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The Unavoidable Crisis: Climate Change in China and Mexico

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Abstract

This article examines the realities of climate change in China and Mexico along with its ethical characteristics and implications. The changing climate does not just affect individual countries, but it threatens humanity across the globe. This analysis delves into how two developing countries from both the Western and Eastern hemispheres are impacted by and addressing climate change. Although this analysis shows differences between China and Mexico in terms of sheer size and contributions to climate change, it does not mean that these two countries have significantly different ethical decisions to make when addressing the issue. In fact, both nations must augment their climate-response policies to further cut carbon emissions in order to meet requirements set by the scientific community and to avoid significant consequences not just for their own countries but the whole globe.

I. Introduction

The nature of the Earth's climate makes it habitable for life, making the planet unique amongst all others in its solar system and most planets in the known universe. However, due to human activity, changes in the Earth's climate will cause 250,000 human deaths each year from 2030 to 2050 according to a conservative estimate.[1] Unlike many political issues facing individual nations, climate change impacts the entirety of human existence, as it threatens the very planet that allows humanity to exist. In order to combat the negative effects of climate change, scientific experts from across the world agree that greenhouse gas emissions should reach net zero by 2050, translating to a 50 percent cut by 2030.[2]

This article analyzes China and Mexico's contribution to climate change along with their adaptation policies through an ethical lens. While China and Mexico are both developing countries, they are respectively, the world's leading and 12th highest emitters of carbon dioxide (CO_2).[3] While climate change threatens human life, its impacts do not occur in a vacuum. Thus, this

[1] Rettner (2019).
[2] Stanford Woods Institute for the Environment (2019).
[3] Union of Concerned Scientists (2020).

analysis keeps socioeconomic realities in mind when examining the ethical approaches and implications of climate policies for the developing nations.

After this introduction, Section II provides a review of previous literature regarding China and Mexico's carbon emissions, the impact of climate change on each nation, and the scientific consensus on necessary steps to combat climate change. The third section details the socioeconomic background of each nation, providing context to their climate realities and policies. Section IV analyzes the facts regarding China and Mexico's carbon emissions along with the resulting temperature increases. The fifth section reviews the ethical origins of each country's policies in response to climate change along with the overall ethical approaches to addressing the crisis. Lastly, Section VI summarizes the findings along with noting necessary steps for China and Mexico to combat climate change.

II. Literature Review

As the most significant dangers of climate change are in the future, there are a multiplicity of scientific studies and forecasts of the potential impacts of increasing temperatures and other resulting environmental changes. Esperón-Rodríguez, Bonifacio-Bautista and Barradas (2015) and Estrada et al. (2020) specifically examine the vulnerability of the Mexican economy and its urban centers as a result of climate change. Fang et al. (2018) and Zheng et al. (2019) examine the causes of China's contribution regarding carbon emissions along with the impacts of climate change on the nation. The United Nations Environment Programme (UNEP) (2019) identifies the current state of the global fight against climate change and notes the minimum standards that nations need to meet in order to mitigate future damages.

- Esperón-Rodríguez, Bonifacio-Bautista and Barradas (2015) investigate how climate change would affect the socio-economic realities in different regions and cities of Mexico. More specifically, they find that increases in temperature and decreases in precipitation will likely significantly reduce crop yields, harming Mexico's large agricultural sector. The authors suggest that Mexico will need to dramatically alter the focus of their agricultural sector towards crops better suited to higher temperatures and less precipitation in order to mitigate the economic damage. Additionally, the article notes that Mexican poverty will likely be exacerbated by climate change due to the degradation of local, agricultural economies.
- Estrada et al. (2020) study the vulnerability of Mexican cities to climate change and recommend strategies for dealing with the various issues. They find that the impact of climate change on Mexican cities will be severe in terms of overall health, the environment, and the economy due to the geographical location of many population centers and the lack of sufficient urban sustainability infrastructure. In response, the authors advise Mexican policymakers to invest in reducing water consumption, expanding public transport systems, and maintaining urban green centers and water bodies, which will reduce the climate change's impact on urban centers.
- Fang et al. (2018) summarize the Chinese government's efforts to reduce their carbon emissions along with investigating the ability of China's terrestrial ecosystems to act as carbon sinks. They explain how, in 2009, China promised to reduce carbon emissions by 40-45 percent by 2020, and in 2015, the government planned to decrease emissions by 60-65 percent from its 2005 level. To further this effort, the Chinese government has started multiple ecological restoration projects along with energy-wasting factories and businesses.

Moreover, the authors find that China's terrestrial ecosystems are significant carbon sinks, thus, further Chinese efforts to combat climate change and promote ecological protection and restoration can substantially reduce emissions.

- Zheng et al. (2019) investigate the primary causes of the significant augmentation in China's carbon emissions since 1978. The study finds that Chinese population expansion stimulated immense economic growth which correlated with augmented carbon emissions. In addition, China has relied on coal for primary energy consumption since 1978, even comprising 59.0 percent of it in 2018. The authors also note that each time China expanded the market aspect of its economy, transitioning away from a command economy in 1978 and joining the World Trade Organization (WTO) in 2001, increased foreign investment and domestic consumption perpetuated greater carbon emissions.
- The United Nations Environment Programme (UNEP) (2019) focuses on the progress of the global community in reducing greenhouse gas (GHG) emissions along with highlighting the necessary changes that nations need to make to their policy agendas in order to meet environmental goals. The report finds that in contrast with the promises of most nations, GHG emissions continue to rise with no sign of peaking or decline without dramatic changes in energy consumption in the immediate future. The members of the Group of 20 (G20) produce 78 percent of global GHG emissions. In order to keep global temperatures from increasing less than 2°Celsius or 1.5°Celsius by the end of the century, global emissions must decrease by 2.7 percent and 7.6 percent for each respective goal.

