



# Twenty Years after the Storm: Hurricane Vulnerability in Bluefields, Nicaragua

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## Abstract

Devastating outcomes of natural disasters in Latin America and the Caribbean are increasing, largely as a result of the increasing vulnerability of local populations. Twenty years after a Category 4 hurricane destroyed the remote coastal city of Bluefields, Nicaragua in 1988, this research examines how present conditions have reshaped its vulnerability to a future storm. Using the Pressure and Release (PAR) model as a framework (Wisner *et al.*, 2004), we examined historical and ethnographic data and interviewed the city's Creole leaders to identify and examine the root causes of vulnerability in Bluefields. A history of political isolation and distrust in the national government combined with policy changes that increased migration and urbanization have increased vulnerability to hurricanes. The most at-risk populations are not longtime Creole residents, but rather more recent migrants to Bluefields living in improvised housing in the city's floodplain.

*Key words:* hurricanes, risk, developing countries, vulnerability, Nicaragua

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## 1. Introduction

How a community reacts to a hurricane is highly dependent on their social vulnerability before the storm. In natural disasters, social vulnerability reflects the social, economic and political conditions of a place or of individuals (Wisner *et al.*, 2004). Today, unsafe conditions exist throughout Nicaragua's Atlantic Coast as a result of displacement caused by war (1979-1989) and neoliberal economic reforms (1990-2008) that generated social upheaval and intensified poverty. Dramatically different political and economic ideologies brought about by Sandinista and neoliberal governments have spawned social transformations in the autonomous regions. This

study asks how changing conditions in the city of Bluefields, in the country's historically isolated Atlantic region, and throughout Nicaragua have affected that city's vulnerability to future hurricanes. More than twenty years after Hurricane Joan, we examined historical and ethnographic data, and conducted interviews with 15 community leaders from the long-residing Creole population to identify the most important factors that contribute to vulnerability to future hurricanes.

We employ Wisner's (1988) notion of 'everyday vulnerability' to argue that how society functions in normal life can influence the outcomes of any natural disaster. Through this case study of Bluefields, we demonstrate that understanding a community's economic, geographic, and political

context is essential to assess vulnerability. Following the theoretical Pressure and Release (PAR) framework developed in Blaikie *et al.* (1994), Wisner (1994), and Wisner *et al.* (2004), we identify the causes and dynamic pressures that created unsafe living conditions for Bluefields' poorest residents, and have thus increased their vulnerability.

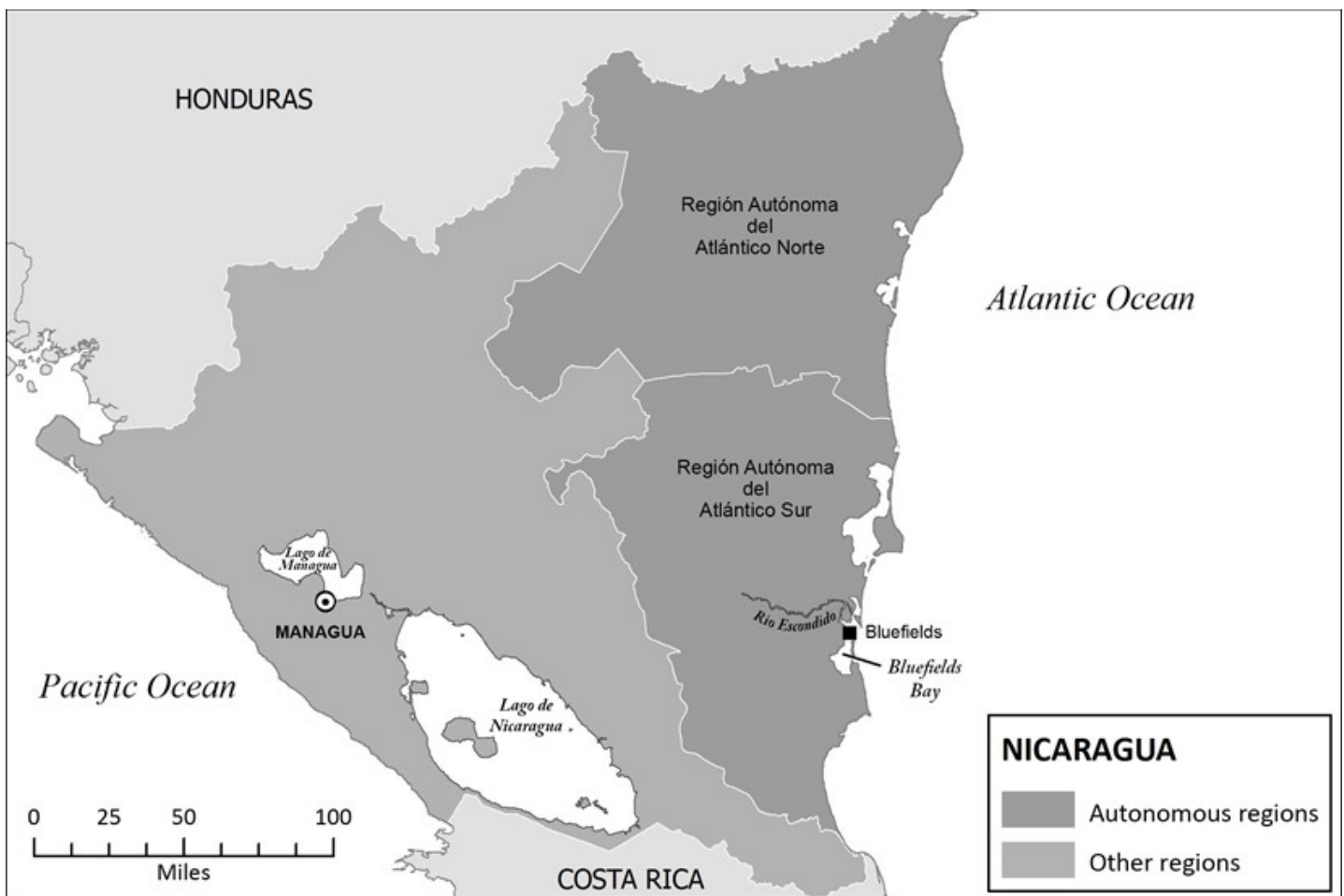
This article helps to improve theoretical understanding of vulnerability through its multi-scalar, local, long-term perspective, a view which relatively few disaster studies have implemented to date (Flint and Luloff, 2005). This paper begins with a geographic and historical context of hurricane vulnerability on Nicaragua's Atlantic Coast and reviews Blaikie *et al.*'s (2004) and Wisner *et al.*'s (2004) vulnerability framework. It examines the roots of Bluefields' present-day vulnerability and considers the dynamic pressures that have produced unsafe spaces for the city's most vulnerable residents. We provide a historic accounting of the region's economic, political, social, and demographic shifts, and use interviews of long-term Bluefields residents to provide a voice for local

