during the cyclone, Fiji Red Cross has spent the last months helping the community to recover, building demonstration houses and training twelve carpenters in how to build safer and stronger shelters (Nasedra & Ambler, 2017).

In addition, the Building Back Safer training program funded by the Australian and New Zealand governments was launched in November 2016 (The Sun, 2016). Implemented by Habitat for Humanity Fiji, the project will take place in 100 locations around the Fijian islands. 'Building Back Better' is indeed one of the priorities of the Sendai Framework we mentioned before for Disaster Risk Reduction 2015-2030 (UNISDR, 2015). Published in 2015 and adopted by Fiji, this framework is one of the major agreements in the development agenda. Concerning migration and displacements, it requires several actions, which are:

- reducing disaster risk, including displacement risk;
- ensuring quick reaction to disasters and related displacements;
- incorporating disaster risk management, in particular in terms of temporary resettlements.

In addition, this framework uses three terms in regards to population movement: displacement, evacuation and relocation. The three of them are not interchangeable; as it mentioned by Michelle Yonetani (Yonetani, 2017), displaced people are people who have had to leave their place of residence for several reasons or circumstances. Relocation and evacuation are two different forms of displacement, the latter being the emergency movement of population in response to the immediate threat or impact of a disaster. On the other hand, relocation is perceived as a process of resettling people in alternative locations.

When it comes to Winston, evacuation was the primary response. Indeed, it is impossible to implement relocation in a state of emergency since it is a long and costly process. In the case of extreme events, only evacuation is considered in terms of displacement, mainly during the reconstruction and repair of damages.

More than evacuating and relocating the affected populations, it is also necessary to displace impacted infrastructure and installations to provide basic services such as drinking water. The priority of the government was then to rehabilitate these services, while sheltering the impacted population. After Winston, the spread of diseases such as Zika or dengue was an important source of concern and required a lot of attention on drinking water and sanitation. Fortunately, Winston did not seem to have any negative impact on the spread of dengue fever. However, many cases of typhoid fever were reported (Herriman, 2016). To tackle this issue, organizations such as the Fiji Red Cross Society distributed pamphlets and conducted awareness campaigns about infectious diseases. They also tested toddlers for malnutrition and distributed insecticide-treated mosquito nets to households with vulnerable individuals, such as young children or pregnant women.

After analyzing some of the post-disaster measures the Fijian government and non-governmental organizations implemented in response to Winston, this study will now compare them to relocation policies already in place.

Comparison to Relocation Policies

In opposition to temporary sheltering and reconstruction, Fiji has also developed strong relocation policies in order to reduce their population's vulnerability to environmental events. In 2014, the country even became the first in the Pacific to relocate communities in order to adapt to climate change and increase resilience to severe weather patterns such as the cyclone Winston (UNOCHA, 2014). With the relocation of the Vunidogoloa village in January 2014, Fiji became a world leader in resilience policies (Narain, 2016). This measure took decades to be implemented but now is considered a necessity for the country. Then, the government identified and decided to relocate 63 villages in total, according to sources (Radio New Zealand, 2016) (Swami, 2016). Even if the process of relocation can be highly complex, these villages are considered too vulnerable and it is necessary to ensure risk reduction, while also providing stability and long-term economic and social development. However, we will see with the first example

of Vunidogoloa and the case of the Narikoso village how difficult this process can be and why it cannot be used as a post-disaster measure.

The Vunidogoloa village is located along the shoreline of Vanua Levu Island, the second largest of the country. Facing rising sea levels for more than twenty years, it was the first community to be relocated in Fiji, and one of the first in the world. In 2007, the village leader asked for help from the national government, leading to a seven-year process, and the last new house was finished when the entire community decided to move to the new village in January 2014. The main difficulty was to convince people to leave their homeland which they associate with their heritage and identities. At first, people only slept in the new village and went back to the old village every day before starting to adapt to the new village. To help the process, the Pacific Conference of Churches (PCC) has been working with the government and regional organizations to deal with losses. For example, the cemetery was relocated to avoid any personal trauma and feelings of loss.

This strong attachment to their land and their community was one of the main complexities of the process. Even when relocation is a necessity and must be an absolute priority (UNOCHA, 2014), this first example shows the difficulty in implementing these measures and how time consuming it can be. After decades of reflection and seven years of procedure, the community now lives in better conditions, without having to worry about the weather every day. The new village has solar lighting thanks to an UN-Women-funded program on solar engineering at Barefoot College in India, which was completed by one of the grandmothers, Somica, and made her able to bring home new skills and technical equipment (such as a power inverter). Moreover, the government adopted an integrated strategy and helped to relocate professional activities such as fisheries and agriculture, providing them with fish ponds and pineapple seeds.

With the example of the Narikoso village, Sharneel Narain also shows the complexity of this process. Due to rising sea levels, seawalls were first built in this village but they didn't prove effective, leaving relocation as the only solution against flooding. In his paper, Narain mentions the new site was not appropriate and presented problems such as soil erosion and landslides. Thus, it characterizes another difficulty in relocation: the difficulty in selecting the location of new village and the importance of this selection. If this issue is not addressed correctly, populations can be displaced in vulnerable zones where risk can be even more important. In addition, the availability of land can be problematic and was one of the key elements of the success of the Vunidogoloa scheme (McNamara &

Des Combes, 2015). Indeed, the village was relocated within its boundaries, avoiding protocols and discussions with another community which could have led to conflicts or to some kind of compensation.

In May 2015, the Fijian government shared a list of “do’s and don’ts” learned from the Narikoso experience at the annual Pacific Climate Change Roundtable (PCCR) (Secretariat of the Pacific Regional Environment Programme, 2015). First, they mentioned relocation should remain as a last resort option because of the high cost of this operation. Among many requirements, the government described community engagement as one of the keys to the process. Indeed, the decision to involve civil society, churches and traditional leaders has proven particularly effective and led to community acceptance and support.

However, the government cannot support relocation only by itself. Beyond the complexity, this process was highly costly and the government could not support the relocation of all 63 villages it identified. Once more, support from intergovernmental and non-governmental organizations is required in order to increase their resilience to climate change.

