

ENVIRONMENTAL REFUGEES

By

Katie L. Peters

Advised by

Professor William Preston

SocS 461, 462

Senior Project

Social Sciences Department

College of Liberal Arts

CALIFORNIA POLYTECHNIC STATE UNIVERSITY

Winter, 2011

Table of Contents

Research Proposal	ii
Annotated Bibliography	iv
Outline	vii
Text	1
Introduction	1
Environmental Refugees of the Past	3
Causes	5
Case Studies	11
Problems in the New Environment	15
Current Land Remedies	17
Current Policy	19
Possible Solutions	20
Conclusion	22
Bibliography	24

Research Proposal

The Maldives, a small group of islands found in the Indian Ocean, is at a serious risk. With the highest elevation level at 2.4 meters, the islands hold the possibility of being completely submerged by the current rising sea levels. If and when this happens, close to 400,000 people will become environmental refugees – a term and situation rarely dealt with or addressed in the past.

Unfortunately, the case of the Maldives is not alone. Many people in countries around the world are at risk of becoming environmental refugees. The specific case of the Maldives is an extreme case where the islands may completely disappear. Other areas around the world may not experience stress to this level, but other scenarios are likely. The land may be overworked to a point where it is no longer suitable for people to live on, water resources may become scarce and nonexistent, or extreme weather and temperature may make certain areas unsuitable for communities and societies to live and thrive. When these types of environmental events do occur, people may be forced to abandon their land in search of new land that can support their lifestyle. As these people migrate, they take on the title of “environmental refugee,” and often experience hardship and complications with this title.

Through this project, I hope to analyze multiple aspects of environmental refugees. By looking at events from the past, I hope to discover how some historical events produced environmental refugees, and what these people did to solve their problems. Additionally, I hope to investigate specific countries and case studies. Through these investigations, I want to look into the infrastructure of the countries and see how that has affected the environment and ultimately produced environmental refugees. Ultimately, I hope to fully understand the causes of environmental refugees, both direct and indirect. Direct causes would include sea level rise and

land degradation; while indirect causes may include CO₂ emissions and poverty. By looking at both direct and indirect causes, I hope to discover possible solutions that address all aspects of the problem, not just the surface level causes.

Annotated Bibliography

Bates, D. C. (2002). Environmental refugees? Classifying human migrations caused by environmental change. *Population and Environment*. 23(5), 465-477.

This article is important because it attempts to clarify exactly what an environmental refugee is. The UN has not put forward any official definition of an environmental refugee, so this article tries to define the term. The article discusses whether individuals who are currently defined as environmental refugees should actually be considered refugees or whether it would be more accurate to define them as migrants. Additionally, the author examines the different types of environmental refugees, including those due to disasters, expropriation of the environment, and deterioration of the environment.

Black, R. (1994). Forced migration and environmental change: the impact of refugees on host environments. *Journal of Environmental Management*. 42(3), 261-277.
doi:10.1006/jema.1994.1072.

This article takes an interesting approach by examining how environmental refugees affect the country that receives them. It discusses how the environmental refugees may affect deforestation, land degradation, and water supply and quality. After discussing these potential factors, the author explains that there is little evidence available that shows that the aforementioned problems are due solely to the presence of environmental refugees.

CNN Wire Staff. (2010, October 27). UN: 70,000 people in Myanmar are homeless in wake of cyclone. *CNN*. Retrieved from <http://www.cnn.com>.

This is a very specific news article about a recent situation that has created at 70,000 homeless people in Myanmar. This was caused by a cyclone that came and hit the area earlier this week. These 70,000 people now have the potential of becoming environmental refugees. The result may be that they are internally displaced, or they may have to seek help in another country. This is an example of a natural environmental condition that could result in environmental refugees.

Daily, G.C. (1995). Restoring value to the world's degraded lands. *Science, New Series*. 269(5222), 350-354.

The author of this article starts off with how the world's land has been degraded, and she discusses the extent to which this has occurred. Her estimates state that in 1995, roughly 43% of the world's vegetated surface had been degraded due to human use. The article then goes on to discuss how much time would be required to restore the land, how it would be done, and costs and benefits of restoration. As restoration of the land occurs, environmental refugees who were forced to leave the land may be able to return.

Goudie, A. (2000). *The human impact on the natural environment*. Cambridge, MA: The MIT Press.

This book examines how human activity has influenced the earth, and how it continues to influence the earth today. Issues such as deforestation, pollution, urbanization, and desertification are addressed in great detail, and examples of each are given. These factors play a role in the creation of environmental refugees because the environment becomes poor and unsuitable for human life.

McMichael, A.J. (2002). Population, environment, disease, and survival: past patterns, uncertain futures. *The Lancet*. 359(9312), 1145-1148. doi:10.1016/S0140-6736(02)08164-3.

This article examines how the environment plays a role on various factors, such as disease and survival of the populations living on the land. As societies become less sustainable, the potential for disease and death increase. Additionally, the article looks at population growth and how that interacts with the environment. As populations grow, the carrying capacities of various areas are often met and exceeded, sometimes resulting in unproductive land. When this occurs, people can no longer live on the land and must find a new place to live.

Morner, N., Tooley, M. & Possnert, G. (2004). New perspectives for the future of the Maldives. *Global and Planetary Change*. 40(1), 177-182. doi:10.1016/S0921-8181(03)00108-5.

