When it comes to knowing how to live in balance with rainforest ecosystems and stop forest loss, rainforest communities are the experts. In order to position these communities as climate and conservation experts, and identify and interrupt the root causes of rainforest degradation, we practice a grounded methodology called Radical Listening. To reverse deforestation, in our experience, rainforest communities from Brazil to Indonesia don’t design siloed, sector-based solutions. Instead, they design exchange systems consistently defined by the following interdependent elements: healthcare, conservation, livelihoods, and education. We are working with rainforest communities to take this successful model to scale.

Programs are women-led and all staff are national citizens. We are working alongside 135,000 Indigenous and traditional people, protecting over 8.8 million hectares of high conservation value rainforest in Indonesia, Brazil, and Madagascar.

A proven climate solution

In 2020, PNAS published Stanford University’s analysis of our work alongside communities in Gunung Palung National Park.

After a $5.2 million dollar investment between 2007 and 2017, impact at the proof of concept site in Indonesia was:

- **$65M**: In carbon protected and primary forest loss stabilized
- **21K**: Hectares of secondary forest regrown
- **3K**: Orangutans protected
- **90%**: Drop in illegal logging households
- **67%**: Drop in infant mortality

Black-and-white ruffed lemur
Because of your support, we increased healthcare access in the Manombo Special Reserve, and launched our first reforestation and agriculture training programs.

We established NGO status in Madagascar, and have officially partnered with 31 local communities: 7,885 people of Antaisaka, Antaify, and Betsileo ethnic descent. In collaboration with local health centers, we built up our healthcare team, who now see nearly 1000 patient visits a month at mobile clinics in seven locations.

Through these mobile clinics, community members are able to easily access and pay for healthcare through discounted cash or non-cash payments, reducing the need to log or hunt in the rainforest for quick income.

When COVID-19 hit, we moved quickly to set up health checkpoints, assist health centers in training medical staff, and provide critical supplies and protective gear to community members and health centers. In June 2021, we distributed the first dose of COVID-19 vaccines to the communities surrounding Manombo Special Reserve.

**PROJECT COST:** $575,000 per year

---

**MADAGASCAR**

*Data from 2020 - June 2021*

**6,438**

PATIENT VISITS CONDUCTED

- 368 routine vaccinations
- 261 COVID-19 vaccinations
- 2,000+ participants in agricultural trainings
- 500kg of rice harvested in 2020
- 60% of agricultural participants were women
- 7.35 hectares reforested
- 8,833 seedlings planted
- 9 seedling nurseries built, with a capacity of 45,000 seedlings
- 9 endangered lemur species live in the reserve, 3 are critically endangered

---

*Image: Workers planting rice in Madagascar*
Manombo Special Reserve

Human and ecosystem health are inextricably linked, and nowhere is this interdependence more evident than in Madagascar.

Madagascar is an island of extraordinary biodiversity: 85% of its plant species, 90% of its mammals and reptiles, 99% of its amphibians, and 100% of lemurs, the island’s iconic primate, are found nowhere else. As a result of human-induced habitat destruction, 98% of lemur species are at risk of extinction, making them the most threatened mammals on earth. Nearly half the island’s forests have been lost in the last six decades, and half of the remaining forest is within 100 meters of an edge, making it vulnerable to further degradation. Despite legal protected status, the forest is shrinking rapidly: the reserve legally encompasses 15,730 hectares, but Health In Harmony estimates that only 5,800 hectares remain forested today.

Manombo’s forest is particularly vulnerable due to the poverty and poor infrastructure experienced by surrounding communities who steward this forest. Health In Harmony’s 2019 baseline survey of 1,321 households uncovered extreme multidimensional poverty for the 7,885 people living in 31 villages around the Manombo Forest Area, especially for women and girls. Although 94% of households believe the forest should be protected for future generations, poverty and hunger are forcing people to degrade the forest for survival.

Manombo Special Reserve, like many ancient forests around the world, is nearing a critical tipping point. Unfettered degradation could result in the extinction of multiple wildlife species, including the endemic Manombo sportive lemur and Malagasy poison frog. The human impact of forest loss would be increased poverty and illness for the communities who rely on the rainforest for drinking water, irrigation, mosquito control, and weather regulation. The well-being of these communities is tied to the rainforest, an interdependent relationship that requires win-win solutions.

In order to identify solutions to the degradation of Manombo, we asked the experts - the communities living in and around Manombo Special Reserve. During Radical Listening sessions, communities identified the need for:

- Access to high-quality affordable healthcare
- Regenerative Livelihoods
- Reforestation
- Education

Health In Harmony signed reciprocity agreements with the 31 communities surrounding Manombo Special Reserve. The agreements are rooted in Dina (local law) which states that communities agree to protect and preserve the rainforest in return for the interventions they designed.

