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Ecosystem Restoration as a Successful Way for Fighting Global Climate Changes



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EXECUTIVE SUMMARY

The world's ecosystem has been affected throughout the ages by human development which has led to climate change throughout the whole globe. Global warming is causing not only warmer water temperatures but it is also raising the level of the seas and the consequences of this can affect food security, health, access to water and personal security. It can affect all human beings especially the vulnerable ones. People living in third world countries will be the most affected. Climate change affects our right to life, right to adequate food, right to water, right to health, right to adequate housing and right to self-determination. We, humans, depend on the ecosystem since it provides us with basic needs starting from food and water to disease control and cultural benefits. It needs to be protected and if possible to be restored (Society for Ecological Restoration International 2007) with the help of ecosystem restoration, which is one of the few ways to fight the global climate change phenomenon. The aim of the paper is to show that ecosystem restoration is one of the most successful ways to fight global climate change.

INTRODUCTION

Due to global warming, even a small temperature change can have a tremendous effect on the ecosystem which is very sensitive to climate change. A minor change in temperature can cause a huge behavioural change in species and can even cause mortality which consequently causes a collapse in the ecosystem. A slight temperature change is also a common reason for forest fires throughout the world, which leads to less trees, which leads to lack of oxygen and again to ecosystem collapse (True Nature Foundation 2018). In places where it usually would snow in winters now it is raining instead and we are as well witnessing late autumn and early spring snow melting (Glicksman 2009).

GLOBAL CLIMATE CHANGE

Global warming itself is a recent phenomenon. The water supplies and ecosystem generally were enough for human beings starting from the first era until the mid-18th century. The world population was small and people did not live very long which was reasonably proportionate for the ecosystem, however starting from the end of the 18th century civilisations started growing with agriculture as well as industrial developments and inhabitation and damage of the ecosystem. (Peter Gleick, 2006) The world population continues to grow in big numbers whereas the amount of water stays fixed. The global (Peter Gleick, 2006) Ecosystem is being damaged by humans, by water pollution and by land mismanagement (Gleick 2006).

Global climate change has led to many economic problems for countries as well as threats to human rights (Werrell & Femia 2018). The right to life, the right to adequate food, the right to water, the rights of indigenous people, basic human security such as poverty and social deprivation and most importantly the right to health are all in direct danger when it comes to climate change threatening governments from fulfilling their obligations to protect their own people's human rights (Von Doussa, Corkery & Chartres 2007).

Global climate change affects the ecology of the planet. Animals and plants living in

particular areas that are or will be harmed due to global climate change can bring an ecological change of the earth's biosphere with disruption of the proportionate balance between plants and animal species (NASA 2011). While climate change is an ecological problem, it is also an economic one. One of the main obstacles that we are going to face will be the issue of migration which can be caused by the rising sea levels, because people will be deprived of their basic needs. Studies have shown that by 2050 around 150 million people would be forced to migrate due to climate change (Myers 1993) since global climate change will cause displacement due to natural disasters such as hurricanes and the rise of sea levels and flooding following up with food shortages (Von Doussa, Corkery & Chartres 2007).

Climate change is a dangerous global phenomenon that preys upon the vulnerable and poses a significant threat to the protection of human rights. Not only can climate change play a causal role in violent conflict, it also threatens the enjoyment of basic human rights. International human rights law can play a preventative role in global climate change. Conventions such as the International Covenant on Civil and Political Rights (1966), the International Covenant on Economic, Social and Cultural Rights (1966), the International Convention on the Elimination of All Forms of Racial Discrimination (1969), the International Convention on the Elimination of All Forms of Discrimination Against Women (1979), the International Convention on the Rights of the Child (1990) and the International Convention on the Rights of Persons with Disabilities (2008) (Center for International Environmental Law 2018) are relevant human rights tools for advancing the enjoyment of human rights threatened by climate change. These conventions put obligations for the signatory countries to protect the individual's right to life, right to water, right to adequate housing, right to express their opinion, right to participate in public affairs and right to culture. The conventions obligate countries who are part of them to prohibit discrimination against women and children, to protect the rights of rural women, to eliminate any sort of racial discrimination and to protect

persons with disabilities in situations of risks and natural disasters (Center for International Environmental Law 2018). However, the issue is that unfortunately not every country respects and protects these rights as well as that not every country is part of these conventions.

