



PAMUN XVI RESEARCH REPORT—Tackling and preventing the devastation caused by the extinction of ecosystems

Introduction to Topic

Today in modern civilisation, there appears to be a line drawn between the natural and manmade world; although many would like this to be the case, in reality both worlds are incredibly intertwined and our manmade societies depend completely on the wellbeing of the natural environments surrounding them. Extinction and the danger of extinction are drastic issues that permanently devastate an environment. There are multiple factors tied into the disappearance of ecosystems, such as the endangerment of plant and animal species, misuse of natural resources, climate change, and disregard for pre existing habitats.

Although all ecosystems are subject to their own difficulties, ecosystems in different geographic location suffer from different issues. For example, aquatic ecosystems are endangered of being overfished with coral reefs disappearing all over the world, whereas forested lands are constantly subjected to deforestation and arctic regions are damaged severely by global warming. Current extinction rates are over 100% more than they ever would be naturally due to human interference which impacts environmental spaces all across the globe; every plant and animal in a particular environment is linked in some way, so when one small creature is harmed, it damages the rest of the ecosystem.

The extinction of an ecosystem isn't easily defined and there are a plethora of factors that lead to their destruction. Extinction of individual species, as well as the depletion of the planet's land, water, and air quality are all main components tied into the eradication of ecosystems. It is critical to realise that all parts of nature are interdependent, and that, in order to heal any part of the natural world, all aspects must be taken into consideration. Human overuse of natural resources, as well as the pollution let off by modern technology into the water, soil, and atmosphere are the issues that need to be re-evaluated and tackled in order to preserve ecosystems for the coming generations.

Definition of Key Terms

Deforestation

Deforestation refers to the mass clearing of trees in a particular area. Oftentimes trees are taken in a manner that leave the areas cleared either intentionally or unintentionally; forest clearing is done intentionally for human development and construction, but when forests are left cleared without purpose, then it usually leaves the soil depleted of nutrients and renders the land useless because there aren't enough nutrients or support for plant life to regrow.

Biodiversity

Biodiversity describes the variety of fauna and flora in a particular environment. The higher the level of biodiversity, the more variation of plants and animals in a particular ecosystem; a high level of biodiversity is generally needed in order to maintain the health of an ecosystem.

Ocean Acidification

Ocean acidification is generally the result of extreme air pollution; when carbon dioxide levels increase in the atmosphere, it impacts the acidity of the water since bodies of water such as the ocean absorb about 30% of the carbon dioxide in the air. Due to the increased carbon levels, the water's pH levels drop, which affects the sea life within it. Some of the dangers of this acidification include the destruction of calcium carbonate structures such as seashells and coral.

Sustainable Development

Sustainable development generally refers to the growth of human infrastructure or societies without the depletion of natural resources to the extent that future generations are unable to fulfil their needs due to lack of resources. There are many forms of sustainable development, whether it be farming techniques such as crop rotation, using renewable energy, or replanting trees after deforestation.

Background Information

Mankind has relied on the environment to provide them with their basic necessities for billions of years, and as time has passed, the human race began to use more resources to do more than just satisfy their survival needs; evolution has led to the expansion of human societies and the population of mankind is now growing at an exponential rate. It wasn't until around the year 1800 that the world

achieved a population of one billion; following that, it only took 130 years to reach two billion, then around 30 years to reach three billion, followed by only 15 years to reach four billion, and then a mere 13 years to grown to five billion. The boom in population created a high demand for resources, thus causing much harm to the environment as it was exploited to meet the demand.

Excess was, and still is, something that is incredibly harmful to ecosystems everywhere. Excessive hunting, fishing, deforestation, and farming are just a few examples of ways the demands of mankind has led to the destruction of natural habitats. Deforestation is one of the examples of mankind's excessive usage; according to the World Resources Institute, the earth has already lost a staggering 80% of its forest coverage due to deforestation. If deforestation continues with this rate, then it won't be long until the remaining 20% is used leaving forest coverage extinct. Without forestation, not only is the biodiversity of ecosystems severely affected, but mankind in its entirety could also be destroyed; when matured, a single tree can provide a year's supply of oxygen to ten people within a season, while also absorbing carbon dioxide at the rate of around 48 pounds a year. Without these massive carbon sinks and providers of oxygen, harmful gasses will continue to build up in the atmosphere and ultimately, mankind will simply not be able to exist due to a lack of oxygen. That being said, it's not just land resources that are endangered; in 2014, it was estimated that 25% of the world's coral reefs have already disappeared due to water pollution, excessive and illegal fishing, and ocean acidification, while being projected that 60% more of the reefs will be gone by 2044.