concerns regarding vulnerability to future storms.

## 2. Hurricane Vulnerability on Nicaragua's Atlantic Coast

Bluefields' most destructive hurricane pummeled the lagoon community on the eastern coast of Nicaragua (Figure 1) in autumn 1988. The storm was recent enough that many long-term residents vividly remember the event. When Hurricane Joan made landfall on the coast of Nicaragua early on October 22, 1988 it was classified as a strong Category 4, with wind speeds reaching 145 mph (NHS, 1988). The storm's track passed over the city of Bluefields before moving across Central America and onto the eastern Pacific Ocean, where it was renamed, becoming Tropical Storm Miriam (Lawrence and Gross, 1989).

Hurricane Joan was responsible for more than 200 deaths in the southern Caribbean, including approximately 150 in Nicaragua and 28 in the city of Bluefields. The storm flooded hundreds of miles along the Nicaragua-Costa Rica border near the Atlantic Coast. The damages were estimated to total around \$2 billion, with about half of the losses occurring in



**Figure 1:** Map of Nicaragua and the study location of Bluefields, Nicaragua

Nicaragua (Blanchard-Boehm, 2004; Lawrence and Gross, 1989). Hurricane Joan heavily impacted Nicaragua's eastern coastal economy, where dramatic losses occurred. Economic losses from Joan were estimated by the Nicaraguan Ecumenical Group to be greater than the 1972 earthquake in Managua (Wisner *et al.*, 2004).

In Bluefields, eighty to ninety percent of buildings and infrastructure were destroyed. The hospital, post office, electric plant, and major fishing company facilities were damaged or destroyed. Despite Joan's destruction, relatively few deaths (28) were recorded in the city. Many lives were saved due to a pre-storm mobilization carried out by the Sandinista government and the Civil Defense (Taylor, 2005). Sandinista policies, however, discouraged the United States and its allies from donating aid, leaving the impacted communities with limited funds for reconstruction (Taylor, 2005; Wisner *et al.*, 2004).

By the time of Hurricane Mitch in 1998, Nicaragua had abandoned socialism. Under new leadership, the country bowed to the demands of the International Monetary Fund (IMF) and the World Bank and had made drastic cuts in public investment, road and bridge maintenance, and local government. In addition, because many elected municipal governments were controlled by pro-Sandinista officials, the national government had systematically tried to isolate and starve them of resources. The result was that communities were left to face the storm with little warning and no evacuation. Ultimately, Hurricane Mitch was much worse than it should have been, with more than 3,000 deaths in Nicaragua (Wisner *et al.*, 2004). The exceptional death toll was a direct result of inadequate meteorological warnings and/or warnings that were not taken seriously by the government. The National Hurricane Center issued hurricane warnings for Jamaica, Honduras, Guatemala, and Belize, but warnings in Nicaragua were few because the storm was expected to track farther north than it did (NHC, 1999).

While Hurricane Mitch never actually entered Nicaragua, bands of intense rainfall associated with the storm heavily impacted the country. Before Hurricane Mitch, the mayor of a community near Casitas Peak alerted Managua to the threat of landslides in their community. President Alemán, however, personally dismissed the warning because the mayor was a Sandinista (Close and Deonandan, 2004). Between 60 and 120 cm of rain fell in regions of north central Nicaragua, causing steep slopes on the Casita Volcano to turn into a lahar. These mudslides killed an estimated 2,000 people, and an additional 1,800 were killed and

7,000 missing in other parts of the country (NHC, 1999).

### 3. Understanding Vulnerability

Vulnerability is an important framework for disaster studies because it stresses the social, economic, and political factors that contribute to disaster outcomes (Wisner *et al.*, 2004). As disaster research has evolved over the past half century, vulnerability models have become an integral part of natural disaster paradigms. There are a number of different lenses through which vulnerability has been observed. Previous research has developed indices or other quantitative measures to determine the disaster potential for a given geographic location (Cutter, Boruff and Shirley, 2003). While this method can give a glimpse into the relative social condition of a place, it overlooks the factors that determine an individual's or community's vulnerability and how their vulnerabilities change over time. Researchers must evaluate not only individuals' and communities' current exposure to danger, but should also understand their capacities, and the viable options and alternatives they have to fully understand disaster vulnerability (Heijmans, 2001). Here, we undertake a vulnerability assessment that is understands the perspectives of those who are at risk.