We have established legal NGO status in Madagascar as well as formal partnerships with the Madagascar Ministry of Health and Ministry of Environment. We work closely with Fianarantsoa Medical School, Farafangana district health centers and medical inspectors, local community leadership, the Madagascar National Parks office, the family-planning NGO Marie Stopes, the health NGO PIVOT, Valala Farms, the research station Centre ValBio, and the Manombo lemur conservation group GERP. We also receive technical support and conduct educational exchanges with international organizations including Missouri Botanical Gardens, Harvard University, Harvard Medical School, and Zoo New England.

The Health In Harmony Madagascar team consists of a program manager, a finance manager, two medical doctors, three midwives, one community liaison, one reforestation manager, two agricultural technicians, a communication manager, one data-entry manager, and two drivers. We have one office building in Farafangana, one building for staff housing, and one building for storage of medical and agricultural equipment.
Manombo Special Reserve contains 5,800 hectares of lowland and littoral rainforests and one of Madagascar’s last remaining pandanus swamps, a carbon-rich ecosystem of stilt-rooted tree islands. The reserve is home to at least nine species of lemur, twenty species of bat, six species of rodent, four species of tenrec (including the aquatic tenrec), and the highest number of snails anywhere in Madagascar. Guibemantis diphonus, a species of Malagasy poison frog, several freshwater fishes, and the Manombo sportive lemur are all found only within the reserve.

The Manombo area contains the last remaining parcel of basalt-growing littoral forest, remarkable for its resilience to frequent uprooting by cyclones and their ability to grow in shallow, nutrient-poor soils including sand and basalt substrates. This ecosystem is a narrow, oceanside forest that grows above the high water mark and extends approximately one kilometer inland. Formerly abundant in Madagascar, littoral forest is poorly protected and is now one of Madagascar’s most threatened ecosystems. Whereas Madagascar’s western coast is dominated by mudflats and mangroves, the eastern coast is rocky and steep with little sedimentation from rivers, providing ideal conditions for littoral forests, which form a low canopy less than 20 meters tall.

This type of forest is known for high species and genus endemism: at least four plant genera are endemic to Madagascar’s eastern littoral forests. They also contain high biodiversity: botanists recorded 360 plant species from one eastern fragment in Tampolo, including 11 palm species. Common species on the ocean’s edge include the flowering Calophyllum trees, white-sapped Faucherea trees, and fruit-bearing Mimosops trees. Further inland, the forest shifts to include slender and valuable Diospyros ebony trees and Uapaca trees whose roots dangle from the trunk. An important feature of littoral forests is the freshwater swamps which often form behind the sand-dune barrier. These are populated by raffia palms (used for weaving), ravenala or traveller’s palms (whose stems hold supplies of clean drinking water), succulent Dracaena shrubs, and spiky Pandanus trees. These unique plant assemblages also provide habitat for a rich diversity of birdlife.

High-quality, affordable healthcare

In spite of the pandemic, Health In Harmony has made significant progress alongside communities surrounding Manombo Special Reserve. In November 2020, Health In Harmony began offering mobile clinics twice monthly, in seven locations determined by the communities. The medical team provides healthcare with a focus on reproductive, maternal, and pediatric care. We ensure these services are affordable by accepting non-cash payments, such as artisan crafts and seedlings used in reforestation projects.

In the five years preceding Health In Harmony’s 2019 baseline survey, infant mortality in the communities surrounding Manombo was at 41 per 1,000 live births, and under-five mortality was on the rise. Contraception usage is very low in these communities, particularly among women in the lowest wealth quintile, who have an average total fertility rate of 8.0 children, compared to an average rate of 5.2 children among women in the highest wealth quintile. We will measure these rates again in three years to assess program success in lowering infant and maternal mortality.

Starting mobile clinics in November 2020, the health team has conducted a total of 94 mobile clinics with 6,438 patient visits to date providing general healthcare services, vaccinations, antenatal consultations, and family planning services. We are working closely with four local health centers (CSBs) in the region, and during the mobile clinics two community health workers and 2-3 staff from the nearest CSB are assigned to join our mobile clinic team.

COVID-19

We signed an MOU with the Ministry of Health, conducted COVID-19 response and outreach, strengthened the local response through partnerships with local health authorities and regional health centers, operated health checkpoints, supported communities with radio communication, masks and prevention and preparedness education and outreach. HIH also delivered supplies for community health centers. The team has also begun COVID-19 vaccinations in the region in collaboration with the Ministry of Health.
Reforestation & Agroforestry

In one generation, Manombo’s rainforest coverage has dropped from 15,730 hectares to an estimated 5,800 hectares today. This rapid deforestation is representative of the situation across Madagascar - nearly half the island’s forests have been lost in the last six decades, and half of the remaining forest is within 100 meters of an edge, putting it at high risk of further degradation.

The people who live around Manombo understand that Manombo risks becoming too fragmented to support the long-term survival of megafauna, water filtration and cycling, and consistent rains. Under the lead of the reforestation manager and with support from community members and the Ministry of Environment, the team planted 7.35 hectares inside Manombo Special Reserve using traditional and Muvuca reforestation methods. We will work alongside the communities to reforest 40 hectares through agroforestry, which will support community members to grow vanilla, cloves, jackfruit, avocado, and cinnamon. Community members will be able to sell the products, providing a sustainable income while regenerating the canopy for wildlife.