After the Second World War, radiation and newer forms of pollution were introduced to the atmosphere and earth, and use of harmful chemicals such as untested pesticides, caused harm to both the land and the things living there. With developments of newer technologies and energies, there have been fuels leaked into the atmosphere, and because of this, the earth is .75 degrees celsius warmer than it was one hundred years ago. These changes in the atmosphere are one of the many factors that threaten to endanger species of both plants and animals. With climate change, water has been heating up and expanding, and ice caps have been melting, which has caused water levels to rise in locations that aren't ecologically built to sustain the change, thus causing harm to ecosystems and their inhabitants. According to Greenpeace, sea levels have been rising at approximately 3mm per year, and although this may seem minimal, smaller islands, such as those in the Pacific Islands of Kiribati, are already suffering the impacts of these rising levels in the forms of frequent floods that destroy crops and homes, which impacts both the economy and the personal well being of the inhabitants. These rising sea levels also mean higher tides in coastal regions, which has resulted in higher erosion levels as well as the saltwater contamination of groundwater resources, which renders them useless for farming or consumption without extensive treatment.

As scientists have continued learning more about the impacts we have on our environment, steps have been taken to preserve the wild spaces that our earth has left. Natural parks and land reserves have grown to become the most untouched parts of the wild and organisations continue to search for new ways to keep ecosystems thriving. In 1972, the first of many UN hosted conferences concerning the preservation of the environment was launched and as a result, the United Nations Environment Programme was established and has continued working alongside nations to ensure the preservation of wildlife on a global level.

Major Countries and Organizations Involved

It is to be noted that all nations must continue to work towards putting an end to the destruction of their natural resources and local habitats, seeing as climate change and habitat destruction affects everyone on a global level. Though different nations impact the environment in differing ways, it is still an international problem that demands the attention, cooperation, and collaboration of every country.

[UNEP \(United Nations Environment Programme\)](#)

The UNEP was a result of the 1972 UN Conference on the Human Environment and since its creation has worked towards ensuring the wellbeing of the environment on an international level. One of the main things the UNEP focuses on is managing ecosystems, and with the new millennium development goals focusing on sustainable development of both the manmade and natural worlds, the UNEP has strongly set out to raise awareness and aid countries that need help creating and reaching sustainable environmental goals.

[WWF \(World Wildlife Fund\)](#)

The World Wildlife fund is an organisation that works worldwide in collaboration with 100 nations around the world in order to preserve wildlife in all its forms. Recognising nature as a necessity, they target six different aspects of the natural world: forests, freshwater, oceans, food sources, climate, and wildlife. Through educating and collaborating with other organisations and governmental bodies, the WWF strives to raise awareness and involve as many people as possible in the salvation and preservation of species and their natural habitats. A main goal of the foundation is ensuring that the integrity of nature is upheld despite being used for human use on both an industrial and personal level.

Timeline of Events

| Date | Description of event |
|--|---|
| March 1st, 1872 | Yosemite becomes the world's first national park reserve |
| June 5th-16th, 1972 | United Nations Conference on the Human Environment |
| June 5th, 1972 | United Nations Environment Programme formed |
| December 29th, 1993 | Convention on Biological Diversity enters into force |
| December 11th, 1997 | Kyoto Protocol is signed |
| September 6th-8th | The World Summit establishes the first Millennium Development Goals |
| February 16th, 2005 | Kyoto Protocol goes into effect |
| September 25-27, 2015 | The Millennium Development Goals are renewed |
| November 30th - December 12th, 2015 | The UN Climate Change Conference, COP21, takes place in Paris |

Relevant UN Treaties and Events

- Convention on Biological Diversity, June 5th, 1992
- United Nations Conference on the Human Environment, June 5th-16th, 1972
- Kyoto Protocol, February 16th, 2005
- Millennium Development Goal, 2000 and 2015

