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# Cultural and Economic Factors That Influence Brazilian Public Opinion on Climate Change

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# CULTURAL AND ECONOMIC FACTORS THAT INFLUENCE BRAZILIAN PUBLIC OPINION ON CLIMATE CHANGE

by

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# INTRODUCTION

Climate change is a commons problem of global proportions. The effects of climate change threaten not only the natural world, but also the human systems that we have established (IPCC 2014, 4). The devastating effects of climate change will not be confined to those regions of the world that have contributed the most to this problem. Already, every continent and ocean has been touched by climate change (IPCC 2014, 4).

While some countries have contributed to the problem more than others, effectively addressing climate change will require the efforts of all nations (Selin and VanDeveer 2013, 283). Brazil will be an important player in the world's attempts to address climate change. Brazil is considered a developing nation but its rapid pace of development has also placed it in a high position on the list of global emitters. In addition to its level of emissions, Brazil will be a critical player because it is home to much of the Amazon rainforest.

Designing effective policy to address climate change requires an understanding of more components than just the physical nature of the problem. I propose that cultural factors are crucial influences on public opinion regarding climate change. In order to shed light on the influence of cultural factors, I propose to study the relative weight of these factors on public opinion in Brazil.

The biological, geographical, physical, and economic consequences from climate change are regularly discussed in academic and public discussions (Clammer 2012, 144). Because these consequences are widely recognized, they tend to influence climate change mitigation polices. For Brazil, forestry is the main focus of its climate change mitigation

policies (Townshend et al. 2011, 14). Culture, although not as widely discussed as the previously mentioned factors, is also likely to influence a country's climate change mitigation policies. Linda Steg and Charles Vlek define culture as something that "…often determines gut feelings or emotional responses towards persons, objects or events. Culture involves self-evident knowledge, basic beliefs and fundamental values, which serve as the basis of many different kinds of behavior," (Steg and Vlek 2009, 137). John Clammer recognizes that cultural factors played a role in creating climate change and are likely to influence our adaptation and mitigation strategies (Clammer 2012, 144). Richard van der Wurff recognizes cultural differences as an influential factor in international climate change politics that will help to shape environmental policies (van der Wurff 2009, 459). Perceptions of the environment, environmental problems, and environmental solutions vary between different cultures (Reijnders 2009, 86).

"Brazil is the country of the future-and always will be," is a Brazilian joke that is commonly referenced when discussing the country's level of economic development. Brazil is located at an important juncture of development. It is traditionally thought of as a developing country but is quickly moving in the direction of developed status (Hochstetler 2012, 959; Aldy and Stavins 2009, 5). Countries like Brazil may be pivotal in the global effort to constrain greenhouse gas emissions because their pursuit of economic growth implies an especially large expansion of energy use and potential expansion of greenhouse gas emissions. Already, Brazil is a critical case to examine because of its level of emissions. Matthews et al. rank Brazil as the fourth largest contributor to historical global temperature change based on the cumulative emissions of

fossil fuel carbon dioxide, land-use carbon dioxide, aerosols, and non-carbon dioxide greenhouse gasses (Matthews et al. 2014, 9).

In preparation for the United Nations Framework Convention on Climate Change 2015 Paris Conference, countries outlined their plans for tackling climate change in Intended Nationally Determined Contributions (iNDCs). Brazil pledged to reduce GHG emissions by 37% below 2005 levels by 2025 and 43% below 2005 levels by 2030 (Federative Republic of Brazil 2015, 1). Brazil's iNDC made clear that the country views itself as a developing country. The iNDC states that Brazil welcomes financial support from developed countries (Federative Republic of Brazil 2015, 3). Additionally, the iNDC states that Brazil is willing to work with other developing nations with South-South initiatives to share information and technology regarding forest monitoring systems, biofuels, low carbon agriculture, and reforestation (Federative Republic of Brazil 2015, 4).

Brazil submitted an additional document with their iNDC, "Additional Information on the iNDC For Clarification Purposes Only." This additional document further emphasizes Brazil's status as a developing nation by recognizing that in addition to climate change, Brazil is also faced with problems of poverty, education, public health, employment, housing, infrastructure, and energy access (Federative Republic of Brazil, Additional Information on the iNDC 2015, 1). This document also makes clear that Brazil believes historic responsibility should be considered when determining each country's role in addressing climate change (Federative Republic of Brazil, Additional Information on the iNDC 2015, 5).

In addition to having a high level of emissions, Brazil is a critical case because it is home to the majority of the Amazon rainforest, a carbon sink for the world. The Amazon rainforest is one of earth's most complex and diverse biomes (Nobre 2014, 16). The Amazon rainforest stores more than 20% of the carbon stocks found in the world's forests (Food and Agriculture Organization of the United Nations 2011, 22). Because of the crucial role that the Amazon rainforest plays in storing carbon, it is important to understand the sources of Brazilian public opinion in regards to climate change.

In addition, much of Brazil and South America is becoming more vulnerable to adverse effects of climate change, such as drought, as a result of the shrinkage of the rainforest (Nobre 2014, 10). The Brazilian Amazon experienced its highest level of deforestation in 2004 with the loss of 27,772 km² of forest. Deforestation rates fell 77% between 2004-2011, stabilizing at a loss of 5,000-7,000 km² of forested land a year (Godar et al. 2014, 15,591). While progress has been made, deforestation at this rate could clear a portion of the Amazon equivalent to the size of Costa Rica (Nobre 2014, 22).

The Amazon rainforest plays a key role in the hydrological system of Brazil and South America. The rainforest releases water vapor that travels in an "aerial river" from the Atlantic Ocean to the Andes, bringing rainfall to South America (Nobre 2014, 18). Deforestation of the Amazon leads to a decrease in the transpired water that the Amazon produces (Nobre 2014, 30). The wet season is progressively arriving later in the most deforested part of the Amazon (Nobre 2014, 22).

Brazil is currently experiencing one of its worst droughts. Sao Paulo, Rio de Janeiro, and other cities are rationing water. Deforestation of the Amazon is believed to

be a contributing factor to the current drought (Robbins 2015). The IPCC reports with medium to high confidence that observed droughts in South America are a major contribution of climate change (IPCC 2014, 7).

The impacts of deforestation alter more than Brazil's hydrological system. The Andean and Pacific regions of South America rely on glaciers for their water supply. The "aerial river" of the Amazon replenishes these glaciers (Nobre 2014, 10). Water vapor from the Amazon also provides rainfall to the southern savanna regions of South America where one of the world's largest grain and agricultural belts is located. Changing Brazil's hydrological system can impact the agricultural areas of Brazil, Bolivia, Paraguay, and Argentina (Nobre 2014, 10). Global warming contributes to these droughts in a straightforward way by elevating average temperatures (IPCC 2014, 14). By provoking more and more intense forest fires, it also combines with the forest-clearing activities of humans to reduce the size of the forest itself. Hence, learning about the cultural sources of public opinion on climate change is vital. I identify and examine four cultural factors that appear relevant to influence public opinion on climate change in the Brazilian context: religion, cultural interpretation of time, conceptual understanding of climate change, and perceptions of risk. I will address these cultural factors in order of level of influence on public opinion, beginning with the least influential factor.

# RELIGION

The way that individuals think about climate change varies in part because of their religious and spiritual beliefs. Religion influences the way an individual thinks about climate change in terms of how they view their moral obligations to others, nature, and their deities (Hulme 2009, 339). The value of the created world order, stewardship, and the sanctity of life are themes that religious leaders have used to discuss climate change (Hulme 2009, 347). Although many religions share the belief that human life and the created world need to be cared for, differences emerge in beliefs of who is to blame for climate change (Hulme 2009, 339).