To determine who is at risk, we examine the everyday vulnerability of individuals and the community (Wisner, 1988). Disaster researchers are finding that life during normal, non-crisis times has a significant impact on the outcome of a disaster, perhaps more than the physical impact of the event (i.e., Fordham, 1998; Hewitt, 1997). This view assumes that normal life is anything but ordinary, mundane, or safe. Rather, the complex system of everyday activities and events occurring during this 'normal life' determines how a community or an individual will prepare for, can respond to, and is able to recover from an 'out of the ordinary' event (Fordham, 1998).

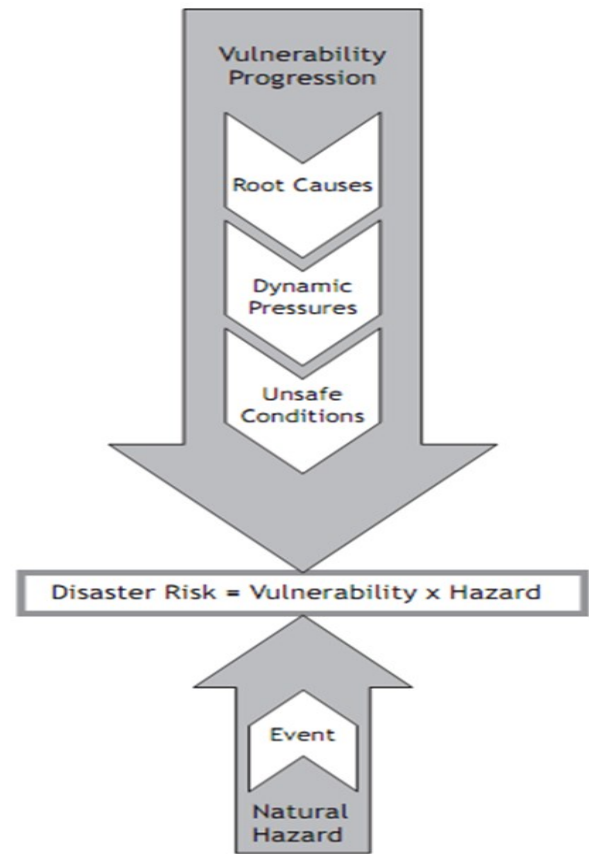
The PAR model, which identifies characteristics that initiate vulnerability and motivate its progression over time, is often used in vulnerability assessment studies (Cutter, 1996; Cutter *et al.*, 2003; Wisner *et al.*, 2004). The premise of the model is that a disaster is the product of the intersection of two opposing forces – the physical hazard and the social processes that generate vulnerability. The model suggests that vulnerability is the only variable which can truly be altered through management, and assumes that humans lack the ability to mitigate or prevent a natural, physical event. Blaikie and Wisner use three sets of links to explain the

generation of vulnerabilities: root causes, dynamic pressures, and unsafe conditions (Figure 2). These factors influence vulnerability at the large-scale (scale of an individual or a community), and are a product of smaller-scale processes (i.e., political stability or economic conditions) (Blaikie *et al.*, 1994; Wisner *et al.*, 2004).

According to the PAR model, vulnerability is produced by the root causes, which are operating at the smallest geographical scale and thus are the most “distant” (in theoretical terms) from the eventual disaster. The roots result from two primary conditions: limited access to power, structures, or resources; and the ideologies of economic or political systems. The roots we focus on here are the economic, political, and demographic processes that are generated by the ideological systems of the state. These factors influence the outcomes of disaster because they are vital determinants of the allocation and distribution of resources (Blaikie *et al.*, 1994). The causes of vulnerability reflect the power structures of society. For instance, past civil wars may undermine the disaster-prevention and hazard-mitigation abilities of central or local governments. Public trust of the government is necessary for prevention and mitigation to be effective. Civil wars, especially long ones, can erode this trust (Wisner, 2002).

Dynamic pressures, the final link in the progression of the PAR model, are processes and/or activities that ultimately translate the root causes of vulnerability into the unsafe conditions of the present. The pressures that promote vulnerability are processes that result from the political and economic systems of states and communities. Some may be a lack of any of the following: local infrastructure, training, appropriate skills, local investments, local markets, freedom of the press, and ethical standards in public life. Macro-scale forces, including rapid population change, rural-to-urban migration, arms expenditures, debt repayment schedules, deforestation, and decline in soil productivity, are also dynamic pressures that can affect Nicaraguan communities. Structural-adjustment programs in Latin America are viewed as responsible for the decline in social services in Nicaragua, and social services are a key dynamic pressure in Wisner *et al.*'s process of producing vulnerability.

The final component of the PAR model, unsafe conditions, determines the factors that make an individual or a population vulnerable. Unsafe conditions can be found in the physical environment (i.e., physically dynamic dangerous locations or unreinforced buildings and infrastructure), the local economy (i.e., livelihoods



**Figure 2:** Pressure and Release Model (after Wisner *et al.*, 2004).

that are at risk or prevalence of insufficient income levels), social relations (i.e., special groups are marginalized or the persistent lack of local institutions), and public actions and institutions (i.e., insufficient disaster preparedness or persistence of endemic diseases). We investigate the historical and local origins of vulnerability using the PAR model as our framework enable understanding of Bluefield's current vulnerability to future hurricanes.

