Conservation Grant Proposal: Conservation and Sustainable Development for Forestry

Introduction

Conservation Problems

As our world lessens in its capabilities to harbor our parasitic habits the drive to solve the negative outcomes of said habits escalates. More and more people are searching for quick fixes while the best results will only come from large and most daunting, costly changes. Whether it be artificial or natural, change must occur in humanity's way of life. One way to positive change in a beneficial direction is to conserve and sustain the losses of our forestry and the biodiversity they harbor. Our forests also contribute to a wide variety of benefits beyond increased biodiversity compared to most urban areas.

As global populations increase anthropogenic disturbances also increase to decrease tropical forests' abilities to support biodiversity, tropical forests' global carbon storage capabilities, and the facilitation of human well-being. All of which raise the need for conservation efforts to uplift these forests' declines (Hansen 2020). While anthropogenic drivers of global climate change and deforestation vary to a wide extreme from simply overdriving your car to large companies outputting tons of greenhouse gases the number of activities that promote deforestation can similarly vary especially for tropical forests acting as large contributors to global biodiversity. Anthropogenic causes promoting deforestation differ from logging, agricultural farmland expansion, human-induced fires, and infrastructure clearing. While some are lesser than others, they all promote edge effects inducing a decline in tropical forest structural condition indexes (Hansen 2020). Another factor that must be taken into account is the possibility of a forest reaching an environmental tipping point commonly known as an area of change in which it will not be able to return to the status quo or improve without extreme/costly changes (Hansen 2020). This is quite possibly one of the largest dangers of deforestation and will be covered later on.

Tropical forests' structural conditions and interior-edge ratios are both crucial factors for forests' capabilities to foster biodiversity. However as recently stated, anthropogenic impacts are deteriorating these influences doing more harm than benefit, of course. The increased shift in occurrences causes other morphological changes as well. An extensive decrease in tree-top foliage has been a resultant circumstance in a contraction of forest cover negatively shifting forested regions' ecosystems (Le 2014). Adding further to the list, forest stability indexes dropping in leveled percentages likewise affects biodiversity integrities (Maure 2023). As possible global adaptation and mitigation strategies are being developed the conservation and sustainability of our forests should be further integrated since the residence time of carbon stores in tropical tree biomasses can depreciate tropical forests from carbon sinks to sources (Maure 2023). In the end, unprotected areas mirror this forest stability degradation in equivalence with species loss and habitat fragmentation including the edge-interior ratios (Maure 2023). While the general biodiversity of tropical forests is an important global issue, the biodiversity in tree species should be an augmented problem being directly correlated with forest health and in turn vertebrate-invertebrate biodiversity. Further forest fragmentation will lead tree species diversities to species

with lower wood densities (Maure 2023). By decreasing the statistical difference in the wood densities of tropical forests the climate is directly related by affecting their capabilities to store carbon as a sink as previously mentioned (Maure 2023).

Conservation Solutions

The most important job for the public and scientists to accomplish is not to accept defeat or view the conservation and sustainability of our world as a doom/gloom scenario. Much can and should be done as we are the individuals who as a whole live on it. As such, we might not be able to protect every inch of the globe, but rather important regions should be prioritized. One such region is the conservation and the inclusion of sustainable practices within the Amazon Rainforest.

