Description of the Nicaragua Dry Corridor (NDC)

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Foreword

The main objective of this study is to better understand the characteristics of the Nicaraguan Dry Corridor, principal causes and consequences of the problems, and possible development alternatives and opportunities for the population living there, especially actions impacting on housing conditions, water access, sanitation, livelihoods (taking the demographic bonus into account), food security, access to essential services, prevention of disaster risks and adaptation to climate change, and in this way contribute to mitigating migration from Central America.

Climate change is a constant threat that affects the global population overall, with greater impact on those who are most vulnerable. The effects take many forms, depending on the geographical and social conditions in each territory.

Due to its location in the Central American isthmus between Honduras and Costa Rica and between the Pacific and Atlantic oceans, Nicaragua is the planet's second most vulnerable country to hurricanes and tropical storms. It ranks third on the world scale in vulnerability to earthquakes[1].

The Nicaraguan Dry Corridor (NDC) runs diagonally from the country's northeastern border to the intermediate zone between the Xolotlán and Cocibolca lakes. According to the Nicaraguan Institute of Territorial Studies (*Instituto Nicaragüense de Estudios Territoriales*-INETER), this area spans 8,666 km^2, with 31 municipalities situated primarily in Nicaragua's central region and some in the western end of the Pacific region, comprising 6.65 % of national territory (130,375 km2)[2].

Temperatures have risen considerably and will continue affecting the country, especially the NDC. From the 1980s to 2015, average temperatures in Nicaragua increased 0.7 degrees Celsius[4]. By the year 2100 temperature could rise by two to three degrees Celsius[5].

Seventy percent of municipalities in the Nicaraguan Dry Corridor present an elevated risk of drought,

worsened by accelerated deforestation that reduced forested area from 6.3% to 5.5% between 2000 and 2015[6]. This is particularly significant for populations residing in the NDC, given their high socioeconomic dependence on agriculture[7].

At Habitat for Humanity Nicaragua, we consider the multidimensional problem of the Nicaraguan Dry Corridor can only be addressed in partnership with diverse players, with the participation of the communities, to design sustainable solutions and adapting to climate change in this geographical area.

Frank Matus
Country Director
Habitat for Humanity Nicaragua

1 Source: Inter-American Development Bank (IDB) – Press Release, November 27, 2013. https://www.iadb.org/es/noticias/comunicados-de-prensa/2013-11-27/nicaragua-refuerza-respuesta-ante-desastres-naturales%2C10676.html#
2 INETER (2020). Boletín Agrometeorológico de la Dirección General de Meteorología. (Technical note: the document does not indicate the publication date, which was thus researched by the consultant in INETER.)
3 INIDE (2019). *"Anuario estadístico 2019"*. INIDE. Published March 8, 2021. Data summary in Table 3, Annexes. (Technical note: all INIDE data are projections based on the 2005 census).
4 Plataforma nacional información y conocimientos sobre el cambio climático. Impactos de la Variabilidad Climática y el Cambio Climático. Consulted October 4, 2021, at https://cambioclimatico.ineter.gob.ni/impactopage.html
5 "Proyección de temperaturas para Nicaragua para el 2100", INETER, MARENA (2018), "Atlas de escenarios Climáticos de Nicaragua hasta el año 2080", Recovered [8/6/2021] at: https://www.ineter.gob.ni/libro/index.html.
6 Plataforma nacional información y conocimientos sobre el cambio climático: Impactos de la Variabilidad Climática y el Cambio Climático. Consulted October 4, 2021, at https://cambioclimatico.ineter.gob.ni/impactopage.html
7 MEFCCA (2018) "Marco de Gestión Ambiental y Social del Proyecto: Agricultura Resiliente al Clima en el Corredor Seco de Nicaragua.". Ministerio de Economía Familiar, Comunitaria Cooperativa y Asociativa 2018. https://ewsdata.rightsinde-velopment.org/files/documents/82/WB-P162982.pdf. Public disclosure authorized.