## The Catholic Church and Climate Change

Brazil is the world's most populous Catholic nation. In 2010, 1.26 million Brazilians identified as Catholic, making Brazil the home to 11.7% of the world's Catholic population (Pew Research Center 2013). Pope Francis, the first Latin American pope, took his papal name after Saint Francis of Assisi, the patron saint of ecology (Francis 2015, 9). In June, Pope Francis released Laudato Si', an encyclical that garnered the attention of the news media because of its proposal to link faith with science in order to combat climate change (Yardley and Goodstein 2015).

Encyclicals are letters written with authority that Catholics are expected to embrace (Yardley and Goodstein 2015). Francis extends Laudato Si' beyond the boundaries of the Catholic Church by intending to address "every living person on this planet," (Francis 2015, 4). In addition to referencing the works of previous popes,

Francis cites Ecumenical Patriarch Bartholomew from the Eastern Orthodox Church and Ali al-Khawas, a ninth-century Muslim poet (Francis 2015, 8, 168).

Laudato Si' recognizes lifestyle, production, and consumption habits as human causes of climate change (Francis 2015, 18). Use of fossil fuels, a "throwaway" consumer culture, and a faster pace of life are specific examples that Francis gives of our mistreatment and neglect of the earth (Francis 2015, 15-19). Francis recognizes natural causes of climate change but cites scientific studies that show human activity has contributed to global warming (Francis 2015, 18). The encyclical's recognition of human causes of climate change has received criticism from individuals who do not believe in human-caused climate change (Yardley and Goodstein 2015).

Francis believes that developing countries will be impacted by climate change more than developed countries because of their lack of adaptation measures and economic dependence on natural resources like agriculture, fishing, and forestry (Francis 2015, 20). He discusses an "ecological debt" that the global north owes to the global south (Francis 2015, 36). Because developed countries have benefited from their long-term exploitation of natural resources, they should provide assistance to help developing countries with sustainable development (Francis 2015, 38). Developed countries should share their technologies and provide technical and financial assistance to developing countries so that they can develop cleaner energy (Francis 2015, 126). Developing countries should focus on eliminating poverty and eliminating corruption (Francis 2015, 126).

Francis calls for greater protection of areas that are critical to the health of the global ecosystem. The Amazon, the Congo basin, aquifers, and glaciers are specifically

mentioned as critical areas that require protection. Francis reminds us to be skeptical about proposals that claim to protect these resources because oftentimes they are hiding economic interests (Francis 2015, 28).

Deforestation for agriculture purposes is discussed in Laudato Si'. Francis recognizes that sometimes laws are not enough to prevent climate change. Countries with forest protection laws that silently watch deforestation take place are cited as an example of the failure of legislation (Francis 2015, 107). Another negative result of deforestation for agricultural purposes is the loss of the cultural traditions of indigenous communities. Agricultural and mining projects push indigenous communities from their homes while harming the environment at the same time (Francis 2015, 109). When looking for solutions to climate change, Francis reminds us to respect cultures (Francis 2015, 108).

Laudato Si' was written to serve as a call to action to address climate change (Yarley and Goodstein 2015). Francis praises individuals who have been working to protect our home, young people who are hungry for change, and individuals who have been fighting to help the poor combat the negative impacts of climate change (Francis 2015, 12). International agencies that increase awareness of climate change and organizations that hold governments responsible to the environment are also praised (Francis 2015, 28). While international agreements have not had much success, Francis calls for "enforceable international agreements," to combat climate change (Francis 2015, 127).

Laudato Si' is not the first time the Catholic Church has addressed environmental degradation. Pope John Paul II's 1990 message for the World Day of Peace shares

themes with Laudato Si'. John Paul II's message discusses the damaging of the ozone layer, the "greenhouse effect," industrial waste, fossil fuels, and deforestation (John Paul II 1990, 2). John Paul II recognizes the responsibilities that industrialized and developing countries have in resolving the world's ecological problems (John Paul II 1990, 3). Poverty is categorized as a cause that needs to be resolved in order to solve ecological disasters like deforestation (John Paul II 1990, 4).

Sister Dorothy Stang lived in the Amazon for more than twenty years, fighting for rainforest preservation ("Amazon on Fire" 2005) and for the rights of the region's impoverished (Dalton 2012, 173). In 2005, Stang was murdered by gunmen that a local rancher hired ("Amazon on Fire" 2005). Then president Luiz Inacio Lula da Silva responded to outrage over Stang's death by placing part of the Amazon under federal environmental protection and temporarily banning logging in the portion of the rainforest where Stang was murdered ("Amazon on Fire" 2005). Murders of individuals advocating the end of deforestation have continued to plague the area of the Amazon where Sister Dorothy Stang was killed (Rudolf 2011).

## Religious Demographics in Brazil

Although Brazil is the world's most populous Catholic country, the percentage of Brazilians identifying as Catholic has decreased from 92% in 1970 to 61% in 2014 (Pew Research Center 2014, 27). In a 2014 Pew Research Center study, 20% of Brazilians identified themselves as former Catholics (Pew Research Center 2014, 4). 61% of Brazilians identify as Catholic, 26% identify as Protestant, 8% identify as unaffiliated

(individuals identifying as atheist, agnostic, or as having no particular religion), and 5% identify with another faith (Pew Research Center 2014, 14).

While conversion out of Catholicism is occurring at a faster rate than conversion into Catholicism in Brazil, the reverse can be said of the Protestant faith and the religiously unaffiliated (Pew Research Center 2014, 33). 54% of Brazilians who identify as Protestant and 45% of Brazilians who identify as unaffiliated were raised Catholic (Pew Research Center 2014, 34). When Protestants who were raised Catholic are asked if eight different factors were an important reason for leaving Catholicism, more than 60% of respondents cited wanting a personal connection with God, attraction to a different style of worship at a new church, desiring a church with a greater emphasis on morality, and having found a church that helps its members more (Pew Research Center 2014, 38). Less than 25% of respondents cited personal problems, wanting a better financial future, and marriage to a non-Catholic as reasons for leaving the Catholic Church (Pew Research Center 2014, 38).

Brazilian Catholics and Protestants differ in how they practice their faith and how important they believe religion is in their life. When asked how important religion is in their life, 89% of Protestants and 71% of Catholics say religion is very important (Pew Research Center 2014, 41). While 76% of Protestants in Brazil say they attend religious services at least once a week, only 37% of Catholics say the same (Pew Research Center 2014, 43). 78% of Brazilian Protestants and 59% of Brazilian Catholics say they pray at least once a day outside of religious services (Pew Research Center 2014, 44). 62% of Protestants and 17% of Catholics in Brazil say they read or listen to scripture at least weekly outside of religious services (Pew Research Center 2014, 48).

Current and former Catholics in Brazil have differing opinions of Pope Francis. 92% of current Catholics in Brazil describe their view of Pope Francis as favorable while 51% of former Catholics in Brazil describe their view of Pope Francis as favorable (Pew Research Center 2014, 104). Current Catholics in Brazil are more likely to believe that Francis's election is a "major change" for the Catholic Church than former Catholics in Brazil. 62% of current Catholics and 35% of former Catholics believe that the election of Pope Francis is a "major change" for the Catholic Church (Pew Research Center 2014, 105).

## Summary

Although Brazil is the most populous Catholic nation in the world, I do not believe religion greatly influences the country's public opinion on climate change. While Pope Francis's encyclical is consistent with Brazil's stance on historical responsibility, other environmental issues brought up by The Catholic Church have been ignored in Brazil's climate change mitigation policies. The Catholic Church has addressed the ecological problem of deforestation in the past but destruction of the Amazon has persisted.