Main Issues

Extinction of flora and fauna

The loss of plants and animals in an environment is detrimental to that particular ecosystem. When animals go extinct, it impacts the entire food web of a particular area, which, when changed

drastically enough, can spread to cause ecological issues worldwide. When large predators go extinct, it leads to the overpopulation of its prey, which then could lead to the extinction of that animal's prey; extinction is a vicious cycle that easily spreads and impacts at least 100,000 species per year. It's not only large animals that make a big impact; when pollinators go extinct, it then causes entire species of plants to die off, which in turn means less food for animals, and thus changes an entire ecosystem's dynamic. Ever since the early 2000s, it was voiced by many biologists that colony collapse disorder (CCD) was becoming more of a prevalent issue, particularly in the agricultural industry. CCD is the rapid depletion of a bee colony, and in 2006, CCD statistics began to rise exponentially, with beekeepers reporting a 30-90% loss of their bee colonies with mass disappearance of worker bees, which then completely cripples the entire hive. These numbers have since continued to rise and it is becoming noticeably evident that, not only are domestic bees in danger, but wild bees, as well as copious other pollinators, including birds and butterflies, are disappearing incredibly fast. According to the United Nations Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, approximately 235 to 577 billion dollars worth of agricultural revenue will be lost if pollinators keep disappearing at these rates. Besides the economic detriments, most all vegetable and fruit plants will go extinct without pollinators, which has countless negative impacts for everyone around the world.

Disregard for native species

Disregard for the native species of an environment can result in many pitfalls. When the pre-existing life of a particular environment isn't taken into consideration, then it can lead to the misuse of resources as well as additional harm that wasn't initially planned. One of the biggest mistakes made caused by the ignorance and disregard for native wildlife is the dangers of invasive species. Alien invasive species are incredibly detrimental to any environment; when a non-native species is introduced to an ecosystem, it endangers the native species and changes the entire wildlife population. These species often are introduced to their non-native environment by human devise, whether it was intentional or not. The harm caused by invasive species has the capacity to completely destroy an ecosystem, which has negative effects for the entire area. Examples of this can be seen with species such as the black rat and the kudzu vine. Black rats originated in tropical Asia, but through inadvertent transportation via human boats and trade wagons, these rats were able to first spread to Europe, and have since inhabited almost every country on Earth. Due to their enduring nature, these rats have been able to thrive in all sorts of conditions, but at the cost of the extinction of copious other species of birds, reptiles, and other small vertebrates, as well as the mass spread of diseases to both animals and humans. On the other hand, the kudzu vine is an invasive species that was more intentional than the black rat; in 1876, this Japanese vine was brought to the United States to be featured in an exposition as a rapid

growing plant that could help stop erosion. That being said, once planted, the kudzu vine spread at alarming rates (150,000 acres annually) and suffocated entire habitats, thus killing off many native plant species and driving out native wildlife.

Pollution and global warming

As the manmade world demands expansion and innovation, more and more resources are required in order to meet these demands. As mankind has worked towards their societal goals, the processes they've carried out to reach them have grown to be quite careless, which has had lasting impacts on ecosystems everywhere.

With modern machinery and mass industrialisation, pollution levels have reached heights that the natural world wasn't built to handle. The excessive amounts of carbon and nitrogen in the air have caused harm to plants, as well as water ecosystems. In addition to that, the sheer masses of greenhouse gasses that have developed into our atmosphere has strengthened the greenhouse effect to the extent that our earth's temperature is rising. With this rise of temperature, there is shifts in, not only the plants and animals who are accustomed and oftentimes rely on consistent weather conditions, but also the physical habitat itself. With the rising temperatures, ice is melting thus destroying arctic ecosystems and causing sea levels to rise. Polar bear counts are falling towards extinction and the higher tides mean floodings that coastal and riverside regions aren't equipped to handle.

Not only is global warming and air pollution an ever growing issue, but with the disposal of human waste, there are several threats to the natural world via littering, poisoning of water and land sources, as well as just occupance of natural habitats to the extent that ecosystems aren't able to grown due to human presence. If mankind continues to destroy the natural world with excessive trash, resources, and energies, then it's only a matter of time until all ecosystems reach a point of no return and go extinct.

Economic detriments

Harm and extinction of ecosystems causes harm in the natural sense, as well as in the field of economics. According to the UNEP, governments don't usually take the economic benefits of healthy ecosystems into account when making decisions, rather it is a benefit that they take for granted. Free services that the environment provides such as food, water, and protection from the elements and climate change is estimated to be worth billions of dollars. With the aid of organisations such as the UNEP and TEEB (The Economics of Ecosystems and Biodiversity), nations have begun to take advantage of the economic benefits of the environment in a healthy manner, however, if the 'goods and services' of nature grow to be damaged beyond repair, that means a loss worth billions.

