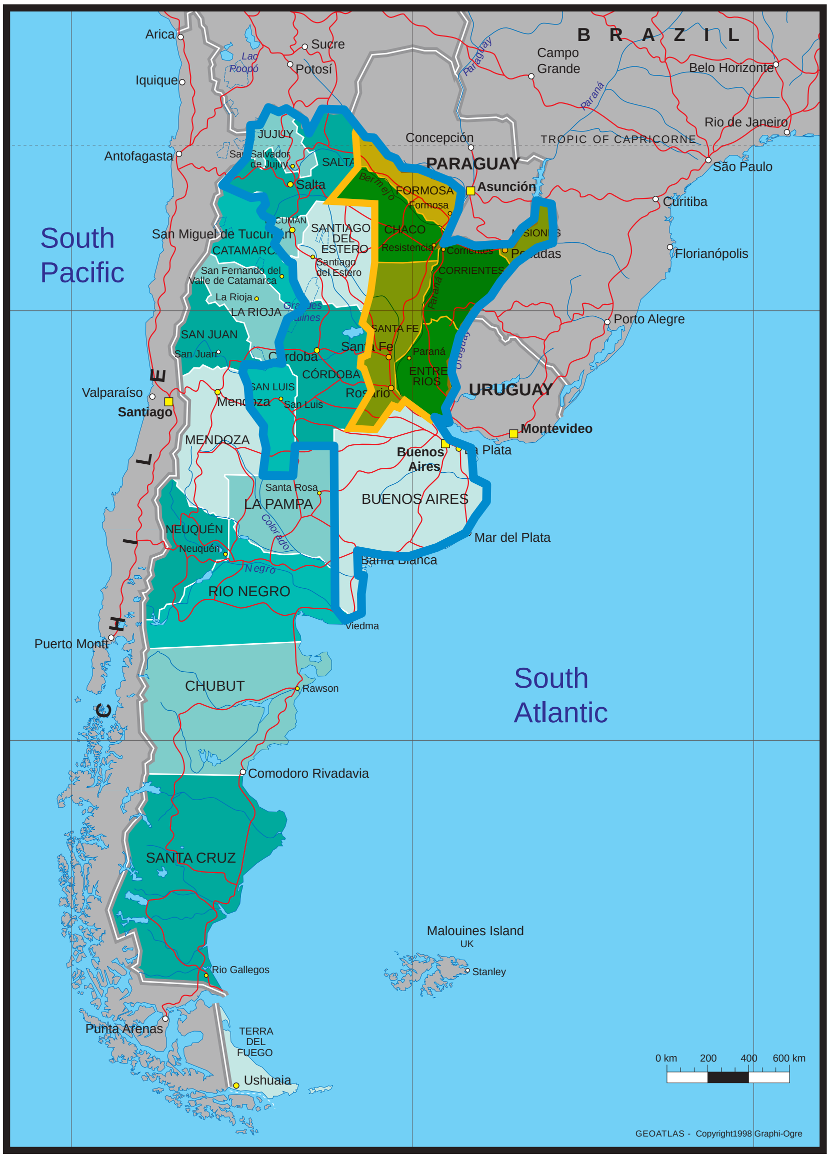
El Niño floods in Argentina

A story of displacement and vulnerability

Tamara Ulla

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



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

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

Javier, fisherman and head of household

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

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

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

The fact that many people in Concordia and the region refused to leave their homes because they feared being robbed (El Explorador Producciones, 2015) or because they didn't have anywhere safer to go stresses the importance of considering the links between demographic and socio-economic factors and the ability to move as a means to cope with natural events. In this sense, it appears that communities with prevalence of certain demographic groups (i.e. the elders), with higher rates of people under the poverty line or depicting more unemployment rates, just to name a few factors, have a higher propensity to be affected by being less able to move even if they wish to do so. This situation magnifies their vulnerability in many ways, especially because their *immobility* exposes them to higher risks, such as potential death, injury and disease (Black, Arnell, Adger, Thomas, & Geddes, 2013; Black & Collyer, 2014).

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

Environmental And Social Context Of Argentina

Argentina, a country marked by flooding

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

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

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

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

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

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

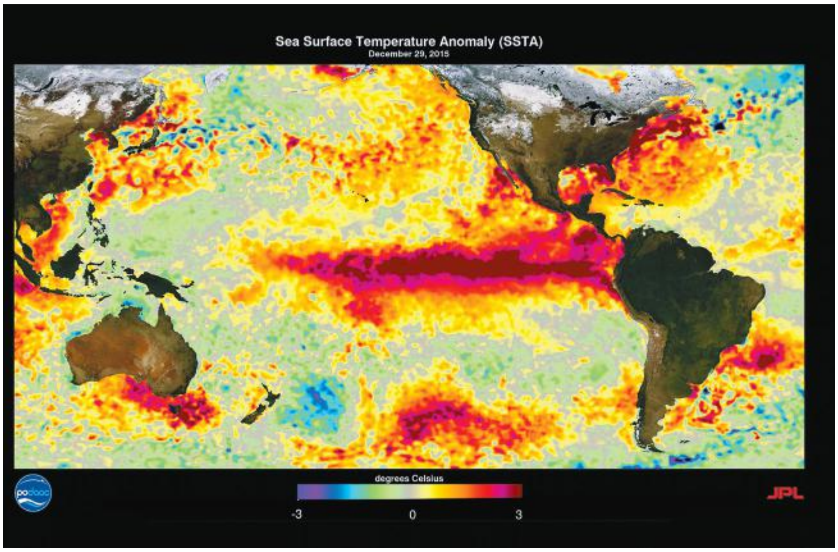
In almost all the Littoral region, annual rainfall has increased over the second half of the twentieth century, and precipitations have become more extreme in their intensity and frequency. Scientific modeling studies focused on the tendencies for the twenty-first century depict that in mid-term and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