III. Socioeconomic Background

Due to major market-based reforms, China has grown from a poor command economy to the second largest economy in the world behind the United States over the last five decades. Under the leadership of Chairman Mao Zedong, the vast majority of economic activity in China was controlled by the state. Following Mao's passing in 1976, the Chinese government began to institute major reforms, starting in 1978. Most of the reforms constituted a decentralization of the Chinese economy along with market and trade liberalization.[4] According to the World Bank Group (2020a), China experienced the fastest sustained expansion by a major economy in history, which lifted 850 million people out of poverty between 1979 and 2020.

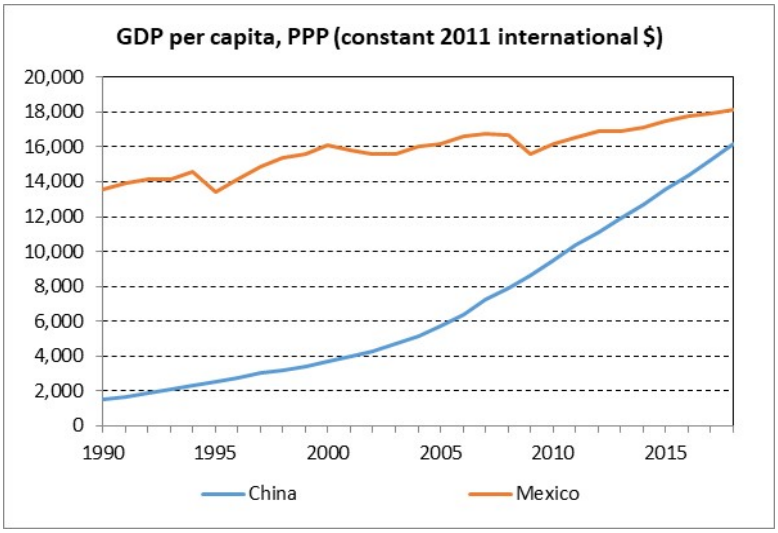
Mexico had the 15th largest GDP in the world, growing at around 2 percent per year during 1980-2018, which represents an underperformance compared to similar countries.[5] Although Mexico has not experienced a dramatic reconstruction of its economy, it did implement some market and trade liberalization reforms during the 1980s and 1990s.[6] Mexican poverty has fallen over the last thirty years. In 2018, Mexico's poverty headcount ratio at $5.50-a-day was around 23 percent, compared to almost 40 percent in 1989.[7]

Figure 1 illustrates purchasing-power-parity (PPP)-adjusted GDP per capita in constant international dollars from 1990 to 2018. China's GDP per capita has continuously increased over the last three decades at a significant rate. In 1990, China's PPP-adjusted GDP per capita was $1,522, which increased to $3,690 in 2000, $9,498 in 2010, and $16,182 in 2018. The rate of GDP

[4] This paragraph is based on Congressional Research Service (2019), pp. 2-5.
[5] World Bank Group (2020b).
[6] Central Intelligence Agency (2020).
[7] World Bank (2020).

per capita growth for China significantly shifted in the early 2000s, which was at least partially caused by China's further opening up to the global economy through joining the WTO. At no point did China's GDP per capita decrease from 1990 to 2018. In contrast, Mexico's GDP per capita increased only marginally, from $13,580 in 1990 to $18,134 in 2018. Mexico's GDP per capita dipped three times: from 1994-1995, from 2000-2003, and again from 2008-2009 due to recessions caused by the 1994 Mexican Peso Crisis, the so-called early 2000s recession, and the 2008 Great Recession, respectively.[8]

Figure 1: GDP per capita, PPP (constant 2011 international $), 1990-2018



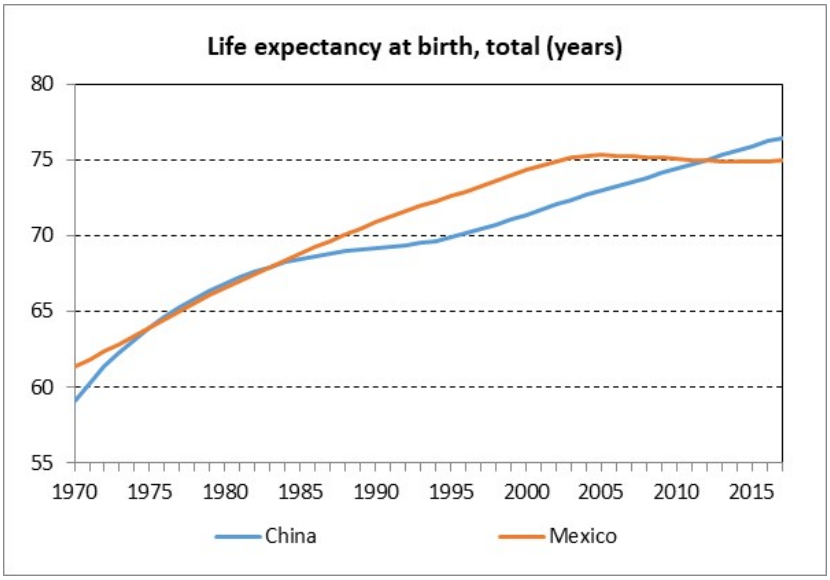
Source: Created by author based on World Bank (2020).