#### 4. Methods

The most effective way to examine the root causes of vulnerability at the community scale is through a case study of a specific area (Johnson and Onwuegbuzie, 2004). This study uses an ethnographic approach for data collection, including participant observation and semi-structured, in-depth interviews. Ethnographic studies aim to uncover processes and meaning, allowing us to connect structure, agency, and geographic context (Herbert, 2000). These methods enable us to gather information about people's

perceptions and attitudes towards hurricanes, their government, and the general view of vulnerability in the community. The second author resided in Bluefields, Nicaragua for a six-week period from late June to early August, 2008. She lived with a host family who were prominent members of the local Creole community. Immersion into the field site was imperative as it allowed a personal understanding of the cultural traditions and practices of the participants, and enabled familiarity with participants' daily lives and behaviors. This study acquired ethnographic insights from the answers of residents to directed questions about social vulnerability to hurricanes, and also from observing actors' behaviors and their daily lifestyles, combining the view of agency in a broader structural and sociospatial context.

In-depth interviews were facilitated by the host family. In total, fifteen prominent community members were interviewed. They included two NGO organizers, three clergy leaders, two university historians, three political activists and local politicians, two healthcare professionals, and two emergency managers.

The interview questions focused primarily on historical and contemporary concerns, limitations, and deficiencies specifically with regard to hurricane threats and the community. Each interview began with the same questions about personal characteristics, occupations, and leadership roles held within the community. This background information was important, as many interviewees had held multiple leadership roles at various times in their life. We modified subsequent questions depending on the affiliation of each informant. For the interviews of the NGO organizers and the clergy leaders, we asked about the roles and responsibilities of their organizations concerning responses (i.e., preparation, shelter, recovery, aid) to hurricane events. We asked the historians about past hurricane experiences in Bluefields and community resilience at various times in history. The interviews with the political activists and local politicians focused on community preparation and education regarding natural disaster threats and the healthcare professionals were asked how hospitals and other healthcare services might respond to a hurricane. The emergency managers were asked about the common response issues and problems they perceived to exist in the community. The interviews lasted between 30 to 60 minutes and twelve were audio-recorded.

The interviews were subsequently transcribed and coded to identify the themes that emerged from the interviews and from informal conversations experienced while in Bluefields. The themes that emerged included

the city's political history, its isolation, rapid urbanization, changes in urban structure, migration and demographic change, the vulnerability of new migrants to the city, the structural or institutional influences on vulnerability, and the importance of disaster experience. In the results section that follows, we discuss our observations within the structure of the PAR model (root causes, dynamic pressures and unsafe conditions) to explore these themes.

The primary limitation of this study is that a majority of the interviewees and survey participants were Creole. Ideally, this research would have fully engaged the diverse perspectives of all of the ethnic groups found in Bluefields. Due to cultural and socio-economic barriers that exist between the Creoles and recent indigenous and Mestizo settlers in Bluefields, the authors were unable to access non-Creole populations within these communities during the 6-week period of fieldwork.

## 5. Results

### 5.1 Root Causes of Vulnerability in Bluefields

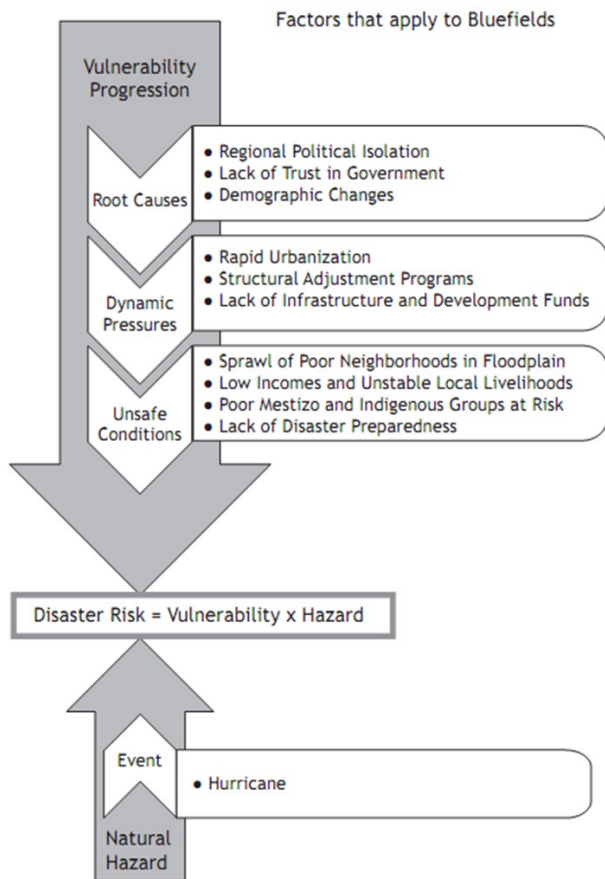
Bluefields' isolated geographic location, its unique socio-political history which generated a lack of trust in the national government, and recent demographic changes are keys to understanding its vulnerabilities. According to a recent report, the Nicaraguan Atlantic region's defining characteristics of inaccessibility, dispersed population, idiosyncratic cultural aspects, migration processes, and high rates of illiteracy all contribute to its vulnerability (TELCOR *et al.*, 2015). Nicaragua's indigenous and Africa-descended populations are among the country's most vulnerable. Political isolation, regional poverty and lack of access to resources influence the existing power structures, which strongly contribute to the roots of vulnerability in the PAR model (Figure 3).