The Amazon located in South America and Brazil comprises half of the moist tropical forest estate and as such will be the point of this proposal/research directed to the governmental Partnership for the Conservation of Amazon Biodiversity (PCAB) in cohort with the Brazilian government (Hansen 2020). The Amazon Rainforest is already a high-priority target for several developed nations and the developing nation of Brazil as they are the most capable of directing change thereof. The forest is one of the largest tropical rainforests on the planet and as a result is a region of high biodiversity on the planet when compared to other notable forests. Protecting this forest high in structural integrity will make sure its ecosystem does not cross the bounds of an ecological tipping point (Hansen 2020). In product, biodiversity will be protected and improved upon. Mitigating a tropical forest's degradation such as this can reduce biodiversity loss (Hansen 2020). With these benefits in mind, one must wonder what can be considered beneficial forms of conservation for the goal of forestry to better benefit the global climate and the Amazon Rainforest. While there are several forms, the most concentrated and physical methods are the most beneficial. Policies and political actions are beneficial to the conservation of forests, the basis of forestry must also be viewed as the labor done on the ground within forested or to be forested regions. Boots on the ground methods such as reforestation, active management, and grazing/fire controls are forest-level forms of tactics for conservation (Hansen 2020).

If physical labor of any conservation and sustainability job is to be accomplished community integration can be critical. However, attaining reliable and motivated nearby neighbors does not come easily, quickly, or without costs. Integrating the public with the interests of the goal of the job to be accomplished also benefits the buffering environment and the community at large. As such, on the social and local level education, community incentives, and regulation or enforcement are equally important and reduce negative anthropogenic factors as well as increase local involvement and local economic supplement (Hansen 2020).

In conclusion, forest conservation and stability directly benefit high global biodiversity and the degree of forests' individual tree species carbon stock capabilities which must be achieved under the proposal of a forest (Maure 2023). For itself, conservation and sustainability efforts that will stay dependable, manageable, and at its baseline attainable may not be achievable in areas that are not able to attain community absorption, have

biodiverse tree stands, or have their current anthropogenic clashes cleared from their residence. Conserving forests in targeted smaller regions could be the best start to developing biodiverse forests that benefit the global climate. Within potential stability hotspots high biodiversity and carbon density are correlated with each other (Maure 2023). Large goals are possible but can be more costly, have greater risks of losing community engagement, and have higher risks when gathering policy enactments or regulations of entry. In turn forest management and sustainability through stability can reduce edge effects, increase stability, and avert/mitigate the additive emission of stored carbon within tropical forest biomass caused by disturbance (Maure 2023).

As the goal of this conservation grant proposal, raising the total forest coverage of the current Amazon Rainforest backed by conservation, sustainable forest use, land management practices, community employment/engagement, as well as policy implementation will prove most beneficial. From raising a specified species diversity of seedlings in a nursery, using careful planting practices, and managing their growth forest abundance will be projected to advance. Afterward, managing the zoned regions with herbicides, watering, and invasive plant removal conservation can be achieved. Community engagement absorbing government involvement and therefore policy regulation may, as mentioned earlier, prove to be a lifeline. Planting marketable species will benefit the grant's budget and the economy of those homed nearby and involved as well further garnering their motivation to be involved.

Methods

Planting Methodology

By the projected problems and solutions, increasing tropical forest abundance and stability are principal factors to ascertain mainly through the process of reforestation. Projected by Preece 2023, planting saplings is one method that has proved to be reliable statistically and sectionally. Conserving inner untouched forests through rigid regulations and governmental integration as well as placing granted replanting zones on current and stable hotspots of biodiversity should improve the buffering quality of nearby provinces. Planting saplings can be done easily, what comes during and most importantly before or after are crucial to their survival and prospective reproduction. Planted sapling survivability and growth are heavily dependent on factors such as pre-plant nursing for a tree's sapling stage from seedling, the watering of the planted soil, decreasing the trauma of plant-root transplant with placement methods/handling, pre-planting application of herbicide, and pre-plant clearing of competitive vegetation to weed control (Preece 2023).