In dissimilar fashion to GDP per capita, life expectancy at birth has not changed at dramatically different rates across the two countries. Figure 2 highlights the life expectancy at birth in years from 1970 to 2017 for China and Mexico. In China, the life expectancy at birth was roughly 59 years in 1970, and this statistic increased at a consistent rate until the early-mid 1980s, where it began to stagnate; however, from around 1995 to 2018, life expectancy increased at a consistent rate again, albeit at a lower rate than during the 1970s. According to Babiarz et al. (2014, p. 39), the high increase in life expectancy during the 1970s was part of an overall trend from 1950 to 1980, due to augmentations in educational attainment and public health campaigns.

As shown in Figure 2, the life expectancy at birth for a Chinese individual increased sharply from 59 years in 1970 to 67 years in 1980, which implied that China's life expectancy was marginally higher in 1980 than that of Mexico. In 1990, China's life expectancy of 69.1 years was again lower than that of Mexico's, which stood at 70.9 years. Overall, China's life expectancy has been growing a bit more uneven than Mexico from 1970 to 2000. After 2000, China's life expectancy growth became steadier, while Mexico's life expectancy began to stagnate and even to decrease slightly. Aburto et al. (2016, p. 88) explain that the stagnation in Mexico's life expectancy largely occurred due to increases in homicides. This led to China overtaking Mexico in terms of life expectancy by 1.5 years in 2017.

[8] Congressional Research Service (2010).

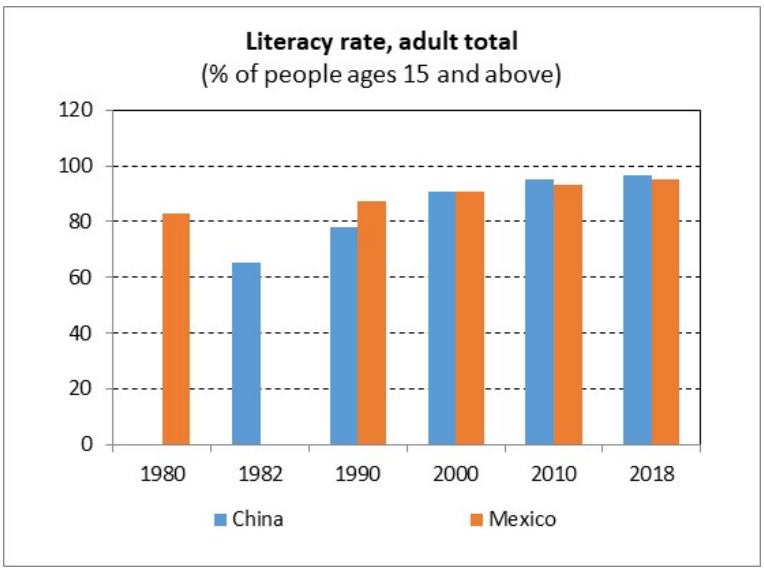
Figure 2: Life Expectancy at Birth, Total (male and female, years), 1970-2017



Source: Created by author based on World Bank (2020).

Figure 3 displays the adult literacy rates in China and Mexico from 1980 to 2018 for all years with publicly available data for Mexico and the corresponding data for China. Despite the limited data, we can see that Mexico had lower literacy rates than China until 2000. China's literacy rate was 83.0 percent in 1980, while Mexico's was only 65.5 percent. By 1990, China's literacy rate increased to 87.6 percent, while Mexico's increased to 77.8 percent. By 2000, Mexico (90.5 percent) had nearly caught up with China (90.9 percent), and for 2010 and 2018, Mexico's literacy rates slightly surpassed those of China.

Figure 3: Adult Literacy Rates, all available years for Mexico, selected years for China



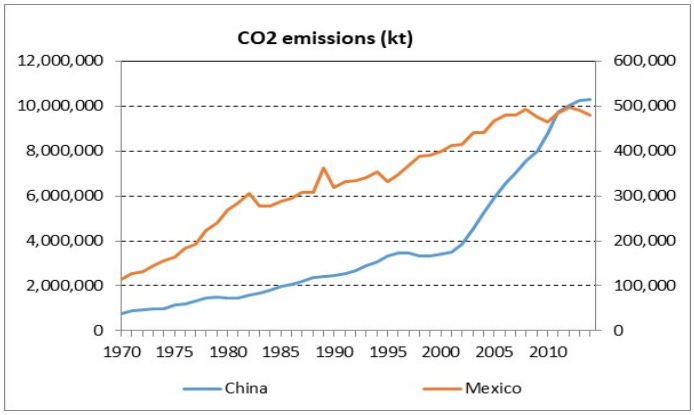
Source: Created by author based on World Bank (2020).