This article specifically addresses the Maldives that is an island chain country in the Indian Ocean that has a significantly high risk of creating thousands of environmental refugees. The primary issue in the Maldives is the rising sea level, as most of the islands are near sea level. The article reviews how sea level rise has affected the Maldives in the past and discusses how the projected sea level rises may affect the Maldives. Additionally, the author examines the various reasons for why sea level rise occurs.

Myers, N. (2002). Environmental refugees: a growing phenomenon of the 21st century. *Philosophical Transactions of the Royal Society*. 357(1420), 609-613. doi:10.1098/rstb.2001.0953.

This article looks at the prevalence of environmental refugees, examining how the rates could increase over time. The article goes on to examine different parts of the world where environmental refugees exist and what the future may look like for the world. Policy options are addressed in this article, which creates a hopeful feeling that something may be done to minimize the rate of environmental refugees in the world.

Ponting, C. (2007). *A new green history of the world*. New York, NY: Penguin Group.

The author of this book takes the reader through the history of some of the major great civilizations that have existed, and discusses their collapses. Specifically, the

environmental reasons for the collapse are addressed in regards to the collapse of the Roman Empire. By looking at the Roman Empire and its collapse, one realizes that environmental refugees have existed for many, many years. Some of the same problems that the world is currently facing were faced many centuries ago, and this book attempts to address some of those issues.

Wilkinson, B. H. & McElroy, B. J. (2007). The impact of humans on continental erosion and sedimentation. *Geological Society of American Bulletin*. 119, 140-156. doi: 10.1130/B25899.1.

This article looks at one of the causes that lead to environmental refuges. It examines the long-term and short-term data on sediment transfer and erosion. The author looks at how this occurs naturally, as well as the impact that humans have. As continental erosion and sedimentation occurs, the land is unable to support as much human life as may have been previously possible. These factors displace people, creating environmental refugees in the areas where continental erosion and sedimentation is high.

Outline

I. Introduction

A. Definitions

1. UNHCR (United Nations High Commission for Refugees) basic definition of a refugee: a person who “owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it.” (UNHCR, 1951)
 - a. Five basic parts:
 - i. Refugees must be outside their country of origin
 - ii. Reason for departure is because of fear of persecution
 - iii. Fear of persecution is well-founded
 - iv. Persecution results from one or more of the following: race, religion, nationality, member of a particular social group, or political opinion
 - v. Unwilling or unable to seek protection from their country of origin
2. Definition of environmental refugee: “those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a

marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life [sic]. By ‘environmental disruption’ in this definition is meant any physical, chemical, and/or biological changes in the ecosystem (or resource base) that render it, temporarily or permanently, unsuitable to support human life.” (El-Hinnawi, 1985)

B. Numbers

1. 25 million in 1995
2. 50 million in 2010

C. Goals of the paper

1. Discuss past environmental refugees
2. Discuss the causes of these environmental refugees
3. Discuss current environmental refugees
4. Discuss current and possible solutions

II. Environmental Refugees of the Past

A. Mesopotamia

1. Resource exploitation
2. Deforestation and salinization

B. Harappa

1. Resource exploitation
2. Tectonic shifts

III. Causes

A. Water

1. Excess
2. Shortage
 - a. Depletion of available water
 - b. Decrease in agricultural harvest
 - c. Overuse

B. Deforestation

C. Desertification

D. Natural-induced environmental change

1. Earthquakes
2. Volcanoes

IV. Current Environmental Refugees

A. Examples

1. Caribbean: Haiti
 - a. Deforestation
 - b. 2010 Earthquake
2. Asia: Maldives
3. Africa: Sahel Dessert

B. Problems

1. Internally and externally displaced refugees
2. Environmental problems in new location
3. Conflict

C. Current land remedies

1. Reforestation

2. Re-habilitating land and soils

V. Current Policy

A. Not recognized as official refugees under UNHCR

B. Some positive policy

1. USA

2. Scandinavian countries

VI. Possible Solutions

A. Address root causes

1. Reduce greenhouse gas emissions

2. Sustainable land use practices

B. Policy changes

VII. Conclusion

References

El-Hinnawi, E. (1985). *Environmental Refugees*. Nairobi, Kenya: United Nations Environmental Programme.

United Nations High Commission for Refugees. (1951). *Convention and protocol relating to the status of refugees*. Retrieved from <http://www.unhcr.org.au/pdfs/convention.pdf>

Introduction

The concept of environmental displacement is a growing phenomenon that expanded exponentially within the past twenty years. Essam El-Hinnawi, a United National Environmental Programme researcher, was the first individual to define the term environmental refugee:

[T]hose people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life. By environmental disruption in this definition is meant any physical, chemical, and/or biological changes in the ecosystem (or resource base) that render it, temporarily or permanently, unsuitable to support human life. (Bates, 2002)

Essentially, this definition defines environmental refugees as people who are forced to leave their original habitat because of some sort of environmental difficulty. In the year 2010, it was estimated that there were approximately 50 million environmental refugees worldwide (Myers, 2002). Estimates further state that by 2050, there will be 200 million environmental refugees (Myers, 2002). These statistics show that the issue of environmental refugees is a huge problem; but unfortunately, environmental refugees are not recognized as official refugees.

