# Regeneration of the Amazon Rainforest by the Application of Permaculture

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**Abstract**

The Amazon rainforest is under great destruction. There is a loss of around 20,000 $km^2$ of every year, or 2.3 $km^2$/hour. This is roughly the size of Maryland, USA. Given the Amazon rainforest offers many valuable resources and functions, it would be a great harm to the world for the loss of another rainforest. To stop this destruction there must be better world cooperation and education. However, in order to mitigate the former destruction, a new method known as permaculture has been applied. In the past few decades, this design method has been taking off, showing up in towns all over the world. It is a design system that follows the patterns of nature, allowing the growth of foliage in a mimicked natural way. This growth also provides for food and other uses for the people applying the permaculture design. It is a sustainable method that goes beyond sustainable agriculture: by using the principles of nature, there is no organized crop or subject. People give the degraded land of the Amazon rainforest the tools it needs to regenerate. The tools given are those which are beneficial to the people; therefore, the forest regenerates while producing necessary resources.

**The Amazon Rainforest and Deforestation**

The Amazon rainforest, also known as Amazonia, is the world's largest tropical rainforest, covering more than half of Brazil. Its abundant vegetation has been described as the "Lungs of our Planet," creating an estimated twenty percent of earth's oxygen. The 1.4 billion acres of the Amazon rainforest is estimated to house half of the species on the planet, having the highest level of biodiversity. It receives about nine feet of rain every year, fifty percent of which returns to the atmosphere through transpiration. Between June and October, the water level of the Amazon River rises by thirty to forty-five feet, flooding millions of acres of the rainforest. The majority of this flood water flows from the snowmelt of the Peruvian Andes. Despite all of its

abundant richness, this flooding would wash the soil clean of nutrients if the foliage did not lock most of it. The giant trees of the Amazon rainforest grow in the poorest of soil. Once waste hits the forest floor decomposers begin to turn it into a nutrient source, allowing the vegetation to feed (Amazon Rainforest, 2003).

Since it is an interdependent network, the portioned destruction of the system can interrupt the whole. Although people have been manipulating this land for thousands of years, it is different today because the rainforest must meet the needs or desires of a larger group of beneficiaries. Globalization has surely taken a toll on the Amazon rainforest by leading to massive deforestation. The main causes of deforestation are agricultural, cattle farming, logging, urbanization (usually for rainforest penetration to advance illegal logging and agriculture). These immense commercial activities are playing an increasingly detrimental role in the Amazon rainforest (Tropical Deforestation, 2007).

Although the ethical part of extinction and destruction is a topic of debate, its physical complications are undoubtable. Currently twenty percent of the Amazon rainforest has been destroyed, give or take. If this rate continues uninterrupted, some estimate the possibility of its disappearance in less than forty years. A projected 130 species of plants, animals, and insects are lost daily. This is because the combination of species specialization and rainforest fragmentation makes them particularly vulnerable to extinction (Amazon Rainforest, 2003).

Many of these plants have been put to countless uses by the native peoples of the Amazon rainforest for centuries. The most important uses have been for medicine, allowing for health and survival in the Amazon and beyond. With the loss of the Amazon rainforest, about 25% of our drugs are at stake. Plus, most will never be discovered considering scientists have tested a maximum of one percent of these plants. Information from local medicine men is limited

since most remaining are above seventy years old. Not only will a wealth of untouched knowledge disappear, but the natives themselves are at risk. So far, the fate of the indigenous people has not been particularly successful. Although there are less than 200,000 indigenous people in the rainforest today, there were nearly 10 million living in Amazonia about 500 years ago. Nearly one hundred tribes have disappeared since the twentieth century (Amazon Rainforest, 2003). This deforestation in indigenous territory has triggered violent conflict. On the other hand, even conservation efforts look to move these people from the Amazon rainforest (Tropical Deforestation, 2007).