General description

The Nicaragua Dry Corridor (NDC) is a transverse geographic axis that extends from the northeastern border of the country to the intermediate zone between Lakes Xolotlan and Cocibolca. It covers an area of 3,346 square miles (equivalent to 6.65% of the country) and forms part of the southern end of the Central American Dry Corridor. It includes 31 municipalities, mostly from the Central Region of the country and some from the western end of the Pacific Region.

The NDC covers a population of **1,354,966** people, which represents 20.5% of the country's total population of Nicaragua; 56.4% of these people reside in urban areas and 43.6% in rural areas. The Nicaraguan demographic pyramid continues to show a population with a broad youth base, which means that most of the population in Nicaragua is entering the economically active age (above 16 years of age and under 60). The number of people per family that depend economically on adults is less. This generation gap is called a demographic dividend. Where it is a clear transition process that is beginning to open a window of demographic bonus. Therefore, in families, more people can generate income and fewer people who must be supported. This is an advantage to improve a family income and the possibility to save, to invest in other things such as home improvement, etc.

NDC climate risk

Nicaragua's geographical location makes it prone to high-intensity climatic events. The Global Climate Risk Index, published by Germanwatch in 2019, places Nicaragua in sixth place worldwide in terms of the number of extreme weather events recorded between 1998 and 2017. Newly gathered historical data shows that the NDC reflects the country's national reality of a long-term warming process, with experts determining that in the twenty years before 2015, the average temperature in that region increased by 0.10 degrees Celsius.

Although the NDC has a dual hydrometeorological pattern that includes annual periods of intense precipitation, droughts are both recurrent and significant. The areas of Nicaragua affected by the most severe droughts are mainly found within the boundaries of the NDC. Nearly 70% of municipalities in the NDC show an elevated risk of drought, ranging from moderate in 28

municipalities to severe in nine. Six municipalities show a mix of severe drought risk in some areas and moderate risk in others. Correspondingly, the NDC has the lowest levels of soil moisture in the country, implying that hydrometeorological droughts tend to lead to agricultural droughts, with a significant negative impact on crops. The El Niño–Southern Oscillation (ENSO), with increasing recurrences, increases this condition of accentuated hydric stress.

At the other end of the spectrum, hurricanes, phenomena such as La Niña, and local climatic forces can trigger flooding events. Nearly one-third of the municipalities in this region show a medium or high vulnerability to floods, which is linked to precarious housing and inadequate locations, such as along riverbanks.

Availability of water resources

Ninety-three percent of Nicaragua's surface waters are located in the Atlantic region, while in the NDC the availability of this type of water resource tends to be low and, due to its nature, very fragile in the face of the impacts of drought, due to the combined effect of low precipitation and pronounced evaporation. This implies a considerable risk that meteorological droughts will turn into hydrological droughts, decreasing the resources available for crop irrigation and other uses. This is particularly important for the populations that reside in the NDC because of their socio-economic dependence on agriculture because groundwater is often found at deep levels (thus, is difficult to access) and because recurrent droughts are affecting the area at increasing rates.

Although Lake Xolotlan is a large body of water adjacent to the NDC, its use is limited by high levels of pollution. Crop irrigation from Lake Xolotlan is concentrated to large plantations, with limited access for the region's many small-scale producers.

Economic and productive aspects of the NDC

Production in the NDC is mainly focused on agriculture and livestock, so the factors associated with the hydrometeorological duality of both droughts and floods, cause significant effects on these economic sectors.

Small and large agricultural properties coexist. For the latter, commercial production is supported by irrigation systems, and the main crops are rice, tobacco, and coffee. Commercial production and its associated agricultural industries comprise most of the region's rural labor. This includes both landless and small producers—the latter of which must work for commercial producers to earn additional income given the low productivity and high drought-related vulnerability of their plots.