Despite the difficulties they encountered, these projects have highlighted key ingredients, which can be very useful in future projects (Secretariat of the Pacific Regional Environment Programme, 2015):

- the decision-making (where, how, when) process of relocation must be left to communities;
- resource and human support;
- inter-agency technical and financial support;
- the availability of land (if the community cannot relocate within their customary land boundaries).

To conclude, even if relocation appears like one of the possibilities to increase resilience against natural disasters, the process is far too complex, costly and time consuming to be implemented as a recovery measure. The state of emergency characterized by the gravity of an event like Winston forces the government and the population to go back to live in the same place after recovery. In this situation, relocation is neither an option, nor a realistic possibility.

This situation can be seen as a paradox because planned relocation would be the most effective policy to increase resilience and avoid trauma like we have seen with the cyclone Winston. In 2014, the UN Refugee Agency even wrote a report about good practices for planned relocation and explained it could be a preventative strategy to reduce exposure to

disasters (UNHCR, 2014). However, it's too expensive for the Government of Fiji only and international assistance comes only in case of emergency.

Conclusion

Winston had serious consequences and provoked important damages. Despite the importance of international assistance, thousands of people lived during months in make-shift shelters or under tents and tarpaulins, raising sanitation issues. As a consequence, many reconstruction programs were launched and allowed a part of the population to receive assistance to rebuild more resistant houses. However, these measures are costly and the government relies strongly on international assistance.

Indeed, the lack of insurance and the extreme poverty of the population remain concerning issues and should be a priority for the government. Without any insurance, the probability of people rebuilding houses unable to resist extreme events remains too high. Facing climate change, the country has understood it will face more and more disasters such as Winston and does not have the financial resources to step in and provide public assistance. Now, the government should understand that economic consequences would be avoided and it would not have to provide so much public assistance if insurance companies were more involved in the process of reconstruction. Improvements were made in the past few years but they need to be much more significant. Recently, Hurricane Harvey also showed the importance of insurance systems (The Economist, 2017).

More than reconstruction, this study analyzed relocation issues. It first showed Pacific Islanders are strongly attached to their lands. Despite tropical cyclone Winston causing significant damages and trauma, the Fijian population did not express any need to migrate or relocate. Over the years, the population has developed a strong resilience to extreme weather events and is very keen to engage in reconstruction after natural disasters. Even if they had to stay and live in temporary shelters, affected communities expressed the desire to come back to live on their lands. In addition, the Fijian government, and Oceania communities in general, have developed a strong leadership in post-disaster management thanks to the international community, and the government implemented efficient evacuation measures, which actively involve civil society.

However, it's important the Government of Fiji raises awareness about planned relocation because the situation is becoming very concerning, not only for Fiji but for many Pacific islands. Even if it rarely can be

implemented as a recovery measure, extreme events are more and more likely to happen and Fijian communities are currently too vulnerable. Facing climate change and sea level rise, relocation appears to be the only long-term solution and would improve their resilience. The example of the Vunidogoloa village even showed that the population finally begins to understand the necessity to relocation and the advantages it can bring to its development, and made Fiji “one of the first nations to have guidelines to address the issue” (Edwards, 2016).

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West Africa

Forest Conservation and Forced Relocation in Côte D'Ivoire

The eviction of cocoa farmers from Mont Péko National Park

Lavinia Giulia Pomarico

Human displacement as a means of conserving biodiversity is not exactly a new phenomenon, especially when considering the environmental history of sub-Saharan Africa. Originating from colonial powers in the early twentieth century, the imperial idea of the conservation of nature was strictly utilitarian. The primary aims of conservation were to ensure that wildlife would be preserved to a sufficient degree to guarantee a sustainable stock of game for trophy hunting purposes, and to facilitate the exploitation of natural resources for the economic benefit of the colonial power (King, 2010, p. 2). To achieve these purposes, the core belief—which still persists today—was that a total separation between humans and nature is required in order to properly manage and protect the latter. The creation of national parks in Africa, like elsewhere in the world, therefore directly translated into the imposed eviction of natives by colonial administrations. Indigenous people were permanently displaced from their homes and often lost their only sources of livelihood security (King, 2010, p. 2).

After decolonization, particularly in the age of rising climate change, conserving biodiversity has gradually become a priority on national agendas. Many newly independent African countries—such as Cote d'Ivoire—built and expanded their national laws on biodiversity conservation on existing colonial foundations. They maintained and expanded protected areas and national parks in an effort to preserve their biological diversity and natural resources, systematically keeping people outside or displacing them definitively from their lands. As Agrawal and Redford point out, conservation-induced displacement has historically involved the “less powerful, politically marginalized, and poor” people who depend most heavily on the ecosystem they live in for survival and subsistence (Agrawal & Redford, 2009). These people usually face various risks when forced to evacuate a protected area such as landlessness, joblessness, homelessness, marginalization, increased mortality, food insecurity, loss of access

to common property resources, and social disarticulation, as identified by Michael Cernea in his Impoverishment Risks and Reconstruction (IRR) Model (Cernea & Schmidt-Soltau, 2003, p. 2). Such dire consequences spark important debates on the implications in terms of human rights and international law of forcing people out of their homes and off their land; on whether the way in which this process is conducted is justified by the imperative need to conserve the environment and biodiversity through the establishment and proper management of protected areas; and on whether such practice is effective in the long run in achieving environmental goals (Schmidt-Soltau & Brockington, 2007). With these points in mind, this research paper examines a peculiar case study of conservation-induced displacement and planned resettlement of over 25,500 people from the Mont Péko National Park in Cote d'Ivoire in July 2016.

Map 1. Mont Péko National Park, western Cote d'Ivoire



Source: Google Maps, 2017

Considered a pivotal “biodiversity hotspot” in the region, Cote d'Ivoire is today on the brink of a true ecological disaster. After more than a decade of political turmoil and civil conflict, Cote d'Ivoire's classified forest cover has been mercilessly destroyed, exploited and depleted, alarming conservationists both in the country and internationally, leading to calls for better protection of forests due to their global importance for biodiversity and to concerns related to climate change (UNEP, 2015, p. 9). According

to the United Nations Environment Program (UNEP), most forest destruction within Cote d'Ivoire is due to the illegal settlement of cocoa farmers within protected areas, who took advantage of the political instability of the country over the past two decades and dismantled forest cover to set up cocoa plantations. These environmental and ecological concerns have pushed current President Alassane Ouattara and the Government of Cote d'Ivoire to commit to strong measures to better protect and regenerate national forests to account for at least 20% of national territory, primarily through the eviction and planned relocation of illegal farmers settled within the boundaries of protected areas (Wormington, 2016).