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

Social, economic and infrastructure vulnerability

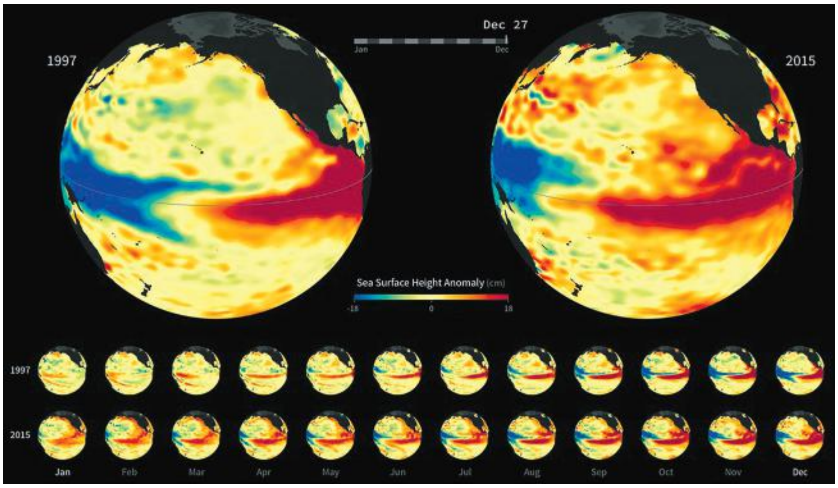
The interaction between environmental events and social activities over time has outlined a set of social and economic aspects contributing to the Littoral region's vulnerability to weather-related events in general and flooding in particular. These vulnerabilities have arisen predominantly due to natural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

Image 2. Sea Surface Temperature rise in December 2015



Source: NASA's Jet Propulsion Laboratory, 2015.

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



Source: NASA/JPL OSTM, Jason, 2015

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

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

The Event

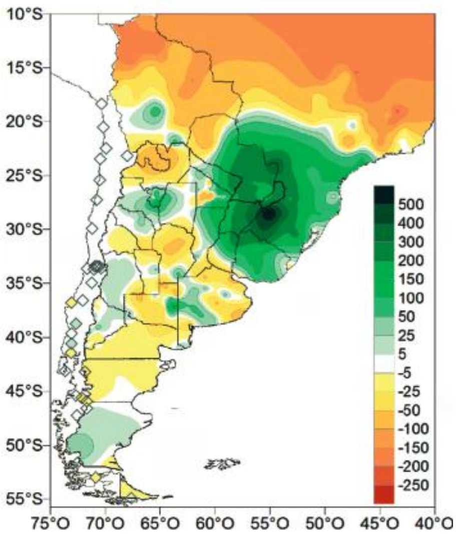
El Niño Reaching South America

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

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

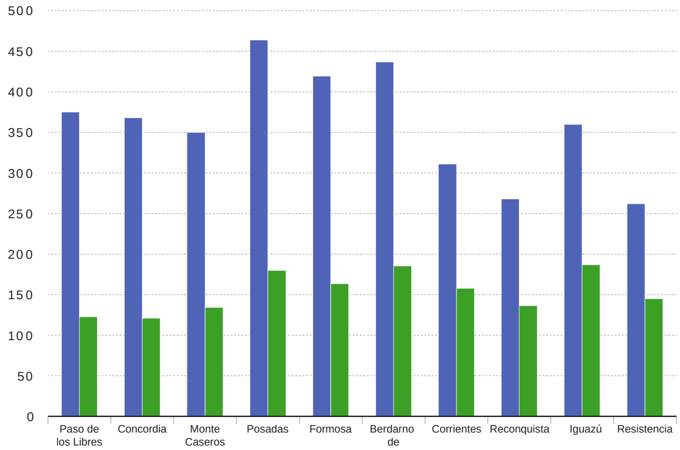
El Niño related events have been occurring for thousands of years in irregular intervals of two and up to seven years, peaking typically during the

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



Source: Skansi, 2015

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



Source: Compiled by author from Repetto, 2015.

