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Climate Crisis in Honduras and Nicaragua: The Vulnerability of Central America's two Poorest Countries

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Abstract

This article analyzes how rising challenges related to climate change disproportionally impact impoverished communities in Central America's two poorest nations: Honduras and Nicaragua. The geographical location of both countries predisposes them to extreme flooding, hurricanes, and other climate change-induced disasters, which threaten the livelihoods of millions of people. Furthermore, these two countries are also vulnerable to complete climate catastrophes, as nearly 60 percent of Hondurans and 30 percent of Nicaraguans live in poverty. While the disproportionate impact of climate change on impoverished communities is generally understood, this article will investigate the specific threats to the people of Honduras and Nicaragua, compare existing policies to combat the growing climate challenge, as well as the ethical dimensions related to climate vulnerabilities in poor Honduran and Nicaraguan communities.

I. Introduction

Central America is one of the world's most vulnerable regions to climate change, despite its low contributions to global carbon emissions.[1] Two of Central America's most vulnerable countries to climate change, Honduras and Nicaragua, have been working for decades to implement policies to both mitigate and adapt to the unique challenges climate change poses to their economies, environments, and people. However, the situation of both these countries is especially precarious, as they also house the largest number of individuals living in poverty in Central America. Populations living in poverty are already challenged with access to safe water, education, health, and economic opportunity, among a host of other factors. Climate change will only exacerbate these issues, causing more damage to the communities that are already worse off.

The intersection between climate change and poverty has garnered significant attention among scholars of economics, development, and ethics. While it is uncontested that there is a clear linkage between the impacts of climate change and the heightened vulnerability of impoverished communities, it is important to further examine the ethical implications of various climate change policies, particularly those that seek to address the inequities caused by poverty. This article seeks

[1] Stewart et al. (2022).

to explore the ethical aspects of policies in both Honduras and Nicaragua that have been implemented to address the intertwined issues of climate change and poverty.

This article is structured in six sections. Following this introduction, the next section offers a brief literature review. The third section provides a brief socioeconomic background on Honduras and Nicaragua. The fourth section examines some of the main facts concerning climate change and poverty in both countries. The fifth section reviews some ethical dimensions of poverty and climate change policy in Honduras and Nicaragua before the last section offers potential conclusions.

II. Literature Review

The rising threat of climate change to vulnerable populations in Mesoamerica has generated a significant wealth of literature examining the impact of climate change on rural and impoverished Hondurans and Nicaraguans. With a particular emphasis on the impact on agricultural systems, rural livelihoods, and climate resiliency, the literature describes that climate change will disproportionally impact more vulnerable populations, but that climate change resilience policy may be an opportunity to strengthen impoverished communities. McSweeney and Coomes (2011), Kocsis (2011), and Keller et al. (2018) center their research on Honduras while Byrne (2014), Herrera, Ruben and Dijkstra (2018), and Quiroga et al. (2020) focus on Nicaragua.

- McSweeney and Coomes (2011) introduce evidence that affirms the commonly held claim that poor households are most heavily impacted by climate change disasters through a study on the Tawahka community in Honduras before and after Hurricane Mitch. However, they offer a glimmer of hope for poor communities, claiming that climate shocks can offer windows of opportunity that trigger systemic social-ecological improvement through climate resiliency policies. They claim the community response to Hurricane Mitch inspired poorer communities to work toward institutional changes such as climate resiliency infrastructure, primary forest conversion, and more equitable land distribution.
- Kocsis (2011) elaborates on the impact of extreme weather events on Honduras's hillside households, namely small-scale agricultural farmers. The analysis found that extreme weather events have the strongest impact on the cash income and human health of these poor, rural farmers. The study also demonstrated that households that rely on agriculture are particularly vulnerable to climate disaster and the coping mechanisms currently employed by hillside households will not provide enough resources to counter the increasing severity of climate shocks.
- Keller et al. (2018) investigate how climate shocks impact food security in Honduran communities. They investigate how climate change has cascading effects on food utilization, food access, food availability, as well as on the underlying system(s) of governance. The authors note in particular that key support systems, including natural resources, storage, transportation, and energy, must be bolstered to respond to the rise of severe climate disaster.
- Byrne (2014) finds that the adaptive capacity of Nicaraguan households is related to demographic information, including family size, age of head of household, indigenous status, and climactic region, and that adaptive capacity signifies a household's ability to respond and adapt to climate crises. Interestingly, they found the Atlantic region, which