Not only are the native plants, animals, and people at risk, but world weather patterns may alter. As rainfall evaporates from the plants and soil, it recycles thirty percent back into the Amazon rainforest. It falls again as rain in a continuous self-watering cycle. This evaporation also cools the Amazon rainforest, which lies along the equator. According to advanced computer climate models, increasing pasture and crop is directly related to a drier and hotter climate. It also predicts an altered rainfall pattern in many points around the world including China, Mexico, and the United States. However, on local scales there is an estimation of increased rainfall. Heated deforested areas enhance the evaporation of nearby water which creates more clouds and rainfall. This increased rainfall, which has already been felt by communities of the rainforest, quickly depletes the soil. Since most of the nutrient content is held within plants, exposed soil would be unable to support life in a few years. This is made worse by monoculture and cattle ranches (Tropical Deforestation, 2007).

Today, after decades of detrimental agricultural techniques, conservation experts are saying that making the mainstream agricultural sciences should a forbidden practice. The agriculture taught at colleges between 1930 and 1980 has tampered nature enough to cause more

damage on the face of the Earth than any other factor. However, nature tampering has been done for most of human history. Today, there are new techniques that flow with the natural landscapes. Permaculture, a design system based on ecological systems, is allowing for regeneration of the Amazon rainforest while producing useful yields and eco communities (Permaculture: Design for Living, 1991).

**Understanding Permaculture**

David Holmgren and Bill Mollison are the originators of the permaculture design system. The word was coined by the two during the seventies for describing an "integrated, evolving system of perennial or self-perpetuating plant and animal species useful to man." (Permaculture Pioneers, 2012). In their book Permaculture one – permaculture is described as 'Consciously designed landscapes which mimic the patterns and relationships found in nature, while yielding an abundance of food, fibre and energy for provision of local needs. People, their buildings and the ways in which they organise themselves are central to permaculture. Thus the permaculture vision of permanent or sustainable agriculture has evolved to one of permanent or sustainable culture. The deforested land of the Amazon rainforest is not only being regenerated, but eco cultures are developing (About Permaculture, 2011).

Permaculture is how we provide human needs from nature and how we wisely utilize those resources. It draws together the diverse skills and ways of living which need to be rediscovered and developed to empower people to move toward being responsible producers. The depletion of the rainforest comes from dependence and blind use of its resources. Aside from the sustainable and ethical fundamentals of permaculture, it is an unclear idea to people, including Holmgren and Mollison. Every year its definition evolves with its practice and accumulated understanding. Regarding the specific needs of the people practicing it,

permaculture varies in its uses. Practices within the Amazon rainforest aim to regenerate land, and often turn into sustainable local communities (Permaculture: Design for Living, 1991).

Although permaculture entails twelve design principles which develop a sustainable system, this focus is on the physical principles which bring the rainforest to life again. One of these is the production of yield. People working to regenerate the rainforest are sure to incorporate things which produce useful results. Another principle is the understanding of use and value of nature's gifts. By valuing the plants that have many uses, dependency on scarce/unnecessary resources is depleted. Another of the twelve principles of permaculture is the application of diversity which creates greater resilience for the regenerated area. Although not the last, but another of the most important principles of permaculture for the regeneration of the Amazon is the designing parallel to nature's patterns. Dealing with the Amazon rainforest, it can be tricky to regenerate delicate life from dull soil. Holmgren said "…if you're dealing with an assembly of biological systems, you can bring the things together, but you can't connect them. We don't have any power of creation: we have only the power of assembly." Through the study of the land and implementation of foliage in which is calculated to survive, regeneration of the rainforest has been made possible (Permaculture: Design for Living, 1991).

Mollison has noted that it is eerie that permaculture is the first known design system organized for survival rather than failure. Humans have been taking a toll on the Amazon rainforest by using systems that are intolerable by nature. Because use of resources has been unbearable by the sources, disaster has followed. Permaculture has taken off into a world-wide network, quite quickly. There are many organizations and foundations moving toward sustainable living using permaculture, including many in Brazil and Peru, which aim to regenerate the destruction in the Amazon rainforest (Permaculture: Design for Living, 1991).