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

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

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

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

Affected regions

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

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

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

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

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

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

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

Impacts and Displacement

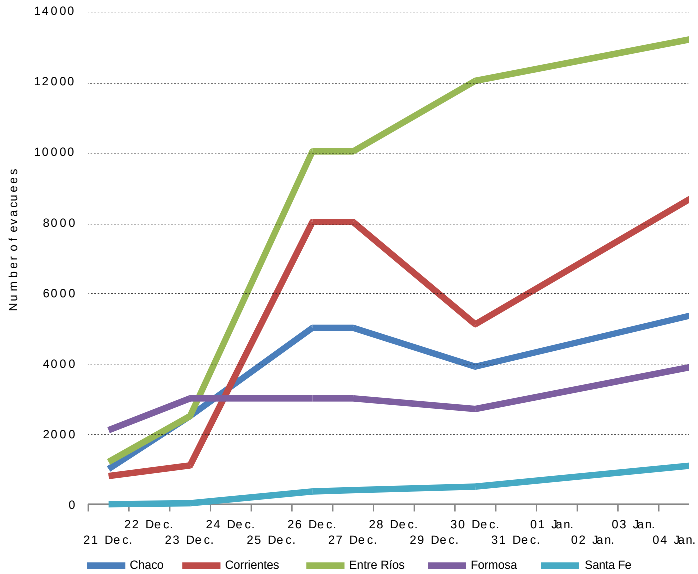
Economic and health impacts

Economic losses

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

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

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



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

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

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

Health impacts

Cases of dengue had been identified before the December 2015 events, but the rains and water accumulation decisively reinforced the outbreak and affected the measures taken to combat a potential epidemic. As explained by the Health Minister Jorge Lemus, the rains not only have multiplied the water spaced where mosquitoes breed but have also washed out fumigations against mosquito from the soils (Argentine White Helmets Knowledge Management Team, 2016a).

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

Affected People and Displaced Population

An Increasing Number of Displaced Population Over Time

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

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

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

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

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

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

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

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

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

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

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

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

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

Different behaviors among the displaced

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

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

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

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

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

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

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

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

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

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

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

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

Image 6. Isolated people in Concordia during Christmas

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

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

Humanitarian response

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

In addition, the Federal Emergency System (SIFEM), a body created in 1999 as a warning and contingency system that had not been used since then, was revitalized. As part of its renewed competencies, the SIFEM established two operating centers, one in the neighbor cities of Resistencia (Province of Chaco) and Corrientes, and another in the neighbor cities of Santa Fe and Paraná (Entre Ríos) in order to effectively coordinate the assistance to people both affected and displaced by the flood (El Independiente, 2015; Télam, 2015d).

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

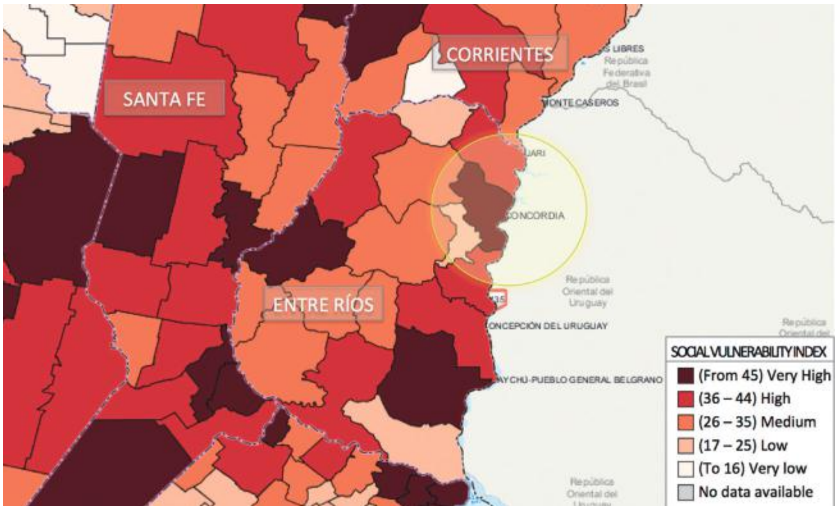
Humanitarian response actions directed towards the abovementioned displaced groups had three major components: getting aid to those displaced and trapped in isolated areas, deploying emergency supplies to those self-evacuated or evacuated in community centers, and managing the collective emergency shelters.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

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

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

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

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



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

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

Social Vulnerability

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

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

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

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

Applied accordingly and timely, the index can be a powerful tool for disaster prevention actions and the development of contingency plans during emergencies (Natenzon, 2005, 2016; Natenzon, González, Gentile, Ríos, & Boudín, 2003). More importantly, by identifying socio-economic conditions of vulnerability pre-existing the occurrence of the disaster, the use of an index of this sort would allow to identify communities and even specific areas in neighborhoods with higher risk exposure to environmental hazards and higher propensity to be displaced in the case of an event. Built up on this data, policies and programs with a durable solutions perspective could be implemented both to prevent potential human displacements under emergency and dangerous circumstances and to provide sustainable solutions to those already displaced (Project on Internal Displacement, 2010).

Conclusions

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

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

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

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

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

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

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

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