Some of the important factors that can be done to fight global climate changes are to create wildlife corridors, to improve disaster planning, to amend local planning laws (Von Doussa, Corkery & Chartres 2007) and to restore water supplies if possible or source new ones. It is important to share knowledge to keep citizens informed. However, since it is a continuing process, the only way to reduce the human endangerment is to start restoring the already damaged ecosystem.

Many of the world's ecosystems which have been overused by human beings now have negative impacts on biological diversity and peoples' livelihoods. There is a growing realisation that we will not be able to conserve the earth's biological diversity. The only solution is the ecosystem restoration.

ECOSYSTEM RESTORATION: COMBATING GLOBAL CLIMATE CHANGES

A small change in temperature can have a devastating impact on the entire ecosystem. This is what global climate change is threatening nowadays (Dean 2018). Currently global climate change is seemingly targeting some particular areas. Since the earth has different levels of biodiversity, climate change affects different biotas and ecosystems, making the problem more or less regional (Harris, Hobbs, Higgs & Aronson 2006) which leads to the loss of flora and fauna in that particular region. Specific areas are inhabited by a specific set of animals and a specific set of plants to survive in that particular area. When the global temperature rises it affects these specific plants or animals and as a chain of action it also damages everything that surrounds it. Since the damages are regional, one of the available and accessible resources to combat the climate change phenomenon is to restore the particular ecosystem. Everything that occurs in our biophysical system is chained

and this restoration can lead to the reduction of the damages that may occur in the other regions thus combating global climate change. 'While climate change threatens to unravel natural systems, ecosystem restoration presents a major – and underexplored – climate solution' (Dean 2018).

Ecosystem restoration can be a primary component of conservation and sustainable development programmes throughout the world (Society for Ecological Restoration n.d.). Its inherent capacity to provide people with the opportunity not only to repair ecological damage, but also to improve the human condition, to renew economic opportunities, rejuvenate traditional cultural practices and refocus the aspirations of local communities makes ecosystem restoration uniquely valuable.

Ecosystem restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed (Society for Ecological Restoration n.d.). It is an intentional activity that initiates or accelerates an ecological pathway – or trajectory through time – towards a reference state (Alexander, Aronson, Whaley & Lamb 2016). This is particularly relevant for land that has been destroyed to enable it to be recovered and rebuilt to its original ecosystem as much as possible but which also does not exclude the adaptation of the new already changed conditions (Alexander, Aronson, Whaley & Lamb 2016).

In order to maintain the balance between sustainable biodiversity and human well-being there is a need for a large scale ecosystem restoration which will lead to conservation of natural capital. The restoration itself needs to be identified with the target, scale, degree and the desired goal achievement for the ecosystem, environment and for the human beings surrounding it, with the help of more policy reforms, investments, research and developments (Alexander, Aronson, Whaley & Lamb 2016).

EXAMPLES OF ECOSYSTEM RESTORATION

One good example of ecosystem restoration is the Everglades, in Florida, USA, which used to have one of the unique ecosystems in the

world. It is not only important for its unique flora and fauna, but also because it collects the water and filters and captures floodwaters. However, as we look at the history, people also have a huge impact in the ecosystem of the Everglades (Restoring the Everglades n.d.). When the population started to grow in Florida the water recourses shrank. People try to control the resort, building modern conservation areas and setting up a speed controlling mechanism. The Everglades is a massive landscape full with water, wildlife and trees that are typical for tropical areas as well as floral diversity. The native Indians called the area 'grassy lake'. Alas, the 'grassy lake' had been a victim of human re-sourcing as it was especially used for agriculture and global climate change and it started to drain (Piccininni 2014).

The bottom line is that the Everglades does not receive the proper quantity or quality of water at the right place or the right time. Its lakes suffer from water levels that fluctuate drastically and its estuaries suffer from inundations of fresh water during the storm season and very little fresh water in times of drought, however the population is increasing. Nevertheless, there is a solution called the Comprehensive Everglades Restoration Plan which is to provide the right amount of water and the right flow conditions to the Everglades, to restore the natural timing and distribution of water, and for fresh water to be stored in the underground aquifer for later use (National Park Service 2019). One important adaptation was to control flooding with the cooperation of agriculture that is using the water. Due to climate changes, heatwaves and heavy precipitation are being witnessed more frequently as well as hurricanes, which makes it even harder to control the water. Despite these factors it was also noted that by the end of the century the air temperature has risen from 3 to 5 degrees Fahrenheit. The higher air temperature can lead to the decreasing of precipitations, destructive fires, frequent flooding and hurricanes, sea level rise and changes in the hydrological cycle (Piccininni 2014).

