Georgy Gryaznov and Calvin Lien
gsgryaznov@ucdavis.edu and cslien@ucdavis.edu
p109
Word Count: 2100+

The Impact of Climate Change on Developing Nations

Intro

Climate change has been a long-debated issue among rich, technologically advanced nations. There are many agreements and conferences based around the need to control climate change, however many of these are ignored in exchange for short-term profits. However, what all of this discussion ignores is the human factor. There are billions of people living in developing nations, which are trying to simply grow their economy and nation to a world standard. This becomes increasingly difficult, however, with developed nations passing restrictive laws and not supporting these developing nations with necessary resources. The discussion on climate change and its effect on the world has to include these developing nations, because in the long run, they are the ones who will be faced with the burden caused by drastic climate changes, while the developed nations will emerge relatively unscathed.

Causes of Climate Change

The main cause of global climate change is the release of greenhouse gases from the burning of fossil fuels. These excess greenhouse gases trap more heat than the global atmosphere would naturally contain, which in turn leads to global warming and climate change. Since the Industrial Revolution, humanity has developed methods of increasingly efficient production of goods, requiring the use of technologies that consume fossil fuels such as coal, oil, and natural gas. In addition, fossil fuel consumption is not only limited to industrial producers, but consumers also contribute a large portion

of greenhouse gas emissions through activities such as automotive travel and usage of electricity produced by the burning of fossil fuels. Of all the world's countries, developed nations emit the majority of greenhouse gas emissions when compared to undeveloped nations. China alone produced 7,711 million tons of CO2 in 2011, with the U.S. and India following with 5,425 million tons and 1,602 million tons, respectively, while least developed nations such as Samoa and Kiribati produced less than 0.2 million tons combined [10].

The manufacturing activities of these developed nations are the primary cause of these high emissions. For example, General Motors not only uses large amounts of fossil fuels to produce appliances and vehicles, those very same vehicles go on to consume additional fossil fuels in the form of gasoline and diesel. Only developed countries, such as the U.S., can afford cars as inefficient as the Hummer.

Another major contributor to climate change is deforestation. Deforestation is defined as the loss of tree cover, and accounts for approximately 17% of annual greenhouse gas emissions [9]. The greenhouse gases are a result of carbon stored in the trees being released into the atmosphere when they are burned or decompose after being cut. In addition, those trees cease to provide the long term benefit of absorbing CO2 from the surrounding air. Unlike fossil fuels however, the primary culprits of deforestation are developing countries, due to their relatively higher reliance on wood fuel than developed countries.

Environmental effects of climate change on least developed nations

Climate change as a result of global warming will greatly affect the water resources and health of the least developed countries. In Africa, higher temperatures will lead to generally decreased precipitation, reduction in soil moisture, and less surface runoff [1]. Already dwindling rivers and lakes such as the Zambezi River and Lake Chad face the possibility of partial or complete evaporation. On the other hand, Asia will experience an average

increase in precipitation, especially at high altitudes. The increased melting of the Himalayas combined with the summer monsoon season could lead to higher risk of flooding in nearby countries. This shifting of temperatures and water allocation will also impact human health, with water-transmitted diseases such as salmonella and cholera becoming more prevalent in Asia, while infectious diseases like malaria may spread to areas previously free from them. With their hands full on combating health concerns, these countries will have less resources available to adapt to other problems.

Global warming will also heavily impact the agricultural industries of these countries. In Africa alone, certain arid and semi-arid areas may lose up to 50% in agricultural production over the next decade due to the decreased soil moisture and precipitation[1]. Rising sea levels also contribute to the problem, with areas such as Guinea facing a future loss of up to 30% of their rice fields due to permanent flooding. These changes will cripple Africa's already insufficient food production and could lead to increased dependence on foreign aid. Climate change will also significantly affect Asia's agricultural industry. A more intense dry season could stress water supplies and force more irrigation, while lowered rice yields will affect the economic growth and agricultural trade of Asian countries, leading to increased dependence on imported food. In addition, increased heat may damage plants and leave them vulnerable to diseases and insects.