Furthermore, plant nurseries will most definitely be a large foundation of the planted saplings' survival as when they are not used, sapling continuation in their new habitats is usually linked to that of the poorest quality seedlings (Le 2014). As such, the saplings planted will be required to undergo a pre-growth phase within assisting nurseries to "head start" their reforestation spreading to ensure their best performance. By doing so pre-grown planted saplings will also reduce the work to be done and costs of managing seedlings to a higher comparable degree in the wild. Running these nurseries will be the most expensive aspect of this grant the likewise costs on

extended working/salary payments, higher sapling mortality, and the surpassing usage of resources will be lesser in degree by the point of project completion. How long we have saplings grow inside this controlled environment raises other questions besides time in itself. For possibly the best but generally equal results seedlings should be allowed to mature into saplings until they have equal measurements of roots 12 centimeters deep, 300 centimeters cubed wide, and about 20 – 30 centimeters high (Preece 2023). These seedlings do however grow on average for about 6 – 12 months.

Planted Species Array Composition

The species diversity and arrayed composition of the planted trees will partly decide the survival outlook of the planted regions. By increasing the survival outlook of these planted regions, we will in part be able to improve the cost efficiency, possible forms of income, and improve other ecosystem variables for more than just the trees. With this, avoiding monoculture and low species diversity of planted tropical forest tree saplings is important to most their survival but their efficiency as well overall. High species diversity is one of the largest factors to consider when looking at conservation plans, a strong measure of current habitat health, and a strong measure of the quality for a region's continued sustainability. Determining the diversity plan and makeup will be challenging statistically, naturally, and historically. How we manage this diversity is equally important. The high diversity of reforested regions should be determined by the results of original sapling's survivals, the fully matured adult functional temperaments, germinability, capability of carbon storage, the handling of the sapling's seeds, and culturing of seedlings while maturing within nurseries (Preece 2023). Viewing an economic outlook statistically should follow a decisive factor on sustainable success, species diversity must hold a necessity to the pathing of this thought process. In turn and as studied by Le 2014, planting marketable species should improve forest growth performance as well as provide environmental to economic benefits (Le 2014).

Pre to Post Plant Procedures

While how, where, and what we plant are crucial aspects of this successful conservation strategy, what comes next is equally if not more important. What comes next is conservation's sustainability. The level of accomplishment for sustainability can be based on several factors. The survival rate of the planted saplings to full maturity is of course what comes first and foremost that strongly controls this grade.

Several forms of sapling management after planting are crucial to their survival. Management forms can vary from post-plant watering for moisture shock reduction to post-herbicide use until the saplings can compete with nearby grasses are both beneficial (Preece 2023). Watering beforehand can be important but not as important as assisting the plants to maturity and while the use of herbicides can be viewed as a negative input on the area's biodiversity most grasses that will be held off are either invasive or in large abundances. Further studied by Le 2014, grazing management with weeds post-plant will improve sapling survival rates and have beneficial effects on reforestation success in less developed and structured countries (Le 2014). Weeds compared to grasses are of course more invasive, especially to saplings which have not matured fully yet and should be prioritized. But the

buffer maintenance of the region's grass on the planted saplings should not be forgotten or lessened for one over the other.

Soil Control

Beyond vegetation and sapling management, soil control with oversight and the reduction of erosion can be strong deciders on an area's sapling health. If the ground slipped around underneath them such as by a landslide whether weak or colossal, a crippled growing base can prove fatal for their development and lead to mortality before their roots reach a large enough area of maturity and structural integrity. As an example, the development of fire breaks has a quantifiable effect on soil erosions (Le 2014). The planting of marketable species being those with larger root areas decreases soil erosion and landslide frequencies similarly (Le 2014). The management of more than just the planted region must also be considered surprisingly enough. Enacting reforestation education and information awareness campaigns have an effect on soil erosion with once again landslide frequencies (Le 2014). This is most likely due to decreased anthropogenic impacts from locals such as avoiding damaging contacts or interactions with the planted soil and not just with the planted flora itself. More than the embedded vegetation needs to be taken into account for the sapling's overall health and timely survival.

