

WIRED

A simple climate crisis solution? Plant trees

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For more than two centuries, a 45-acre patch of land on the northwest tip of Hawaii's Big Island has been turning into an arid wasteland. The sandalwood forest that once filled the area was torn down by loggers in the 19th century and animal grazing has prevented the emergence of new trees that would take their place. With little rainfall and no tree cover, the soil slowly dried out and the land became barren. Around 90 per cent of all Hawaii's tropical dry forests have followed a similar path, leaving just a handful of these rare ecosystems scattered across the state.

Now, Jill Wagner is restoring this plot of land back to its former abundance. The head of forestry at tree-planting startup Terraformation has a plan to bring back Hawaii's tropical dry forests – and then reforest some of the world's most desolate environments. "We need to restore billions of acres," Wagner says. At the site on Big Island, Wagner has already planted 5,500 plants – most of them *Acacia koa* trees, one of the most common trees on the Hawaiian islands.

But reforesting arid land presents some unique problems: chief among them is finding enough fresh water to irrigate the young trees. To get around this, Terraformation's founder – former Reddit CEO Yishan Wong – built what he says is the world's largest solar-powered off-grid water desalination plant, turning brackish water from a nearby well into fresh water. "Now it's possible for desalination to be powered by solar, and we can now produce arbitrarily large amounts of freshwater using clean energy," he says.

Another challenge is finding enough seeds. "Seed banking and seed availability is a huge bottleneck," Wagner says. In 2008 she started the Hawaii Island Seed Bank, and has been collecting seeds ever since – drying, freezing and then storing them to ensure they're available for future projects. She also helped design a seed bank that fits within a 12-metre shipping container with solar-powered air conditioning and dehumidification. One mobile seed bank is being shipped to one of Terraformation's partner organisations in Uganda as part of a project to reforest 450 acres over the next five years.

On Big Island, Wagner is restoring 294 acres of forest, including an abandoned macadamia nut farm that she plans to plant with mahogany trees while also providing space for sheep to graze. This is only the beginning of Terraformation's plans, however. Wong says that the organisation is aiming at restoring three billion acres of native forest in tropical regions in order to sequester a vast chunk of the carbon dioxide currently in the atmosphere. "If emissions aren't going to go down, then we have to sequester more CO2 faster," he says.

Tree planting could make a huge impact on the climate crisis. According to the climate nonprofit Project Drawdown, reforesting 709 million acres of degraded land in the tropics could sequester between 55 and 85 billion tonnes of carbon dioxide by 2050, but only if we get reforestation right. One study of mangrove forest restoration projects in Sri Lanka found that nine of the 23 projects studied had no surviving plants, and that only around 500 of the 3,000 acres that were planted were successfully reforested. Success means planting trees that are suitable for the local environment, making sure those trees stay in the ground, and working with local communities to make sure the land suits their needs. Terraformation's approach is to work with partner organisations who have the local expertise needed to build forests that grow to full maturity. The company has designed courses in seed collection and nursery management, which it plans to use to help forest-planters across the world.

Wagner is now starting the slow process of weaning her newly-planted forest off the irrigation system that it currently needs to survive. As the trees put down roots, they should help the once-arid soil hold on to water and make it easier for other plants to become established. In ten to 20 years the forest should be able to survive by itself. It's a long path, but for Wagner, it's the only way to reverse the impact that humans have had on Hawaii's forests and beyond. "It's very critical that we protect biodiversity on our planet," she says.

Source: <https://www.wired.co.uk/article/terraformation-plant-trees>