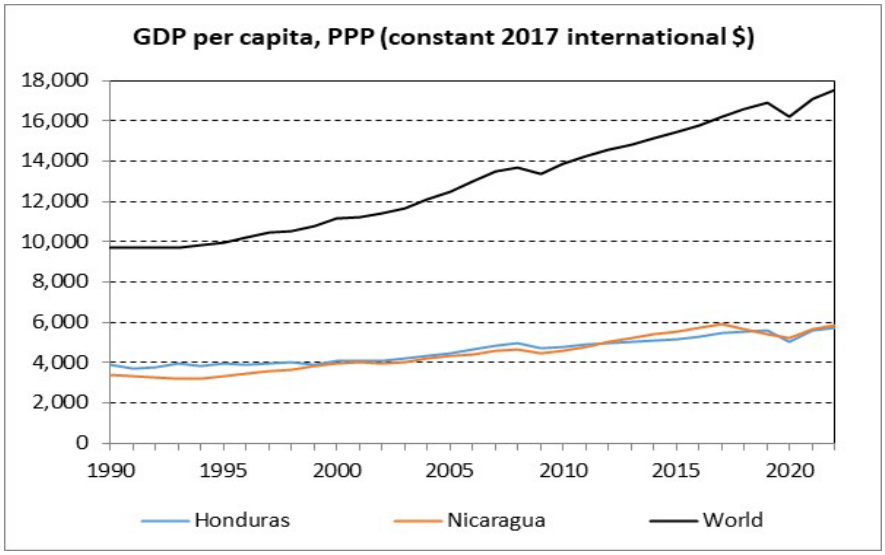
has the highest levels of poverty, is likely to fare better in cases of severe climate shocks even though it ranks low on the scale of adaptive capacity.

- Herrera, Ruben and Dijkstra (2018) examine factors related to climate shock variability and its relation to vulnerability to poverty in Nicaragua. The study found that climate variability causes more people to be vulnerable to poverty than are currently impoverished, indicating the risk of climate change to perpetrating cycles of poverty. The analysis also indicates the heightened threat of climate change to Nicaraguans living in rural areas, where climate disaster also threatens welfare.
- Quiroga et al. (2020) frame the perceptions and behavior of Nicaraguan coffee farmers in the context of adaptation to climate change. Small farmers with lower levels of education live in regions with higher levels of poverty perceived themselves to have a more limited capacity to adapt to climate change. The study also highlighted the threat of climate disasters to Nicaragua's coffee production, as over 44,000 Nicaraguan small-scale farmers rely entirely on income related to coffee production.

III. Socioeconomic Background

Figure 1 demonstrates the similarities between Honduras and Nicaragua on GDP per capita when adjusted for purchasing power parity (PPP). As the countries are in geographically similar locations, have economies that are largely agricultural, and have high levels of poverty, their GDP per capita when adjusted for PPP are very similar. The lower GDP per capita in Nicaragua between 1990 and 2000 may be attributed to the recovery after the Contra War, in which Nicaragua's democracy had just been established and required time to become economically stable after the war. In general, both countries have a largely positive growth pattern, with slight downturns around the 2008 world financial crisis and the COVID-19 pandemic. In 2022, Honduras and Nicaragua are almost back to pre-pandemic levels of GDP per capita, though only about one third of the world's average PPP-adjusted GDP per capita.

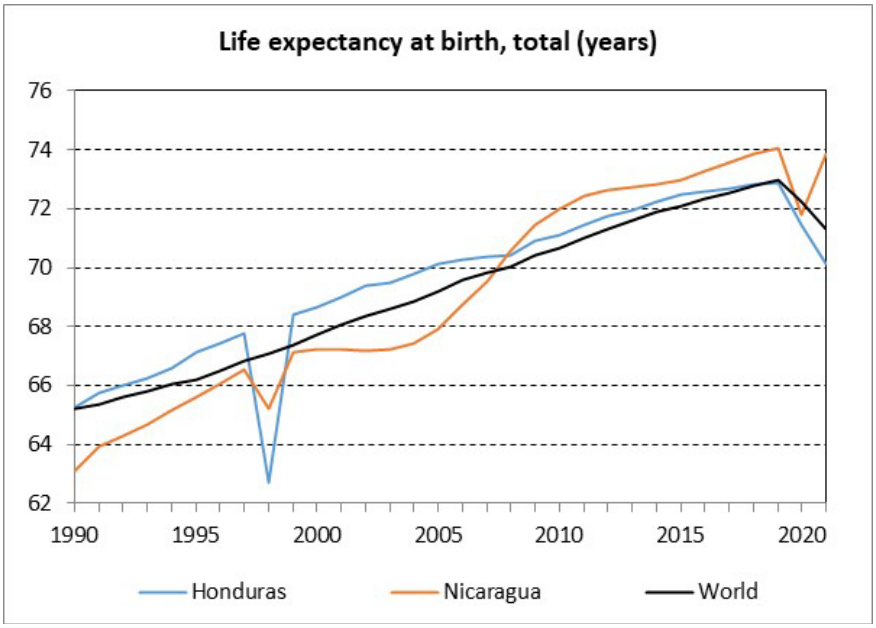
Figure 1: PPP-adjusted GDP per capita, 1990–2022



Source: Created by author based on World Bank (2024).

As shown in Figure 2, Nicaragua and Honduras also have similar life expectancies. Honduras's life expectancy graph follows a relatively positive pattern, with a sharp decrease in 1998 due to Hurricane Mitch, which is considered the second deadliest Atlantic hurricane in recorded history. Nicaragua also saw a downward spike due to Hurricane Mitch although it was not as severe as Honduras's spike. Nicaragua's life expectancy remained lower than Honduras's until Daniel Ortega became president in 2007, where it then rapidly increased. Both countries faced a decline again during the COVID-19 pandemic. Interestingly, Nicaragua's life expectancy immediately bounced back to pre-pandemic levels in 2021, while Honduras's life expectancy continued on a downward trend. When compared with the rest of the world, Honduras's life expectancy follows pretty closely to the global trend with the exception of Hurricane Mitch in 1998. Nicaragua's pattern is more irregular, with fluctuations in life expectancy that the global trend mostly does not experience.