If no restoration occurred and if the sea level rises by two feet, which seemingly is not a big number, 'the Everglades will be inundated and up to fifty percent of the Everglades' fresh water marsh will be transformed into a salt

water system. Coastal flooding and associated wetlands losses also could destroy storm buffers in low-lying areas. The increasingly arid conditions that exist in areas starved of precipitation, runoff, and summer flows will increase the risk of wildfires' (Glicksman 2009).

Despite the fact that the sea level has not yet reached to its two feet raising, the effects are still noticeable. It is especially concerning that the wildlife and entire ecosystem in Florida will be endangered and they will migrate due to unsuitable conditions, leaving Florida (Glicksman 2009).

Recent restorations happening throughout the world have had a sustainable impact into the ecosystem and have been obviously noticeable. Simple steps such as revegetation which is rebuilding and replanting the restored land or cleaning up polluted areas are also steps towards making a better ecosystem for us (Alexander, Aronson, Whaley & Lamb 2016).

One of the other successful examples of ecosystem restoration is the programme known in China as the Grain-for-Green Program where in order to protect the watersheds the agricultural land was reforested. The whole area which will be covered with trees used to be a cropland which is approximately 30 million hectares. Despite the fact that in the beginning the variety of trees used were a small number of commercial tree species, if a wider variety of native species is used the process will be more effective and sustainable. China is using similar restoration methodologies at other large scale areas throughout the country (Alexander, Aronson, Whaley & Lamb 2016).

RECOMMENDATIONS FOR SUCCESSFUL ECOSYSTEM RESTORATION

Global climate change affects from individuals to populations, from species to communities and the entire ecosystem as a whole (Falk 2016). Ecosystem restoration is a huge step towards fighting global climate change. If nothing is done, global climate change will have a significant harmful impact within 20-30 years. Ecosystem restoration is the primary tool used to respond to the global climate changes (Harris, Hobbs, Higgs & Aronson 2006). In order

for the ecosystem to be restored there are important factors to consider. First of all it is necessary to understand how the damaged system had been shifted and then how to restore it (Falk 2016). After this the ecological system should be enhanced to resistance, making more efforts for the particular ecology to survive, then to follow the process of recovery which is to try to re-establish the prior community and for reorganisation, which is to allow the new geographic migration of species that may help to restore the ecology and will be viewed as an ecological response to the climate change (Falk 2016).

Ecological restoration is not only a good response to climate change but also increases the provisioning of biodiversity and ecosystem services. The United Nations (UN) is also one of the organisations that aims to restore the ecosystem in order to combat climate change. By 2030 the UN aims to restore more than 350 million hectares of land (Rohr, Bernhardt, Cadotte & Clements 2018).

In order for restoration to be successful there are five main components to be followed:

1. We should define baselines which should be correct and meaningful. The endpoint of the restoration should be selected realistically and should be appropriate.
2. The restoration should be balanced, particularly between where there is a need of one and where it will have a successful endpoint.
3. The economic system is also important; it should be created in a sustainable ground in order to stimulate the restoration.
4. It is important to understand and more important to manipulate the correct process of ecological restoration.
5. The determination of restoration must be successfully monitored (Rohr, Bernhardt, Cadotte & Clements 2018).

In order to start ecosystem restoration, it is important to identify what is needed to be restored and then to establish goals involving stakeholders in order to aim for success. It is important to note that ecosystem restoration should be about setting realistic goals taking into account the 'past, legacy and current disturbances' and not be about some specific

and more numeric achievements such as the value or number of species that are needed to be restored. The restoration might not serve its purpose if it is about enhancing a rare species in the area or threatening only some species. The restoration should have a functional endpoint, be more structural and compositional (Rohr, Bernhardt, Cadotte & Clements 2018).

In order to have success in restoration it should be noted that it is essential to start the restoration as soon as possible in order to prevent from it to 'transitioning to undesired alternative stable states' and it is also important to include economists from the early stages in order to identify the best cost-wise approach to it (Rohr, Bernhardt, Cadotte & Clements 2018).