Small producers grow basic grains (such as maize, beans, and sorghum) for household consumption. When possible, they sell the surplus. These crops are mainly rainfed (dependent on rainfall due to a lack of artificial irrigation systems) and are cultivated with rudimentary technologies, with little to no access to financial services or technical assistance. This makes them highly vulnerable to climatic impacts. This is significant, given that there are roughly 31,000 small-scale subsistence farms

of less than two hectares each, representing 46% of all farms in the NDC. Examples of poverty, food insecurity, and seasonal and permanent migration conditions are evident in this region.

Small- and large-scale properties also coexist in livestock production. Small-scale livestock farms show low productivity because of the challenges these producers face to provide adequate quality and quantity of food and water to their animals. Inefficient production often means failing to meet even household consumption needs.

In the urban area, retail trade and small manufacturing units and the provision of various services predominate, although in some localities the maquilas have an important presence.

In terms of employment, the Central region (which covers most of the NDC) mainly relies on rural production, with just over half of its population working in the primary sector (agriculture, fisheries, livestock).

Regarding unemployment, which is causally linked to phenomena such as poverty, the country has an extremely low unemployment rate at 5.6% of its economically active population (EAP). However, in terms of underemployment, the Central region reaches 39.8% of the EAP, while in rural areas (across the country) it is 47.4%.

Housing and utilities

As of 2014, Nicaragua's housing deficit was 957,000 housing units, including both qualitative and quantitative deficits. It is estimated that 20,000 new housing units are needed per year, though the government and private sector are only building 5,000—and these are mainly catered to the middle and upper classes, leaving the most disadvantaged sectors unattended.

The most critical quality-related shortcomings are inadequate floors (34.6% nationally and 54.7% in rural areas) and insecure tenure (only 64.3% of households nationally and 56.1% in rural areas have titles to their land).

The 2010 Urban Economic Census found that more than 21,000 housing units in the NDC are also used for small-scale economic activities (trade, services, manufacturing).

As of 2019, 5% of the households in the Central region lacked electricity, with 2.1% addressing this need through kerosene lamps, candles, and similar. In addition, 14.3% of households lacked telephone service.

Sixty-seven percent of households in the NDC use firewood for cooking, often leading to serious

health problems, particularly in women and children.

At the national level, 90% of households in urban areas have access to safe water, while only 55% do in the NDC's rural areas. In 71% of these, water is supplied through micro-aqueducts that are usually managed by Water and Sanitation Committees (CAPS), community organizations that provide this essential service, particularly in rural communities and small cities.

In terms of sanitation, the national lag is higher, with only 51.5% of households having sanitary sewage systems. In addition, nearly two-thirds of households in the Central region use unhealthy solid waste disposal methods, burning, burying, or dumping sewage in places such as rivers and wastelands and multiplying health threats.

Poverty, migration and food insecurity

According to the 2019 Household Survey, in the Central Region of the country, 39.3% of the households surveyed showed one Unsatisfied Basic Need, and 16.4% have two. In both cases, the figures are higher than the national average.

In the measurement corresponding to the Poverty Line method, the results indicate that general poverty was greater in the center of the country and in the Atlantic affecting nearly 59% of the population of these regions. There has been an increase in poverty indicators since 2017, especially in urban areas.

An expression of poverty that combines the effects of hydrometeorological anomalies and the socio-economic status of NDC households has to do with food insecurity. The population of 11 NDC municipalities, most of them in Jinotega, Madriz, and Nueva Segovia, have a high nutritional gap in their population. Some households have addressed food insecurity by implementing strategies that compromise their health and well-being in the medium and long term because they involve sacrificing their livelihoods, children's education, family assets (e.g., selling their house, farmland, or animals), and savings for future crises.

Poverty also becomes the main determining factor of migration, along with the increasingly frequent and extreme hydrometeorological events described above. This is confirmed by studies conducted in some NDC municipalities, which also found that migrants from this region are predominantly young, have a low level of schooling, and, increasingly, are female.