In July 2016, the Government issued an emergency plan to evict roughly 25,500 illegal settlers from Mont Péko National Park, situated in western Cote d'Ivoire. The main aim of the operation was to put an end to illegal farming of cocoa and ensure better protection of tree, elephant and primate species, among others (BBC News, 2016). The Council monitoring the operation, managed by the Minister of Solidarity, Women and Child Protection (*Ministre de la Solidarité, la Femme et la Protection de l'Enfant*), Mariatou Koné, deemed the operation a success for ridding the forest of the illegal cocoa farmers and relocating them in neighbouring villages (Abidjan.net, 2017). Reports from the field, however, indicate a more complex scenario. Some resettled farmers, as well as local NGOs, have denounced a lack of appropriate methods, assistance and compensation, thus infringing on the human rights of the thousands of evicted farmers.

In light of this, this paper aims to disentangle the causes for the massive scale of forest depletion in Cote d'Ivoire since the colonial period, examine the socio-political and economic context which explains the push for and influx of migrants to settle in protected areas in the first place, and finally assess the success of the relocation program and emergency evacuation of the Mont Péko National Park, the biggest protected area in the western region of Cote d'Ivoire. Such a degree of success is analysed in terms of biodiversity conservation on the one hand, and the protection of the human rights of the evicted farmers by the Cote d'Ivoire Government and the Ministries responsible for the operation, on the other.

Conservation-induced Displacement in Context: Cote D'Ivoire

Before focusing specifically on the relocation program of Mont Péko, it is necessary to understand the rationale behind the urgency for

environmental action to halt deforestation and consolidate biodiversity conservation in Cote d'Ivoire, as well as the economic importance of the cocoa industry, which has acted as a strong incentive for farmers to settle in protected areas of the country. This has been enabled partly by general institutional weakness in environmental management, further exacerbated by the decade of political tension and civil conflict which has left the country in disarray since the early 2000s. The following subsections focus on a) the importance of Cote d'Ivoire from a biodiversity perspective; b) the economic importance of cocoa production in Cote d'Ivoire; and c) the civil conflict which has exacerbated environmental issues and enabled illegal settlements in protected areas.

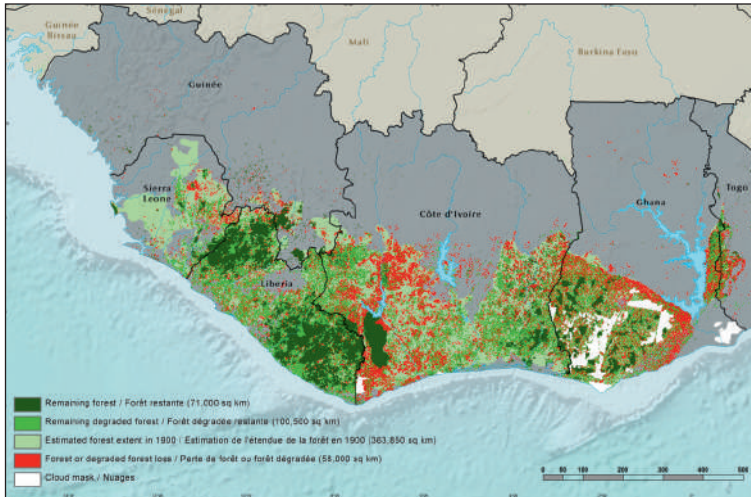
A Biodiversity Hotspot

Cote d'Ivoire is geographically located in West Africa, at the heart of the Upper Guinea Forest (UGF) Region, extending from Guinea to Togo (EROS, 2017), an ecosystem known as a biodiversity hotspot for its concentration of endemic species of fauna (particularly for its high diversity of mammal species), and flora (Koné, 2013, p. 26). This area's high biodiversity and dense forest cover ecosystems have been deemed essential by the international community for global climate control (UNEP, 2015, p. 24). The country includes eight national parks, six wildlife reserves and sixteen botanical reserves, most of which were established under French colonial control. These are meant to include all ecosystems found in the region, and amount to roughly 7% of the national territory (Koné, 2013, p. 26-27).

For this reason, the country has been heavily involved in international negotiations relating to biodiversity and global climate change. In 1994, Cote d'Ivoire became a member state to the Convention on Biological Diversity (CBD), committing to conserve its ecosystems and species diversity through the development of a National Plan on Conservation, adopted in 2002, aiming for the sustainable conservation of biodiversity through protected areas, ex-situ conservation of genetic resources, the efficient management of resources to preserve ecosystems and people's "indispensable resource needs", among other things (Hahn, 2012, pp. 15-18). A wide range of conservation laws developed under French colonial rule and then expanded post-independence have also enabled the creation and establishment of 32,246,000 hectares of protected areas across the country (about 17% of the total territory), with eight national parks and 147 classified forests (Hahn, 2012, p. 27). Mont Péko, one of Cote

d'Ivoire's eight parks designated since 1968 (RAIDH, 2016, p. 2) and the largest in the western region of the country (340km²), is a mountain forest ecosystem, and one of the richest in biodiversity within the UGF region (Koné, 2013, p. 27). It is home to endemic species of trees like Iroko and Samba, as well as elephant and ape species (BBC News, 2016).