According to the Convention on Biological Diversity's Principles (2007) there are some principles of good ecological restoration:

- Ensuring all stakeholders are fully aware of the full range of possible alternatives, opportunities, costs and benefits offered by restoration.
- Empowering all stakeholders, especially disenfranchised resource users.
- Engaging all relevant sectors of society and disciplines, including the displaced and powerless, in planning, implementation and monitoring.
- Involving relevant stakeholders in the definition of boundaries for restoration.
- Considering all forms of historical and current information, including scientific and indigenous and local knowledge, innovations and practices.
- Providing short-term benefits leading to the acceptance of longer-term objectives.
- Providing for the accrual of ecosystem goods and services.
- Striving towards economic viability.

We cannot overcome the problem alone, the only solution is to bring together all the efforts and all stakeholders including indigenous people, multinational corporations and administrative unities to address these principles.

CONCLUSION

Since the temperature in the world is growing and there is nothing that people can do in order to stop it completely, there are just two options here, either to live in a substantially warmer world or to take actions and to try at least to limit, as much as possible, the warming of our planet. One action that we can take is ecosystem restoration. It will give human civilisation an opportunity to have significant stabilisation and even more importantly it will be one of the options to fight the global warming phenomenon, to make the world change back to normal (Malhi, Franklin, Seddon, Solan, Turner, Field & Knowlton 2020).

Climate change is not just a process happening in a land but also in forests, wetlands, water: it is just happening globally. It affects humans physically, biologically, socially and economically. With the species migration and ecosystem changes we can witness tundra turning into temperature forests, deserts into grasslands and so on (Glicksman 2009).

If we bring all our efforts together and make everyone to understand the problem we can easily overcome it, by finding solutions. Human rights will be most useful if we have an opportunity to combine it with international justice as a tool for making governments responsible for climate change and the ecosystem restorations, and, when necessary, to compel responses. If we do it successfully, human rights have the potential to play a significant preventative role in global climate change and in the preservation of the ecosystem.

REFERENCES

- Alexander S, Aronson J, Whaley O & Lamb D 'The relationship between ecological restoration and the ecosystem services concept' (2016) 21 (1) *Ecology and Society* 34
- Center for International Environmental Law, The Global Initiative for Economic, Social and Cultural Rights 'States' Human Rights Obligations in the Context of Climate Change' (2018), available at <https://www.ciel.org/wp-content/uploads/2018/01/HRTBs-synthesis-report.pdf> (last visited 28 June 2021)
- Dean M 'Ecosystems and Climate Change: 3 Key Findings You Should Know' (2018) *UN Foundation*, available at <https://unfoundation.org/blog/post/ecosystems-and-climate-change-3-key-findings-you-should-know/> (last visited 28 June 2021)
- Falk DA 'The Resilience Dilemma: Incorporating Global Change into Ecosystem Policy and Management' (2016) 48 *Arizona State Law Journal* 145
- Gleick P 'ECO-System Restoration Challenges and Opportunities' (2006) 19 *Pacific McGeorge Global Business & Development Law Journal* 1
- Glicksman RL 'Ecosystem Resilience to Disruptions Linked to Global Climate Change: An Adaptive Approach to Federal Land Management' (2009) 87 *Nebraska Law Review* 833
- National Park Service 'Comprehensive Everglades Restoration Plan' (2019), available at <https://www.nps.gov/ever/learn/nature/ceerp.htm> (last visited 28 June 2021)
- Harris JA, Hobbs RJ, Higgs E & Aronson J 'Ecological Restoration and Global Climate Change' (2006) *Wiley Online Library*, available at <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1526-100X.2006.00136.x> (last visited 28 June 2021)
- Sasha Alexander, James Aronson, Oliver Whaley and David Lamb, (2016) The relationship between ecological restoration and the ecosystem services concept, *Ecology and Society*, Mar 2016, Vol. 21, No. 1
- The SER International Primer on Ecological Restoration, Society for Ecological Restoration International Science & Policy Working Group (Version 2: October, 2004), available at: https://www.ctahr.hawaii.edu/littonc/PDFs/682_SERPrimer.pdf (last visited 28 June 2021)