Policy Enactment Design

As mentioned several times, policy actions will go hand in hand with community education and government integration both concerning each other. Policy implementations are crucial to uphold post-plant management and will require policy placements upon and most importantly for locals. However, to avoid an alienation of the reforestation to the local community with possible civil revolt an imbalance of social to ecological goals of reforestation must not take place which can commonly become present in similar scenarios. Developing a policy enacting structure can act as a strong retailer for the conservation of biodiversity through protection, mitigating anthropogenic impacts, reducing the rate of deforestation around the area, and most importantly maintaining a forests' stability (Hansen 2020). A giant point to the usage of policies is to avoid the approach and rising of a more than dangerous tipping point in which negative synergies will occur as a result of lost forest area (Hansen 2020). Once reached the forest may flip to a degraded savanna, an ecosystem with much lower biodiversity than the Amazon's current inhabitants (Hansen 2020). However, by drawing policies and protecting forests with large Forest Structural Integrity Indexes (FSII) these dooming tipping points can be averted (Hansen 2020).

Government Integration, Community Education, and Socio-economic Benefits

As referred to before, alienating the conservation site from the community in the perspective of reducing anthropogenic impacts will result in community members attempting to illegally enter and remove resources. Poaching, the illegal trade of lumber, and illegal land uses are all possibilities that generate anthropogenic afflictions for the forests' sustainability and conservation. If they do not understand the negative impacts they generate or are not benefitted from the reforestation taking place, then they will continue to take part in such

actions. Beyond these reaches, if their actions are continued having their governments integrate with conservation then their afflicting choices will equally reduce.

Government Integration

One way the government can be integrated into the reforestation's conservation is to propose the Brazilian government to partially fund the project themselves. By doing so, local leadership will promote the conservation and sustainable practices of the reforestation taking place influencing the community's decisions and positive involvement (Le 2014). Proposing the government to fund the forests' reforestation may also promote positive results generated by the community. Sourcing seedlings from the government is also a possibility to reduce costs and attain a higher planting diversity further explained in (Le 2014). However, developing countries' governments such as the Southern American Brazilian do not commonly have the funds for complete backing (Le 2014). Nonetheless, any involvement and benefit are the goals to be attained.

Community Education

While severely underappreciated, understood, and underestimated as it may seem, community education in locations such as near the Amazon Rainforest can provide a broad range of beneficial impacts on conservation projects and sustainability efforts. Educating the local community and local landowners that can have impacts whether positive or negative is included in techniques that actively restore degrading tropical forests (Hansen 2020). Education can also spur local involvement similar to government integration garnering awareness of the quantifiable benefits of the reforestation process, conservation, and the sustainable uses of their forests (Le 2014). Lowering the distance to towns is also another quantifiable benefit to the reforestation process and the site's conservation management (Le 2014). On top of the degree of involvement and lowering anthropogenic inflictions education must take place to train and allow the community to provide technical assistance accurately and efficiently for success (Le 2014). This will also colony the number of jobs available for salary output to the community's socio-economy (Le 2014).

Socio-economic Benefits

Socio-economic benefits can range mainly from cash salary payments directly from the sites of reforestation to the indirect benefits of planting marketable species that can produce products to be sold. Marketable species must most importantly be sustainably harvested and collected. Important reforestation requirements for beneficial socio-economic gains are equitable land tenure/security systems, community involvement, strong local leadership, and participation in funding by government establishments (Le 2014). It is crucial to partially control the community's take and give as they may stray away from sustainable practices. Socio-economic benefits on site similar to education will also generate jobs for the community. Incentives such as profit sharing or job opportunities with direct payment and lowering the distance from towns as access is

important for the establishment of reforestation sites which will also have quantifiable benefits to the reforestation process (Le 2014).