IV. Analysis of Facts

IV.1. Total and per capita CO_2 Emissions

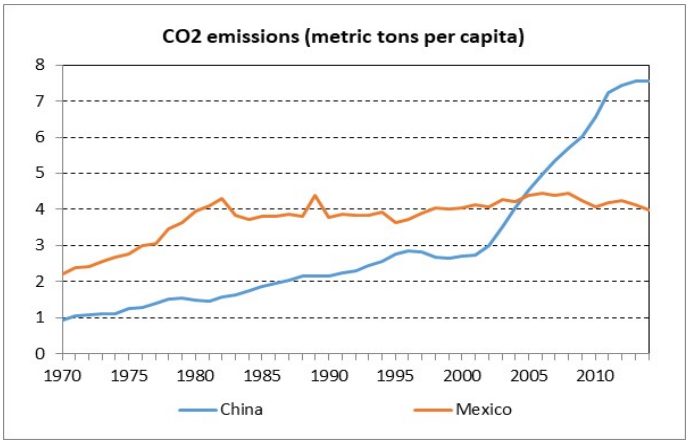
As shown in Figure 4, though starting with very different levels of CO_2 emissions in 1970 (China emitted 771,617 kt of CO_2 while Mexico emitted 114,073 kt of CO_2), the growth rates (in percent) were overall lower in China than in Mexico until 2001, which is when China's CO_2 emissions started to grow exponentially. This sharp increase in China's CO_2 emissions coincides with China entering the WTO in December of 2001 and a subsequent increase in manufacturing production, mostly for exports.[9] While China's CO_2 emissions continued to increase from 2012 to 2014, the growth rate decreased considerably compared to the previous three decades. Despite some volatility, Mexico's CO_2 emissions grew at about the same rate from 1970 to 2008. From 2008 to 2014, Mexico's CO_2 emissions became more volatile, though Figure 4 shows some overall stagnation in Mexico's CO_2 emissions.

Figure 4: CO_2 Emission (kt), 1970-2014



Source: Created by author based on World Bank (2020).

Figure 5: CO_2 Emission (metric tons per capita), 1970-2014



Source: Created by author based on World Bank (2020).

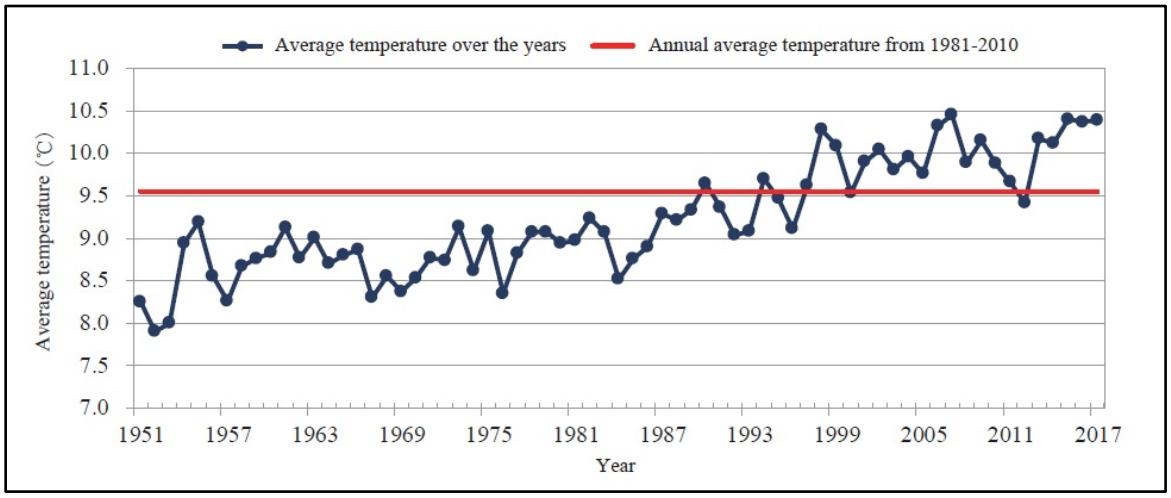
[9] Shan et al. (2018).

Figure 5 accounts for differences in China's and Mexico's population sizes by measuring CO_2 emissions in metric tons per capita from 1970-2014. It shows that Mexico emitted more CO_2 per capita than China from 1970-2004. However, starting in 2005, China overtook Mexico in terms of CO_2 emissions per capita, and in 2014, China emitted 7.5 metric tons of CO_2 per capita compared to 4.0 metric tons per capita for Mexico. Similar to what was noted for Figure 4, the time at which China's per capita CO_2 emissions began to increase in the early 2000s corresponds to when China joined the WTO.

IV.2. Rising Temperatures

While China and Mexico are contributing to climate change through carbon emissions at significantly different absolute amounts, the resulting impacts of climate change do not discriminate based on what country emits the most CO_2. As human-caused carbon emissions have caused global temperatures to rise, the same holds true for both China and Mexico.[10] Figure 6 shows the annual temperature in China from 1951-2017. Over this 66 year-long-period, annual temperatures rose from around 8.3 degrees Celsius to 10.4 degrees Celsius, representing an increase of 2.1 degrees Celsius.[11]