Previous Attempts to solve the Issue

There has been a plethora of steps taken throughout history to preserve ecosystems on a global scale. During the industrialisation of the Americas, people such as John Muir became activists against the harming of natural spaces and in 1978, UNESCO began to create world heritage sites in order to preserve particular places and ecosystems from the grasp of mankind. Unfortunately, these sites have since grown to be massive tourist attractions, and thus are still yet to be completely saved from human exploitation.

As time drew on, it became evident that the destruction wasn't set to stop anytime soon, thus agreements such as the Kyoto Protocol were put into place to set boundaries for nations concerning issues such as pollution. In 2000, the first set of Millennium Development Goals were put in place and though deforestation rates dropped, greenhouse emissions continue to be released into the atmosphere, being a lead cause in global warming and damaging the ozone.

Possible Solutions

It is to be noted that, while individualised policies for nations can be beneficial, most of the time countries pass policies that benefit them rather than the environment as whole; if there is economic incentive involved, governments oftentimes will prioritise their economy rather than the wellbeing of the global environment. In addition to other incentives, nations will often implement policies for short term gain, while finding loopholes in order to benefit from the policies of other nations. It is imperative that, unlike many previous attempts to come to a consensus on environmental policies, nations think on a global, rather than individual, level.

[Sustainable development and living](#)

One of the most effective ways to prevent the potential extinction of ecosystems would be to put an end to the exploitation of the natural world. As the human population increases at an exponential rate, the demand for natural resources has skyrocketed. With this constant demand steadily growing, corporations and governments have been more concerned with filling that demand as soon as possible rather than doing so in a healthy manner. Using renewable resources and energies, such as solar power

or wind turbines could help to eliminate the risk of further habitat destruction, presuming that these power plants were established safely and with thought to the surrounding areas.

In addition to healthier alternatives to resources, all companies and businesses big or small could implement strategies to healthily restore the resources that they take from the environment, paying particular attention to forest habitats and the quality of soil, water, and air. Keep in mind that the United Nations has already set standards for the use of more renewable resources, thus it is now up to the individual nations to make the changes needed in order to fix the ecosystems within their borders.

International legislation

More often than not, environmental decisions are passed by governments because of individual benefits rather than wide scope gain. That being said, since these ever-growing environmental dangers severely threaten the world in its entirety, more collaborative solutions need to be created. With the rapid decrease of forestation and overall loss of quality of natural habitats, some ecological sites need to be preserved no matter the economic cost of human society. International consensus needs to be reached to preserve species and habitats because at the current decline of the world's natural resources, the Earth will very soon reach a point where it's uninhabitable. It has reached a level of severity where nations around the world desperately **need** to come up with worldwide standards that will protect natural habitats from destruction; these compromises will need to first and foremost protect our planet, while also having substantial promise so that countries have legitimate incentive to uphold the agreement. These compromises could possibly be setting aside a certain percentage of valuable land space in each country depending on either size or value; there could also be an increase in international vigilance against activity such as poaching or overfishing, while setting limits to activities that damage the environment, if not outlawing them altogether. Similar to the consensus previously reached to protect the arctic (despite its promise of rich natural resources) these new coming laws may require sacrifice, and it is important to keep in mind the oftentimes greedy nature of governments when involving economic and political gain while coming up with potential ideas to preserve the natural world. It is imperative that everyone globally realises that the environment needs to be a priority if current natural habitats are even to exist for the next two generations; this is something that needs to be taught on a global scale and needs to be taken incredibly seriously by everyone around the world.

Preserving species and habitats

To prevent the extinction of habitats as a whole, it is imperative to prevent them from falling apart piece by piece due to the extinction of individual flora and fauna. Illegal poaching and fishing has led to

the endangerment of large predators, as well as cause harm to delicate habitats such as coral reefs. To prevent events like these from occurring more frequently in the future, it is imperative that legislation against illegal hunting and fishing be put into place and is properly upheld. In addition to crime, it is important that legal hunting grounds also be preserved to prevent overhunting and overfishing.