Brazilian public opinion differs from The Catholic Church's stance on more issues than deforestation. 75% of Brazilian Catholics believe that the use of contraceptives should be permitted by The Church (Pew Research Center 2014, 106). Only 16% of Brazilian Catholics believe using contraceptives is morally wrong (Pew Research Center 2014, 83). 75% of Brazilian Catholics believe that The Catholic Church should permit divorce (Pew Research Center 2014, 106). 17% of Brazilian Catholics

believe divorce is morally wrong (Pew Research Center 2014, 80). 51% of Catholics in Brazil favor the legalization of same-sex marriages (Pew Research Center 2014, 21). 78% of Brazilian Catholics believe that women should be allowed to be ordained as priests by the Catholic Church (Pew Research Center 2014, 107). While Brazilian Catholics have a favorable opinion of Pope Francis, only 37% say they attend religious services weekly (Pew Research Center 2014, 41). I do not believe Pope Francis's encyclical will greatly influence changes in the country's public opinion on climate change.

# CULTURAL INTERPRETATION OF TIME

In "Cultural Topography: A New Research Tool for Intelligence Analysis," Johnson and Berrett define norms as the "accepted and expected modes of behavior," (2011, 17). Cultures adopt different time orientations and norms that influence how they perceive the past, present, and future (Johnson and Berrett 2011, 17). "While the laid-back Latin attitude toward time is something of a cliché, like all clichés, it contains a kernel of truth," (Storti 2010, 12). Because the consequences of climate change will occur at different points in the future, we should examine a culture's time norms regarding the future if we want to understand their cost-benefit analysis regarding climate change policy (Hulme 2009, 283).

A study by Robert Levine compares the pace of life in thirty-one different countries. To measure the pace of individuals, Levine measures the average walking speed of pedestrians (Levine 1997, 8). To measure speed in the workplace, Levine measures how quickly postal workers can complete a stamp transaction (Levine 1997, 130). To measure how interested a city is in time, Levine measures the accuracy of bank clocks (Levine 1997, 9). Countries are then given scores based on how fast pedestrians walk sixty feet in downtown areas, how long it takes for postal workers to complete a stamp transaction, and how accurate public clocks are. A lower score means that a country's walking speeds and postal times are more rapid and that their public clocks are more accurate. Countries are then given an overall pace of life ranking based on how their walking speeds, postal times, and clock accuracies compared to the other countries

studied. Out of the thirty-one countries surveyed, Brazil is ranked twenty-ninth (Levine 1997, 131). This study's findings can be seen in the following table:

| Country | Overall Pace of Life | Walking Speeds | Postal Times | Clock Accuracy |
|---|---|---|---|---|
| Switzerland | 1 | 3 | 2 | 1 |
| Ireland | 2 | 1 | 3 | 11 |
| Germany | 3 | 5 | 1 | 8 |
| Japan | 4 | 7 | 4 | 6 |
| Italy | 5 | 10 | 12 | 2 |
| England | 6 | 4 | 9 | 13 |
| Sweden | 7 | 13 | 5 | 7 |
| Austria | 8 | 23 | 8 | 3 |
| Netherlands | 9 | 2 | 14 | 25 |
| Hong Kong | 10 | 14 | 6 | 14 |
| France | 11 | 8 | 18 | 10 |
| Poland | 12 | 12 | 15 | 8 |
| Costa Rica | 13 | 16 | 10 | 15 |
| Taiwan | 14 | 18 | 7 | 21 |
| Singapore | 15 | 25 | 11 | 4 |
| U.S.A. | 16 | 6 | 23 | 20 |
| Canada | 17 | 11 | 21 | 22 |
| South Korea | 18 | 20 | 20 | 16 |
| Hungary | 19 | 19 | 19 | 18 |
| Czech Republic | 20 | 21 | 17 | 23 |
| Greece | 21 | 14 | 13 | 29 |
| Kenya | 22 | 9 | 30 | 24 |
| China | 23 | 24 | 25 | 12 |
| Bulgaria | 24 | 27 | 22 | 17 |
| Romania | 25 | 30 | 29 | 5 |
| Jordan | 26 | 28 | 27 | 19 |
| Syria | 27 | 29 | 28 | 27 |
| El Salvador | 28 | 22 | 16 | 31 |
| Brazil | 29 | 31 | 24 | 28 |
| Indonesia | 30 | 26 | 26 | 30 |
| Mexico | 31 | 17 | 31 | 26 |

*Source:* Robert Levine 1997, 131-132. *A Geography of Time.* New York: Basic Books

## Internalist and Externalist Loci of Control

A culture's interpretation of time is influenced by its locus of control. Cultures fall on a spectrum between an internalist and externalist locus of control. Levine's study illustrates how varied positions on this spectrum reflect varied paces of life. Internalists believe that individuals control their own destiny, that life is what you make of it. Because individuals do have control over outcomes, internalists believe that sticking to and meeting schedules and deadlines is possible (Storti 2010, 12).

Externalists believe that many things in life are beyond the control of the individual. While they do believe that individuals should try to do everything they can to control outcomes, they recognize that sometimes circumstances are beyond anyone's control (Storti 2010, 12). Fate is real and it is something that individuals cannot change (Parra 2009, 13). While schedules and deadlines are set, externalists recognize that they will have to be changed occasionally. Brazil falls on the externalist end of the locus of control spectrum (Storti 2010, 12).

Brazil's cultural understanding of deadlines is influenced by its externalist locus of control (Storti 2010, 12). Because Brazilians believe that fate is real and cannot be controlled by individuals, they believe that deadlines can be set but cannot always be met. By setting conservative climate change mitigation goals, Brazil is leaving itself room to correct or control for unexpected complications that may arise. We should be wary of the deadlines of Brazil's climate change mitigation policies regarding greenhouse gas emission reduction and stopping deforestation of the Amazon because their externalist locus of control causes them to perceive deadlines as something that they are unable to control.

Past, Present, and Future Time Orientations

While all cultures have a past, present, and future, they value these tenses differently. Past-oriented cultures value historical events and experiences the most. Traditions, history, experience, the elderly, historic architecture, and family history are valued in past-oriented cultures. France, Egypt, Japan, China, Malaysia, Singapore, and Thailand are some examples of past-oriented cultures (Parra 2009, 10).

Future-oriented cultures adopt a forward-looking perspective and work to change the present situation. Innovation, change, and future goals are valued by future-oriented cultures. The United States is an example of a future-oriented culture (Parra 2009, 11).

Present-oriented cultures live in the here and now. Present-oriented cultures do not focus on the future until it arrives. Present-oriented cultures accept the conditions at the present time and realize that they may have been different in the past or may change in the future. While they recognize that the present situation may change in the future, they do not feel the need to push for change. Examples of present-oriented cultures can be found in Latin America and the Middle East (Parra 2009, 11). E.T. Hall differentiates time systems into monochronic and polychronic time. Monochronic time systems are structured by schedules and segmented tasks. Polychronic time systems are less structured and are characterized by multitasking (Hall 1977, 17). Because of their polychronic time system and externalist locus of control, I believe Brazil is a present-oriented time culture.

Brazil's cultural interpretation of time may influence their public opinion on climate change. Taking steps today to combat climate change requires placing some value in the future (Hulme 2009, 283). Because Brazil is a present-oriented culture, I

believe that the problems they face today will be prioritized over the problems we will face tomorrow because of climate change.

In Brazil's Intended Nationally Determined Contribution (iNDC) for Paris 2015, poverty eradication, education, public health, employment, housing, infrastructure, and energy access are all cited as challenges facing the country right now (Federative Republic of Brazil, Additional Information on the iNDC 2015, 1). President Dilma Rousseff discussed Brazil's commitments to reducing greenhouse gas emissions as well as the country's current recession when she addressed the United Nations General Assembly (Goldmansept 2015). By discussing climate change in conjunction with current economic and social problems, Brazil is making it clear that they need to focus on the problems they face today.