Figure 6: China's Average Annual Temperature (in Celsius), 1951-2017

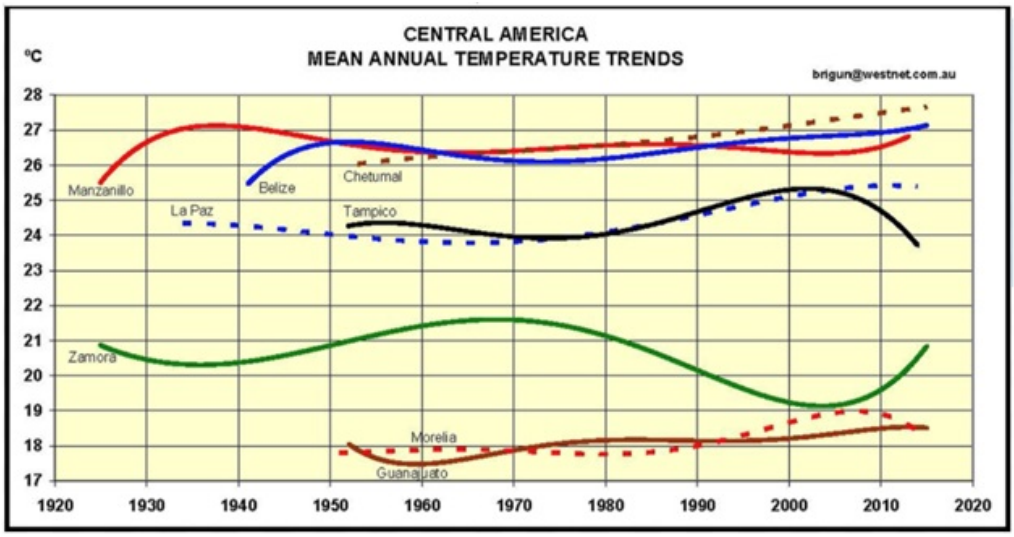


Source: Ministry of Ecology and Environment (2017), p. 46.

Similarly, Figure 7 shows the average temperature temperatures for seven cities in Mexico along with the bordering country of Belize. The data starts as early as 1925 and the most recent numbers represent 2015. In every Mexican city and Belize, except for Tampico and Zamora, the average annual temperature increased from the early-mid 20th century to 2015 by less than 2.0 degrees Celsius, which is slightly less than the 2.1 degrees increase in China's average annual temperatures from 1951-2017.

[10] NASA Goddard Space Flight Center (2011).
[11] Ministry of Ecology and Environment (2017), p. 46.

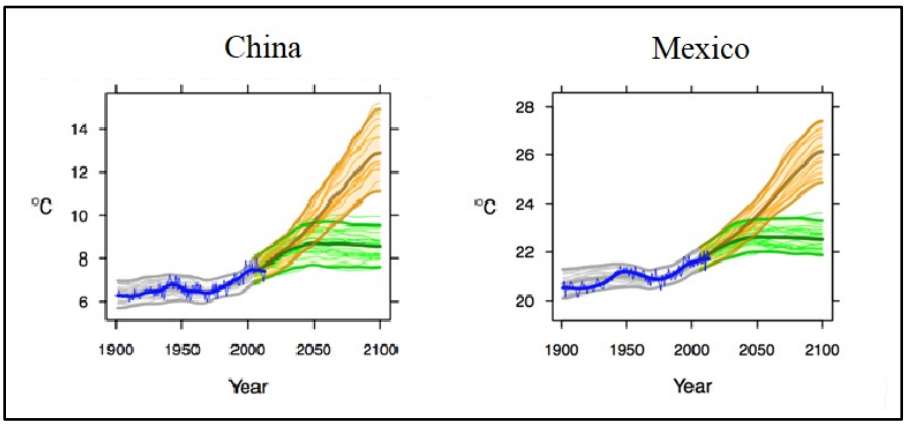
Figure 7: Central American Mean Annual Temperature Trends (in Celsius), 1920-2015



Source: Gunter (2016), based on Royal Netherlands Meteorological Institute data.

Figures 8 and 9 show the World Health Organization's estimates of mean annual temperatures from 1900 to 2100, respectively in China and Mexico. The blue line represents the actual recorded mean annual temperatures in China and Mexico from 1900 to 2015. The orange line represents the estimated mean annual temperatures in a high CO_2 emissions scenario, while the green line represents the estimated mean annual temperatures in a low CO_2 emissions scenario. There are three observations we can make: First, Figures 8 and 9 corroborate the information in Figures 6 and 7, which show that there were modest annual temperature increases in China and Mexico from the early-mid 20th century to the early 21st century. Second, both figures show that in a high emissions scenario, mean annual temperatures will increase at an exponential rate in both China and Mexico. Third, both figures demonstrate that if global CO_2 emissions are reduced so that there is a low emissions scenario, then mean annual temperatures will rise through 2050 and then stabilize.

Figures 8 and 9: Estimated Mean Annual Temperature (degrees Celsius), 1900-2100, respectively for China and Mexico



Source: World Health Organization (2016a for China; 20016b for Mexico).

Disregarding future temperature increases, there have already been negative effects of higher temperatures on China and Mexico. More specifically, rising temperatures have caused glaciers to melt, which has increased flooding in China.[12] In particular, glacial melting causes higher water levels in the Yangtze river, threatening the major cities that exist along it, such as Shanghai.[13] In addition to flooding, there was an inverted-U-shaped relationship between Chinese agricultural production and temperature.[14] While initial temperature increases increased production, continued temperature increases in China have hurt crop yields, and this trend will only continue if temperatures keep rising.[15]

Similar impacts of higher temperatures have been found in Mexico. Over the last decade, the cultivation of certain Mexican crops has begun to decrease. From 2015 to 2019, there was a 4 percent decrease in national corn cultivation and a 18 percent decrease in the city of Tehuacan.[16] Tehuacan represents what may happen to the national Mexican agricultural industry in the future, as many farmers have had to change crops in response to global warming.[17] In addition, higher temperatures have caused more intense draughts. In 2011, Mexico experienced a major drought, resulting in the death of 1.7 million cattle and the withering 2.2 million acres of crops.[18]

Even though China and Mexico have already experienced negative repercussions from higher temperatures, future estimates are far worse than the current realities. According to the World Health Organization (WHO) (2016a, p. 3), under a high emissions scenario, 23 million people in China are projected to be affected by flooding annually from 2070 to 2100. The WHO also estimates that there will be increases in diseases transmission (particularly malaria and dengue fever), heat-related mortality, and undernutrition. In China, the WHO also notes that increases in heat stress will decrease labor productivity. The World Health Organization (WHO) (2016b) projects the same general consequences for Mexico, except that far less people will be affected in Mexico as Mexico's population (126 million in 2018) is less than one tenth of China's population (1.39 billion in 2018).[19]