#### 5.1.1. Regional Isolation

Nicaragua's Atlantic Coast has been isolated and relatively independent from the rest of the country for more than 120 years, a period characterized by reluctant political incorporation. Recent rural-to-urban migration has created a new group of impoverished migrants who, in addition to being politically and economically marginalized in Bluefields, also lack hurricane experience.

During the colonial period, a distinct culture evolved in Bluefields. Escaped slaves intermixed over





**Figure 3:** Pressure and Release Model: The Progression of Vulnerability in Bluefields, Nicaragua (after Wisner *et al.*, 2004)

centuries with British settlers and local indigenous groups, including Miskitos, Sumos, and Ramas. A formal allegiance to the British crown via Jamaica, followed by a strong missionary movement by the Moravian church in the mid-19th century, led to an English- and Miskito-speaking, protestant Costeño culture along the Miskito Coast, the majority living in Bluefields. While the region was formally politically aligned with Nicaragua in 1894, the Atlantic Coast was not fully incorporated economically or socially until the Sandinista Revolution in 1979 (Andrews, 1988; Baracco, 2007; Gordon, 1998; Marriott, 2000; Taylor, 2005). Mestizo migrations to the Atlantic Coast began in the 1930s when the Somoza regime integrated the previously independent east and western regions of Nicaragua. Migration from the west was further facilitated by the Sandinista Revolution, which triggered a massive emigration of Mestizo peasants to the Atlantic Coast during the mid-1980s in search of cheap land and economic gains (Gordon, 1998).

A lack of direct land transportation continues to

isolate Bluefields from Managua and western Nicaragua and contributes to the region's economic, political and cultural isolation. Only 10% of the country's population lives in the Northern and Southern Atlantic Autonomous Regions (RAAS and RAAN, respectively). The low population is due to a lack of infrastructure connecting the Atlantic and Pacific Coasts. As population in the north and west increases, people in the more populous highlands and Pacific Coast have been pushing eastward in search of less crowded and undeveloped land for agriculture (Morris, 2016). Recent road construction has facilitated this migration. In 2007, automobile and truck transit began on a newly constructed dirt road connecting Rama to Pearl Lagoon (a coastal community about 50 km north of Bluefields). This was the first road to connect the coasts and another is proposed to stretch to Monkey Point (65 km south of Bluefields). Newly proposed projects are intended to facilitate extraction of timber and gold in a national effort to improve economic independence. While neither of the aforementioned projects have constructed roads directly to Bluefields, they are expected to encourage migration along the coast (Stiedl, 2000).

Bluefields' remoteness and political isolation contributed to its present economic misfortunes. Poverty has increased on the Atlantic Coast of Nicaragua. Nicaragua is the second poorest country in the Western Hemisphere, ahead of only Haiti. Regionally, the Miskito Coast is below the national average and among Nicaraguans the indigenous are likely to be significantly poorer than the non-indigenous (Stiedl, 2000). While Nicaragua experienced one of the highest economic growth rates in Latin America from 1993 to 1998, the size of the population on the Atlantic Coast experiencing extreme poverty (less than \$1US per day) increased from 30.3% to 41.4%. A study in 1999 found that the 12 poorest municipalities in the country were located in the RAAS and RAAN, underscoring the wealth disparity in Nicaragua's Pacific and Atlantic halves (Taylor, 2005). The latest (2005) Nicaraguan census revealed that 58% of Bluefields' residents lived in extreme poverty, and 36.5% lived in poverty—only 5% were classified as 'not poor'. Poverty and geographic isolation undermine the availability of resources for disaster prevention and/or hazard mitigation.

Economic changes and development failures on the Atlantic Coast have led to dependence on outside sources of income. Prior to Hurricane Joan, fishing was the dominant economic activity in the RAAS region. While fishing remains important to the regional economy, many people in Bluefields have had to find

new ways to generate income. The increased population, closing of the turtle industry, a shortening of the lobster season to only nine months of the year, plunging lobster prices, and hyperinflation of the Nicaraguan Córdoba after the Sandinista Revolution contributed to enormous economic strains on the region, leaving roughly 80% of the Atlantic Coast unemployed (Bower, 1998). Drug trafficking, cruise ship work, and migrant laborer remittances have become significant income generating activities in Bluefields over the past twenty years. Cruise ship employment is one of the most lucrative options for anyone living in Nicaragua, and the Creoles are at a cultural advantage because of their bilingual (Spanish and English) skills. One of the persons interviewed had five children and of these three were currently or had previously worked for the Royal Caribbean cruise ship company. For many of Bluefields' households there is no outside income and the average head of household would be lucky to earn 1000 Córdobas (about US\$42) a month (GPN 2001).

#### 5.1.2. Lack of Trust in Government

A community's or region's relationship with the central government can impact preparedness for or recovery from natural disasters (Wisner, 2002). Hurricane Joan hit Bluefields in 1988 at the height of the Sandinista revolution. While the Sandinista National Liberation Front (FSLN) administration enjoyed broad support in Nicaragua's Pacific and central highlands regions during the early 1980s, it was a political failure in the Caribbean lowlands from the beginning. The Sandinistas were progressing toward a social and economic integration of Nicaragua's Pacific and Atlantic Coasts. The Costeños, who still had not recovered from their forced incorporation into Nicaragua in the early part of the century, were not in favor of the new political initiatives from the central government in the west (Baracco, 2007). Costeños, historically unopposed to the Somoza dictatorship given his hands-off approach in the region, were conflicted over the revolution. Further, the Atlantic Coast had always maintained favorable ties with the United States and its people did not accept the break in these relations (Gordon, 1998). The Sandinista revolution brought an influx of western Mestizos who were unfamiliar with traditional languages and cultures of the region. Tensions between Mestizos and Costeños arose as even well-intended government initiatives often clashed with local sensitivities (Taylor, 2005).