Another way that Brazil's cultural interpretation of time is influencing its climate change mitigation efforts is by disconnecting what it has done in the past and what it is doing at the present time to address climate change. Brazil's iNDC for Paris 2015 plans on reducing greenhouse gas emissions by 37% below 2005 levels in 2025 (Federative Republic of Brazil, Intended Nationally Determined Contribution Towards Achieving the Objective of the United Nations Framework Convention on Climate Change 2015, 1). By using 2005 as a reference point, Brazil is absorbing the success achieved in deforestation starting in 2004 into its plan for the future. Between 2004 and 2011, annual deforestation rates in the Brazilian Amazon fell 77% but have since remained steady at 5,000-7,000 km² of deforestation annually (Godar et al. 2014, 15,591). Because of its previous successes that occurred after the 2005 reference point, Brazil's iNDC has

received criticism for not being ambitious enough (Lee 2015; Edwards and Roberts 2015; Associated Press 2015).

## Lineal and Cyclical Time

Cultural interpretations of time also differ with respect to whether time is viewed as lineal or cyclical. Cultures that view time as lineal believe time moves in one direction towards progress. Lineal time is divided into past, present, and future segments. Time and individuals move in one direction, toward the future. American culture views time as lineal. When explaining cause and effect, Americans tend to identify past events as the cause and proceeding events as effects. Cultures that view time as lineal believe that an individual can control or change the future (Stewart and Bennett 1991, 123).

Not all cultures view time as lineal. Some cultures view time as cyclical. Recurring events like the changing of the seasons and the cycle of life are what define time. Cultures that view time as cyclical identify multiple points in different cycles as possible causes. Because of this complexity, it is easier to adapt to a situation than to change it (Stewart and Bennett 1991, 124-125). Hindu and Chinese cultures view time as cyclical (Stewart and Bennett 1991, 124). Although Chinese culture views time as cyclical, they also have a lineal concept of time (Stewart and Bennett 1991, 125). A lineal sense of time can be used to find a cause for a current predicament but a cyclical sense of time means multiple factors are influencing the present and future. Emphasis is placed on the present with recognition that multiple factors are causing or influencing outcomes.

Because Brazil has a lineal sense of the past, they are able to look to the past to find a cause or causes for present predicaments. During the climate change negotiations of the 1990s, Brazil emphasized its developing status and assigned "historic responsibility" for greenhouse gas emissions to the Global North (Hochstetler 2012, 960). At the Fifteenth Conference of the Parties of the United Nations Framework Convention on Climate Change (COP-15), President Lula pledged financial support to developing countries for combatting climate change while still citing common but differentiated responsibilities (Trennepohl 2010, 271). Brazil's iNDC for Paris 2015 calls for assigning greater responsibility to the developed countries that were greater greenhouse gas contributors in the last two centuries (Federative Republic of Brazil, Additional Information on the iNDC 2015, 5). Based on historic responsibility, Brazil believes it is doing more than its fair share:

> Brazil's mitigation efforts are of a type, scope and scale at least equivalent to the iNDCs of those developed countries most responsible for climate change. In view of the above, and based on available tools, it is evident that Brazil's iNDC, while consistent with its national circumstances and capabilities, is far more ambitious than what would correspond to Brazil's marginal relative responsibility for the global average temperature increase (Federative Republic of Brazil, Additional Information on the iNDC 2015, 6).

Using a lineal sense of time to emphasize the historic responsibility that developed countries have allows Brazil to assign the blame to others and focus on their present problems.

## Additional Factors that Influence a Culture's Interpretation of Time

When Robert Levine compared the pace of life in thirty-one different countries, he found additional characteristics of a culture that correlated with their pace of life. Economic well-being, the degree of industrialization, population size, climate, and cultural values are characteristics that correlate with a country's pace of life (Levine 1997, 9-19).

Levine finds that the strongest correlation between the characteristics mentioned above and a country's pace of life is its economy. Countries with wealthy economies had faster paces of life while many of the slowest countries are third-world countries. Levine believes that the economic well-being of a country and its pace of life mutually reinforce one another. Countries that have higher gross domestic product per capita, purchasing power parities, and higher caloric intake averages also have faster paces of life (Levine 1997, 10).

Levine also finds that the more developed a country is, the faster the pace of life in that country will be. As industrialization takes place in a country, it transforms from having a "time surplus," to a "time affluence," to a "time famine." The "time surplus" of a country that goes through industrialization is replaced with an increase in consumption (Levine 1997, 13). As individuals consume modern inventions that are supposed to be more efficient and use less time, standards are raised. While the vacuum cleaner made cleaning easier, it also caused people to have higher cleanliness standards, increasing the time spent on cleaning (Levine 1997, 12). As Brazil continues to develop, it is possible that their cultural interpretation of time will change.

## Summary

Brazil's cultural interpretation of time influences how it reflects on the past, explains the present, and plans for the future. Brazil's present-oriented culture reinforces its prioritization of present problems over the future consequences of climate change. Poverty eradication, improving education, bettering public health, decreasing unemployment rates, increasing access to energy, and improving housing and infrastructure are examples of present problems that will compete with the future consequences of climate change. Brazil's lineal understanding of the past, in combination with other factors, influences the way it assigns responsibility for global warming. The historic responsibility stance blames developed countries for the problem of climate change and sees them as the parties that are responsible for addressing climate change. The culture's externalist locus of control belief that individuals have little control over the future encourages the conservative, unambitious climate change goals set by Brazil. While climate change is seen as a serious problem, it is a problem that is out of the control of individuals.

# CONCEPTUAL UNDERSTANDING OF CLIMATE

Climate can be a difficult concept to understand. Unlike weather, we cannot feel climate. Although we can measure weather with meteorological tools, we cannot simply measure the world's climate in one instance (Hulme 2009, 67).

Because of the complexity of the concept, individuals' conceptual understanding of climate varies. Individuals combine their understanding of the physical world with their cultural imagination to interpret climate (Hulme 2009, 115). In some societies, it is impossible to separate the physical and cultural components of climate. The Inuit use one word, 'sila,' to discuss weather, climate, and the mystical spirit of the air (Hulme 2009, 81). Our conceptual understanding of climate and climate change are influenced by the ways that knowledge about climate is simplified, grouped, and introduced to discussion (Hulme 2009, 214). Public opinion and the way that climate change is discussed in the media vary between cultures.

## Brazilian Public Opinion on Climate Change

Interpretation of climate change by people varies in different contexts and places (Hulme 2009, 694). Since 2002, measures of Brazilian public opinion have recorded a growing concern for the environment and climate change (Langevin 2009, 17). From 2002 to 2007, Brazilians who were concerned about environmental problems grew from 20% to 49%. During that same time period, U.S. citizens who were concerned about environmental problems grew from 23% to only 37%. Out of the 47 countries included in the survey, Brazil had the greatest increase in concern for the environment (Langevin

2009, 15). The growing concern for the environment has resulted in a national consensus that climate change is one of the most serious problems facing the world (Langevin 2009, 17).

In a 2010 Pew Research Center survey, 95% of Brazilians believe that global climate change is a serious problem (Pew Research Center 2010, 25). 80% of Brazilians believe that protecting the environment should be prioritized over economic growth (Pew Research Center 2010, 26).

Brazilian public opinion is not as divided as American public opinion is on the validity of climate change science. Assessment reports published by the United Nation's Intergovernmental Panel on Climate Change are not as divisive in Brazil as they are in the U.S. (Langevin 2009, 18).

## Brazilian Media Representation of Climate Change

Our conceptual understanding of climate change varies because information about climate change is not presented in a single standard format. Information on climate change is always carrying a message or framed in a certain way (Hulme 2009, 529). It is difficult to define the media as an independent or dependent variable in relationship to public opinion. The mass media is a key player in the contextual framing of climate change (Zamith et al. 2012, 335). The mass media can also be a reflection of public opinion (Soroka et al. 2015, 468). Rather than defining the media and public opinion as independent or dependent variables, I believe that causality runs both directions between these two variables.