Moreover, both China and Mexico will experience sharp decreases in agricultural production. Chen and Chen (2018, p. 585) state that the "average rice yield in China is projected to decrease by 10–19 per cent by 2050 and 11–33 per cent by 2070" with temperature increases being the "dominant factors" driving the decrease in agricultural production, Mexico could experience a 40–70 percent reduction in its cropland suitability by 2030 and an 80–100 percent decrease by 2100.[20] Thus, based on the projections by the Climate Reality Leadership Corps (2018), Mexico would have nearly zero usable farmland by the end of the 21st century. These projections assume that no corrective actions are taken, which will hopefully not be the case. Still, these projections based on current trajectories are powerful to illustrate the gravity of climate change impacts.

[12] Shangri-la Institute for Sustainable Communities (2013).
[13] Lai (2009).
[14] Chen, Chen and Xu (2014), p. 25.
[15] Chen, Chen and Xu (2014), p. 25.
[16] Oré (2020).
[17] Oré (2020).
[18] Climate Reality Leadership Corps (2018).
[19] The population data is based on World Bank (2020).
[20] Climate Reality Leadership Corps (2018).

V. Ethical Origins and Ethical Approaches

V.1. Ethical Origins of Climate Change and Chinese/Mexican Responses

Climate change, while human-caused, is not human-directed. In other words, the resulting impacts from increased levels of CO_2 in the Earth's atmosphere do not occur due to any intellectual or conscious considerations. As stated in the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC) (2015, p. 8), "[c]ontinued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems." More recently, Wallace-Wells (2019, pp. 221–222) warned that large swaths of the planet will not be able to sustain human life if no preventative measures are taken.

The ubiquitous and devastating nature of climate change's impacts both call for common good and utilitarian approaches to the issue by all nations. As all countries are impacted by climate change in some manner, the individual good of each nation is tied to the global good. Additionally, with climate change potentially wiping out nations due to making parts of Earth uninhabitable and causing hundreds of millions of deaths worldwide, the costs of climate change can be seen as far outweighing any other contemporary problem.[21]

Both countries have launched numerous anti-climate-change initiatives in the last two decades to reduce their own emissions and invest in renewable energy. The governments of both nations have tried to strike a balance in their initiatives between the ethical considerations of dealing with the consequences of climate change and the initially negative growth prospects caused by drastic anti-climate-change programs.

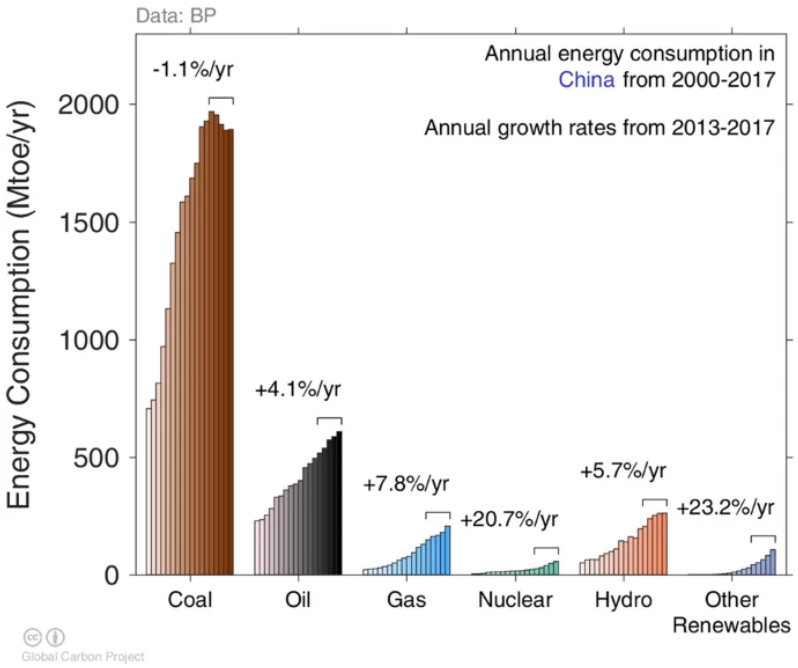
As detailed in Gao (2016): Since the creation of the IPCC, the Chinese government has ordered 110 of its nation's scientists to aid in the preparation of the five IPCC reports that have been released from 1990-2014. In addition, in 2002, the Chinese government began preparing its own National Assessment Report on Climate Change, and different versions were released in 2006, 2011, and 2015. Each of these reports focused on central aspects of climate change itself and potential policy responses.[22] Based on these reports, China has implemented various policy approaches to addressing climate change, especially since 2008, thus, relying on an existence-reality approach.[23]

China's implementation of a low-carbon model helped stabilize the level of overall emissions and per-capita emissions in the most recent years, as was shown in Figure 4 and 5 above. China's model has heavily consisted of reducing the consumption of domestic coal, which heavily fueled its economic growth over the last half-century, and significant investment in renewable energy.[24] Figure 10 shows the increase in renewable energy and decrease in the production and consumption

[21] Parncutt (2019), p. 4.
[22] As stated in Guo (2016, pp. 236-237): The first report "focused on the history and future trend of climate change, its impact and adaptation, and its socioeconomic valuation." The second report "focused on an analysis of global climate change assessment methods, police measures and actions of China in response to climate change, and their effectiveness." And, the third report examined "factual climate change, its impact, adaptation and mitigation, and policy actions, while producing a special report focusing on two hot points 'the impact of climate change on major projects and CO_2 utilization technology.'"
[23] Engels (2018), p. 1.
[24] Engels (2018), p. 2.

of coal. In addition, China officially launched its national carbon market in 2017, which introduced a price on carbon for the largest sources of CO_2 emissions in its economy.[25]

Figure 10: China's Energy Consumption by Source, 2000-2017



Source: Global Carbon Project via Engels (2018), p. 2.