Spreading awareness for endangered species of both plants and animals is something that could potentially aid the prevention of the destruction of local habitats as well as prevent excessive hunting methods that targets endangered species. It is to be kept in mind that oftentimes nations already have policies and legislation passed preserving their national wildlife; it's often lack of enforcement that allows for these laws to either go unknown or be broken.

In addition to preserving local wildlife as means to prevent the destruction of full ecosystems, it needs to be made clear that pollution and littering, particularly in environmental places, isn't something to be taken lightly. Ignorance of the damage caused by small individual acts is often the lead cause of harm in a habitat, and education alone isn't enough to change entire societies.

Bibliography

"Biodiversity Loss and Humans." Biodiversity Loss - Biodiversity Loss and Humans. N.p., n.d. Web. 12 July 2016. http://www.priweb.org/globalchange/bioloss/bl_03.html.

"Loss of Biodiversity and Extinctions." - Global Issues. N.p., n.d. Web. 12 July 2016. <http://www.globalissues.org/article/171/loss-of-biodiversity-and-extinctions>

"What Is an Invasive Species?" What Is an Invasive Species? OceanService, n.d. Web. 12 July 2016. <http://oceanservice.noaa.gov/facts/invasive.html>.

"Invasive Species: How They Affect the Environment." How Invasive Species Impact the Environment. N.p., n.d. Web. 12 July 2016. <http://www.environmentalscience.org/invasive-species>

Jowitz, Juliette. "UN Report Warns of Economic Impact of Biodiversity Loss." The Guardian. Guardian News and Media, 10 May 2010. Web. 13 July 2016. <https://www.theguardian.com/science/2010/may/10/un-report-economic-impact-biodiversity>

"Current World Population." World Population Clock: 7.4 Billion People (2016). N.p., n.d. Web. 13 July 2016. <http://www.worldometers.info/world-population/>

Coburn, Robert. "Can We Stop the Sixth Mass Extinction?" *National Geographic*. N.p., n.d. Web. 13 July 2016. <http://voices.nationalgeographic.com/2015/06/23/can-we-stop-the-sixth-mass-extinction/>

"Impact of Ecosystem Destruction." *The World Counts*. N.p., n.d. Web. 14 July 2016. <http://www.theworldcounts.com/stories/Impact-of-Ecosystem-Destruction>

"Endangered Species by Country." Bagheera. N.p., n.d. Web. 14 July 2016. <http://www.bagheera.com/threatened-by-country>.

"Global Issues at the United Nations." UN News Center. UN, n.d. Web. 14 July 2016. <http://www.un.org/en/globalissues/environment/>.

"Deforestation Statistics." The World Preservation Foundation. N.p., 29 June 2010. Web. 15 July 2016. <http://www.worldpreservationfoundation.org/blog/news/deforestation-statistics/#.V5TMhDI95QI>.

"Economics of Ecosystems." United Nations Environment Programme (UNEP). UNEP, n.d. Web. 15 July 2016. <http://web.unep.org/ecosystems/what-we-do/economics-ecosystems>.

"Amazon Rain Forest, Deforestation, Forest Conservation - National Geographic Magazine." National Geographic. NatGeo, n.d. Web. 15 July 2016. <http://environment.nationalgeographic.com/environment/habitats/last-of-amazon/#page=1>.

Boucher, Doug. "How Brazil Has Dramatically Reduced Tropical Deforestation." RSS. Solutions Journal,, 3 July 2013. Web. 15 July 2016. <http://www.resilience.org/stories/2014-07-03/how-brazil-has-dramatically-reduced-tropical-deforestation>

Gonzalez, Robbie. "10 of the World's Worst Invasive Species." Io9. N.p., 22 Aug. 2011. Web. 15 Aug. 2016. <http://io9.gizmodo.com/5833022/10-of-the-worlds-worst-invasive-species>.

Emerson, Sarah. "Honey Bee Extinction Will Change Life As We Know It." Motherboard. Vice Media, 7 June 2016. Web. 15 Aug. 2016. <http://motherboard.vice.com/read/honey-bee-extinction-will-change-life-as-we-know-it>.

Anne Marie. "How Much Oxygen Does One Tree Produce?" About.com Education. N.p., 20 Apr. 2016. Web. 15 Aug. 2016. <http://chemistry.about.com/od/environmentalchemistry/f/oxygen-produced-by-trees.htm>