The infrastructure and tourism industries of the developing countries will also be influenced by climate change. Increased flooding chance and water-borne diseases will discourage tourism, and wildlife areas may be negatively affected by temperature changes. The higher rate of floods and storms currently do and will continue to disrupt infrastructure in the least developed countries, since most roads and power plants are constructed near the highly populated coastal areas of LDCs [1].

Economic effects of climate change on least developed nations

Aside from the obvious environmental impacts that climate change has on developing nations, there are multiple economic changes that occur with climate change. Global temperatures are predicted to rise at least 2 degrees Celsius in the next few years, due to increased emissions. This rise in temperature will affect many weather patterns, which in turn will hit agriculture the hardest. Many developing nations, especially those in the southern hemisphere, rely on their agricultural sector to grow their economy. Using a reduced-form model, if the world heats up only 2 degrees Celsius, Africa's agricultural sector is projected to lose 131 billion 1990 US dollars , while Latin America's and the Caribbean's agricultural sectors are projected to lose 49 billion 1990 US dollars [8]. Global warming could also lead to spread of diseases such as malaria in Africa, as well as increases in "endemic morbidity and mortality due to diarrheal disease" in Southeast Asia [2]. With an already poor infrastructure, this increase in necessary medical infrastructure would cause a shift budget distribution throughout developing nation. Due to this, they would be able to focus less on economic factors, such as industry and technology, and have to spend more money on their social infrastructure.

Climate change would also make trade and resource transport increasingly difficult due to changes in weather systems, as well as melting permafrost. Many less developed nations are island nations, and as such require ships for international trade. However, the number of tropical storms in the Atlantic is expected to increase drastically over the next few decades [1]. This would limit the number of ships that could reach or leave these small island nations, thus greatly hindering their economy. Rising sea levels would submerge lower elevation areas in developing nations, which include most island nations and much of India. The sea levels are expected to rise up to 0.5 meters by 2100, which would mean the submersion of most cities along deltas and many island nations [2]. Most of this rising will be caused by glaciers melting, however the sea level rising is not the only harm of ice melting globally. The melting of the permafrost throughout Siberia would

damage many gas and oil pipelines that run from there to developing nations in Asia. This would create an even greater barrier to development of needed technologies and industries, causing slower economic development, while the needed methods of transportation of these resources are established.

Things more developed nations can do to help developing nations

The main contribution of developed nations to climate change is the burning of fossil fuels, which contributes greatly to greenhouse gas emissions [1]. Therefore, in order to mitigate the damage that developing nations would experience from climate change, the best thing for developed nations to do would be to stop or greatly limit the burning of fossil fuels, and other greenhouse gas emissions. Even though eventually developing nations will have to contribute their part to the overall emission problem, “equity demands that developed countries act first” [6]. Although there have been many agreements about the reduction of automobile emissions between developed nations, there has been little movement towards the realization of these agreements. For example, the Kyoto protocol is a call by the United Nations to decrease carbon emissions by five percent of their 1990 levels [11]. Many nations have ratified this agreement, however progress is not evident. Most nations have not met their checkpoint goal. Also, the United States has yet to ratify the Kyoto agreement, which would greatly decrease the United States’ carbon emissions, which are the second greatest in the world [10].

Developed nations also have a wealth of knowledge and economic resources available to them. These factors could be used for the research and development of more advanced technologies that would reduce emissions or create new sources for power. For example, as of right now, the US only has 0.5% of all the money in the power sector going to R&D [5]. By putting more money into researching new power sources, such as wind and even nuclear power, the US would be able to develop technology that could wean the nation off of fossil fuels. Also, knowledge “created by a public R&D

program in one country can spillover to other countries", creating an even faster control on global emissions and climate change [5]. Also, this same technology could be used by the developing nations themselves, thus allowing them to focus on creating a national infrastructure, instead of spending money on redundant research. Also, developing nations could greatly benefit if more developed nations shared information with them about technological advances of other kinds. By weakening restrictions on intellectual property, developed nations could help developing nations catch up and avoid costly mistakes in terms of the economy and their impact on climate change.