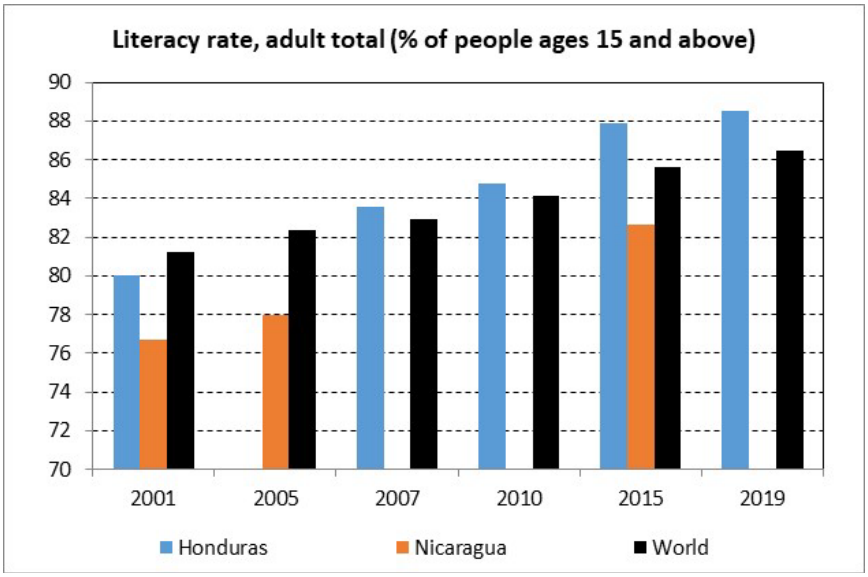
Figure 2: Life Expectancy at Birth (years), 1990–2021



Source: Created by author based on World Bank (2024).

The data for adult literacy rates (shown in Figure 3) in Honduras and Nicaragua are limited but still show a general depiction of growth. In 2001, Honduras had an 80 percent adult literacy rate with Nicaragua trailing slightly above 76 percent. In 2015, the only other year we have data for both countries, the gap between Honduras and Nicaragua has widened slightly even though both countries had experienced a growth in literacy rates. Honduras's literacy rate jumped from 80 percent to almost 88 percent between 2001 and 2015. Nicaragua experienced growth in adult literacy as well, climbing from 76.6 percent to 82.6 percent. Comparing the two countries to the world, we can see that both, Honduras and Nicaragua had lower literacy rates than the world average in 2001. By at least 2007, Honduras surpassed the world average literacy rates while Nicaragua remained below world average literacy.

Figure 3: Adult Literacy Rates as Percentage of the Total Population, selected years



Source: Created by author based on World Bank (2024).

Comparing the three figures with each other, we can make several interesting observations. First, though Honduras and Nicaragua are very close to each other in terms of PPP-adjusted GDP per capita and life expectancy, Nicaragua's literacy rates are considerably below that of Honduras. Second, though Honduras and Nicaragua are far below the world average in terms of PPP-adjusted GDP per capita, they are overall very close to the world average in terms of life expectancy. Third, while Honduras has, with the exception of 2001, higher literacy rates than the world average, Nicaragua's literacy rates are consistently below the world average.

IV. Analysis of Facts

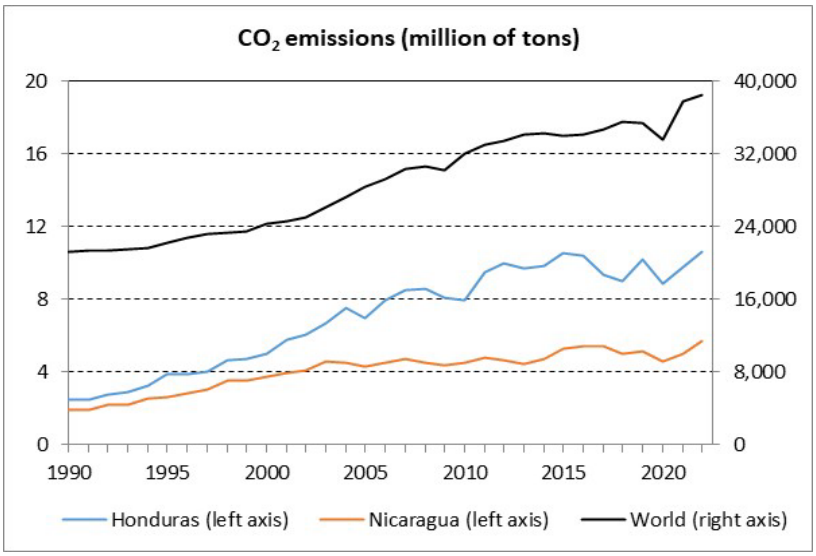
This section is structured into three subsections. The first subsection provides some basic facts on carbon dioxide (CO_2) emissions in Honduras and Nicaragua and compared to the world. As this article discusses the particular ethical concerns relating to the augmented impact of climate change on those facing poverty, the second subsection then examines the evolution of poverty in Honduras and Nicaragua based on three poverty headcount ratios, which allows comparisons to be drawn between the two countries. The third subsection provides some details on the historical natural hazards and climate vulnerability in Honduras and Nicaragua.