Currently, according to the United Nations High Commission for Refugees (UNHCR), an officially recognized refugee is defined as:

A person who owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being

outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it. (UNHCR, 1951)

This definition includes five preconditions necessary for one to be considered a refugee: the person must be outside their country of origin; the reason for departure is fear of persecution; the fear of persecution is well-founded; the persecution is due to race, religion, nationality, membership of a particular social group, or political opinion; and the person is unwilling or unable to seek protection from their country of origin. If a person meets these preconditions, then under the UNHCR, they may be considered a refugee and receive protection and assistance for their needs (UNHCR, 1951).

Environmental refugees do not meet the preconditions for this definition of a refugee, owing to three reasons. First, not all environmental refugees flee their country of origin; some are just internally displaced. Second, environmental refugees do not leave their place of origin because of fear of persecution, but rather because they can no longer physically live there. Finally, because environmental refugees are not seeking protection against persecution, they do not meet the precondition of being unwilling or unable to seek protection from their country of origin. Since environmental refugees do not meet the requirements of the UNHCR's definition of a refugee, they do not qualify to receive the help and support offered to officially recognized refugees.

In this examination, I will expand on the definition of an environmental refugee and explore the causes of their plight. These causes fall into two categories: natural changes and human-induced environmental changes. Many of the causes are a result of both natural and human actions, and I will explain the interaction that occurs between these two factors. I will look at some current examples of environmental refugees, and explain their situation in detail. I

will look at their reasons for migrating and problems that have arisen in their new locations. Finally, I will address solutions to the problem of environmental displacement, both in terms of current solutions and proposed remedies. In the end, I will show that current solutions are not sufficient and that future remedies need to be enacted soon with diligence and consideration for the displaced.

Environmental Refugees of the Past

Despite the fact that environmental refugees have only been officially recognized recently, they have existed throughout most of history. The idea of environmental displacement and the crises that refugees encounter can be traced back to ancient civilizations. While the idea of environmental refugees was not established, these civilizations still had to deal with issues of migration and conflict, as well as environmental degradation that forced them to abandon their location.

The civilizations in Mesopotamia and south Asia experienced the aforementioned scenario. A large part of why these civilizations collapsed or decayed in some cases is largely due to environmental changes within the regions, forcing people to leave their homelands. When looking at Mesopotamia and south Asia prior to the dark ages that occurred from 2200 BC-1700 BC, one can see that these civilizations flourished. The dark ages does not refer to the commonly known Dark Ages that occurred in Europe, but rather refers to a “period of hegemonic shift-the decline of a powerful state and the rise of a different state” (Chase-Dunn & Anderson, 2005, p. 52). These dark ages contain not only socioeconomic stress, but also environmental and climate changes (Chase-Dunn & Anderson, 2005). In order to fuel their success, the civilizations exploited the natural resources to the fullest extent (Chase-Dunn & Anderson, 2005). The civilizations focused on doing whatever it took in order to make their core

regions thrive, but this occurred at the expense of the environment (Chase-Dunn & Anderson, 2005).

Conditions drastically changed for these civilizations during the dark ages. The primary environmental change was salinization, which caused a decrease in the amount of land that could be used for agricultural purposes (Chase-Dunn & Anderson). Due to this ecological change, agricultural yields decreased and people were forced to move out of the urban regions (Chase-Dunn & Anderson, 2005). In addition to salinization, climate change led to an increase in global temperatures, which led to increased dryness and lower food production (Chase-Dunn & Anderson, 2005).

This same is true for the Harappan Civilization, found in present day Pakistan in the Indus River flood plains. The combination of resource exploitation and tectonic activity led to societal crises (Chase-Dunn & Anderson, 2005). Although researchers are unsure, it has been suggested that over-cultivation, over-grazing, salinization, and deforestation led to the decline of this civilization (Stein, 1998). The tectonic shifts diverted the course of rivers that the Harappan Civilization had previously relied upon (Chase-Dunn & Anderson, 2005).

These ecological changes led to migration out of the Mesopotamia region and out of present day Pakistan. People in both societies were forced to move out of the urbanized regions because surpluses declined and the available food production could not support the urban life of the majority of the population (Chase-Dunn & Anderson, 2005). Although these situations have differences from the current environmental refugees in the world, the idea is still the same: people lived on the land until it was no longer capable of supporting their lifestyle, which resulted in a migration out of the area and the creation of environmental refugees.

Causes

Norman Myers put forth a slightly different definition of environmental refugees. In Myers' definition, he addressed some of the leading causes of the creation of environmental displacement. These causes include "environmental factors of unusual scope, notably drought, desertification, deforestation, soil erosion, water shortages and climate change, also natural disasters such as cyclones, storm surges, and floods" (Myers, 1995, p. 18-19). Some of the causes result from a combination of human and natural factors, such as drought, deforestation, soil erosion, and climate change. However, some of the causes result from natural influences, such as cyclones, volcanoes, and earthquakes. Both of these categories add to the growing number of environmental refugees, though the primary focus will be on causes that are both human and naturally induced.

Water, both in excess and in shortage, creates problems and has the potential to create environmental refugees. The problem of excess water comes in the form of sea-level rise, floods, and natural disasters such as hurricanes and cyclones. The reasons for sea-level rise are twofold: the melt from glaciers primarily in the polar regions of the world due to global warming, and the warming of ocean waters, causing them to expand and rise (Mann & Kump, 2008). These issues will be thoroughly investigated in later portions of this paper when the issue of the Maldives is discussed. Water shortages affect all aspects of a society, especially the economic sector.