- John Von Doudda, Allison Corkery & Renee Chartres, Human Rights and Climate Change, (2007). 14 *Austl. INT'LJ.* 161
- Norman Myers, 'Environmental Refugees in a Globally Warmed World' (1993) 43(11) *BioScience* at 752
- Peter Gleick, ECO-System Restoration Challenges and Opportunities, (2006). 19 *Pac. McGeorge Global Bus. & DEV. L.J.* 1
- Frank Piccininni, Adaptation to Climate Change and the Everglades Ecosystem, (2014), 26 *ENVTL. CL.J.* 63
- Donald A. Falk, Resilience Dilemma: Incorporating Global Change into Ecosystem Policy and Management, (2016), THE, 48 *ARIZ. St. L.J.* 145
- Jason R. Rohr, Emily S. Bernhardt, Marc W. Cadotte and William H. Clements, The ecology and economics of restoration: when, what, where, and how to restore ecosystems (2018), *Ecology and Society*, Jun 2018, Vol. 23, No. 2
- Malhi Y, Franklin J, Seddon N, Solan M, Turner MG, Field CB & Knowlton N 'Climate change and ecosystems: threats, opportunities and solutions' (2020) 375 (1794) *Philosophical Transactions of the Royal Society* 20190104, available at <http://dx.doi.org/10.1098/rstb.2019.0104> (last visited 28 June 2021)
- Myers N 'Environmental Refugees in a Globally Warmed World' (1993) 43 (11) *BioScience* 752
- NASA 'Climate change may bring big ecosystem changes' (2011) *Global Climate Change News*, available at <https://climate.nasa.gov/news/645/climate-change-may-bring-big-ecosystem-changes/> (last visited 28 June 2021)
- Piccininni F 'Adaptation to Climate Change and the Everglades Ecosystem' (2014) 26 *Environmental Claims Journal* 63
- Restoring the Everglades, available at <https://www.nps.gov/features/ever/climatechange/ever705/> (last visited 28 June 2021)
- Rohr JR, Bernhardt ES, Cadotte MW & Clements WH 'The ecology and economics of restoration: when, what, where, and how to restore ecosystems' (2018) 23 (2) *Ecology and Society* 15
- Society for Ecological Restoration 'What is ecological restoration', available at <https://www.ser-rrc.org/what-is-ecological-restoration/> (last visited 28 June 2021)
- Malhi Y, Franklin J, Seddon N, Solan M, Turner MG, Field CB, Knowlton N., 2020 Climate change and ecosystems: threats, opportunities and solutions. *Phil. Trans. R. Soc., B* 375: 20190104. Available at: <http://dx.doi.org/10.1098/rstb.2019.0104> (last visited 28 June 2021)
- True Nature Foundation, Ecosystem restoration: A global strategy to mitigate climate change, 2018, available at: <https://truenaturefoundation.org/biodiversity/ecosystem-restoration-a-global-strategy-to-mitigate-climate-change/> (last visited 28 June 2021)
- Robert L. Glicksman, Ecosystem Resilience to Disruptions Linked to Global Climate Change: An Adaptive Approach to Federal Land Management, (2009), 87 *NEB.L. REV.* 833
- Society for Ecological Restoration International 'Ecological Restoration: A Global Strategy For Mitigating Climate Change' (2007) *Science Daily*, available at <https://www.sciencedaily.com/releases/2007/08/070817165031.htm> (last visited 28 June 2021)
- Society for Ecological Restoration International Science & Policy Working Group (2004) The SER International Primer on Ecological Restoration (Version 2: October 2004), available at https://www.ctahr.hawaii.edu/littonc/PDFs/682_SERPrimer.pdf (last visited 28 June 2021)
- True Nature Foundation 'Ecosystem restoration: A global strategy to mitigate climate change' (2018) available at <https://truenaturefoundation.org/biodiversity/ecosystem-restoration-a-global-strategy-to-mitigate-climate-change/> (last visited 28 June 2021)
- Von Doussa J, Corkery A & Chartres R 'Human Rights and Climate Change' (2007) 14 *Australian International Law Journal* 161
- Werrell CE & Femia F 'Climate change raises conflict concerns' (2018) *The UNESCO Courier, Wild Angle*, available at <https://en.unesco.org/courier/2018-2/climate-change-raises-conflict-concerns> (last visited 28 June 2021)



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