IV.1. Carbon Dioxide (CO_2) Emissions

Figure 4 shows that Honduras and Nicaragua had nearly the same CO_2 emissions in 1990: Honduras emitted 2.5 million tons of CO_2, while Nicaragua emitted 1.9 million tons of CO_2. However, both countries' CO_2 emissions were fractions compared to the emissions of the world: Honduras emitted 0.011 percent of the world's CO_2 emission, while Nicaragua emitted 0.009 percent of the world's CO_2 emissions in 1990. By 2022, Honduras' emissions (10.6 million tons) were nearly twice that of Nicaragua (5.7 million tons). While both countries' share in world CO_2 emissions increased, they were with 0.028 percent for Honduras and 0.015 percent for Nicaragua,

still marginal, and hence, both countries have therefore contributed only marginally to climate change.

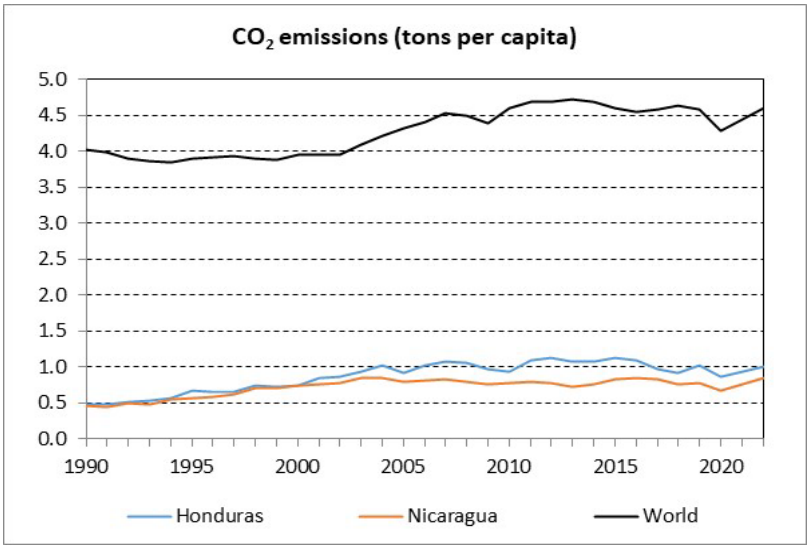
Figure 4: Total CO_2 Emissions (millions of tons), 1990–2022



Source: Created by author based on World Bank (2024) for 1990–2020, and Our World in Data (https://ourworldindata.org/) for 2021 and 2022.

Figure 5 displays CO_2 emissions per capita. Both Honduras and Nicaragua are vastly below the world in CO_2 emissions per capita, with Honduras peaking at 1.14 metric tons per capita in 2012 and Nicaragua peaking at 0.86 metric tons per capita in 2003. The world reached a high of 4.72 metric tons per capita in 2013, which is over four times higher than either Honduras's or Nicaragua's carbon dioxide emissions per capita.

Figure 5: CO_2 Emissions per capita (metric tons), 1990–2022



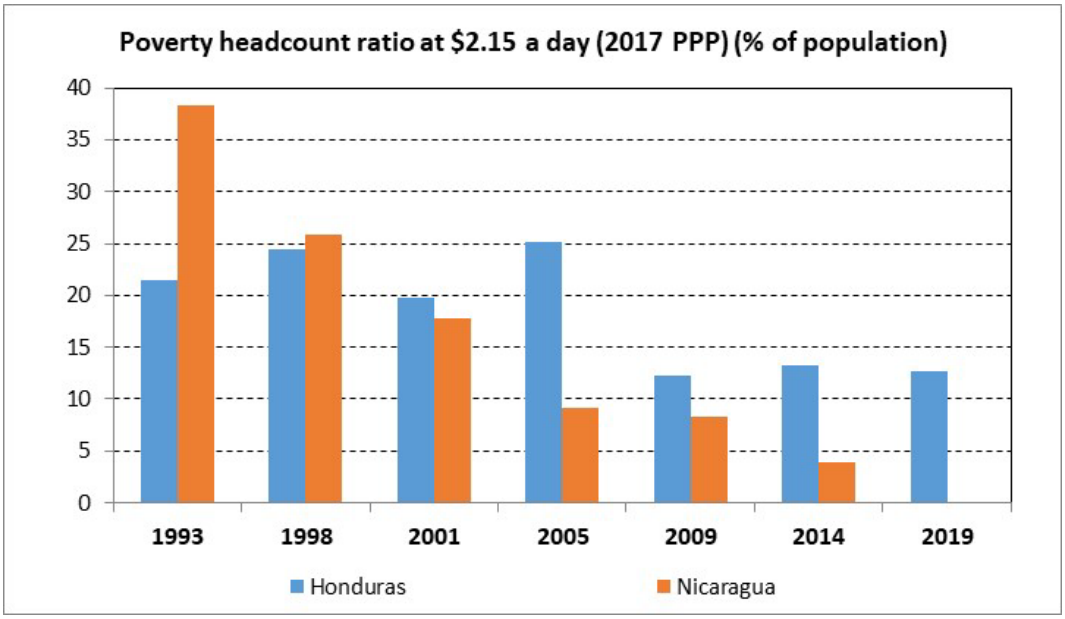
Source: Created by author based on World Bank (2024) for 1990–2020, and Our World in Data (https://ourworldindata.org/) for 2021 and 2022.