Floods, cyclones, and hurricanes are a result of too much water in a given area. When these natural disasters occur, people are often forced to leave their residence because the land is no longer suitable for habitation. Flooding of the Mississippi River in 1993 spread to the city of Kaskaskia, Illinois, and created a massive disaster (Mann & Kump, 2008). This city was an

island that was protected by a levee that broke during the Great Flood of 1993 (History.com). The entire town was under water and all of the residents were forced to leave and find a new home (History.com). In October, 2010, Myanmar was hit with a huge tropical cyclone that left around 70,000 people homeless (CNN Wire Staff, 2010). This cyclone led to homelessness, damage to infrastructure, 27 deaths, and communication problems (CNN Wire Staff, 2010). These are just two examples of ways in which extreme amounts of water can create environmental refugees by making peoples' location unlivable.

Worldwide, there has been an overall deficit of water, which creates major issues as the demand for water has tripled within the past half-century (Brown, 2011). Water is the most important natural resource in the world. It is necessary to support nearly every industry, from processing and manufacturing to agriculture. Shortages of water especially impact the agricultural industry, affecting irrigation and leading to potential harvest issues. In terms of irrigation, two water sources are available: underground water and surface water. Underground water is found in aquifers, most of which are replenished by rainfall, while surface water is found primarily behind dams (Brown, 2011). The current problem with both underground and surface water is that the water is being used at a faster rate than it is being replenished. As this occurs, the available amount of water for irrigation decreases, which directly correlates with the amount of harvest available for any given population. Forty percent of the world's grain harvest comes from irrigated lands, so these decreasing water supplies are clearly an issue of concern (Brown, 2011).

These problems are found in many places throughout the world, including the United States, India, China, and Yemen. In Yemen, for example, water from the aquifers is being extracted quicker than rainfall can fill them. As the water tables fall in Yemen, the population

and the harvest demand rapidly grow (Brown, 2011). However, as previously described, the lack of available water leads to a decreased harvest. As grain harvest decreases, people are forced to either find other sources of food, or migrate to a location where food is readily available. Those that migrate can be defined as environmental refugees, for they are forced to leave their home because of environmental conditions.

Another issue associated with the shortage of water is the overuse worldwide. Agricultural purposes and irrigation are the primary uses of water . About 70% of the water used worldwide is used for irrigation (Brown, 2011). As the water supply worldwide decreases, compromises must be made in regards to where the water is allocated. Will people continue to use the water for irrigation and agricultural purposes, or will the water be left in its natural state and sustain the existing environment? An example of this dilemma occurred in the Aral Sea in central Asia, where the Amu Dar'ya and Syr Dar'ya Rivers were diverted away from the Aral Sea for the purposes of irrigating fields to increase cotton production (Micklin, 2010). When this diversion occurred, the economic condition and health of people in the region were affected. As previously discussed, when water is in shortage, food production decreases, and some people are forced to migrate in order to find food.

This issue of depleting water supplies is both one of human environmental interaction and natural changes. Humans clearly play a role as they take water for irrigation in order to meet the demands of growing populations. The United Nations estimates that by 2050, the world population will surpass nine billion people (United Nations, 2009). These people will all require food to eat, which means that the harvest size will need to increase. Unless the aquifers are used sustainably, they will continue to decrease, as will the harvest size. Natural factors also influence water shortages, such as decreased precipitation. Precipitation is the primary source of

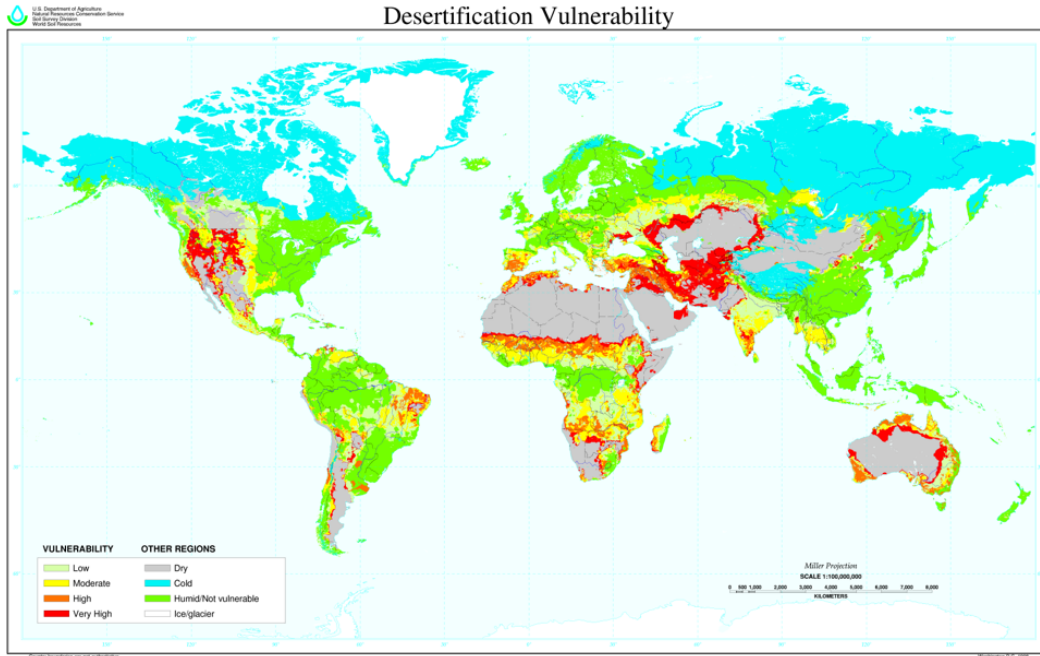
replenishment for the aquifers, so it is necessary to have steady precipitation (Brown, 2011). However, as the climate changes, precipitation decreases, meaning that aquifers are not replenished and the harvest decreases (Mann & Kump, 2008). Clearly, both human and natural factors influence the water supply, though humans play the main role in the vast depletion and shortage of water occurring worldwide.