Map 2. Map showing forest loss in the Upper Guinean Forest Region 1975-2013



Source: EROS, 2017

Cote d'Ivoire's forests, especially those found in western Cote d'Ivoire like Mont Péko, are of particular importance in the field of conservation as they provide local benefits in the form of natural resources as well as a serving as a key climate regulator globally, as mentioned above (UNEP, 2015, p. 54). These resources have, however, been under significant pressure for as long as a century. According to UNEP data, the total forest cover of Cote d'Ivoire dropped from 16 hectares in 1900 to six million hectares in 2000, mainly due to timber exploitation and agricultural practices, population growth and poverty (UNEP, 2015, p. 22). In the past twenty years, however, these forests have suffered unprecedented depletion as an indirect result of the extensive political unrest suffered by the country. According to the *Société de Développement des Forêts* (SODEFOR), about a million people have taken the opportunity to encroach on and establish agricultural plantations within the protected forests. By 2010, only three million hectares of forests remained intact (IRIN, 2013). Prior to the COP21 held in Paris in December 2015, the Government of Cote d'Ivoire publicly announced its intention to evict

protected area encroachers as part of an effort to restore forest coverage to 20% of Cote d'Ivoire's national territory and to combat climate change (HRW, 2016). The focus on Mont Péko National Park sparked in 2016 from concerns over its relevance in relation to biodiversity and forest cover, and the rising number of illegal farmers destroying the forest to plant cocoa crops.

Biodiversity and forest conservation in particular are managed by a number of Ministries and governmental agencies. The Ministry of Environment, Urban Sanitation and Sustainable Development (MINESUDD) is the primary institution dealing with environmental matters. National Parks, like Mont Péko, are managed primarily by the Ivorian Office of Parks and Reserves (OIPR), as SODEFOR is dedicated particularly to forests and their management, conservation and regeneration. In the case of Mont Péko, however, other Ministries have become involved in the eviction operations: Mariatou Koné, Minister of Solidarity, has been appointed as primary supervisor of the evacuation plan (Kra, 2016, pp. 33-34).

Institutional weakness, lack of synergy between laws on conservation and among agencies, as well as the general mismanagement of protected areas have been pointed out by many as the main reasons why forest depletion has occurred at such a devastating rate. According to Koné, Ivorian conservation laws, most of which were drawn up in the 1950s, are outdated and inadequate, and translate into ineffective management of the environment by government agencies. Institutions often lack funds, technical means and the necessary human personnel (Koné, 2013, p. 30). According to UNEP, SODEFOR has for instance been unable to impede illegal agricultural practices and the poaching of fauna within forests as it lacks the funding and personnel to properly address the crisis (UNEP, 2015, p. 66). As the mandates of many agencies also overlap, the institutional networks seems somewhat disorganized to address the magnitude of the environmental risks Cote d'Ivoire is facing, (Koné, 2013, p. 28) particularly those related to human encroachment in protected areas like the 25,500 farmers in Mont Péko.

To better understand the patterns of deforestation in Cote d'Ivoire as a whole, and the difficulties linked to the relocation of such high number of migrants from national parks and forests, it is first essential to understand their rationale for migrating into protected areas in the first place, which is mainly grounded in socio-economic and political reasons. The following section concentrates on the cocoa industry in Cote d'Ivoire and the economic rationale for the cocoa plantations which have destroyed most of Mont Péko's classified forest.

The Cocoa Industry, Illegal Farming and Migration Patterns since Independence

Cote d'Ivoire is the second largest economy in West Africa, only topped by Nigeria. It relies mostly on agricultural cash crops, and 85% of activities occur in the southern regions of the country (UNEP, 2015, p. 26). Cote d'Ivoire is today responsible for 40% of global cocoa production (Ruf, Schroth & Doffangui, 2014, p. 101). As Mitchell argues, "Cote d'Ivoire's fortunes and misfortunes have been closely connected to the rise and fall of its cocoa sector" (2011, p. 127). The rise of cocoa as the most important source of economic revenue in Cote d'Ivoire, and of the nation as largest cocoa producer in the world began with colonization. During that time, colonial powers encouraged labour migration to the South of the country to develop the cocoa sector (Mitchell, 2011, p. 127). After independence, in 1958, the first President of Cote d'Ivoire Félix Houphouët-Boigny focused on intensifying the primary sector, particularly the production and export of cocoa, under the slogan: "the land belongs to those who make it produce" (Woods, 2013, p. 645).

Cocoa farming has without a doubt been, since then, one of the major drivers of biodiversity loss and deforestation in Cote d'Ivoire and its national parks. As cocoa plantations have the characteristic of decreasing in productivity over time, farmers have been prompted to engage in migration to enhance productivity and to set up in virgin territory to grow new cocoa crops ((Ruf, Schroth & Doffangui, 2014, p. 102). In the middle of the last century the Government authorized plantations in protected areas relatively easily, channelling such revenue towards infrastructure construction (Woods, 2013, p. 646). From the 1960s, the weak laws on forest protection drew a higher influx of immigrants from neighbouring countries, particularly Burkina Faso, as well as from the savannah regions of Cote d'Ivoire, who settled in the forests and exploited the land (Woods, 2013, p. 648). By the 1980s, commodity prices had dropped hitting the Ivorian cocoa market and revenues for the state and producers hard. This triggered an intensification in cocoa production and an expansion of plantations to bridge the price gap, which eventually contributed to the gradual migration into and the agricultural use of protected forests (Woods, 2013, p. 648).

The high economic incentive of cocoa production still encourages the illegal settlement of farmers in Cote d'Ivoire's protected areas. In a study on primate extirpation in Cote d'Ivoire's protected areas, Bitty *et al.* estimate that any protected area in Cote d'Ivoire is now 10% or more occupied

by illegal plantations. In seven of the protected areas studied, including Mont Péko, the park or reserve has been fully converted into illegal agricultural settlements. Cocoa plantations amount to 93% of the total illegal plantations surveyed in the study (Bitty *et al.*, 2015, p. 96). Along with timber exports and other agricultural produce, the cocoa market has been the most powerful driver of deforestation in Cote d'Ivoire, as evidenced by the case of Mont Péko National Park. The situation has been further exacerbated in recent years as a consequence of political turmoil and civil conflict between 2002 and 2011, as confirmed by an interviewed farmer: "I decided to farm in the protected forest to live better, because I did not want to be a robber or a beggar or a thief." (BBC News, 2016).