Methods Depiction

In conclusion of the methodology to take place, the nursing of saplings using a diverse and marketable species composition will begin. Government inclusion in this process will occur partly for selection and supply. Policy enactments and minor government-assisted regulations previously planned will be put into effect before any onsite work is started. Once work begins for attained land, education and community involvement can begin to assist in job employment and fulfillment. Afterward, the areas for reforestation will be dealt management towards their invasive vegetation such as weeds and grasses, waterings, and herbicidal usage. Once the saplings are planted using careful practices, further land management, policy regulation, and regional security will need to occur. The saplings will reach maturity and produce marketable products which will need to be regulated for their sustainable harvesting. After the timescale has been concluded, either the local community and government will be left to manage the reforested region following what has been learned and previously practiced or their government may seek to extend our holding and authority further providing funds.

Expected Outcomes

Following the previously projected methods expected outcomes will revolve around the success of sapling planting, sapling survival, community benefits, successful policy/government integration, land management, and other factors. The success of the community's education will also hopefully lead to long-term forest maturities and increased survival rates. Quantifiable success from similar projects will be used to predict the measure of possible success for this conservation grant proposal.

Pre/peri/post Planting Reactions

Strategized pre-plant planning will have noticeable effects from survival rates to land quality reactions. Watering is a large focus for planting methods whether to the plant directly or to the area for planting. Focusing on pre/post sapling watering may result in an increased survival rate by at least 10% (> 91 % versus 81 %) and increased soil moisture over the growing time can also contribute to >90 % survival at 4 months of age to drier conditions at 80 % (Preece 2023). Controlling grazing, managing weeds, the condition of nearby roads, and as mentioned earlier the deduction of invasively growing plants post-planting have quantifiable effects as well. The odds of a reforestation project for a tropical forest attaining a survival rate of 80 % were enhanced by 20 times if the successful management of grazing was achieved, 18 times if controlling weeds was enacted, and 12.5 times if the condition of nearby roads were not problematic (Le 2014). Carefully planting the saplings further has a surprisingly large effect on the sapling's survival rate. Careful planting methods such as by handling similarly could improve the sapling survival rate by at least 10 % and careful planting could also result in a 23 % increase in sapling survival after 20 months (Preece 2023). By carefully planting the saplings, the time it takes for them to reach maturity is also lowered (Preece 2023). While it is not described well on how careful planting is done besides using a forester’s planting spade into moist soil and reducing grass competition which will already be

accomplished through pre-post site management, what is most likely and additionally accomplished is the careful handling of the sapling's roots and the reduction of its transplant shock (Preece 2023). Physical protection possibly such as wind protection and general fauna blocking will also be used (Preece 2023). By process, when carefully planted the time to grow well would be established 1-3 months in advance and have a lower mortality of 0.5 % - 1.09 % compared to 1.95 % (Preece 2023).

Nursery Head Start Results

Having a seedling grow into a sapling without having to survive maturing threats will improve the survival rate when compared to a seedling grown in the wild. Another benefit of growing seedlings within a controlled nursery environment is that other aspects of the sapling are healthier and more improved when once again compared to a sapling in the wild. Seedlings originating from a higher standardized nursery will possibly have a tree breast height density of > = 10 cm (1132 +- 371 stems ha^{-1}) compared to lesser standards with 855 +- stems ha^{-1} (Le 2014). The production of marketable products within the project objectives will also be enhanced when saplings are grown in nurseries by a factor of (X^2 (1.43) = 5.021, $p < 0.05$) (Le 2014). Taking advantage of utilizing a nursery allows grown seedlings to mature at a faster rate and produce products faster than non-nursery-grown seedlings. According to previous studies, mean short-term survival rates were higher when saplings were nursed before planting at about 77 % (Le 2014). Not only were the sapling's survival rates higher but the forested area in which they were planted was also larger being higher than 70 % in 83.7 % of reforested areas (Le 2014).

