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# Four Key Characteristics of Quality Reforestation Projects

> *The true meaning of life is to plant trees, under whose shade you do not expect to sit. — Nelson Henderson*

As companies turn their focus towards climate and ESG, many are looking to carbon removal projects to help them achieve net-zero targets. But the type, cost, and quality of these projects vary dramatically, and it can be difficult for corporate buyers to understand the true impact of the projects they support.

In this article, we'll review why reforestation projects are some of the most proven, high-value carbon removal options. We'll also explain markers of high-quality projects to ensure your organization invests in the greatest impact carbon removal.

But first, what are reforestation carbon projects? Reforestation projects, part of a category of projects known as ARR (Afforestation, Reforestation, and Revegetation), restore degraded land back to forest. Credits from these projects are considered carbon removal credits because planting trees draws carbon out of the atmosphere. They differ from other nature-based carbon projects that focus on avoidance, such as conservation projects, which aim to protect existing forests from deforestation, or improved forest management projects, which employ advanced techniques to improve the carbon storage potential of an existing working forest.

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# Reforestation: a powerful carbon removal strategy

There are several ways to remove carbon from the atmosphere. Some pull it directly out of the air (direct air capture). Others use minerals and land management techniques to absorb carbon through land (soil carbon sequestration, biochar, enhanced mineralization). And then there's the technology that has been around for 360 million years: forests.

Although we'll need all possible solutions to address climate change, a few key characteristics make nature-based carbon removals like reforestation better than engineered solutions. Firstly, nature is far more scalable — it's faster and easier to plant trees than it is to build a direct air capture plant. Recent analyses suggest that carbon markets have the potential to drive net deforestation to zero and reforest an area about ten times the size of France, removing carbon at a gigaton scale. Nature is also more cost-effective; even high-quality nature projects typically cost less than their technology-driven counterparts (direct air capture credits currently range from $250-$600, compared to Pachama's recommended $50-$82 for high-quality reforestation projects).

And finally, the non-carbon benefits of nature-based removals are impossible to ignore. "Healthy forests offer shelter to a range of species and act as highly biodiverse corridors for wildlife to migrate through," explains Dr. Rachel Engstrand, Applied Science Lead at Pachama. "Additionally, they provide significant potential benefits to local communities, including offering educational opportunities and creating an emotional bond with nature." Not only that, but forests also create a cooling effect, improve water cycles and waterways, protect communities from storms and strong winds, and can provide sustainable income through activities like beekeeping, sustainable agriculture, and ecotourism.

Reforestation is a crucial climate solution with both carbon and beyond-carbon benefits, but it faces some key challenges. The biggest issue right now? A lack of high-quality supply. There are currently very few high-quality projects available

for investment, and that's because it's very hard to get reforestation *right*.

## What makes a high-quality reforestation project, and how can technology help to identify quality?

Reforestation is not as simple as planting trees. It requires the right blend of expertise and management to ensure it achieves the impact it claims to. There are four key characteristics of quality for reforestation projects.

### 1. Right trees

Effective ARR projects should be mostly composed of native species. "Planting trees somewhere they don't belong is usually a red flag," says Engstrand. "It typically means you're not planting them to 'restore' nature. And if that's the case, then what *are* you trying to do?" Non-native plants may be unsuitable for the terrain or local climatic conditions, making a project vulnerable to destruction. Pachama accepts an ARR project if >60% of the trees planted are native species and none of the non-native species planted are considered invasive.

It's also important that an ARR project contains a diverse selection of species, just like natural forests do. "From a carbon perspective, species diversity dramatically increases the resilience of a forest over time," says Gabe Chapin, Project Implementation Lead at Pachama. "Monocultures can be easily wiped out by insects and diseases, whereas diverse forests can absorb the loss of a single species and regenerate to fill the gaps left." Pachama accepts an ARR project if it plants >5 species.

Figure 1. Native Species and Species Diversity. These figures show two reforestation projects outlined in white. The left example is a plantation with just a single non-native species planted, resulting in a uniform topography. In contrast, in the right example, the project has planted a variety of species, and nearly 90% are native, which can be seen in the textural differences in the images.

## 2. Right place

Forests must be planted in appropriate terrain. “A forest planted in a desert or on the top of a mountain will struggle to survive even with regular human intervention such as irrigation or fertilizer,” says Engstrand. It might be additional, but it likely won’t be very durable — and it may create even more negative environmental consequences.

It’s also important to measure a project’s baseline and background reforestation, which refer to whether reforestation is naturally occurring in the project area and its surroundings. If that’s the case, an ARR project may not be additional.