Deforestation has been an intense environmental problem, especially in the tropical regions of the world. Deliberate removal of forests has been occurring for centuries as there has been a constant demand for lumber (Goudie, 2000). Forests are cleared for various reasons, such as agricultural expansion, fuel needs for domestic and industrial processes, and firewood for local populations for their everyday needs (Goudie, 2000). The results of deforestation are reduced biological diversity including species extinctions; changes in local and regional environments such as soil degradation, change in water flow, and increased sedimentation in rivers, reservoirs, etc.; and changes to the global environment in regards to the carbon dioxide released into the environment (Goudie, 2000).

Desertification is a huge problem affecting large portions of the world today. Desertification occurs primarily in arid and semi-arid regions when land is used and worked unsustainably, depleting the soil of nutrients and resulting in desert-like conditions (FECYT, 2010). Recent figures published in February of 2010 state that 38% of the world's surface is in danger of desertification (FECYT, 2010). There are eight natural regions of the world that have the greatest risk of experiencing desertification: coastal areas, prairies, the Mediterranean region, the savannah, temperate steppes, temperate deserts, tropical and subtropical steppes, and tropical and subtropical deserts (FECYT, 2010). This is a huge portion of the available land today, and

as the population of the world continues to rapidly grow, people will continue to need land that can sustain successful agriculture.

The image below shows regions of the world that are most vulnerable to desertification. Those areas found in the light green color are at a low risk of desertification, while regions with a bright red color are at a very high risk of desertification. Areas that are in gray represent dry areas found throughout the world where agriculture is already hard to sustain. From this map, one can see that three main areas that are at a high risk of desertification are the Sahel in Africa, central Asia, and western portions of the United States.



(Natural Resources Conservation Service, 1998)

When desertification occurs, the lives of the people in the regions are dramatically affected. Successful agricultural practices are no longer possible and the ecosystem can no longer provide necessities sufficient food and water (news.bbc.co.uk). Individuals will be hit hard by the effects of desertification because of the lifestyles of subsistence farming and the location of most developing countries near the tropics, where the risk of desertification is high

(Morton, 2007). In developing countries where large populations rely on subsistence agricultural practices, people must move and find suitable land to continue producing food. In the Sahel region in Africa, the desert is expanding and pushing people south (Brown, 2011). As they move, the farmers and herders are forced into other peoples' land, where resources are already scarce. Practices and actions that can be taken to help reverse desertification will be discussed thoroughly when investigating the possible solutions for dealing with environmental refugees.

Earthquakes and volcanoes are other natural hazards, in addition to the cyclones that were already discussed, that lead to the creation of environmental refugees. The earthquake that occurred in Haiti in 2010 killed thousands of people and left many homeless (Interlandi, 2010). This earthquake and its relation to environmental refugees will be discussed in detail in later sections when the specific case of Haiti is explored. Volcanoes also drastically affect societies, often pushing people out of their homes because of spreading lava and ash. These types of events occur without the interaction of humans, but they have the potential to have huge effects on human life.

A common theme can be seen through all of these causes: physical change to an environment that produces an ecosystem that cannot sustain the humans living there. Cyclones, earthquakes, and volcanoes often lead to the destruction of infrastructure, creating not only environmental problems, but also huge economic and political problems. When issues such as deforestation or desertification become severe enough, people must leave their land and find other land that can sustain human life. When displacement occurs, these individuals become environmental refugees and they are faced with even more problems of how and where they can survive. The following sections address examples of current environmental refugees, explaining

the causes of their situations and what actions they have taken to deal with the degraded environment.

Case Study: Haiti

Haiti is a small country located in the Caribbean Sea on the island of Hispaniola. With a GDP of only \$1,200, Haiti economically ranks 205 out of 229 countries worldwide, and Haiti is the poorest country in the Western Hemisphere (Central Intelligence Agency, 2011a). Eighty percent of the population lives under the poverty line, and 54% of the population lives in abject poverty (Central Intelligence Agency, 2011a). This type of extreme poverty corresponds with the poor environment in Haiti. While only one-third of the land is suitable for agriculture, three-fifths of the land is being cultivated because of population demands (Myers, 2002). As a result, the soils are especially prone to erosion and much of the soil is so overworked that it is not reclaimable (Myers, 2002).

The poor environmental conditions have historically resulted in the migration of many Haitians. Estimates show that about 1.3 million Haitians have left their homelands, with 300,000 of them migrating to the United States (Myers, 2002). Refugees realize that their lives in Haiti contain little hope, and so they desire to start a new life elsewhere (Myers, 2002). Since the primary factor causing Haitians to migrate is poor environmental conditions, it is logical to call these individuals environmental refugees. In the United States, and Florida in particular, \$250 million have been paid per year in the past to meet the needs of Haitian environmental refugees (Myers, 2002).