Species Composition Impacts

A large goal for this conservation grant proposal is to not just conserve and sustain the development of forestry in the Amazon Rainforest but to also increase its biodiversity. By doing so, the forests' health will equally improve through ecological feedback systems and reactions. As such, the species diversity of the introduced tree saplings should be equally high. Mixed introduced species of reforested plantations will most likely have the best growth performance as they have had a larger mean annual augmentation compared to their total volume at 21.3 m^3 ha^{-1} $year^{-1}$ to mixed native species plantations having 11.6 m^3 ha^{-1} $year^{-1}$ and monoculture plantations having 13.9 m^3 ha^{-1} $year^{-1}$ (Le 2014). While mixed sapling species grow at a higher rate, they will also reduce the timely costs of managing their maturity. Similarly, mixed introduced species reforested plantations could have larger mean yearly increments for above surface biomasses comparing their 10.9 Mg ha^{-1} $year^{-1}$ to monoculture plantations of 6.4 Mg ha^{-1} $year^{-1}$ and mixed native species plantations of 6.9 Mg ha^{-1} $year^{-1}$ (Le 2014). With larger growth rates and an increase in biomass productivity, structural forest integrity would be bolstered and as tropical forests function as a large global carbon storage their capability would expand (Le 2014). Another aspect of the forest's health that is improved upon by introducing a mixed species stand is the rate of soil erosions which in turn affect the frequency of landslides. A mixed species plantation should decrease soil erosion more than a monoculture plantation of $x^2(1, 43) = 5.969$, $p < 0.05$ as well as decrease landslide frequencies also compared to monoculture plantations of $x^2(1, 43) = 3.305$, $p < 0.10$ all measured by a Pearson Correlation (Le 2014). Lastly, a

larger project scale alongside a higher species diversity will equally result in more jobs with direct payment for locals (Le 2014).

Social-economic Eventualities

By providing economic incentives, marketable species, community education, and accurately deciding the location of reforestation within local towns socioeconomic factors can improve. A community's economy is not the only factor that is influenced through reforestation choices. Reforestation projects that utilize marketable species having integrated food production can help secure food insecurity by 61 times (Le 2014). Doing such will also solve nearby developing population's market instabilities of forest products(Le 2014). Projects with forms of economic production incentives for long-term forest management have equal results (Le 2014). When a community's income is improved by local reforestation efforts, they will equally make certain that efforts are beneficial and likewise successful. Ecosystem services that fixate the income of farmers by 14 times will have them focus on better site health consisting of its management and protection (Le 2014). Reforestation efforts harboring an impact on education with education campaigns will have positive influences. Education, information, and awareness campaigns will provide market knowledge and support on timber to improve market access by 8 times (Le 2014). A reforestation's site/location choice also and quite clearly holds a large factor in the success of a conservation and sustainability design. Having a reforestation site closer to a local town will reduce illegal harvesting, higher planted tree retainment, and allow easier tree establishment and management (Le 2014).

Budget

Without funds no conservation project is easily completed if at all. Acting as a main decider on this conservation grant's completion money should come first before many other limiting aspects. Without funds, workers' salaries and pay would not be fulfilled, advised community education would not occur, nursery tasks would not finish nor start, and therefore nothing might be accomplished. Extensively, necessary materials and resources including seedlings, saplings, herbicides, or tools would not be purchased and no trees would be planted or managed efficiently. Non-profits do exist and donations are always appreciated but having a reliable baseline fund and economic source is critical.

Cost-effectiveness

The funds for our project will most likely not be infinite. Attaining and maintaining a cost-effective quota will be vital to uphold the base for our industry. As many things will add up over time, efficiencies anywhere possible should always be a workable priority, and staying within realistic, studied, and if possible quantifiable bounds is influential to success. Cost-effective reforestation efforts can be heavily dependent on maximizing planted sapling survival as in approximation losing 4800 plants can place an economic loss at around USD 9000 at $ 1.93 per plant (Preece 2023). Resources that are in use throughout the raising, planting, and maturing process for our saplings which will decide the success rate of our venture are targets of efficiencies. As an example,

targets of efficiencies can be examined with herbicides. Limiting the amount of herbicide to be used can reduce establishment to maintenance costs (Preece 2023). Maintenance costs, being the combined figures for water, herbicides, salaries, tools, equipment, and transportation prices/payments over the enterprise timescale all rein in a high portion of our budget.