Before around 2011, China's anti-climate initiatives largely served to protect China's economic progress. China sought to "address climate change within the framework of sustainable development" and stressed that it "is necessary to promote sustainable development amidst efforts to address climate change, and strive to achieve the goal of win-win in both."[26] In 2010, the Chinese government called international efforts to curtail carbon emissions a "conspiracy to divide the developing world" and included itself as a developing nation in the assessment that "rich nations… must cut carbon emissions and [for] developing nations… action is not compulsory."[27]

Thus, one major ethical principle of China's climate change response for most of the last several decades was to implement a utilitarian approach, where the costs to its economy and those of developing nations were mitigated while richer nations that could afford major cuts in CO_2 emissions would carry a greater burden. China saw itself as arguing for procedural justice. As described in Paavola, Adger and Huq (2006), this form of justice requires the recognition that developing countries are not equal partners in international negotiations on climate change.

However, since the early 2010s, China significantly shifted its approach to climate change, embracing the low-carbon model.[28] Fearing domestic instability, international instability and a

[25] Harvey and Min (2017).
[26] State Council of the People's Republic of China (2008), Section III, paragraph 3.
[27] Watts, Carrington and Goldenberg (2010), paragraph 8.
[28] Engels (2018), p. 2.

lack of international influence due to both the negative effects of climate change on its economy along with national security issues, China began to cut back on its carbon emissions.[29] China's national carbon market is the largest out of any nation in the world. China has also invested around twice as much money into renewable energy than the United States, the second-largest carbon emitter and largest economy in the world.[30]

As the largest emitter of CO_2, China's focus on procedural justice did not end, rather it changed.[31] Instead, of viewing itself as among the developing nations that cannot afford to take significant climate action, China recognized both its ability and need to cut back on its CO_2 emissions.[32] China also did not abandon the utilitarian approach. Instead, the Chinese government has recognized that the consequences of climate change on the environment along with its economy and domestic stability outweighed the costs of shifting its economy towards renewables and away from coal.[33]

Unlike China, Mexico began not only recognizing but addressing climate change before recent years. Schäfer (2013, paragraph 2) noted that "Mexico has a sound record of addressing climate change challenges and is considered a global leader in the area." In 1998, Mexico ratified the Kyoto Protocol, an international agreement committing industrialized economies to limiting and reducing greenhouse gases, and signed it in 2000.[34] While China took the same actions in a similar timeframe, Mexico actually worked to limit greenhouse gases while China stalled. Since 2000, the Mexican government has worked with the World Bank to invest in renewable energy, manage risks of climate disasters, conduct relevant research, coordinate actions with other nations, and more.[35]

In 2009, Mexico created its Special Program on Climate Change (SPCC), which set "Mexico's long-term climate change agenda, together with medium-term goals for adaptation and mitigation."[36] The SPCC heavily focused on low-carbon measures, such as investing in renewable energy and cutting back on fossil fuels.[37] As reported by the BBC (2012), Mexico passed a comprehensive bill on climate change in 2012, the General Law on Climate Change (GLCC), that committed Mexico to reducing CO_2 emissions by 30 percent by 2020 and 50 percent by 2050 from its 2000 levels.

As detailed in a study by the London School of Economics and Political Science (2020), Mexico's GLCC was amended in 2014 to institute a carbon tax and it was again amended in 2016 to frame a carbon market. Upon passing the GLCC, the Mexican government recognized the significant consequences of climate change on human life, its economy, and ecosystems. Furthermore, in similar fashion to China post-2011, the Mexican government's climate response since the late 1990s and especially since the early 2010s has reflected a utilitarian approach. More specifically, when justifying climate action, Mexico has cited the costs of climate inaction, framing preventative and proactive measures as resulting in a net benefit for the nation. After all, Mexico's vulnerability

[29] Moore and Melton (2019).
[30] Moore and Melton (2019).
[31] Gao (2016), p. 237.
[32] Gao (2016), pp. 237-238.
[33] Engels (2018), p. 2-3.
[34] United Nations (2020).
[35] Schäfer (2013).
[36] LEDS Global Partnership (2015), first paragraph.
[37] LEDS Global Partnership (2015).

to natural phenomena, such as droughts, which will only increase with global temperature increases, threatens its farmers, overall economy, health, and access to food.[38]

Due to Mexico's utilitarian approach, it's climate measures have slowed and even reversed in the face of the COVID-19 pandemic. On May 15th, 2020, Mexico passed a bill that effectively halted private renewable energy investment in the country, prioritizing the government's own ageing, fossil fuel-fired power plants. The reason for this reversal in policy is that the pandemic caused the nation to postpone power feeds from renewable sources. In the eyes of the Mexican government, the immediate risks and costs of the COVID-19 pandemic outweighed the costs of slowing down its climate measures.[39]

V.2. Ethical Approaches in Addressing Climate Impacts

The examination of China's and Mexico's approaches highlight the almost universal adoption of a utilitarian approach to climate change measures across the globe, which produces a debate on the type of anti-climate measures that should be adopted. This debate asks a simple question: what anti-climate policies will produce societal costs that do not outweigh the costs of climate change? One response to the aforementioned question is rooted in the common good approach and cosmopolitan theories of social justice. More specifically, the international goals set by treaties such as the Kyoto and Paris Agreements are rooted in the fact that the entire world faces a common problem. Thus, the individual good of each nation is tied to the collective good of the entire world.