In 1988, the Sandinista Party was in political control of Nicaragua, however they were still fighting

Contra forces and many Costeños had forfeited the little support they originally had for the 1979 revolution. The coincidental timing of the hurricane with the Sandinista revolution provided an opportunity to build support among the Costeños. Hurricane Joan fortuitously enabled Daniel Ortega to 'win the Coast' by implementing a successful refuge and recovery plan. A superb pre-storm Civil Defense mobilization, which was highly politicized and well publicized, was undertaken by Ortega's government. Because the mitigation and recovery was led by the Sandinista military with aid from the Cuban government, the United States and its allies limited their disaster aid (Taylor, 2005; Wisner et al., 2004). This added to Costeños' mixed feelings about the Sandinista government as they were left with few funds for reconstruction.

#### 5.1.3. Demographic Changes

In the two decades since Hurricane Joan, Bluefields has experienced rapid population growth and a shift in the predominant ethnic group from Creole to Mestizo. Creoles were historically the dominant group culturally and numerically in Bluefields, but today they make up less than 36% of the population. Historically, Creoles have had higher literacy rates and have tended to consider themselves to be Bluefield's superior ethnic group since the British left in the early 1800s (Baracca, 2007; Gordon, 1998). They have maintained a strong African-identified culture even though their ancestry has derived from African, Amerindian, and European cultures. Locally, Creoles' relatively higher levels of education and their bilingual ability has given them economic and political advantages. Due to the changing demographics of Bluefields, many Creoles worry that their political rights will not be upheld, and that local and traditional cultures will disappear with the influx of migrants. Although specific poverty indicators by ethnic group are not available, the key informants interviewed indicated that Creoles' local knowledge, strong community bonds, and higher levels of education have made them less vulnerable than the indigenous rural-to-urban or Mestizo west-to-east migrants residing in Bluefields. In the words of one long-time Creole resident:

Bluefields has changed a lot since Joan... There are more people because those farmers don't want to live on the farm anymore and came here to Bluefields, and we are having more and more of the Pacific Coasters come to the Atlantic every day.

*Miss Sarah, July 14, 2008*

Rapid population growth not only increases the number of people at risk (i.e., exposed), but also increases the exposure of people who do not have experience with unusual extreme environmental conditions and the potential for breakdown of social networks (McLeman, 2010). The cultural differences and prevailing distrust between long-time Costeño residents and Mestizo newcomers (Morris, 2016) are significant underlying factors, or root causes in the PAR vernacular, of social vulnerability in Bluefields.

## 5.2 Dynamic Pressures Creating Vulnerable Conditions

Rapid urbanization and inadequate infrastructure and development funding, both linked to neoliberal structural adjustment reforms, are among the dynamic pressures currently enhancing vulnerability in Bluefields. The social strain created by the rapid influx of culturally and linguistically distinct Mestizo migrants combined with poor access to local social services like health care and education result in pressures that, following the PAR model, will increase vulnerability.

### 5.2.1 Rapid Urbanization

Rapid urbanization in Bluefields has marginalized new populations of culturally isolated and economically disadvantaged residents. Despite its poor economy, Bluefields continues to draw migrants from rural areas and the Pacific Coast. As the largest city in the region, Bluefields has urban amenities and, perhaps most importantly, basic services (e.g., electricity and schools — including the region's only university, BICU est. 1991). Since Hurricane Joan, Bluefields has more than doubled both its areal extent and its population. The number of people living in the outlying neighborhoods continues to grow, making population estimates highly variable and less reliable. The 2005 Nicaraguan census reported the city's population to be 35,790 (INIDE, 2008), and growth has continued to the present. The jobs that are available in the region favor either the more educated Creoles or Managua-based entrepreneurs, and this has increased vulnerabilities of the poor and of rural migrants to the city.

At the national scale, Bluefield's rapid urbanization can be attributed to neoliberal policies initiated in the early 1990s after the defeat of the Sandinistas. The new policies heightened poverty and increased landlessness. Between 1978 and 1988 the Sandinista government restructured land tenure through the Agrarian Reform Law, which caused a sharp decline in landholding by the largest landowners. Redistribution

of the land benefited 60% of Nicaraguan peasant families. One of the first acts of President Violeta Chamorro's (neoliberal) regime in 1990 was to reverse the land redistribution. The new administration was committed to compensating the large landowners who had lost their lands at the hands of the Sandinista government. The Chamorro regime prioritized privatization and reauthorized the sale of private property. As a result, many indigenous subsistence farmers sold their lands and moved to cities in search of work. Mestizos in the highlands pushed eastward in search of new, unclaimed land for agriculture. Some eventually settled in Bluefields (Mendola, 2006).

### 5.2.2 Structural Adjustment Programs and Lack of Infrastructure and Development Funds

Structural Adjustment Programs (SAPs) that began in 1990 also exacerbated poverty and intensified economic and political marginalization of the poor. After 17 years of neoliberal governments, the Sandinista party regained control in 2007. With Daniel Ortega as president once again, the Nicaraguan government denounced neoliberalism and politically aligned itself with the leftist governments of Venezuela and Cuba. However, political corruption and a commitment to complying with International Monetary Fund's structural adjustment programs conflicted with the government's anti-poverty programs, programs that have ultimately failed to reach landless migrants (Gutiérrez, 2010).