Socio-political Tensions, Conflict and Forest Erosion

In the 1990s, with the first multiparty elections, the solidification of the *Ivoirité* discourse and rising tensions over land rights between migrant and native populations "politicized" the issues of land tenure, migration and autochthony. A new law on Ivorian citizenship and rights passed in 1994 arguably "disenfranchised nearly two million Burkinabe (and other migrants), as a strategic move to exclude Alassane Ouattara—a Muslim with alleged Burkinabe origins and political support from northerners—from the upcoming elections in 1995" (Mitchell, 2011, p. 127). This significantly contributed to a rise in tensions, xenophobia within the country and the outbreak of conflict during the first decade of the twenty-first century (Mitchell, 2011, p. 127). With the military coup of 2002, the country fell into a full decade of conflict and failed peace negotiations. When in 2010 a democratic election was held and Ouattara was elected president, former president Laurent Gbagbo refused to cede power, resulting in a revival of violence (UNEP, 2015, p. 8).

The two civil wars of Cote d'Ivoire hit Ivorian biodiversity, and especially its forests, very badly. Especially in the south-eastern provinces of Cote d'Ivoire, National Parks were highly affected and forests were deeply degraded. Due to the weakening of institutions and the chaos provoked by violence, militants were able to infiltrate and settle in protected areas, along with other migrant farmers who took advantage of the political turmoil to enhance their livelihoods exploiting the forest rent (UNEP, 2015, pp. 9-11). According to the UNEP Post-Conflict Environmental Assessment published in 2015, the number of families settled within protected areas rose from 90,615 in 2002 to 229,560 in 2012 (UNEP, 2015, p. 62). Most infamously, Mont Péko became home to Burkinabe and pro-Ouattara

militant leader Amadé Oueremi, who seized and governed the territory until his capture on 18th May 2013 (Kra, 2016, p. 1). Following his capture, the Government of Cote d'Ivoire initiated its "*politique de déguerpissement*" ("eviction policy") on the 9th July 2013, aiming to free the National Park of all encroached farmers, mostly of Burkinabe origin, and restore the sustainable conservation of the Park's biodiversity (Kra, 2016, p. 3).

As mentioned above, Cote d'Ivoire faces a massive dilemma: "can it foster conservation while avoiding social unrest and preserving the country's position as the world's top cocoa grower?" (Aboa, 2016) Is peaceful relocation possible without eroding too extensively the livelihoods of the people involved? The case of the relocation of over 25,500 farmers from Mont Péko in July 2016 offers interesting insight in the search for answers to these questions.

Mont Péko: Successful Relocation or Human Rights Violation?

Displacement has for decades been included in the biodiversity conservation and forestry policy agenda in Cote d'Ivoire. As Cernea and Schmidt-Soltau point out, during the 1990s the Government of Cote d'Ivoire submitted a plan to the World Bank for the "sustainable commercial exploitation of the forest", which included the displacement of more than 200,000 people, which was rejected and revised by the Bank to substantially reduce the number of displaced, provide the appropriate assistance and sound conditions for resettlement, and integrate the evicted into forest management plans. Cote d'Ivoire, despite never having adopted a formal policy on resettlement, ended up giving up on its initial displacement projects due to the World Bank's legal opposition (Cernea & Shmidt-Soltau, 2003, p. 5). Shortly afterwards, the country fell into a political crisis which, as outlined above, would not be fully settled until 2011.

With the rising pressures of environmental degradation and climate change, and the stabilizing security environment in Cote d'Ivoire, it became imperative to address the biodiversity and forest crisis occurring particularly in the western region of the country. After the second civil war was brought to an end and President Ouattara formally began his mandate, the institutions and agencies in charge of forest conservation and protected areas in the country sought to regain control particularly of the National Parks, which had endured a decade of heavy degradation

due to conflict, political turmoil and illegal agricultural activity. The main policy adopted has again been the displacement and resettlement of people residing inside protected areas.

In 2016, the Government finalized an operation of eviction from the largest National Park in western Cote d'Ivoire, Mont Péko National Park, a mountain forest park which has lost 95% of its original forest cover and much of its fauna as a consequence of conflict and illegal farming activities (BBC, 2016). The following sections analyze the planning, the process, and the aftermath of the eviction and relocation process of 25,500 people from Mont Péko.

The Planning for the Eviction and Relocation of Illegal Farmers from Mont Péko

Most importantly due to its relevance during the months of conflict in serving as a hub for militants, the alarming environmental situation of Mont Péko pushed the Government to take urgent action and issue, on the 9th July 2013, a plan for the eviction of approximately 25,500 farmers. Most of the farmers had cut down Mont Péko's trees to plant cocoa crops, their only means of livelihood. The majority of these farmers had also migrated from Burkina Faso or had Burkinabe origins, and had largely settled illegally in the National Park during the years of conflict. These illegal farmers were producing around 10 thousand tons of cocoa each year (France 24, 2016), worth a net US\$ 28 million (Africa News, 2016), and engaging in illegal trade (Kra, 2016, p. 3). The cocoa plantations have seriously damaged and depleted Mont Péko's forests, and wildlife biodiversity and density have also suffered consistently from the presence of people in the park (Al Jazeera, 2016).

In May 2012, according to Human Rights Watch, an inter-ministerial policy directive was issued to the illegal residents of parks to leave voluntarily or be evicted, even though they were given a specific time frame to do so (HRW, 2016). The Government's approach to eviction was from the start rather aggressive. In February 2013 the Minister of Water and Forests Matthieu Babaud Darret stated that, "the time for awareness-raising has passed. We are to move now to repression" (HRW, 2016). This was received with hostility by the illegal farmers, often quite vulnerable individuals living in precarious conditions of subsistence, as this testimony from a farmer in Mont Péko highlights: "the government has in many occasions asked us to move out of here, but I can't. How else would I feed my children?" Others had simply established themselves in the park

Image 1. K. Ouattara, an OPIR agents responsible for Mont Péko, stands in a destroyed village during an eviction operation of illegal farmers inside the Mont Peko National Park, August 2, 2016



© Reuters/Luc Gnago

so many years ago that they had no other place to go, and felt deeply attached to the land and forest, and considered it their home: *"We've been told we cannot go (...) anymore. Places where we used to live, where we were born"* (Al Jazeera, 2016).