Deforestation is a huge contributor to environmental degradation in Haiti. Only 2% of the original forest remains, creating extremely degraded land (Keese, 2011). This extreme deforestation occurred for a couple of reasons. First, French colonizers were desperate to make

room for coffee and sugar plantations, so they cleared a large portion of forest land for farming (Interlandi, 2010). Additionally, during the 19th and 20th century, the timber industry played a large role in deforesting Haitian land (Interlandi, 2010). One of the last major reasons for deforestation in Haiti is for the needs of the Haitian population (Interlandi, 2010). The lumber from the forests provided fuel for subsistence farmers and as fuel for the capital of Port-au-Prince (Interlandi, 2010). The intensive deforestation led to additional soil erosion, decreased harvest, and increasing severity of floods (Interlandi, 2010). As these negative effects of deforestation worsened, massive amounts of people left the country-side and headed to Port-au-Prince (Interlandi, 2010).

When the earthquake hit Haiti in January of 2010, the environmental problems only worsened. The aforementioned situation of deforestation resulted in a huge Haitian population living in Port-au-Prince. Months after the earthquake hit, the city was still in shambles as people were living in make shift tents and disease ran rampant (Interlandi, 2010). The soil and potential for mudslides and landslides was already high due to the deforestation, and the earthquake only increased the intensity of such events (Interlandi, 2010). This earthquake created thousands of refugees who were in need of basic supplies, such as food, water, and sanitation (Pape, Johnson, & Fitzgerald, 2010).

The situation in Haiti shows a combination of natural and human-induced factors that led to the creation of environmental refugees. The earthquake was the natural factor that could not have been prevented by any human actions. However, the severity of the effects of the earthquake throughout Haiti was extreme, partially due to previous human actions. The massive deforestation that has occurred throughout Haiti led to a migration to Port-au-Prince, where the

earthquake was focused. Additionally, the mudslides and landslides only worsened after the earthquake occurred.

Case Study: The Maldives

The Maldives are located in the central Indian Ocean, and are comprised for 1200 small, individual islands (Morner, Tooley, & Possnert, 2004). With the highest point at 2.4 meters, these islands are at a high risk of the effects of sea-level rise (Central Intelligence Agency, 2011b). Depending on the rate of sea-level rise, these islands could be completely submerged at some point within the next couple centuries. With a population of about 400,000, this would have a huge effect on the surrounding areas such as India, the rest of Asia, and Australia, as these environmental refugees would have to migrate to other regions (Central Intelligence Agency, 2011b).

Sea level rise occurs for two reasons. First, as water warms, it expands. Secondly, melting ice contributes to sea level rise. The melting of ice is an interesting factor because it is primarily the continental ice sheets that would cause sea level rise, rather than the sea-ice (Mann & Kump, 2008). Continental and mountain glaciers have the most potential boosting sea level rise, as their complete melting would result in a sea level rise of seventy meters. Even though complete glacial melting is unlikely at any point in the near future, sea level rise is still likely to continue. Based on current data, there is a projected sea level rise of .5 to 1.2 meters by the year 2100(Rahmstorf, 2007). . Since, as previously stated, the highest point of the Maldives is at 2.4 meters, this sea level would clearly affect the islands.

When those living in low-lying island states must migrate, many stateless individuals result. When this occurs, the question arises of where these individuals can find statehood. As sea-level rises, the entire population of the Maldives may eventually be externally displaced

(UNHCR, 2009). As the population migrates, they will be completely dependent upon the government where they migrate to (UNHCR, 2009). It has yet to be determined what should occur when states completely cease to exist, which would occur if sea levels completely engulfed the Maldives, but it is clear that problems will arise both for the migrating population and the population of the host country (UNHCR, 2009). The International Law Commission has stated that “when a state disappears by dissolution, its nationality also disappears” (UNHCR, 2009). Therefore, if forced to completely abandon their country, the Maldives’ population would be without a place of residence and without nationality. The tragedy of sea-level rise is that everyone, in some small way, contributes to sea level rise; but it is only those who live in low-lying coastlines and islands and regions that are directly affected by it.

Case Study: Sub-Saharan Africa

Africa, particularly sub-Saharan Africa, is an extremely impoverished region, both in terms of the people and the environment. A correlation exists between these two factors where a poor environment helps increase the levels of poverty. In a region that is extremely prone to drought and food resources are scarce, the people constantly struggle to make ends meet (Brown, 2011). Sub-Saharan Africa is the fastest growing region in the world, and this increase in population is only going to make environmental problems worse (Rowntree, Lewis, Price, & Wyckoff, 2009). Recent data shows that in sub-Saharan Africa, 80 million people are undernourished due to environmental conditions, with about seven million people migrating in order to find food (Myers, 2002). Sub-Saharan Africa has become the main producer of environmental refugees because of reasons such as food scarcity and drought which force people to migrate and search elsewhere for resources and living habitats (Myers, 2002).

Desertification plays a huge role in sub-Saharan Africa and particularly in the Sahel region in Africa. In 2006, a UN conference estimated that by the year 2020, approximately 60 million people could migrate to North Africa and Europe from sub-Saharan Africa due to desertification (Brown, 2011). People in this region are constantly affected by water shortages, often leading to drought and harvest reduction. The amount of cropland available is constantly decreasing, which leads to a decrease in harvest and an increase in malnutrition (Myers, 1997). As desertification, water shortages, drought, and harvest reduction occur; people are more likely to migrate in search for a better environment that will sustain their life. Additionally, as global temperatures rise, North Africa is expected to experience more intense, more frequent, and longer lasting heat waves (Mann & Kump, 2009). As this occurs, individuals are likely to migrate in search of regions primarily in Africa and Europe where water is available.