Government Pay Integration

As mentioned several times preceding this section, government integration will assist in the project's completion considerably. Being funded by a government source such as the Brazilian Amazon Rainforest would provide a cheap provision of resources, local participation, government provisions for regulations, security, policies on sustainability, and the promotion of education. Being funded by the government can be a constructive priority as government-funded projects have tended to reforest large areas at low-efficiency costs and have met planting target areas before primarily planting large areas at lower costs (Le 2014). Positive profit incentives on all sides being government, social, and inner project will also push the success of our project's profit as it will benefit everyone. Main financial assistance through the government alongside income from non-lumber forest production such as livestock or organic products will most likely have positive effects on the reforested area (Le 2014). The government would also have a beneficial say in what species are selected as well as administering an exponential rate of sapling and ecological prosperity. In other words, tree species diversity can be determined and sourced by the government reducing nursery and seedling costs (Le 2014).

Salary Payment Form

Cash is king is correct indeed. Direct payment in the form of cash will be beneficial for the quantity of paid workers and equally their level of knowledge. In general, nothing brings people to work more than money acting as an incentive. From evidence previously stated direct payment should be the largest form of payment as it will yield the most benefits from acting as a socio-economic incentive resulting in more jobs and opportunities on site as well as after planting with site management and guaranteeing local participation (Le 2014). By this standard, direct payment will in other words have a positive effect on the amount of employed personnel (Le 2014). The use of USD or Brazilian Real (BR) due to the difference in purchasing power could also be a controlling factor in how much salary could be provided or how much funding and distribution of the project's total costs can be appropriated. Taking this into account, local communities that take part in the reforestation process will be given an advantage. If reforestation provides cash income to locals the odds of local food security could be raised by 61 times further increasing community involvement (Le 2014). While taking advantage of these differences and specific benefits can yield ethical concerns, what is concluded of our actions and the success of our project may determine the constructive or incriminating weights of our choices.

Budget Summary

The total cost of anything is a large deciding regulator on whether the change will or can take place. Especially if that total increases as time proceeds with no discernable changes. Taking this into account, providing an accurate and only slightly more than what will be needed total should be proposed. As an itemized list, the project total will need to take into account cash for workers, local education, and local involvement. As well as money set aside for work region divisions of the reforested site and the input for the project locating. This total will of course run beyond the word of a billion considering the timescale in effect to confirm success based on our seedling, sapling, and matured tree temporal length. Supplies such as saplings, water, herbicide, tools, equipment, transportation, nursery run costs, and all others may run a total of 1.0 billion USD per year over 5 – 10 years plus an additional 0.75 – 1.0 billion USD for 5 – 10 additional years taking into consideration planting efforts as well as nursery raising to post plant management. Beyond the funding management of supplies, the Brazilian government and enacted policies may also require a fee. Money set aside for government involvement and policies may need to be enacted. Not all costs will be in a sense negative to the funding of this project. There is the possibility that after a certain amount of reforested growth ecosystem products may provide a source of minor income to alleviate costs. Though sustainability must be conserved. With this in mind, ecosystem products should not be exploited, as it would reverse our conservation efforts. An average total value will run nearly 14 billion USD adding together pre-plant and post-management costs until the Amazon rainforest is sustainably run and conserved.