Media coverage can influence public opinion's understanding and reaction to issues (Zamith et al. 2012, 335). A comparison of four newspapers from different countries (Argentina's *La Nacion*, Brazil's *Folha de Sao Paulo*, Colombia's *El Tiempo*, and the United States' *New York Times*) reveals differences in news coverage of climate change (Zamith et al. 2012, 347). The content of news stories (periodicals longer than three paragraphs, excluding editorials, opinion columns, letters to the editor, and advertisements) mentioning global warming, climate change, and the greenhouse effect that were published in the four newspapers between December 31, 2008 and January 1, 2010 were examined to reveal variations in the coverage of climate change (Zamith et al. 2012, 341). The coverage, tone, and framing of climate change in *Folha de Sao Paulo* more closely resembled the coverage found in *The New York Times* than in *La Nacion* or *El Tiempo* (Zamith et al. 2012, 348).

The four newspapers studied varied in how often they published articles on climate change. The Brazilian and American newspapers ran significantly more articles on climate change than the Argentinian and Colombian papers. *Folha de Sao Paulo* ran 196 articles on climate change in the time period surveyed. *The New York Times* ran 191, *El Tiempo* ran 40, and *La Nacion* ran 30 articles (Zamith et al. 2012, 345).

The newspapers studied also differ in the tone that they use to discuss climate change. The Argentinian and Colombian newspapers used an alarmist, urgent tone to discuss climate change and its catastrophic consequences. *La Nacion* and *El Tiempo* also linked climate change mitigation with social benefits (Zamith et al. 2012, 349). *Folha de Sao Paulo* and *The New York Times* used a less-catastrophic tone to discuss climate change. The Brazilian and American newspapers used a tone that portrayed climate

change as a complex inconvenience. Rather than focusing on the social benefits of climate change mitigation, *The New York Times* and *Folha de Sao Paulo* focused on the potential economic costs of addressing climate change (Zamith et al. 2012, 349).

The framing of climate change was different in the four newspapers. *The New York Times* and *Folha de Sao Paulo* framed climate change as a complex and expensive inconvenience (Zamith et al. 2012, 349). *La Nacion* and *El Tiempo* framed their discussion of climate change as a catastrophe that needs resolving (Zamith et al. 2012, 349). Although Argentinian and Colombian coverage portrayed climate change as a pending catastrophe, the limited coverage in *La Nacion* and *El Tiempo* may cause their readers to view climate change as unimportant (Zamith et al. 2012, 349).

Brazil's Agencia de Noticias dos Direitos da Infancia (ANDI) examined the coverage of climate change in fifty national and regional newspapers from 2005 to 2008. During this time period, coverage on climate change increased in Brazilian newspapers (Langevin 2009, 19). The majority of articles studied supported the scientific consensus on global warming. 9.5% of the articles offered differing opinions on climate change, 44.2% of the articles focused on climate change mitigation, and 28.4% of the articles illustrated the scope of climate change (Langevin 2009, 20.) Following the Brazilian release of Al Gore's documentary, An Inconvenient Truth, and the release of the IPCC's 4th Assessment, Brazilian newspapers featured nearly a 200% increase in climate change articles (Langevin 2009, 19).

Langevin notes that the increase in climate change coverage by Brazilian newspapers occurred during the same time period that the Pew Research Center noted an increase in Brazilians concerned about the environment (Langevin 2009, 19). By

including confirmation of scientific findings on global warming, excluding opinions that deny climate change is human induced, and increasing the amount of climate change coverage, Langevin believes that Brazilian newspapers helped to shape a conceptual understanding of climate change that encourages concern and support for climate change mitigation polices (Langevin 2009, 20).

## Summary

Because climate and climate change are abstract concepts, they are open to different cultural conceptual understandings. The way that information is packaged and delivered can influence its reception (Hulme 2009, 214). Additionally, public opinion on an issue can influence the way the media covers that issue. An increase in Brazilian news media coverage correlated with an increase in the percentage of Brazilians that are concerned about climate change (Langevin 2009, 19). While President Rousseff, like her predecessor, has prioritized development and economic growth policies over environmental conservation (Hurwitz 2012, 22), Brazilian policymakers recognize the importance of climate change policy (Langevin 2009, 24). Because of this, I believe that Brazil's conceptual understanding of climate change does carry some weight when it comes to the formation of public opinion on climate change.

# PERCEPTION OF RISK

The effects of climate change will not be distributed equally throughout the world. Climate change risks will affect different regions and populations of people at differing times and with differing impacts (IPCC 2014, 20). Townshend et al. recognize a link between vulnerability and climate change policies developed to create adaptation measures (Townshend et al. 2011, 11). How Brazilians perceive their risk of climate change will influence its climate change mitigation policies.

## Objective Risk

Before examining how Brazilians perceive their risk of climate change, I am going to briefly summarize some of the objective or actual risks that Brazil faces. While perception of risk does not fully reflect objective risk, it is most likely founded in it. Perception of risk varies from objective risk because different groups are culturally prone to ignore, exaggerate, or discount some risks (Hulme 2009, 444). Because of this, I believe it is important to understand the objective risks that Brazil faces as well as their perception of the risk of climate change.

### Agricultural Productivity

Climate change's impact on agricultural productivity is one risk that Brazil faces. The Intergovernmental Panel on Climate Change (IPCC) reports with very high confidence that recent climate-related extremes have revealed vulnerabilities to human

systems like food production and water supply (IPCC 2014, 6). The impact of climate change on agriculture will possibly affect food access, utilization, and price stability in the future (IPCC 2014, 18). Decreased food production and quality is a key risk that the IPCC identifies for Central and South America (IPCC 2014, 24).

Desertification of Brazil is expected to result from climate change. Brazil's agricultural resources will be negatively affected by the desertification, causing economic losses in addition to food security risks. Because Brazil is currently inadequately prepared to adapt to desertification and other changes in climate, changes in climate are expected to greatly impact Brazil, especially the country's poorest populations (Via Barros-Platiau 83).

In "Quantifying Vulnerability to Climate Change: Implications for Adaptation Assistance," David Wheeler evaluates 169 different countries' vulnerabilities to climate change's impact of extreme weather, sea level rise, and agricultural productivity loss (Wheeler 2011, 5). Wheeler ranks Brazil the 95$^{th}$ most vulnerable country to the climate change impact of agricultural productivity loss. When the ranking is adjusted to include Brazil's ability to manage climate change's impacts, Brazil is the 99$^{th}$ most vulnerable country to the climate change impact of agricultural productivity loss (Wheeler, "Mapping the Impacts of Climate Change," 2011).

## Extreme Weather Events

Extreme weather events are a risk from climate change that Brazil faces. The IPCC reports with very high confidence that higher numbers of and more severe heat waves, droughts, floods, cyclones, and wildfires have shown that human systems and

ecosystems are significantly vulnerable to extreme weather events (IPCC 2014, 6). The risk of extreme weather events is higher in places without the proper infrastructure and services (IPCC 2014, 18). Wheeler ranks Brazil the 36th most vulnerable country to the climate change impact of extreme weather. When the ranking is adjusted to include Brazil's ability to manage climate change's impacts, Brazil is the 50th most vulnerable country to the climate change impact of extreme weather (Wheeler, "Mapping the Impacts of Climate Change," 2011). Brazil is already experiencing its vulnerability to drought as it is facing one of the worst droughts in its history (Robbins 2015).