Problems in the New Environment

As the environmental refugees move into their new environment, various problems and concerns arise. Where will these new refugees live? What government will pay for the expenses of these refugees? What happens when conflict arises? These questions and more need to be addressed as the issue of environmental refugees continues to grow.

As environmental refugees are created due to environmental conditions, some are internally displaced, while some are externally displaced (Myers, 2002). For those that are internally displaced, their transition is a little easier since they are staying within the same country. Therefore, they still function under the same federal government and must abide by the same rules. A cultural familiarity is present for these refugees, as they can at least hold on to the same nationality, even if their exact location has changed. For the externally displaced environmental refugees, the transition is more difficult. Not only must they leave their current

place of residence, but they must also leave their country and possibly adapt to an entirely new way of life.

Immediate problems arise in the places of refugees. As can be expected, environmental problems often arise as environmental refugees migrate. The amount of environmental impact that these refugees exert on the new location is affected by a couple of factors, namely the length of the refugees' stay on the land, the new living conditions that the refugees must adapt to, and the size of the refugee population (Black, 1994). Three main environmental issues include deforestation, land degradation, and water shortages and supply issues (Black, 1994). Not surprisingly, in reference to the earlier section on the causes of environmental refugees, these three issues also lead to their creation. One can expect to see a cyclical pattern as the environmental refugees migrate to new environments, environmental problems arise that result in the creation of more environmental refugees, causing more migration and more environmental problems, etc.

In addition to these environmental problems, conflict often arises between the local indigenous groups and the environmental refugees. To start with, conflict arises as the new refugees compete for the environmental resources in their new homeland (Black, 1994). In a world where resources such as food and water are already scarce, people are more likely to create conflict when their country's resources are being taken by individuals who are not from their country. Situations like this have occurred widely throughout sub-Saharan Africa, where scarce resources have forced individuals to migrate in search of available resources (Rowntree, Lewis, Price, & Wyckoff, 2009). Conflict often leads to the breakout of wars and mass killings as people fight over resources (Rowntree, Lewis, Price, & Wyckoff, 2009).

Migration from poor, developing countries to richer, developed countries is the general trend that is seen worldwide. In the three case studies that were discussed, refugees are all moving from poor, resource deprived regions to other locations that may offer a stronger, better environment. However, these richer countries are not always receptive to the environmental refugees. In many countries, measures are being taken to prevent the flow of refugees, environmental or political. In America, a fence is being built between the border of America and Mexico (Brown, 2011). A fence is also being built between the border of India and Bangladesh, where refugees from Bangladesh hope for a better life in India (Brown, 2011). Many other restrictive measures are being made worldwide, as governments attempt to keep out refugees who may take resources or create conflict in the new land.

Current Land Remedies

Because environmental refugees are caused by environmental issues, it is logical that environmental practices should change in order to support habitable and sustainable land. Such practices include reforestation, re-habilitating the land and soils, and desalination endeavors. As these practices take place, the hope is that the land will once again be suitable for human life, and the environmental refugees that were forced to flee their land may be able to return and lead to a more sustainable life in their place of origin.

Worldwide, reforestation is taking place in regions that have experienced extreme deforestation. Two specific examples of this process are in Haiti and sub-Saharan Africa. Haiti, which currently only has about 2% of its original forests intact, is in dire need of reforestation (Keese, 2011). In the article entitled “A Tree Grows in Haiti,” Jeneen Interlandi (2010) discusses how reforestation in Haiti would help minimize the effect of future natural disasters that may occur. In the article, the U.N. Development chair recognizes the importance of

reforestation, stating that “planting trees is not just some quaint side project; it’s the key to rebuilding the country” (Interlandi, 2010). Many nonprofit groups in Haiti are focusing on the best approaches for reforesting Haiti, looking at which trees will be most beneficial and how this reforestation campaign can best help the economy of Haiti (Interlandi, 2010). In sub-Saharan Africa, there are many groups that work to reforest the region. In particular, a woman named Wangari Maathia won the Nobel Peace Prize for her environmental work in sub-Saharan Africa (Green Belt Movement). The Green Belt Movement, focused in Kenya, has planted more than forty million trees across Africa (Green Belt Movement). Through this planting, soil erosion has been reduced and biodiversity in forest regions has been increased (Green Belt Movement).

Land is an extremely valuable resource, as well as an extremely scarce one. As previously described, the amount of land available may be reduced as sea levels rise. Additionally, much of the land today is essentially useless because it has been overworked or used unsustainably, resulting in either desertification or salinization of the land. Thus, it is extremely important that the remaining land be used sustainably. However, another useful strategy is the attempt to replenish these lands, giving them nourishment and allowing them to be used once more for agricultural purposes. The hope of these mitigation efforts is that land may be able to support agricultural production once again, even though it is currently unable to produce substantial agricultural output currently (Daily, 1995). Unfortunately, rehabilitating degraded land is an expensive and generally, a length process (Daily, 1995). The United Nations Environment Program estimates that the total cost of global rehabilitation practices falls around \$10 to \$22 billion. Although expensive and time consuming, such rehabilitation measures are beneficial, especially for environmental refugees who have had to flee their land due to degraded

lands. More research is necessary on this topic in order to discover successful practices of restoring land.