The lack of infrastructure on Nicaragua's Atlantic Coast exemplifies the PAR model's dynamic pressure components, which render isolation and lack of access to federal government funds into the production of unsafe conditions (especially a lack of hurricane refuge shelters). An emergency manager in Bluefields stressed the impact of the lack of funds available from the federal government to adequately prepare for a future hurricane:

Right now we are working on plans for shelters. We would like to make sure that there are safe places for people to go, both here in Bluefields and on the Corn Islands. As of now there is no place for people of Corn Island to go and that could be a disaster if there is a hurricane. The biggest problem is our budget. We don't have the money to build this and we don't have money to pay people for labor costs. This is a big problem everywhere in Nicaragua. Because our budget is so small there is very little to be



done.

*Captain Lewis, Nicaraguan Civil Defense, July 12, 2008*

### 5.3 Unsafe Conditions for the Highest Risk Populations

The sprawl of poor neighborhoods in floodplains, poor housing quality, insecure livelihoods that limit the access to safe housing, and lack of experience with hurricanes together increase vulnerability, primarily among new migrants settling in improvised housing in flood-prone areas. Insights from Creole community leaders can help to explain the increase of vulnerability since Hurricane Joan.

#### 5.3.1 Sprawl of Poor Neighborhoods in Floodplains

Bluefields is built on the Bluefields Lagoon at the mouth of the Escondido River (Figure 1). While the city was originally settled on an elevated bluff overlooking the lagoon, the urbanization has spread to the lagoon's edge and to the riverbanks. According to Mr. Nelson (July 13, 2008), the Escondido River commonly experiences floods throughout the rainy season, and people are routinely evacuated from their homes.

Bluefield was deeply transformed by Hurricane Joan. The hurricane itself prompted the beginning of rural-to-urban migration to Bluefields (Rocha, 2007). The storm destroyed homes and property throughout the RAAS and caused heavy losses among subsistence farmers and rural residents. Without the economic means to rebuild, many were forced to move to the city. While the Creoles replaced century-old multi-generational wood homes with sturdy single-family concrete dwellings in the city, new migrants established their own neighborhoods on the outer edges of the city. Homes in these newer neighborhoods are often constructed out of sub-standard or unconventional building materials and they typically lack proper sanitation and access to electricity.

#### 5.3.2 Poor Mestizo and Indigenous Groups at Risk

Creole respondents did not view themselves as the most vulnerable of residents in Bluefields. They alluded to the rift between the Creoles and the more recent migrants to Bluefields. Creole informants regularly referred to the vulnerable as 'those people' who live 'out there' or 'down there', pointing toward the riverbank or toward the periphery of the city. A general theme emerged from the interviews of the Creole elders

that they considered themselves to be disconnected from the more recent migrants to the city.

#### 5.3.3 Low Incomes and Unstable Local Livelihoods

Unsafe settlements along the riverbanks and lagoon are a product of the residents' economic dependencies on fishing, of the urbanization that pushed people to the outer limits of the coastal city, and the need for peasant migrants to relocate on less expensive and less desirable land. Land pressures increase as people migrate to urban areas and, as it is throughout the developing world, new arrivals have few alternatives to living in risky locations and in substandard conditions (Wisner et al., 2004). Bluefields' neighborhoods contain many shanty homes built on steeply-sloped river banks or on the low-lying shoreline of the lagoon (Figure 4). Furthermore, recent migrants have settled in Bluefields' hazard-prone areas, resulting in more people living in dangerous settings around the city. The low elevation and hazardousness of floodplains guarantee storm-surge flooding exposure caused by tropical storms. A community organizer explained some of her concerns about this problem:

Before, there were not homes built right on the lagoon. Now there are more people here and some are building their houses right to the shore. So if a hurricane comes now, there is going to be a big disaster. Their homes will flood first and be ruined.

*Miss Daphne, July 10, 2008*

In Bluefields, many people make their livelihoods on the sea. Fishermen's needs to keep their valuable equipment secure and near to their homes has prompted some residents to live near the water. The local fishing inspector explained who he felt was at risk and why some residents felt that being near their valuables was worth the risk:

Since Hurricane Joan, many people built houses right near the water, against the shore. That is going to be a big disaster with all of these new neighborhoods there... there have been a lot of people moving here to Bluefields, so there are less of the safe areas for them to build. Also many people rely on the rivers and lagoon to keep their fishing boats and they want to be near their boats, so nobody steals things you know. People thieving things is a big worry here. We all worry about that. Many people don't have any



**Figure 4:** Dwellings built on low-lying areas along Bluefields Lagoon (July 2008).

money so they just look for things to take and to sell, everyone locks their gates here. It did not always used to be this way, but it is the way now because there are so many people that are poor.

*Mr. Polk, July 30, 2008*

Bluefield's former mayor confirmed that the Nicaraguan government did try to intervene at one point to move the people that were living these highly exposed locations. Their homes were being flooded several times a year, which put the lives of their family members in danger, and Civil Defense and the Red Cross were constantly risking their own lives to rescue them:

Have you been down to the lagoon, and seen the homes that are built right beside the water? Those people must be moved any time there is floods or anything. I remember the government tried to give them land so they could be in a safer place. But right away those people returned, went right back. They don't understand the risks... The people are fishermen so they want their boat right there, and they don't realize what we were trying to accomplish. In a short time, they go right back, so I can see if a hurricane strikes them, they will do it again. When there is a bad flood, and these homes fall down, they come back and fix them with the sticks and just go on. And then the government will say that they won't do any more to help

because the people did not take the help from them .