Pachama evaluates additionality through baseline and regional suitability checks. With the baseline check, Pachama will pass on a project if reforestation similar in nature to the planned project activities is observed within a buffer region (20km area around the project) that is not enrolled in the carbon market.

With the regional suitability check, Pachama accepts an ARR project if the

planned activities will lead to the growth of a forest similar to what would typically be found in its local ecoregion.

## 3. Right reason

Financial incentives are commonly exploited, and the carbon market is no exception. For example, some developers may plant trees in order to collect carbon credit funding and then harvest these trees for lumber at the end of the crediting period — effectively wiping out any positive environmental impact (and getting paid twice). They might also clear trees, profit from the harvest, and then enroll in a carbon project to benefit from reforesting the cleared area. Ensuring that developers aren't perversely incentivized to harvest trees gives us confidence that a project has high durability and that the carbon it captures will remain out of the atmosphere for a very long time.

Pachama assesses motivation with a forest cover check. "We look at the tree cover prior to the project and make sure that there wasn't any intentional timber harvesting or tree clearing immediately prior to the project," says Chapin. "This way, we can be more certain that a landowner isn't simply replanting trees with the intent to manipulate the system." We accept a project if, in the ten years before the start date, there is no deforestation within the project area and existing forest cover is less than 10%. Other telltale signs often appear in satellite imagery. For example, "there are distinct planting patterns that reveal whether you're trying to mimic natural forest or simply planting trees to cut them down again," says Engstrand.


Figure 2. Forest Cover. These figures show two reforestation projects outlined in white. In Project A, the forest cover ten years before the start date is well over 10% of the project area, but by the project start year, it's under 10%. There was clear deforestation on the eastern border of the project before the start year as well as some natural reforestation throughout. This indicates the project may not be motivated by the right reasons. In contrast, in Project B, the forest cover is less than 5% of the project area, and there has not been any forest cover loss in the past ten years.

## 4. Right people

Community involvement is the number one deciding factor in determining whether a nature-based project lives or dies. Local communities that aren't on board with a project can cause it to fail in a number of ways. In contrast, fully engaged communities can become integral to protecting and monitoring a forest project.

Pachama evaluates community involvement through a series of checks. "First, we

look to see if it's on communally held land or indigenous territories," says Engstrand. "We use that as an indication that this project has a high likelihood of impacting indigenous peoples or people living traditional lifestyles." Then, Pachama conducts an FPIC check (Free, Prior, and Informed Consent). Finally, the team performs a literature review of local newspapers and project documentation to ensure the project has reached out to local communities, conducted stakeholder interviews and engagement processes, published the outcomes of those interviews, and has not received accusations of human rights violations. We also partner with projects to better understand what they're doing on the ground to benefit local communities, and we surface that information for our customers.


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## Why does quality matter for reforestation projects?

Reforestation can do so much good, but not all projects are created equal. It's very difficult to tick all the right boxes for reforestation — to plant the right trees, in the right place, with the right people, and for the right reasons. As a result, buyers who fail to conduct due diligence expose themselves to two kinds of risk: the reputational risk of having a project publicly exposed as fraudulent or lacking in environmental impact, and the risk of falling short of corporate climate targets if a project fails. A genuine and lasting climate impact through reforestation credits is possible, but companies must be willing to conduct thorough research.

Due diligence failures are often the result of investing based on price alone. But building a quality reforestation project is an expensive exercise. Engaging and educating communities, sourcing a range of native species, selecting the appropriate land, and monitoring a project over time are time-consuming and expensive activities, which translates directly into project costs. "Low cost should be a red flag for reforestation projects," says Chapin. "If landowners aren't being fairly compensated for a project, this is a social issue, but also a carbon permanence issue, as it's unlikely that a financially unviable project will last."

## How corporates can invest in quality carbon removal projects

If you're considering investing in nature-based carbon removal, keep these steps in mind.

1. Look for projects that meet key quality factors: projects planting the right trees, in the right places, with the right people, and for the right reasons.
2. Budget for higher quality: cost and quality tend to go together in carbon

markets, so make sure you have the budget to maximize your impact. Pachama believes the average price for an active reforestation carbon credit from upcoming 2023 vintages should sit between $50-$82/tCO2e.

3. Invest in projects built with technology from the beginning: Pachama's portfolio of Originals projects is built with the technological capacity to make implementation and monitoring easier.
4. Consider investing in conservation projects in the near-term to supplement your long-term reforestation investments: while the world works to scale quality carbon removals, we desperately need funding for avoidance-based credits such as those from conservation projects.

## Want to learn more?

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