Plans for eviction in Mont Péko did not start until mid 2013. In light of the newly amicable relations between Cote d'Ivoire and Burkina Faso, and the ethnic majority of people occupying Mont Péko, plans were made in 2014 to set up a mixed Ivorian-Burkinabe committee and inter-ministerial committee to plan the eviction and assisted relocation of the 25,500 infiltrated farmers into the villages neighbouring the National Park. In January 2014 the Ministry of Solidarity issued a first proposal for the evacuation plan and the resettlement of the populations into selected villages around the park (RAIDH, 2016, p. 2). Yet these plans were pushed back until early July 2016, when the Government issued an emergency eviction directive under which all inhabitants of Mont Péko would be forced to leave the park, their homes and crops and be denied access starting from the 30th July 2016. Evictions were to be carried out and coordinated by SODEFOR and OIPR guards, as explained later by K. Ouattara, a Mont Péko Park Service Agent:

Since 30th of July they [the farmers] have been banned from entering the Park. And it is strictly forbidden to harvest

anything at all. If we catch them we will arrest them and charge them with trespassing (Africa News, 2016).

The Eviction Process: Violations of Fundamental Human Rights?

While the Government of Cote d'Ivoire has been successful in evicting 25,500 people from the park into neighbouring villages, some humanitarian actors, both international, such as Human Rights Watch (HRW), and national, such as the *Regroupement des Acteurs Ivoiriens des Droits Humains* (RAIDH) have expressed concern and denounced the Government and its forces for violating the fundamental human rights of the evicted farmers during the evictions which took place between the 26th and 30th of July 2016.

Such an approach arguably goes against the main principles reflected in recent international policy developments such as the preliminary guidelines set out by the United Nations High Commissioner for Refugees (UNHCR), in collaboration with the Brookings Institution and Georgetown University, in an effort to develop set guidelines for States to use planned relocation as an adaptation strategy in response to climate change. The guidelines emphasize that planned relocation should represent a last resort solution, implemented with an emphasis on respect for humanity, dignity and human rights of the displaced, and with the "free and informed consent of the affected communities" (UNHCR, 2015, p. 22).

As mentioned above, the SODEFOR unit for Mont Péko National Park were the authority in charge of evicting the populations still living in the area. According to reports by HRW and RAIDH, the SODEFOR guards that carried out the evictions abused their authority and the use of force to evict people from the Mont Péko settlements (Wormington, 2016). Prior to the emergency operation in July 2016, guards reportedly threatened farmers with arrest or eviction if they refused to pay a bribe (Wormington, 2016). When the emergency eviction was announced, SODEFOR officers reportedly entered the Park and burned down entire settlements and plantations without prior warning, and without allowing people to collect their belongings before being evicted. According to RAIDH, most farmers were not given enough notice prior to their forced eviction, preventing them from preparing for resettlement (RAIDH, 2016, p. 3).

The forceful approach of SODEFOR arguably led to the loss of not only property, but also money and important irretrievable documents such

**Image 2. A farmer stands in the remains
of his burned house in Mont Péko National Park, 1st August 2016**



© Reuters/Luc Gnago

as ID cards and travel permits, now hindering the possibility of movement of many of the ex-inhabitants of Mont Péko (RAIDH, 2016, p. 2). According to a farmer's testimony, their physical security was also put in danger, as his house was burned down without warning as his toddler was sleeping inside. While some farmers were arrested and faced prosecution, others' houses were burned while they were away working in their plantations and did not have a chance to peacefully agree to voluntarily leave the Park (Wormington, 2016). Another evictee, in an interview with France 24, stated, "When I lived in Mont Péko I had a big shop, but when they came they burned everything." (2016). Yet during a press release in February 2017, the Minister of Solidarity Mariatou Koné stated that the "populations left the park voluntarily because they understood the aim of the operations, that have not translated into any sort of violence" (Abidjan.net, 2017).

The evictions in Mont Péko National Park are not the first to have given rise to alarming reports of an excessive use of force during conservation-induced resettlement operations in Cote d'Ivoire. According to Human Rights Watch, most populations residing in the protected areas of Cavally, Goin-Debé and Scio also "suffered extortion and physical abuse by forest conservation authorities" during eviction raids (Wormington, 2016). When contacted during the research for this paper, OIPR authorities appeared suspicious and preferred not to answer any questions about their operations in Mont Péko in July 2016. When discussing this informally

with an Ivorian national, a native of western Cote d'Ivoire who now resides in France, she did not seem surprised by this reaction (in French): "It's complicated, because it's a political affair. They say it's about the environment; but it's mostly politics. No one in Cote d'Ivoire really wants to talk about this".

Humanitarian Situation Post-eviction and Government Response

All the illegal farmers residing within the boundaries of the Mont Péko National Park were relocated to selected villages on the outskirts of the Park, under the authority of the OIPR and the Minister of Solidarity Mariatou Koné, head of the mixed Ivorian-Burkinabé committee charged with the supervision of the operations. The evicted farmers were inserted into existing settlements and hosted by local communities. The arrival of the evicted farmers provided a considerable challenge to the livelihoods of the host communities, putting additional pressure on already-strained resources, in areas that were very badly hit by conflict until 2011.

Furthermore, most farmers lost their main source of livelihood, being banned from entering the park and accessing their plantations (WFP, 2016, p. 8). More than 4,000 farmers displaced from Mont Peko, for instance, were resettled in the village of Bagohouo, located in the Douékoué region south of the park, an area still recovering from the scars left by the civil war and highly strained in terms of arable land, and with limited housing capacity. This combination of factors has led to highly overcrowded households, a lack of job opportunities for the evicted and limited revenue opportunities available in the village. An evicted farmer, living with 14 people in a one-room house, expressed his condition in the following terms, "We're suffering here; we've got nothing to eat. Life is bad, we just sit here with no work to do. We've become like corpses. We're alive, but it's like we're dead." (France 24, 2016).