## Sea Level Rise

Another risk from climate change facing Brazil is rising sea level. The IPCC reports with very high confidence that coastal areas will face submergence, coastal flooding, and coastal erosion more frequently (IPCC 2014, 17). While Brazil has a population density of 25 people per square kilometer of land area (The World Bank Group), the majority of Brazil's population lives on 10% of the country's land in the Atlantic coast region (Wiarda 2011, 132). Low elevation coastal zones refer to areas of land that are connected to the coast and have an elevation below 10 meters (Neumann et al. 2015, 2). In 2000, Brazil had the 12th highest coastal zone population in a low elevation zone out of 187 coastal nations studied (Neumann et al. 2015, 15). Although Brazil's low elevation coastal zone only accounts for 1.4% of the country's land area, 6.6% of Brazil's population lived in Brazil's low elevation coastal zone in 2000 (Neumann et al. 2015, 19). In 2030, Brazil's low elevation coastal zone population is expected to be 15.8 million people with 2.9 million people living in the 100-year flood

plain (Neumann et al. 2015, 16). By 2060, Brazil's low elevation coastal zone population could be 19 million people (Neumann et al. 2015, 19).

Barbi and da Costa Ferreira examine policy responses to climate change risks in the coastal cities of Sao Paulo. The Regional Monitoring and Identification of Critical Areas of Flood, Erosion, and Landslides Programme is a regional policy response that works to create a regional survey of areas susceptible to erosion, flooding, and landslides (Barbi et al. 2014, 496). A state level program in Sao Paulo, the Preventive Civil Defense and Contingency Plan, is a risk and disaster management program that focuses on landslides in Serra do Mar (Barbi et al. 2014, 496). 'Santos New Times' is a program funded by the federal government and the World Bank. This program invests in areas that have a high level of social and environmental vulnerability to improve infrastructure, housing, and urban planning (Barbi et al. 2014, 497). Barbi and da Costa Ferreira categorize these policy responses as being in the assessment stage of adaptation as opposed to the stage that defines adaptation intentions or the stage that initiates adaptation measures (Barbi et al. 2014, 497).

## Changing Hydrological System

A changing hydrological system is another risk that Brazil faces from climate change. The IPCC reports with medium confidence that changing precipitation patterns and melting snow and ice are changing water resources. They report with high confidence that glaciers are melting around the world because of climate change (IPCC 2014, 4). Carbon that is currently being stored in peatlands, permafrost, and forests can be released into the atmosphere because of climate change, deforestation, and ecosystem

degradation (IPCC 2014, 15). Destruction of the Amazon threatens to change Brazil's hydrological system as well as release carbon that is currently being stored in the forest into the atmosphere.

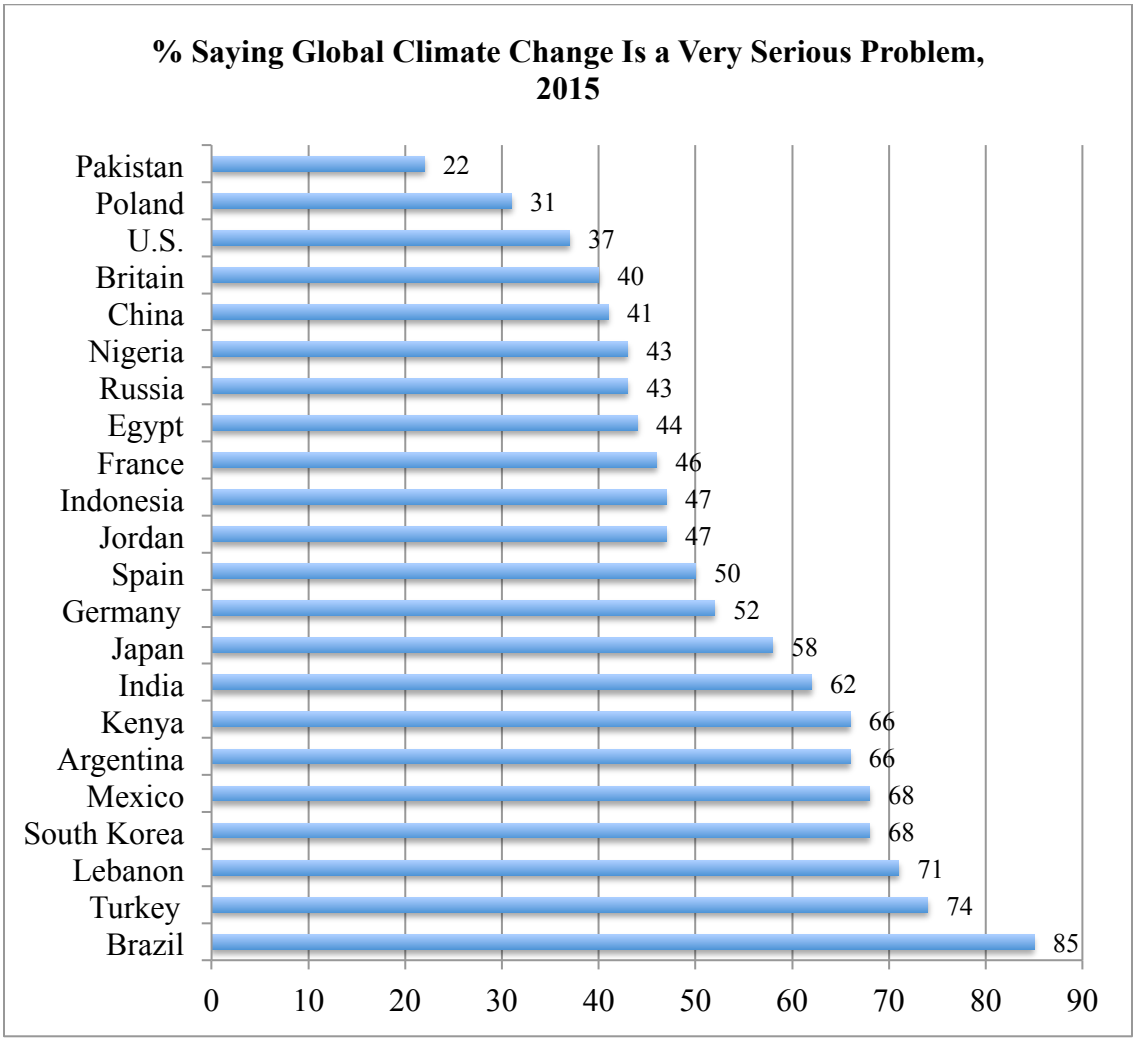
## Perception of Risk

Individuals perceive risks differently (Hulme 2009, 413). Situated risks are risks that hit close to home and are tangible (Hulme 2009, 439). Un-situated risks are intangible risks that seem distant. Because climate change is an intangible risk, individuals have a hard time placing it in their daily lives (Hulme 2009, 440).

Perception of climate change as a risk can also be influenced by the context in which climate change is placed regarding other risks. Different groups of people choose to notice, fear, amplify, and act on certain risks while ignoring others based on their values (Hulme 2009, 444). The unsituated nature of climate change as a risk can cause individuals to prioritize and act on situated risks. Job security, health care, and local environmental issues are examples of risks that are more tangible and local than climate change (Hulme 2009, 447).

A 2010 Pew Research Center poll shows that 95% of Brazilians think global climate change is a serious problem and 85% think it is a very serious problem (Pew Research Center 2010, 25). 80% of Brazilians think that protecting the environment should be prioritized over economic growth (Pew Research Center 2010, 26). 49% of Brazilians are willing to pay higher prices to confront global climate change (Pew Research Center 2010, 27). 62% of Brazilians believe that Brazil's economic situation is

good and 75% of Brazilians expect the economic situation to improve (Pew Research Center 2015).




*Source:* Pew Research Center 2010, 25. "Brazilians Upbeat About Their Country, Despite Its Problems."

In a 2015 Pew Research center poll about the greatest global threats, 75% of Brazilians say they are very concerned about climate change. 60% of Brazilians say they are very concerned about global economic stability, 46% are very concerned about ISIS,

49% are very concerned about Iran's nuclear program, 47% are very concerned about cyber attacks, 33% are very concerned about tensions with Russia, and 28% are very concerned about territorial disputes with China (Carle 2015, 4).