Rising global temperatures caused by carbon emissions by human activity require a reduction of carbon emissions to curtail climate change due to its varying consequences, such as increased natural disasters and higher mortality. Additionally, cosmopolitan theories of social justice argue that justice is "universal, unchanged by time and place," meaning that all humans are entitled to equal justice.[40] Initiatives to reduce carbon-emissions, such as those implemented by China and Mexico, potentially fall in line with these theories, as the effects of their reduced emissions aid the general wellbeing of people across the globe.

Furthermore, another response to the aforementioned question is rooted in rejecting a climate-based common good approach and favoring a specific interpretation of communitarian theories of justice. While the entire globe faces a common problem, different nations have different circumstances, and thus, they should not be mandated to follow the same goals. The Chinese government held this mentality in 2010, when claiming that international efforts to curtail carbon emissions were a "conspiracy to divide the developing world."[41] China's economically-focused perspective on climate change placed an ethical importance on economic growth that increased the living standards and power of its population.[42] Thus, international initiatives that could harm that growth were viewed as unethical, especially as China considered itself a developing nation that should hold the same responsibilities of rich, largely-Western nations.

Moreover, communitarian theories of justice argue that "justice emerges from the relationships between members of a community and that social justice is thus specific to a particular space and

[38] Most of this paragraph is based on London School of Economics and Political Science (2020).
[39] This paragraph is based on a report by Climate Action Tracker (2020).
[40] Paavola, Adger and Huq (2006), 265.
[41] Watts, Carrington and Goldenberg (2010), first paragraph.
[42] State Council of the People's Republic of China Information Office (2008).

time."[43] Since justice is specific to a particular space and time, dramatic climate-action may not be beneficial for nations at certain times. For example, Mexico reduced its usage of renewable energy and reverted back to fossil fuels in response to the realities of the COVID-19 pandemic.[44] In addition, Davey (2016) stated that many developing nations do not view themselves as economically secure enough to transition away from fossil fuels.

The concepts of distributive and procedural justice also heavily impact ethical approaches to climate change. Distributive justice is "the incidence of benefits and costs, broadly conceived so as to encompass nonpecuniary advantages and burdens."[45] In the present context, distributive justice refers to the fact that while climate change impacts all nations, it does not do so equally. In addition, the countries responsible for most carbon emissions should carry more responsibility than those less responsible. Thus, according to international agreements, such as the Paris Agreement, heavier carbon-emission-cutting responsibilities are placed on more developed, richer nations.[46] As the number 1 and 12 current CO_2 emitters, China and Mexico face some of the highest responsibilities under international standards.[47] Furthermore, according to the Center for Global Development (2015), 79 percent of historical carbon emissions were caused by developed countries. However, many of the principal causers of climate change have been driving international climate talks.

Procedural justice "relates to the way in which parties are positioned vis-à-vis processes of planning and decision making, encompassing issues such as recognition, participation, and distribution of power."[48] In the present context, procedural justice means that developing countries are not equal partners in international negotiations that are driven by developed nations. While China and Mexico have heavily participated in international agreements, most developing countries have not driven talks. For example, the European Union, which is responsible for 40 percent of the historical carbon emissions, was critical in comprising the terms of the Paris Agreement.[49] Therefore, in the ethical considerations of many developing countries, distributive justice may be more prevalent than procedural justice.

VI. Conclusion

Through an analysis of China and Mexico's unique histories, this article highlighted the detrimental current and future effects of climate change on the globe and developing countries along with the ethical balancing of priorities for individual nations. While Mexico and China have both augmented their climate response policies in the last decade in order to reduce greenhouse gas emissions, they have yet to implement the necessary changes in the worldwide effort to stabilize global temperatures. In addition, both nations have attempted to balance addressing the threats of climate change without significantly hurting their economies.

Although China and Mexico exist on different continents and have significantly different economies, this analysis reveals the indiscriminate impacts of climate change. As was detailed in this article above, both countries will experience similar dramatic increases in their annual

[43] Paavola, Adger and Huq (2006), p. 265.
[44] Climate Action Tracker (2020).
[45] Paavola, Adger and Huq (2006), p. 266.
[46] European Union (undated).
[47] Union of Concerned Scientists (2020).
[48] Paavola, Adger and Huq (2006), p. 266.
[49] Center for Global Development (2015) and European Union (2018).

temperatures. Furthermore, this article showed that both China and Mexico will experience increases in mortality rates, illness, and natural disasters along with decreases in agricultural production. Therefore, while both countries seek to balance addressing climate change with economic concerns, effective next steps must cause significant decreases in greenhouse gas emissions, in accordance with UN guidelines detailed above. Otherwise, the available research and literature demonstrates that China and Mexico will both experience consequences that most likely far outweigh the economic costs associated with cutting emissions.

Even though both countries have initiated frameworks to reduce their future CO_2 emissions, the goals fall short of the requirements set by the international scientific community. Hence, China and Mexico should both go further in their efforts to cut emissions. While both countries are developing nations, they have much larger economies and more resources than most other developing nations. Thus, if any countries are able to be global leaders in the developing world, China and Mexico are among them.

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