*Mr. Robinson, July 17, 2008*

Ultimately the government has not solved this issue. As illustrated above, even when given the opportunity to move out of hazardous areas, residents choose short-term economic security over longer-term safety. The economic burdens and risks associated with theft take precedent in their lives.

Substandard housing in flood-prone areas also has heightened the residents' vulnerability to hurricanes, especially that of the migrants. Since poverty spawned their migrations to the city, they lack the financial resources to construct safe, permanent housing. Rural-to-urban migrants tend to reside in inadequately built dwellings that are scattered along hillsides and river banks throughout the Bluefields region (Figures 3). One leader of a prominent NGO explained how migrants often construct dwellings:

We have a lot of poor migrants that just come and make buildings out of any type of material they find and that's what they live in. They might have some old boards or old zinc and just nail it up. That is bad material, bad construction and not safe. ...They are just trying to live for tomorrow, much less think about if a storm is going to hurt them...

*Mr. Franklin, July 19, 2008*

### 5.3.4 Lack of Disaster Preparedness

Finally, most Bluefields residents living in the dwellings of lowest quality in the most hazard-prone places are migrants who have little hurricane experience. Creoles have expressed concern that new residents lack awareness and experience with local hazards. The Creoles feel that their awareness (often reinforced by the stories of family members who have lived on Nicaragua's Atlantic Coast for a long time) and their experiences have provided them with extensive understanding of hurricane risks and vital strategies for mitigating them. Several participants stated that it was specifically Hurricane Joan that made them aware of the dangers of tropical storms. Mr. Byers provided a fitting example:

Before Joan, everyone around here thought that a hurricane couldn't come to Bluefields. They thought that the lagoon would protect us, or that because of the shape of the coast it would not hit here. But after it did, and people see how bad it was, that changed our minds, and now people know that hurricanes are very dangerous.  
*Mr. Byers July 20, 2008*

Most of the Creole respondents expressed some variation of the notion that experience is vital: 'we were here twenty years ago, we have lived through storms and we know what to do. But the others, the newcomers, they may be in trouble.' Creole informants pointed out that the residents who were living with less were more at risk to be impacted in a disaster event:

If a hurricane were to come to Bluefields, there are many houses, like mine, that are stronger built. But then there are lots of people out there that have migrated from the woodlands and the farms to come to Bluefields and they are living in what we call chosas or huts. So we can't say that Bluefields is totally prepared because there are many people living in huts.  
*Miss Sylvia, July 14, 2008*

In Bluefields, Nicaragua, the local 'unsafe conditions' delineated in the PAR model, are manifested as sprawling poor neighborhoods located in floodplains that are populated by impoverished recent migrants who have little experience with hurricanes. These neighborhoods are characterized by extreme poverty, rooted in insecure livelihoods that yield only poorly constructed dwellings built of inadequate materials, and substandard living conditions.

## 6. Conclusion

In assessing how the city of Bluefields changed since it was destroyed by Hurricane Joan, this article has sought to unveil how these changes have affected the city's present vulnerability to future hurricanes. The historical political independence and cultural distinctiveness of the Atlantic Coast has also shaped the region's vulnerability to natural hazards. Bluefield's relationship with the federal government in Managua has produced new vulnerabilities on the Atlantic Coast twenty years after Hurricane Joan. Government policies have directly influenced not only hurricane preparedness and recovery but have generated regional migration and rapid urbanization.

At the community level, this study has shown the specific factors that act to shape vulnerability, and provided details of how these various factors emerged in Bluefields. On the Atlantic Coast, the Sandinista Revolution (1979-1989) followed by a period of retooling by neoliberal policies (1990-2007) contributed to migration (rural-to-urban and west-to-east) to Bluefields, increased poverty and substandard living conditions, and intensified a lack of trust of the central government. These factors have largely intensified over the two decades since Hurricane Joan (1988) and the end of the Sandinista era (1989) and have concurrently increased vulnerability. Vulnerability will likely continue to increase as more time passes due to an increasing population living in unsafe conditions in unsafe place and that lack knowledge and experience with such devastating storms.

This case study brings to light many of Wisner *et al.*'s (2004) 'generalizable truths' about natural disasters. Vulnerabilities to natural disasters, as seen in Bluefields, are rooted in everyday life, are manifestations of development failures, have distant and remote precursors, and are linked to livelihood resilience and household capacities. Compounded, these factors result in the need to release pressures through changes in institutions, structures of dominations, and improved access to resources (Wisner *et al.*, 2004, p. 367). Also evident in Bluefields is the tendency to address the symptoms rather than the causes of disasters. Since any fundamental solutions to disaster will require political change, radical reform of the international economic system, and the development of public policy that would protect rather than exploit people and natural resources, solving the problems are unlikely (Wisner *et al.*, 2004). In the PAR model, dynamic pressures are contemporary processes or activities that 'channel' the root causes of vulnerability into specific unsafe

conditions. Rapid migration is a key dynamic pressure in Bluefields. The forces that initiated migration of Bluefield's most vulnerable population emanate from regional and state-level trends and policies that encourage Mestizo land-grabbing and the eventual movement of rural peoples to Bluefields. These forces likewise are unlikely to abate.

As natural disaster research continues to evolve, more studies should enlist a holistic, local approach, as demonstrated here. This approach has drawn from and situated local perspectives within smaller scale issues of governance and global policies. By connecting various scales of analysis and assessing how local residents feel toward hurricane vulnerability in Bluefields, this study has provided insight into the social elements of vulnerability to hazards.

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