As for the general trend in Honduras, the carbon emissions generally appear to increase from 1990 until 2004. In 2004 a period of volatility begins, with bursts of emission increases followed by decreases. Notably, Honduras sees sharp increases from 2005 to 2007, 2010 to 2012, 2018 to 2019, and after 2020, with subsequent periods of declining CO_2 emissions per capita from 2004 to 2005, 2007 to 2010, 2012 to 2013, 2014 to 2018, and from 2019 to 2020. Nicaragua follows a similar pattern of increasing emissions per capita beginning in 1990; however, it begins on a downward trend after 2003, with periods of slight resurgence before decreasing again. In general, CO_2 emissions per capita in Nicaragua decrease after peaking in 2003 until they increase more significantly again between 2013 and 2015. The trend stabilizes briefly between 2015 and 2017, before generally decreasing again in 2020 and then increases again in 2021 and 2022.

IV.2. Degree of Poverty

Figures 6, 7 and 8 use the available data to demonstrate the trends in the poverty headcount ratios at $2.25 a day, $3.65 a day, and $6.85 a day, respectively from 1993 to 2019 for Honduras and from 1993 to 2014 for Nicaragua. In both countries, the three poverty headcount ratios are the highest in 1993, with nearly 70 percent of all Hondurans and 80 percent of Nicaraguans living on less than $6.85 per day. Following 1993, the Nicaraguan poverty headcount ratios follow a steady decline, with each level of the poverty headcount ratio demonstrating decreasing levels of poverty during each period of measurement.

Figure 6: Poverty Headcount Ratio (2017 PPP) (percent of population), 1993–2019

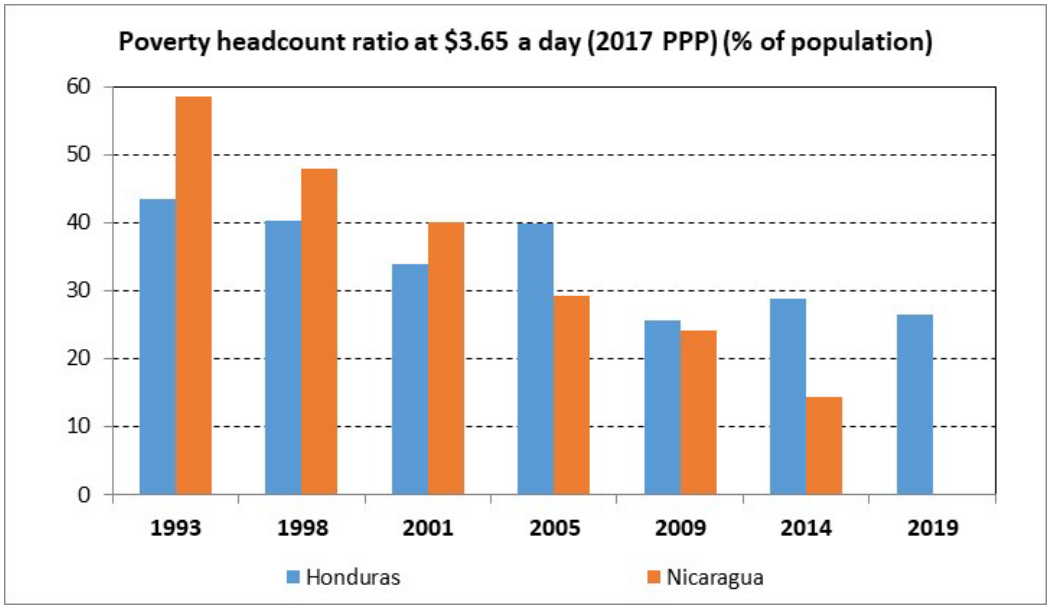


Source: Created by author based on World Bank (2024).