According to the World Food Programme (WFP) only 14.9% of displaced people gained access to land after their resettlement, leaving most individuals completely dependent on precarious sources of revenue and external aid (2016, p. 8). Since August 2016, a number of international humanitarian organizations including the WFP, FAO, IRC and UNICEF have begun, under the coordination of UN OCHA, an evaluation of the main needs of the estimated 25,532 displaced people and their host communities (WFP, 2016, pp. 4-5). The main challenge faced by the resettled farmers and their host communities was reportedly a shortage in food

and the increasing levels of malnutrition, deemed by a WFP Report in August 2016 to be “very worrying”. This was mainly due to the undermining of their individual sources of livelihood and the lack of other possible alternatives of economic revenue due to the physical lack of resources in the areas of resettlement (WFP, 2016, p. 23). Rising market prices due to increased demand has left most displaced people without the necessary economic means to purchase food from local markets (WFP, 2016, p. 23). According to the Brookings, Georgetown and UNHCR Guidelines for Planned Relocation, the process should aim to allow the displaced, as well as host communities, to regain the same or a higher standard of living as they experienced prior to the relocation (Brookings Institute, Georgetown University & UNHCR, 2015, p. 12). In the case of Mont Péko, it is clear that the standards of living of both displaced persons and host communities decreased considerably.

The health and hygiene situation in the villages neighbouring Mont Péko was also exacerbated by the arrival of the evicted farmers. Local NGO RAIDH denounced a considerable lack of proper sanitation infrastructure and a lack of access to clean water in most villages where the displaced were resettled by the Government, as well as a lack of enforcement of the health measures announced by the Government in 2014 when planning for the resettlement (RAIDH, 2016, p. 5).

In the short-term, Government assistance post-eviction was slow to be delivered to those displaced and the host communities in need. While the government publicly stated its intention to deliver assistance packages to the newly resettled, many displaced people lamented a lack of knowledge of when they would receive them; “the government wants to starve us”, said an Ivorian traditional leader quoted in a HRW Report published in September 2016, two months after the evictions occurred (Wormington, 2016). News reports confirm the delivery of food packages only in November 2016, in the presence of the Minister of Solidarity Mariatou Koné, pictured above (Abidjan.net, 2016).

In February 2017, 8 months after the resettlement operations took place, the mixed Ivorian-Burkinabé expert committee in charge of evaluating the needs of the displaced presented its findings. The report deemed the resettlement operation a success and evaluated the possibilities for the integration or voluntary repatriation of Burkinabé farmers back to Burkina Faso (Abidjan.net, 2017). Overall, however, no clear-cut long-term solution has so far been provided by the Government to respond to the humanitarian situation in the villages hosting the evicted populations of Mont Péko. Many of those displaced remain jobless, landless, and

Image 3. Illegal farmers evicted from the Mont Peko National Park gather with their families inside the yard of an evangelical church at Nidrou in Duekoue department, western Ivory Coast on August 1, 2016



© Reuters/Luc Gnago

homeless, while general levels of food security and health are still low, almost a year after resettlement.

A Surable Solution? Risk of Renewed Tensions

As seen above, the livelihoods and food insecurity issues faced by the displaced population and their host communities have not yet been addressed by the government to produce significant outcomes. The deprivation of agency and the undermining of the livelihood generation strategies of the displaced, who have been denied access to their plantations within Mont Péko and have not been given viable economic alternatives in their host villages, seem to have hindered the efficacy of the resettlement operation. According to a broadcast by France 24, many people still cross the borders of Mont Péko National Park illegally to find food and resources to sell. One farmer, whose identity is not disclosed, confessed:

Honestly, we are risking our lives to find something to eat. I went [into the Park] once to find bananas, but it was really difficult. I went in at 4am and I only got out at 3am the following night. I hid all day in the bushes before I could get out, because if they find you it's really dangerous, they put you in prison (France 24, 2016).

The lack of alternative sources of livelihood, along with the scarcity of resources in the place of resettlement, therefore poses an obstacle to the very aim of the evictions to protect the Park's biodiversity and rid it of illegal human activity. Although no one is allowed to live in the park, the lack of necessary assistance to the livelihoods of the displaced persons forces some ex-farmers to infiltrate the park illegally at night to find food. This not only puts the safety of these individuals in danger, risking jail time if discovered, but moreover fails to completely prevent individuals from entering the park and degrading the forests to survive. Without the appropriate assistance and monitoring, the efficacy of the eviction in protecting biodiversity is at this stage still questionable. The expulsion of people from the park without any kind of alternative livelihood or more participatory solutions is perhaps not, ultimately, the most effective solution to protect the forests and their fauna.

The socio-political context of the region, coupled with the stress posed on the existing scarce resources in the villages neighbouring Péko, also increase the risk of hostility and a "resurgence of ethnic tensions" (France 24, 2016). The farmers, the majority of whom as mentioned above are Burkinabé, do not enjoy a good reputation in Cote d'Ivoire as a whole. Online comments by readers on Ivorian newspaper articles indicate general resentment of "foreigners" illegally depleting Ivorian forests and exploiting the land for their benefit (Abidjan.net, 2016). The risk of reigniting conflict in an area previously torn by civil war is however more palpable in the field.

Overcrowding and lack of resources act as magnifiers of the host community's feelings of frustration. These communities, according to Kra, already perceived the evicted farmers as economically and socially prosperous, due to their previous exploitation of the fertile lands of Mont Péko and their involvement in the cocoa business (2016). This is confirmed by an interview with the spokesperson for traditional leaders in the region surrounding Mont Péko, who opposed the Government's decision to relocate the farmers to neighbouring villages:

We are not ready to host them in our villages. We do not even agree with the Government's decision to create hosting sites for them. (...). They should return to where they came from (Kra, 2016).

Reports of stolen crops and tension over land use further magnify these grievances and the risk of renewed tensions between evicted farmers and host communities, in a socio-political context that is already fragile.

Although international organizations in the field claim these tensions are under control, it is clear that the eviction of the illegal farmers from Mont Péko and their relocation to host communities surrounding the park have not yet been matched with the necessary amount of assistance to both those displaced and the host communities (France 24, 2016). In the long run this may prove highly detrimental both to biodiversity conservation and the socio-political stability of the area, undermining the very aim of the resettlement programme.

Conclusion

The case of Mont Péko serves as a clear example of the “dark side” of the international imperative to conserve biodiversity through the complete lack of human activity in protected areas. Although illegally occupying the forests, the ex-inhabitants of Mont Péko arguably suffered repeated violations of their human rights, which are protected under international law, through an extensive use of force during eviction operations and a deprivation of their main source of livelihood without adequate reactive assistance. In line with international policy developments on planned relocation, alternatives should perhaps be explored before resorting to forced displacement and the associated infringement of basic human rights.