Tabled Budget

On-site employee salaries: A considerable sum of money for pre-plant and post management of the forested region for local employees towards weeding, planting, applying security, etc When the money runs out, low corruption and a lack of conservation interest could occur. ($ 2,800,000,000 USD)	Teaching salaries: An income for locals to educate their communities and others will provide long-term benefits. If locals understand the benefits of the reforested region, its continued conservation could occur. ($ 784,000,000 USD)
Land acquisition: Acquiring un-conserved land to be reforested possibly from other international companies or locals will be the first step to stopping the area's overexploitation. These groups may require short-term compensation or a large outright purchase. ($ 938,000,000 USD)	Landholding and security: Third-party locals may not acknowledge our ownership and attempt to circumnavigate our law. Providing security for the conserved area as well as providing continued compensation for the original owners may be necessary. ($ 784,000,000 USD)
Nursery operation costs: Nursery operations, besides salary employment, may be the largest deciding factor for the quality of seedlings planted and the area of most time spent working. If the seedlings are poorly	Sapling costs: Purchasing a large diversity and quantity of saplings will be expensive. Especially if the amount we require exceeds what a single supplier has. If saplings are lost in any way, their loss will

produced, then their wild survival will degrade. ($2,814,000,000 USD)	amount to a large net requirement. ($ 1,050,000,000 USD)
Water costs: If the water used is taxed or billed having a source of billing large enough to reduce drought occurrence will be more than crucial. Local/natural sources could be used to lower the costs of watering. ($ 854,000,000 USD)	Herbicide costs: Herbicide will be needed for weed control before and after planting. Limited use should be practiced to reduce this cost in case one cost exceeds another. Physical weeding can replace the use of herbicide if needed. ($ 350,000,000 USD)
Tool costs: Tools will be needed to accomplish a varying degree of tasks, including security. The cost of tool upkeep and replacement will be a frequent billing occurrence and if this cost is not upheld other areas of work may depreciate. ($ 784,000,000 USD)	Equipment and transportation costs: Vehicle usage will be necessary for transporting workers, seedlings, tools, and other amenities. Mechanized processes may also be needed to efficiently complete large-scale jobs not requiring careful labor. Road condition maintenance is optional. ($ 742,000,000)
Local government policy enactments: Governments will not pay for everything and lobbying may be required to attain reforestation security and long-term continuity. ($2,100,000,000 USD)	Possible ecosystem product income: Saplings must first grow for the region to provide any products. Only if the reforested region can remain conserved and sustainable. (-$ 728,000,000)

Conclusion

The conservation and sustainable uses of forestry have more than just an economic benefit. By conserving the state of our current forests through slowing and halting anthropogenic impacts as well as enacting sustainable forestry practices, global climate and the designated ecosystem's health will improve. Ecosystem health can vary from carbon stocks down to a forests' biodiversity of both fauna and flora. From an economic standpoint, local socio-economic factors of those nearby healthy forestry efforts are similarly benefitted. Factors such as market stabilities, food securities, and general wealth. Under better forestry practices, forests, communities, and even governments such as the Brazilian Amazon Rainforest and its nearby inhabitants both animals, plants, and humans can prosper.

References

Hansen, A.J., Burns, P., Ervin, J. *et al.* A policy-driven framework for conserving the best of Earth's remaining moist tropical forests. *Nat Ecol Evol* 4, 1377–1384. https://doi.org/10.1038/s41559-020-1274-7

Le, H. D., Smith, C., & Herbohn, J. (2014). What drives the success of reforestation projects in tropical developing countries? the case of the Philippines. *Global Environmental Change*, *24*, 334–348. https://doi.org/10.1016/j.gloenvcha.2013.09.010

Maure, L. A., Diniz, M. F., Pacheco Coelho, M. T., Molin, P. G., Rodrigues da Silva, F., & Hasui, E. (2023). Biodiversity and carbon conservation under the ecosystem stability of tropical forests. *Journal of Environmental Management*, *345*, 118929. https://doi.org/10.1016/j.jenvman.2023.118929

Preece, N. D., van Oosterzee, P., & Lawes, M. J. (2023). Reforestation success can be enhanced by improving tree planting methods. *Journal of Environmental Management*, *336*, 117645. https://doi.org/10.1016/j.jenvman.2023.117645