Honduras, on the other hand, is far less synchronized in its trend. The percentage of Hondurans living on less than $6.85 per day decreased between 1993 and 2001, before bouncing up again in 2005. It then declined again in 2009 before going up slightly in 2014. The poverty headcount ratios at $3.65 and $2.15 a day also demonstrated this slightly irregular pattern, with periods of brief increase following longer periods of decrease. Between 1993 and 2009, a larger percentage of

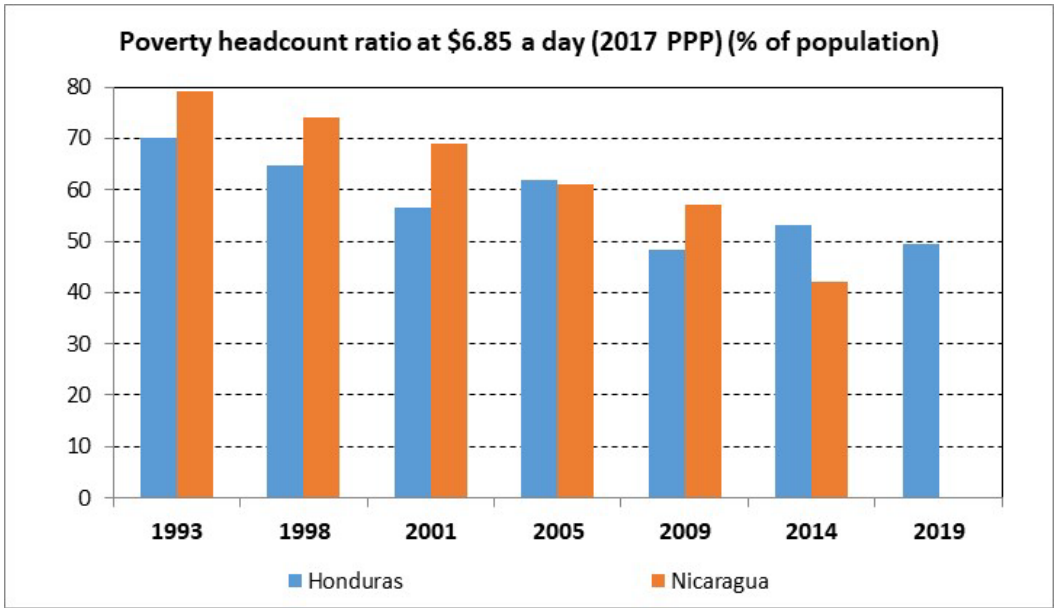
Nicaraguans lived in poverty than Hondurans. However, Nicaragua's steady reduction in the poverty headcount ratio across the board caused it to have lower poverty rates in 2014 than Honduras, who actually experienced a slight increase in poverty rates during 2014, though all three poverty headcount ratios decline in 2019.

Figure 7: Poverty Headcount Ratio (2017 PPP) (percent of population), 1993–2019



Source: Created by author based on World Bank (2024).

Figure 8: Poverty Headcount Ratio (2017 PPP) (percent of population), 1993–2019

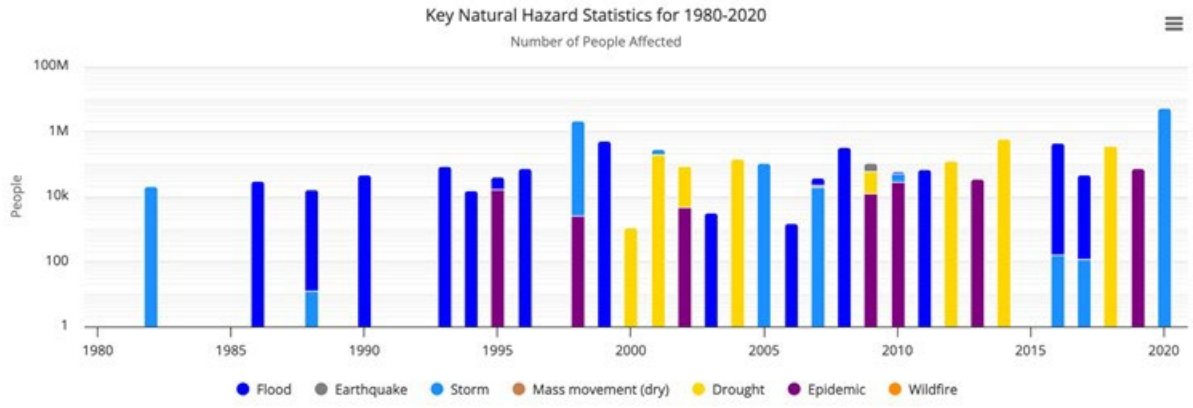


Source: Created by author based on World Bank (2024).

IV.3. Historical Natural Hazards and Climate Vulnerability

Figures 9 and 10 demonstrate the key natural hazard statistics of Honduras and Nicaragua between 1980 and 2020, demonstrating how many people are impacted by different natural disasters and their frequency across recent history. Figure 9 demonstrates that Honduras is most frequently plagued by cases of flooding, drought, and epidemic. Based on Honduras's particular vulnerability to periods of flooding and drought, the country appears to be most impacted by irregular precipitation patterns induced by global warming. Honduras also appears particularly vulnerable to pandemics, with the increase of vector-borne and water-borne illnesses as a hazard of climate change potentially driving this trend.[2] Also frequent are severe storms, which the Central American region is particularly vulnerable to, due to the dynamics of the El Niño/La Niña phenomenon.[3] The number of impacted Hondurans follows a relatively static trend, with natural hazard events in 1998 and 2020 culminating in climate vulnerability for over 1 million Hondurans.

Figure 9: Observed Natural Hazard Statistics for Honduras, 1980–2020



Source: Climate Change Knowledge Portal, https://doi.org/10.57966/tw2k-9h36.