**% Very Concerned About Threats around the World**

| Country | Climate change | Economic instability | ISIS | Iran | Cyber-attacks | Russia | China |
|---|---|---|---|---|---|---|---|
| Burkina Faso | 79% | 50% | 41% | 28% | 25% | 17% | 15% |
| Brazil | 75% | 60% | 46% | 49% | 47% | 33% | 28% |
| Peru | 75% | 58% | 35% | 42% | 35% | 26% | 27% |
| Uganda | 74% | 62% | 39% | 33% | 30% | 24% | 23% |
| India | 73% | 49% | 41% | 28% | 45% | 30% | 38% |
| Philippines | 72% | 52% | 49% | 47% | 49% | 38% | 56% |
| Ghana | 71% | 67% | 46% | 34% | 42% | 30% | 29% |
| Nigeria | 65% | 48% | 36% | 24% | 29% | 25% | 24% |
| Chile | 62% | 39% | 31% | 31% | 22% | 15% | 15% |
| Venezuela | 60% | 60% | 28% | 35% | 38% | 22% | 24% |
| Spain | 59% | 63% | 77% | 52% | 35% | 39% | 20% |
| Ethiopia | 59% | 50% | 38% | 23% | 28% | 20% | 20% |
| Vietnam | 58% | 37% | 30% | 22% | 32% | 19% | 60% |
| Kenya | 58% | 44% | 35% | 29% | 35% | 19% | 20% |
| Argentina | 57% | 49% | 34% | 31% | 28% | 22% | 18% |
| Mexico | 54% | 46% | 23% | 28% | 30% | 16% | 14% |
| Senegal | 51% | 59% | 35% | 33% | 37% | 20% | 16% |
| Tanzania | 49% | 56% | 51% | 37% | 46% | 30% | 26% |
| France | 48% | 49% | 71% | 43% | 47% | 41% | 16% |
| S. Africa | 47% | 33% | 26% | 25% | 28% | 18% | 22% |
| Canada | 45% | 32% | 58% | 43% | 39% | 35% | 19% |
| Italy | 45% | 48% | 69% | 44% | 25% | 27% | 17% |
| Lebanon | 44% | 39% | 84% | 30% | 17% | 18% | 16% |
| U.S. | 42% | 51% | 68% | 62% | 59% | 43% | 30% |
| Indonesia | 42% | 41% | 65% | 29% | 22% | 15% | 11% |
| Japan | 42% | 30% | 72% | 39% | 39% | 32% | 52% |
| S. Korea | 40% | 31% | 75% | 41% | 55% | 24% | 31% |
| U.K. | 38% | 32% | 66% | 41% | 34% | 41% | 16% |
| Australia | 37% | 32% | 69% | 38% | 37% | 31% | 17% |
| Malaysia | 37% | 37% | 21% | 11% | 20% | 9% | 12% |
| Jordan | 36% | 39% | 62% | 29% | 26% | 18% | 16% |
| Turkey | 35% | 33% | 33% | 22% | 22% | 19% | 14% |
| Germany | 34% | 26% | 70% | 39% | 39% | 40% | 17% |
| Palestine | 33% | 32% | 54% | 17% | 24% | 12% | 10% |
| Pakistan | 25% | 6% | 14% | 9% | 14% | 7% | 18% |
| Russia | 22% | 43% | 18% | 15% | 14% | * | 8% |
| Ukraine | 20% | 35% | 9% | 11% | 4% | 62% | 4% |
| China | 19% | 16% | 9% | 8% | 12% | 9% | * |

| % Very Concerned About Threats around the World | | | | | | | |
|---|---|---|---|---|---|---|---|
| Country | Climate change | Economic instability | ISIS | Iran | Cyber-attacks | Russia | China |
| Poland | 14% | 26% | 29% | 26% | 22% | 44% | 11% |
| Israel | 14% | 28% | 44% | 53% | 18% | 6% | 3% |

*Source:* Carle, Jill 2015, 4. "Climate Change Seen as Top Global Threat." Pew Research Center.

Brazil's economic situation is being perceived as more of a threat in 2015 than it was in 2010. 13% of Brazilians believe that Brazil's economic situation is good and 66% of Brazilians expect the economic situation to improve (Pew Research Center 2015).

Public concern and awareness of climate change varies across the world (Lee et al. 2015, 1). A study by Tien Ming Lee et al. examines the influence of socio-demographic characteristics, geography, and perceived well-being on climate change awareness and risk perception in 119 countries (Lee et al. 2015, 1). More than 75% of Brazilians are aware of climate change (Lee et al. 2015, 2). The top ranked predictors of climate change awareness in Brazil are environmental behavior (e.g. active in an environmental group, voluntarily recycling, avoiding certain products, and trying to use less water), being connected via electronic communications, and income (Lee et al. 2015, Supplementary Information 8). Brazilians who participate in more environmental behaviors, are more connected via electronic communications, and have higher incomes are more aware of climate change (Lee et al. 2015, Supplementary Information).

Of the Brazilians who are aware of climate change, more than 90% believe climate change is a serious threat (Lee et al. 2015, 2). The top ranked predictors of perceiving climate change as a risk in Brazil are beliefs about the cause of global warming (human induced, natural causes, or both), living in an urban or rural location,

and marital status (Lee et al. 2015, Supplementary Information 8). Brazilians who believe global warming is caused by human activities or both human activities and natural causes and live in urban areas are more likely to perceive climate change as a serious threat (Lee et al. 2015).

## Summary

Brazil perceives climate change to be a significant risk. Unfortunately, climate change is not the only risk facing Brazil. Since 2010, Brazilians have replaced much of their optimism about the economy with the perception that its stability is at risk. Brazil's iNDC emphasizes the fact that climate change is not the only risk facing the country. Poverty eradication, education, public health, unemployment, and housing are some of the other risks facing Brazil (Federative Republic of Brazil, Additional Information on the iNDC 2015, 1). Cultural, political, and psychological factors will continue to influence the way Brazil constructs, perceives, and ranks the risk of climate change (Hulme 2009, 416).

# ECONOMIC DEVELOPMENT

Climate change and poverty are both discussed as problems that negatively impact billions of people but the billions of people impacted by these problems are not the same group. The billions of people that will be negatively impacted by climate change is a future group of people that includes today's children and future, unborn children. The billions of people that are negatively impacted by poverty is a group of people living and facing the reality of poverty today (Hulme 2009, 573).

Economic development has typically been included in international climate change agreements (U.N. 1998; UNFCCC 1995; UNFCCC 2001; UNFCCC 2009; UNFCCC 2011; U.N. General Assembly 1992). The Marrakesh Accords, the Copenhagen Accord, and the Cancun Agreements all recognize social and economic development and poverty eradication as priorities for developing countries (UNFCCC 2001; UNFCCC 2009; UNFCCC 2011). Because it is the international norm to take a country's level of economic development into consideration when discussing climate change, I believe economic development is a factor that will influence a country's climate change mitigation policies. Although economic development is not a cultural factor, Brazil's level of economic development appears to heavily influence the weight that cultural factors have on forming public opinion about climate change.

## The Incorporation of Economic Development Into Climate Change Discussions

The United Nations Framework Convention on Climate Change (UNFCCC) assigned different responsibilities for combatting climate change to countries based on

their level of economic development in the Kyoto Protocol (Selin and VanDeveer 2013, 283). The Kyoto Protocol suggested that developed countries, or Annex I parties, reduce their GHG emissions to 1990s levels. Developing countries were not assigned GHG reduction levels (Selin and VanDeveer 2013, 283). Countries were sorted into Annex I or developing groups in 1992 (Aldy and Stavins 2009, 5.) Brazil was placed in the group of developing countries (UNFCCC 2014).