Things least developed nations can do to help themselves

Developing nations can reduce and adapt to the effects of climate change in a multitude of ways. Most important of all is a proactive approach and an effective government to direct the adaptation. A major barrier in adaptation to climate change in Africa is an agricultural industry extremely reliant on precipitation[1]. Diversification of labor away from non-agricultural jobs is vital in creating a workforce resilient to the negative effects of climate change on the agriculture industry in the least developed nations. Technological and political solutions can also alleviate many of the issues created by global warming. For example, increased aridity can be counteracted with improved irrigation and water storage systems, and genetically modified crops can deal with droughts and pests better. In addition, improved national water policies and incentives to use water saving devices can counteract reduced rainfall. Finally, extreme poverty is also a major obstacle to adaptation. Properly supported micro-loans, social welfare, and other economic policies can encourage people to diversify away from failing agricultural practices and prepare for long-term adaptation.

Conclusion

As we enter an age of international interdependence, we must begin, as a people, to consider our actions and their effects on places outside our home. There are many developing nations, most of whom we never think about nor realize even exist. There are people living there much like the rest of us. However, our decisions that affect climate change are felt there much more than here. Therefore, in order to survive as a civilization, humanity must take steps in order to control global warming and reduce climate change, or else we'll all suffer the consequences for we are all one people.

Works Cited

[1]"The Impact of Climate Change on the Development Prospects of the Least Developed Countries and Small Island Developing States." Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS), 2009. Web. 13 Nov. 2011.

[2]"Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries." *United Nations Framework Convention on Climate Change* (2009). Web. 13 Nov. 2011.

[3]Chambwera, Muyeye, and Jesper Stage. "Climate Change Adaptation in Developing Countries: Issues and Perspectives for Economic Analysis." *International Institute for Environment and Development*. 2010. Web. 13 Nov. 2011.

[4]Adger, W. Neil. "Progress in Development Studies." *SAGE* (2003). *Sage Journals Online*. Web. 13 Nov. 2011.

[5]Stern, Nicholas. *The Economics of Climate Change: Stern Review on the Economics of Climate Change.* Cambridge: Cambridge UP, 2007. Print.

[6]Chandler, William. "Climate Change Mitigation in Developing Countries." Pew Center on Global Climate Change, Oct. 2002. Web. 13 Nov. 2011.

[7]Parry, Martin. "Climate Change, Global Food Supply and Risk of Hunger." *Philosophical Transactions of The Royal Society*. *Royal Society Publishing*. Web. 13 Nov. 2011.

[8]Mendelson, Robert. "Country-Specific Market Impacts of Climate Change." *Climatic Change* 45 (2000). *SpringerLink*. Web. 13 Nov. 2011.

[9]Gorte, Ross, and Pervaze Sheikh. "Deforestation and Climate Change." Congressional Research Service, 4 Mar. 2010. Web. 13 Nov. 2011.

[10]"World Carbon Dioxide Emissions Data by Country: China Speeds Ahead of the Rest | Environment | Guardian.co.uk." *Latest News, Sport and Comment from the Guardian | The Guardian*. Web. 13 Nov. 2011. <http://www.guardian.co.uk/news/datablog/2011/jan/31/world-carbon-dioxide-emissions-country-data-co2>.

[11]"Kyoto Protocol to the United Nations Framework Convention on Climate Change." *United Nations Framework Convention on Climate Change*. Web. 01 Dec. 2011. <http://unfccc.int/essential_background/kyoto_protocol/items/1678.php>.