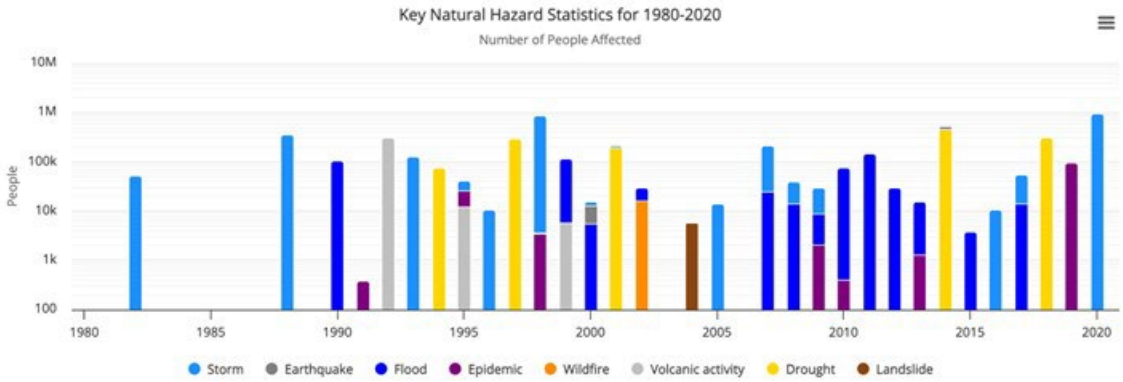
Figure 10 illustrates Nicaragua's vulnerability to various natural hazards. Similar to Honduras, Nicaragua most frequently faces storms, flooding, and drought. However, Nicaragua has slightly more diversity concerning natural disaster related incidents, with a number of years including volcanic activity, landslides, and wildfires. Nicaragua faces slightly more variability than Honduras in the number of people affected by natural hazards, and the data demonstrates how periods of storms or heavy rainfall are often followed by a year of drought, such as in 2015 or in 2018, which often impact hundreds of thousands of Nicaraguans. This rainfall irregularity has an extremely dangerous impact on agriculture, making Nicaragua particularly vulnerable to food scarcity.[4]

Natural disasters in Nicaragua also impacted almost one million people in 1998 and in 2020, just as occurred in Honduras, and for similar reasons: storms and epidemic. As Nicaragua and Honduras are both located in Central America, it likely that their geographical similarities play a role in the high level of vulnerability to climate change-related disasters both countries face. The

[2] Notre Dame Global Adaptation Initiative (ND-GAIN) (2024a).
[3] GRID Arendal (2024).
[4] Notre Dame Global Adaptation Initiative (ND-GAIN) (2024b).

following section will discuss the particular ethical concerns of climate change on people living in poverty.

Figure 10: Observed Natural Hazard Statistics for Nicaragua, 1980–2020



Source: Climate Change Knowledge Portal, https://doi.org/10.57966/tw2k-9h36.

V. Ethical Analysis

Honduras and Nicaragua have both undertaken significant strategies to alleviate poverty and address climate change in their respective countries. This section analyzes the ethical considerations of poverty prevention policy and climate change policy in both countries through an application of different ethical perspectives. Subsection V.1. will focus on the ethical considerations of poverty prevention and human development programs whereas subsection V.2. will discuss the ethical considerations of climate change adaptation and mitigation policy.

V.1. Ethical Dimensions of Poverty Prevention and Human Development Programs

As the two poorest countries in Central America, both Honduras and Nicaragua have crafted significant national strategies to reduce poverty and bolster human development. Addressing poverty as multidimensional, the strategies proffered by Honduras and Nicaragua seek to address all three of the World Development Report's key issues of poverty: lack of opportunity, lack of empowerment, and lack of security.[5]

Honduras has a significant history of collaboration with international developmental organizations, such as the International Monetary Fund and World Bank, as well as with non-governmental organizations (NGOs) and domestic stakeholders. The Poverty Reduction Strategy Paper (2001–2015) prepared by the Government of Honduras (2001) deduces that the main causes of poverty in Honduras are slow economic growth and low income per capita, income inequality, low levels of education, and low employment productivity. The strategy lays out five major guidelines aimed at reducing different facets of poverty: prioritize actions that tend to reduce poverty in a sustainable manner, prioritize actions that favor the least developed groups and areas of the country, strengthen civil-society participation and decentralization, strengthen governance and participatory democracy, and reduce environmental vulnerability and its impact on poverty.

[5] World Bank (2001).

The first two guidelines adopt the priority perspective, described by Barrientos et al. (2016) as an ethical perspective through which the most ethical outcome is to prioritize the worst off members of society. As Honduras's national strategy emphasizes the importance of prioritizing the peoples and regions which are experiencing poverty most acutely, the targeted provision of services, such as income transfers, entrepreneurship training, and strengthening local organizational capacities in rural areas, corresponds to the priority perspective while simultaneously addressing multiple dimensions of poverty.[6]

Nicaragua's national poverty reduction strategy, the National Plan to Fight Poverty and for Human Development, also adopts the priority perspective in some regards. Nicaragua's Minister of Housing and Public Credit, Ivan Acosta, emphasized the need to ensure both economic and social policies centered on alleviating poverty amongst the Nicaragua's poorest.[7] Hence, Nicaragua's efforts to reduce poverty is also based on the priority perspective for why to assist people in poverty.