Brazil was experiencing hyperinflation and had recently shifted from a military government to a democracy when the UNFCCC divided the world into Annex I and developing country groups (Hochstetler 2012, 959). Since 1992, many of the non-Annex I countries, have experienced rapid economic growth paired with an increase in GHG emissions (Aldy and Stavins 2009, 5). During the initial UNFCCC negotiations, Brazil, South Africa, India, and China were not expected to experience the high levels of economic growth that transformed them into "emerging powers," (Hochstetler 2012, 959).

Since 1992, certain non-Annex I countries, including Brazil, have undergone high levels of economic growth. (Aldy and Stavins 2009, 5). Brazil's gross domestic product (GDP), reported in U.S. dollars, has risen from $390 billion in 1992 to $2.35 trillion in 2014 (The World Bank Group 2015). In 1992, Brazil's gross national income (GNI) per capita was $2,770 compared to the United States' GNI per capita of $25,780. In 2014, Brazil's GNI per capita had risen to $11,530. The United States' GNI per capita in 2014 was $55,200 (The World Bank Group 2015). Brazil's GNI per capita grew 316% between 1992 and 2014 while the United States' GNI per capita grew a mere 114%.

"Historical Responsibility"

Brazil's climate change mitigation policies have consistently followed the principle of "historical responsibility," that was established by the Kyoto Protocol (Trennepohl 2010, 271). "Historical responsibility" for climate change is given to developed countries because they have been emitting and have enjoyed the economic benefits from the emission of GHGs since the Industrial Revolution (Via Barros-Platiau 2010, 78). Because developing nations believe that a viable path to poverty eradication is to follow the path of development taken by developed nations (Baer 2002, 393), they focused on economic development instead of making GHG reduction commitments that would possibly hinder growth (Hochstetler 2012, 960).

Brazil resisted making international GHG reduction commitments until the Bali Road Map in 2007 (Hochstetler 2012, 960). For the Copenhagen Accord, Brazil committed to reducing 2020 GHG emissions by 36.1-38.9% of what they would have been (Hochstetler 2012, 961). In preparation for the UNFCCC Paris Conference, Brazil submitted its Intended Nationally Determined Contribution (iNDC) in October 2015. In the iNDC Brazil voluntarily commits to reducing its GHG emissions 37% by 2025, using 2005 as a base year (Federative Republic of Brazil 2015, 1). Brazil submitted "Additional Information on the iNDC For Clarification Purposes Only," along with their iNDC, which includes a section on historical responsibility (Federative Republic of Brazil 2015, 5).

Focusing on Poverty Eradication

Although Brazil has experienced economic growth, the country suffers from some of the world's worst income inequality levels (Hochstetler 2012, 960). The top 10% of Brazilians hold 41.8% of the country's income, while the lowest 20% hold 3.3% of the country's income (The World Bank Group 2015). When President Rousseff was elected, she pledged to focus on the eradication of poverty in her country (Youngblood Coleman 2015, 89). Brazil's climate change mitigation policies have consistently emphasized that the eradication of poverty will continue to be the country's focus.

In Brazil's Copenhagen submission, it was emphasized that economic and social development and poverty eradication would continue to be prioritized (Hochstetler 2012, 961). Brazil emphasized the importance of poverty eradication and social and economic development to the UNFCCC in 2011 in their document "Historical Responsibility," (Hochstetler 2012, 972). In the additional information document that was submitted with their iNDC for Paris, poverty eradication, education, public health, employment, housing, infrastructure, and energy access are problems listed that the country has to face in addition to lowering its GHG emissions (Federative Republic of Brazil 2015, 1).

While Brazilian climate change mitigation policy clings to the principles of "historical responsibility" and poverty eradication, it has made advances in where the country sees itself in terms of financial aid. During the Copenhagen Conference, then President Lula offered financial aid to developing countries if necessary (Trennepohl 2010, 271). The country's iNDC for Paris welcomes financial aid from developed countries and warns that additional actions outside of the plan will require an increase in financial aid (Federative Republic of Brazil 2015, 3). The country expresses its

willingness to cooperate with other developing countries to enhance forest monitoring systems, biofuels capacity-building and technology transfer, low carbon and resilient agriculture, restoration and reforestation, and the managing of protected areas (Federative Republic of Brazil 2015, 4).

## Brazil's Economy Today

In a 2010 Pew Research Center Global Attitudes Project, Brazilians gave their economy the second-most positive evaluation out of the 22 countries surveyed (Pew Research Center 2010, 8). Since 2012, the percentage of Brazilians who think their country's economic situation is good has dropped from 65% to 13% (Pew Research Center 2015). Unemployment and inflation levels in 2015 have been on the rise as Brazil's economy entered into a recession (Gallas 2015).

## Summary

Brazil's climate change mitigation policies emphasize the importance of taking a country's level of economic development into consideration. Through the principles of historical responsibility and prioritizing the eradication of poverty, economic development strongly influences Brazilian public opinion. In a 2010 Pew Research Center survey, 95% of Brazilians believe that global climate change is a serious problem (Pew Research Center 2010, 25). 80% of Brazilians believe that protecting the environment should be prioritized even if slower economic growth and unemployment rates rose as a result (Pew Research Center 2010, 26). Yet, only 49% of Brazilians agree that people should be willing to pay higher prices to confront global climate change (Pew

Research Center 2010, 26). As Brazil's economy worsens (Gallas 2015), I believe it is unlikely that poverty eradication will be deemphasized in the country's climate change mitigation policies. Brazil's level of economic development will continue to be an influential factor on Brazilian public opinion regarding climate change.

# CONCLUSION

We cannot attribute all of the cultural influence on Brazilian public opinion to one factor. Overlap between the cultural factors examined in this study and Brazil's level of economic development exist. I do believe some of the cultural factors that were examined carry more weight than others.

Due to the fact that Brazil is the most populous Catholic country in the world and because of Pope Francis' popularity in Latin America, I expected religion would be an influential cultural factor on the country's public opinion on climate change. Out of all of the factors examined in this study, I believe religion is the least influential. The Catholic Church has expressed concern for deforestation on multiple occasions but destruction of the Amazon has persisted.

Religion, when paired with Brazil's level of economic development, does appear to be consistent with the country's climate change mitigation policies. Laudato Si', like many Brazilian climate change policies, emphasizes the historical responsibility that developed countries have regarding climate change. Additionally, the papal encyclical and Brazilian climate change policy emphasize the importance of eradicating poverty.

Brazil's cultural interpretation of time appears to be consistent with its public opinion on climate change. The country's level of economic development is also addressed by its time culture. Brazil's status as a present-oriented culture supports the prioritization of present problems, like poverty, over future problems, like climate change. Brazil's iNDC has been criticized for having conservative, unambitious climate change goals. Brazil's externalist locus of control leads individuals to believe that they

have little control over the future. This lack of control is in line with their unambitious goals.

I believe that Brazil's conceptual understanding of climate change and perception of risk are the most influential cultural factors influencing public opinion on climate change out of those covered in this study. The media plays an influential role in how our conceptual understandings of issues are formed. An increase in news coverage of climate change correlated with an increase in the percentage of Brazilians that are concerned about climate change.

Brazilian culture appears to be unique in that Brazilians perceive climate change to be a significant risk more than most other nations. At the same time, Brazilians also perceive their level of economic development to be a significant risk. While climate change presents economic risks in addition to physical risks, Brazil's climate change mitigation policies seem focused on the current economic risks facing the country. Brazilians perceive risk in climate change but Brazilian climate change mitigation policies continue to focus on poverty eradication and social development.

Brazil's level of economic development also appears to influence the country's public opinion and conceptual understanding of climate change. While Brazilians believe that protecting the environment is important, they are more reluctant to agree that people should be willing to pay higher prices to confront global warming. Brazilian policies consistently stress the importance of eradicating poverty and social development. Historical responsibility, a principle that is founded in its recognition of the varied levels of economic development around the world, is frequently cited in Brazil's policies.

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