Institutional weakness coupled with corruption and scarcity of resources result in human rights violations going unnoticed, while simultaneously exacerbating the vulnerability of host communities through an overcrowding of villages with strained resources. This is ultimately also detrimental to the efficacy of the operations in protecting the forests and the biodiversity of Mont Péko. In order to avoid tensions and to make concrete progress in the recovery of biodiversity in Mont Péko and protected areas in Cote d’Ivoire as a whole, the Government should resolve these underlying issues and make sure no livelihood is undermined in the process of healing the country’s environment and combating climate change.

Despite the illegality of cocoa farming within protected areas, and the utmost urgency for better forest conservation in Cote d’Ivoire, this case study is peculiar in showing that there is a balance which needs to be carefully established between protecting biodiversity and protecting human rights. The conservation of the environment must occur in ways that do not destroy the livelihoods of those that are displaced from national parks, and planning should take into account pre-existing structural

weaknesses in order to produce successful results. In the words of Cernea and Schmidt-Soltau:

The question (...) is not whether there should be an increase in biodiversity conservation (...). There will be and there has to be. Nor is the question, whether people's livelihood and rights must be protected and enhanced. They have to be. Nor—least of all—is it a question of whether these two considerations are interlocked. They are. *The solutions to the dilemmas of protecting both biodiversity and livelihoods clearly revolve around the 'how', not around the 'whether'* [emphasis added] (2003, p. 3).

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Kristiane Davidson



Over the last thirteen years Kristiane has dedicated her studies, volunteerism and professional pursuits to the promotion of sustainable and equitable development. She has worked with governments and multilateral development agencies, in Australia and throughout the Pacific Islands, preparing, implementing and evaluating policies and projects regarding climate change adaptation and urban resilience. She has also worked with non-government organisations in Europe,

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Max Friedrich



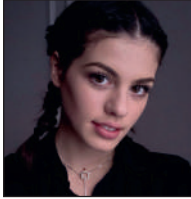
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Christophe Picamilh



After graduating in Water & Environmental Engineering, Christophe decided to pursue his education at Sciences Po Paris. He is now completing his Master's double degree in Environmental Science and Policy at Sciences Po and Université Pierre et Marie Curie (UPMC), focusing on food systems and agriculture. Despite his scientific background, Christophe is convinced social sciences are essential to environmental studies, which make them much more complex but also much more stimulating. During his experiences in Brazil and in the United States, where he interned as a research assistant, he showed keen interest in natural resources management. In parallel of Sciences Po, he even worked part-time as a project engineer in water resources management. Moving forward, he is now aiming to enhance his professional experience in the field of agriculture and natural resources conservation after graduating.

Lavinia Giulia Pomarico



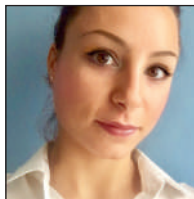
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Michael Twigg is a master's student in the Environmental Policy programme at the Paris School of International Affairs (PSIA), class of 2018. He holds a bachelor's degree in International Development from McGill University and a bachelor's degree in Political Science and Public Policy from Concordia University. Before pursuing studies at PSIA, Michael worked as a program officer for the Income Security and Social Development branch of the Government of Canada, focusing on economic empowerment, adaptive public policy planning, stakeholder engagement and community based research strategies. Prior to joining the Government of Canada, Michael worked for the United Nations Secretariat of the Convention on Biological Diversity in the cities and subnational governments unit, supporting the implementation of the Aichi Biodiversity Targets within the context of local government implementation strategies. Currently, Michael is in Timor-Leste doing field work for his master's thesis, which examines the intersection between national economic growth policies and the capacity for communities to adapt environmental change. Upon finishing his master's program at the Paris School of International Affairs, Michael aims to pursue a career in the field of environmental governance that focuses on sustainable environmental resource management and the challenges posed by different catalysts for environmental change.

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After completing a Bachelor's degree in Political and Social Sciences at SciencesPo Paris, Rachele Miscioscia has pursued her studies in Environmental Politics and is currently completing her Master's degree at the Paris School of International Affairs (PSIA/ SciencesPo). Her deep interests in today's environmental challenges have also led her to delve into Urban Studies at the University of California, San Diego (UCSD) where she learned the importance of transport and resource management in urban areas. She also completed a long-term internship as a researcher at the Institute for Sustainable Development and International Relations (IDDRI—Institut du développement durable et des relations internationales) where her research focused on the media impact of the first report of the IPBES (Inter-governmental Panel on Biodiversity and Ecosystem Services) on pollinators, pollination and food production. For the forthcoming future Rachele seeks to dedicate her career to foster the preservation of biodiversity preservation and the rehabilitation of contaminated environments.

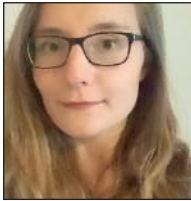
Yubai Wu



Currently in the final year of her masters in International Public Management at Sciences Po's Paris School of International Affairs, Yubai specialises in project management and environment. Her personal experiences of residing in different countries and diverse environments since early childhood has greatly intrigued her interest in migration and education issues. Presently, she is undertaking an internship at the OECD working on promoting education equity and sustainability. Before coming to Paris, Yubai completed her bachelor degree in sociology and has interned for the UNDP office in Beijing as well as a number of NGOs. She aims at pursuing her career in the field of integrating education equality, especially migrant education from the policy level.

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International Organization for Migration

The International Organization for Migration (IOM) has been supporting the State of Environmental Migration series since its creation in 2011, by providing students with access to its data and resources available across its network of national and regional offices worldwide, and by supporting the review and editorial process. The State of Environmental Migration is also part of a wider collaboration between IOM and the Hugo Observatory, which IOM joined as an associate member in 2016.

The opinions and recommendations expressed in the report are those of the authors and persons interviewed during the course of the research and do not necessarily reflect the views of the International Organization for Migration (IOM). The designations employed and the presentation of material throughout the report do not imply the expression of any opinion whatsoever on the part of IOM concerning the legal status of any country, territory, city or area, or of its authorities, or concerning its frontiers or boundaries.

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The Hugo Observatory

Environment, Migration, Politics

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