Current Policy

Currently, environmental refugees are at an extreme disadvantage. When the UNHCR put forth the official definition of a refugee in 1951, they did not include environmental or climate refugees (UNHCR, 1951). Since 1951, environmental displacement has been a growing issue, but the UNHCR has not amended their definition to incorporate environmental refugees. Instead, the UNHCR is hesitant to use the term “environmental” or “climate” refugee because it has no basis in international law (Hartmann, 2010). The UNHCR fears that the use of this term would “undermine the existing refugee regime and the existing legal definitions, to the detriment of bona fide refugees” (Stand Up for Your Rights, 2009, p. 25). With this in mind, while climate refugees often do receive basic human rights, such as the right to life, food, and water, they do not receive the same rights as those that are guaranteed to officially recognized refugees (Stand Up for Your Rights, 2009).

There is a possible way in which these environmental refugees could fall under the UNHCR defined definition of a refugee. If an individual is displaced due to the environment and the government withholds vital necessities due to the individual’s ethnicity, political group, religion, etc, then the individual would be recognized by the UNHCR as a refugee (Stand Up for Your Rights, 2009). However, this situation rarely happens, and the UN even recognizes that this situation will occur in few cases (Stand Up for Your Rights, 2009). Often, since environmental refugees generally come from poorer, developing countries, the government lacks sufficient vital resources to give to its people. For example, when the earthquake struck Haiti in

2010, there were very few resources available that the government could provide (Interlandi, 2010).

There are a few positive situations occurring that offer hope for the environmental refugees. In the United States, the Temporary Protected Status (TPS) was enacted in 1990 which helps individuals who are temporarily prevented from returning to their homeland (U.S. Citizenship and Immigration Services, 2011). Individuals may be granted TPS if their home country is experiencing ongoing armed conflict, an environmental disaster, or other extreme conditions (U.S. Citizenship and Immigration Services, 2011). Individuals from Haiti have been given TPS, which has allowed them some temporary relief while the country attempts to recover from the earthquake (U.S. Citizenship and Immigration Services, 2011). Additionally, some Scandinavian countries have chosen to extend refugee protection to environmental refugees (U.S. Citizenship and Immigration Services, 2011).

Possible Solutions

Through the previous discussion, it is clear that environmental refugees need help. Although they are being recognized in some regions of the world; the majority of countries worldwide, as well as international law, does not officially recognize these people or give patronage to their struggle. Solutions are necessary, both in the form of addressing the root causes of the creation of environmental refugees, as well as addressing the policy regarding how to deal with individuals who are already environmental refugees.

One of the most important ways to help environmental refugees and the environment as a whole is through the reduction of carbon dioxide and other greenhouse gases. Greenhouse gases are the primary cause of human-induced climate change worldwide (Mann & Kump, 2008). As the climate changes, specifically as it warms, desertification and drought increase and water

supplies decrease (Mann & Kump, 2008). The hope is that by reducing the emission of greenhouse gases, desertification and drought may decrease while precipitation increases (Mann & Kump, 2008). Over time, if such changes occur, fewer environmental refugees will be created due to events such as desertification, drought, and water shortages.

Although the reduction of greenhouse gases is extremely important, it is only part of a solution. The reduction of greenhouse gases is aimed towards the prevention of more environmental refugees, but it does not directly address the issue of land shortage for the current environmental refugees. Other actions such as reforestation and restoration of the land, soils, and water need to take place, along with a change in the way that land is used. These sorts of practices allow for refugees to return to their homeland and re-establish their lives there.

In a recent article, the UNHCR recognized the existence of environmental refugees, but refused to acknowledge them as “bona fide” refugees, citing a key distinction in that so-called true refugees fear returning to their homeland due to persecution (Stand Up For Your Rights, 2009). This distinction between true refugees and environmental refugees proves to be unclear. While it is certainly true that persecuted individuals cannot return home for fear of, in the most extreme cases, death, it is also true that environmental refugees cannot return home because it is physically impossible to do so. Their homes may have been destroyed, or they may not be able to survive on their land anymore due to degraded land or lack of water. Whether it is people or the environment that prevents refugees’ return does not seem to affect the problems that they cause at their destination. Overpopulation, overuse of resources, and other problems occur whether a person is displaced because of religion or rain.

Conclusion

Through this examination, it has become clear that the issue of environmental displacement is a crisis in the world today. With the number of environmental refugees estimated at 200 million by the year 2050, environmental displacement cannot be put on the back-burner; this is an issue that must be dealt with now. It must be addressed in attempt to prevent the number of environmental refugees from growing at exponential rates.

These environmental refugees are people who established their home on land where their home is being destroyed. Destruction comes through a variety of causes, such as deforestation, drought, and earthquakes to name a few. As a result, the individuals must leave their established home and find a new residence, often at a place where they are not wanted. They may relocate or be relocated within their original country or in another country; but regardless of the degree of displacement, it is still a completely new and unfamiliar environment.

In addition to the hardship of creating a whole new life, these refugees also struggle with recognition. Without formal refugee recognition by the United Nations, they are not given rights that would help them reestablish their lives in the new location. Environmental refugees must search for a new location, often without any financial aid from governments or the international community.

A change must be made. Changes must be made in regards to the amount of greenhouse gas emissions. Changes must be made in the way that land is used and more sustainable land use practices must be established. And finally, policy must change so that the international community can help these individuals who experienced extreme hardship in their homeland, and now experience extreme hardship in their new location. These environmental refugees need and

deserve recognition from the UNHCR and the international community so that they can build up a new, successful life in their new community.

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