In addition, any ethical issue can be examined using the Markkula Center for Applied Ethics' (2021) framework for ethical decision-making. Within that framework, Nicaragua's national strategy can also be perceived through the rights approach because it centers according to the Inter-Parliamentary Union (2022) on creating access to key pillars of human rights, such as healthcare, sanitation, economic opportunity, and a safe and livable climate. Even predating the National Plan to Fight Poverty and for Human Development, Nicaragua's antipoverty initiatives have demonstrated a desire to fulfill core human rights, through making primary education free and accessible, de-privatizing the healthcare sector, and even working to address gender disparities and increase gender equality across all aspects of Nicaraguan life.[8]

Both Honduras and Nicaragua prioritize policies that seek to lift rural farmers out of poverty, as these small campesinos are often most impacted by economic turmoil, live in the steepest conditions of poverty, and are most vulnerable to climate variability. Through bolstering the human dignity of campesinos through poverty reduction, these policies reflect the common good approach of the Markkula Center for Applied Ethics (2021). The common good approach emphasizes the importance of respect and compassion for others, particularly the most vulnerable. In having compassion for the multi-layered challenges to alleviating poverty for rural farmers, Honduras and Nicaragua are both crafting national strategies that improve the welfare of communities and strengthen the common good.

V.2. Ethical Dimensions of Climate Change Adaptation and Mitigation Policies

Similarly, to how Honduras and Nicaragua approach poverty reduction and human development, they both recognize the inextricable connection between climate vulnerability and poverty. Both countries work on creating ethical solutions that address the interconnected problems of climate change and poverty. Honduras's National Plan for Adaptation to Climate Change (2018–2030) was adopted in 2017 as part of the Honduras Framework Law on Climate Change.[9]

One of the key provisions of the plan is to encourage the participation and social integration of vulnerable groups, such as those who face poverty, in order to draft adaptation measures that best

[6] Government of Honduras (2001).
[7] Mattson (2021).
[8] Inter-Parliamentary Union (2022).
[9] Government of the Republic of Honduras (2018).

respond to the needs of those who are most directly impacted. This policy measure is reflected best in the Markkula Center's care ethics approach, which centers on the need to respond to individuals in their specific circumstances over calculating utility.[10] Honduras's strategy places a high value on garnering input from diverse sectors of society and tailoring their climate change mitigation efforts to match the unique circumstances of different regions or populations, which entrenches the core tenets of the care ethics approach. Analyzing the distinctions between situations using the care ethics approach helps to create ethical solutions to climate change that are constituent centered.

Nicaragua also has a number of strategies in place to mitigate and adapt to climate change, one of which is called the National Policy on Mitigation and Adaptation to Climate Change. This national policy both emphasizes the importance of climate change adaptation and mitigation while simultaneously championing the importance of economic growth as a mechanism for alleviating poverty.[11] According to Nicaragua's plan, striking a balance between sustainable economic growth and climate change is necessary to ensure the greatest balance of good is found in Nicaragua. This perspective mirrors that of the Markkula Center's utilitarian approach, which emphasizes finding the greatest balance of good for the largest number of stakeholders possible. Because economic growth is typically juxtaposed with sustainability, ensuring climate change mitigation and adaptation measures generate the best possible outcome for as many Nicaraguans as possible is critical. This is exemplified by sustainable forestry practices, where the Nicaraguan forestry industry gains the economic benefits from managing Nicaragua's land resources while also ensuring the rest of Nicaraguan maintains the benefits of biodiversity and ecological conservation.

VI. Conclusion

As demonstrated through this article, there are a number of ethical implications related to poverty reduction and climate change adaptation and mitigation, which are often closely related. As policymakers in Honduras and Nicaragua move forward with the implementation of their policies, it is paramount that they consider the multidimensional aspects of both issues as well as understand how different demographics face variation in vulnerability. As climate change and poverty are becoming increasingly interrelated issues, it is necessary that policymakers do more to address the disproportionate impact of these issues on those living below the poverty line.

Of the perspectives proposed by Barrientos et al. (2016), the priority perspective appears the most prominent in both the policies of Nicaragua and Honduras, which makes sense considering those facing poverty most urgently are also the most vulnerable to climate change. Therefore, considering that impoverished communities are the worst-off in terms of both poverty and climate change, they should be prioritized in the form of policy interventions to alleviate these issues. While Honduras and Nicaragua are both making considerable progress on both the areas of poverty reduction and climate change mitigation and adaptation, they must continue to implement these policies, targeted at impoverished communities, in order to respond to these difficult challenges.

Finally, considering how little both countries have contributed to climate change, yet being some of the worst affected countries by climate change, an argument could also be made that the rights approach implies that compensation payments by those having caused climate change are also

[10] Markkula Center for Applied Ethics (2021).
[11] Green Climate Fund (2020).

required. While some such initiatives have been initiated, there is considerable disagreement about the sufficiency of these compensation payments.

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