Most international migrants travel to Costa Rica, Panama, El Salvador, and Spain. Migration is usually permanent, although in the case of Costa Rica it is often seasonal. This seasonal migration, related to crop performance and climatic impacts, also happens domestically as the labor force moves to zones within Nicaragua that have large coffee and tobacco plantations. In the end, such migratory seasonality ends up mobilizing the families of working people including children and leads to new challenges and social problems.

Health and education

In terms of health, certain diseases are particularly tied to socio-economic conditions, housing, its environmental, and cultural patterns of housing and hygiene stand out. In terms of diseases transmitted by vectors (insects and rodents, mainly), it is observed that in recent years there has been a significant incidence of malaria, which totaled almost

34 thousand cases in 2020, a 161.6% increase compared to the previous year. Although suspected cases of dengue decreased by 5.2% compared with 2019, the number of confirmed cases totaled more than 25,000. Conversely, instances of Chikungunya and Zika have almost disappeared in recent years. Acute respiratory infections (ARI) and diarrhea also decreased from 2019 to 2020 by 16.4% and 29.7%, respectively; however, these rates are still extremely high. Diarrhea reached almost 75 thousand cases in 2020, while ARI had an incidence of 490 thousand cases in the same year.

While this data was gathered at the national level, the patterns could be replicating or escalating in the NDC areas, given their climatic and socioeconomic characteristics.

The Central region shows better access to health centers in comparison to the national average, with shorter distances (1.6 miles versus 1.36 miles) and less travel time (29.1 minutes versus 24 minutes) to the nearest health center.

By 2019, the Central region had an illiteracy rate of 19%—one-fifth of its population and 4% higher than the national average. In rural areas, the illiteracy rate is 6.5% higher than the national average.

Net enrollment rates—understood as the percentage of students of age for a given level of education who are enrolled in any level of education, expressed as a percentage of the corresponding population—were: 87.4% for primary grades, 64.6% for middle and high school, and 15.3% for college. In rural areas, just 47.9% are enrolled in middle and high school, and only 7.3% are in college.

Indigenous peoples

Chorotega descendants are predominant in the NDC, with a population of approximately 93,000 in the Central region, concentrated in the following NDC municipalities: **Mozonte**, **Telpaneca**, **San Lucas**, **Totogalpa**, **Cusmapa**, **Sébaco**, and **Jinotega**. These communities are organized into indigenous coordination groups and indigenous councils. Importantly, the Chorotega descendants' territory includes 50,334 hectares of forests, 24,825 (49%) of which are in the NDC.

Closing

Habitat for Humanity International in Latin America and the Caribbean and Habitat for Humanity Nicaragua conducted the study on the Nicaraguan Dry Corridor (*Caracterización del Corredor Seco de Nicaragua*) to further understand the impact of climate change on the environment and living conditions of the population inhabiting this geographical area, and how this directly impacts the right to adequate housing.

This study reveals the problems afflicting more than 1.3 million people who live in the Nicaraguan Dry Corridor and face severe conditions of economic, social and environmental vulnerability. Finding alternatives to help this population increase resilience and improve their living conditions is the primary motivation and goal of the information presented in this document.

Reality shows that urbanization is occurring rapidly in Nicaragua, and unless measures are taken to mitigate or adapt to climate change and regulate urbanization and migration, the consequences for the population in general and particularly for the most vulnerable will be greater in coming years.

For this reason, at Habitat for Humanity International we have proposed an articulated approach at regional level allowing us to design programmatic and strategic initiatives for mitigating threats and vulnerabilities in this territory. We hope the information encourages other actors to join this effort.

For more information about Habitat for Humanity Nicaragua, visit **www.habitatnicaragua.org** and **https://www.habitat.org/lac-es** to learn more about Habitat for Humanity International's work.

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