**Permaculture Applied for Regeneration**

One of the most globally known centers for reforestation is the Chaikuni institute. The name comes from the Amazonian legend of the invisible protector spirits of the forest. The vision of the Chaikuni institute is to honor indigenous wisdom and incorporate permaculture into the lives of many. Their permaculture center constantly investigates and promotes sustainable access to medicine, food and economic opportunity by the creation of an integral agriculture model. It is 175 hectares of degraded land, which has been evolving and regenerating since its beginning. From the permaculture masterplan, one of the latest projects has been on one hectare of seriously degraded land. Being three-year-old monoculture cropland, the top soil was washed away, leaving minimal nutrients. Following the well-designed permaculture plan, the team redirected the flooding water in pathways which mimic the surrounding forest for minimal erosion. They have been planting upland and lowland crops that grow best to their suited areas. Although it has been difficult to maintain growth, progress has finally shown. After a few years of guidance, the cropland is beginning to look lush, hosting an array of different plants (The Chaikuni Institute).

The Paititi Institute is an educational institute of many aspects, but has a large focus on reforestation of the Amazon rainforest through permaculture. It has reforested many degraded areas while educating people from around the world (Restoration and Preservation, The Paititi Institute). Like the Paititi Institute, the Yorenka Atame Center (Forest Wisdom school) teaches people concepts which stem from the principles of permaculture in order. In doing so, the center continues to regenerate much degraded land. The Yorenka Atame Center came from the Ashaninka tribal leader, Benki Piyako. Founded in 2007, near the town of Marechal Thaumaturgo, the center has been a huge success. Since the time of the rubber boom, the

Ashaninka territory has been forcefully degraded by illegal loggers, illegal hunting/fishing, and monoculture crop plantations. This center educates colonizers and indigenous people about polyculture gardening, reforestation, native seed collection/cultivation, and beekeeping. As they learn, they work toward permaculture design, allowing for expansive regeneration of the degraded territory (Sustainable Revolution).

These are just a few of the largest institutes, however, there are many ecovillages sprouting with inspiration from them. Permaculture is also working to regenerate land in areas around the Amazon rainforest including tropical savannah areas and the Atlantic Forest. The permaculture and ecovillage institute of the Cerrado (IPEC) is based in Pirenoplis, Goias, Brazil. It is a growing ecovillage with permaculture at the root of all major decisions. In doing this, these people have found ways to replenish areas of the tropical savanna of Brazil (Sustainable Revolution). The Instituto de Permacultura da Bahia is the oldest institute in Brazil, created in 1992, and works with communities in the Atlantic Forest. They have developed very successful techniques to regenerate the forests, by sowing an array of species into degraded land and allowing nature to do the selection and succession. The forest struggles to regenerate on its own, due to few seed sources or wildlife to spread the seeds. However, once an area is seeded by the institute, it explodes with life, and the forest rapidly regenerates.

**Conclusion**

If humans decide it is important to sustain themselves, the culture must consider being part of the larger pattern of ecology. The Amazon rainforest plays a major role in sustaining climate weather patterns, creating oxygen, sequestrating carbon dioxide, and hosting the most biodiverse life on the planet. Without these functions, the world may be a very different place. With the increase of deforestation, the precious Amazon rainforest is at risk of collapse. By

utilizing a design approach initiated by the patterns of nature, the rainforest is enabled to regenerate. Many institutes have implemented the practices of permaculture to the rainforest with much success.

The success goes beyond just the succession of degraded land. Permaculture is more than sustainable agriculture in the sense that it incorporates many more science and social aspects. With this combination, permaculture regenerates, as well as produces yield and sustainable hubs from which people learn and copy. The growth of these ecovillages has been increasing within the Amazon rainforest, allowing people to live free of outside sources. Without the need for outside sources, there is much less land destruction, making permaculture a success in many aspects. The root causes of Amazon destruction go far beyond the forest, meaning that there must be cultural shifts around the world before it is mitigated. Although forest degradation is not necessarily for the use of local people, the understanding of permaculture has been a leap forward.

Permaculture has achieved inspiring results, restoring degraded landscapes and creating self-sustaining food systems. It goes beyond just the biological aspects of regenerating a place. Culture and a larger drive to sustainability is infused. Basically, permaculture entails patience and design based around the principles of ethics, which allows for the coming together of humans with nature in a sustainable way. This is difficult because it is something that takes lots of cooperation and learning. It varies depending on the needs of the people and the landscape to be regenerated. Since it is a new concept, there is much to be learned. However, this is not all a problem, considering permaculture is growing through education, institutes, and ultimately the movement powered by the will of people to become a more sustainable existence. Permaculture is a promising concept.

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