The soil in Manombo is heavily degraded and soil restoration is needed to increase survival rates of seedlings used for restoration inside and around the national park. To increase the success of reforestation projects, we will conduct a soil assessment to understand the condition of the soil and the specific amendments that are necessary. We will sample the soil and send it to the laboratory, then add nutrients accordingly to increase the nutrients in the soil that can support the initial growth of the seedlings in the restoration project. We will work closely with Rio Tinto restoration advisors and Missouri Botanical Gardens to improve and restore the quality of the soil.

To ensure that the reforestation sites are not lost to wildfires, we will work closely with the communities and the Manombo National Park officials to build fire breaks around the agroforestry and restoration areas.

Regenerative Livelihoods

Health In Harmony works with 31 rural farming communities of Antaisaka, Antaifasy, and Betsileo ethnic groups. To date, agriculture training in rice cultivation and organic farming has reached over 2,000 participants, 60% of whom are women. We provide training in the sustainable farming of crops requested by the communities, such as faster-growing rice varieties, nutritional gardens, and income-generating crops.

By supporting the communities in rice cultivation and farming techniques, they have healthier food and no longer need to stress the forests through slash-and-burn agriculture, bushmeat poaching, overharvesting food products, and logging for charcoal. These programs incentivize long-term food security with an emphasis on skills and techniques to weather the challenges the climate crisis brings, such as delayed and unpredictable rains, cyclones, and drought.

In 2020 we set up a total of eight rice cultivation plots, and 23 organic farming plots strategically located for increased access throughout the 31 communities. A women's association has been formed in one of the villages that oversees the community farming plot, a model we hope to expand to other communities. We have started our second round of training in 2021 and 1,000 community members signed up.
Education

As we have witnessed at our pilot site in Indonesian Borneo, planetary health education for youth is the most direct way to reach adults and make a long-lasting, intergenerational impact on the environment. In concert with youth education, we will extend our planetary health engagement to adults in the 31 communities. Programs will emphasize the importance of the rainforest to local and global health, marine ecosystems, healthy eating, and hygiene practices.

Education

During Radical Listening meetings communities requested access to education, support with school infrastructure, and salaries for teachers. In 2022 we will conduct more Radical Listening with teachers and parents in the communities to understand how we can best support the education program. We will collaborate with partners in the field of education to implement community-designed solutions.

Planetary Health Education

Based on our successful planetary health education program in Indonesian Borneo, we will begin a program called Manombo Kids to engage youth in the communities around Manombo Special Reserve in hands-on classes focused on rainforest ecosystems. We will work with the educational team at ASRI in Indonesia and Centre ValBio to adapt our model of youth education to Madagascar.

Starting in 2022, Health In Harmony will conduct community education gatherings four times a year. We will work with partners to develop a curriculum and conduct classes covering a range of environmental and planetary health topics, centering on the interdependence of human health and ecosystem integrity. Topics will include the link between deforestation and increased rates of malaria and diarrheal disease, the relationship between food security, agricultural practices, and the rainforest, public health topics such as smoking cessation, HIV prevention, and nutritious diets, and methods for community members to engage in conservation through reforestation and reducing human-wildlife conflict. These classes will take place in the mobile clinics and schools, typically in the evenings so they will be convenient for adults and families to attend.
One Health Research

In July 2021, Health In Harmony is launching a ten-year, One Health research project in collaboration with Harvard, Centre ValBio, and Zoo New England to document the benefits of reforestation for wildlife and human health in Manombo, Madagascar.

We aim to answer the question: What is the impact of regenerated forest habitat on animal and human health in Manombo?

The global impact of SARS-CoV-2, a virus that originated in wild bats, highlights the devastating consequences that can result from animal-to-human transmission of novel pathogens. An estimated 60% of emerging infectious diseases are zoonotic, meaning they spilled over into humans from an animal. Deforestation, selective logging, the fragmentation of forests, and wildlife hunting increase the risk of spillover. A substantive body of literature suggests that intact, biodiverse ecosystems may offer disease-buffering services for surrounding human communities, presenting a win-win opportunity for both wildlife conservation and human health.

Very few studies have taken a “One Health” approach to evaluate the interactions of landscapes, wildlife, and human disease in an experimental study design. Health In Harmony’s reforestation efforts offer a unique opportunity to do just that. A transdisciplinary team will conduct quarterly field assessments of the pathogen and parasite community at paired sites inside and outside Manombo Special Reserve at the onset of reforestation efforts, and longitudinally over the following ten years.

Specifically, we will assess the impacts of Health In Harmony’s reforestation interventions on three variables:

1. Biodiversity
2. Wildlife Health
3. Human Health

This One Health research project offers an unprecedented opportunity to quantify the simultaneous benefits of community-designed conservation interventions, especially reforestation, on biodiversity conservation, wildlife health, and human health.