



DISEASE, FOOD, ENERGY, AND WATER SOLUTIONS • DEFUSING A GLOBAL CRISIS



Food, water, and energy shortages, as well as infectious diseases afflict marginalized populations throughout the developing world.

More than 200,000 people a year are killed by schistosomiasis, a disease originating in snails that feed on aquatic plants across the developing world. These tiny snails host thousands of parasitic flatworms that they release into the water. Villagers routinely come into contact with the parasites as they gather water, clean clothes, and bathe. Today, over 200 million people are infected with this disease, and 700 million more are at risk.

The people suffering from this infectious disease are simultaneously experiencing shortages of food, energy, and water. Over 225 million people are undernourished in Africa, 32 out of 48 African countries are in an energy crisis, and the economies of sub-Saharan Africa lose 40 billion hours per year collecting water.

These crises will only intensify in the coming years: by 2100, the world will be home to 11 billion people. Most of this population growth will happen in Africa and Southeast Asia, regions endemic both with schistosomiasis and scarcities of food, water, and energy. If we don't act now, hundreds of millions will continue to suffer.

A sustainable, local solution is needed to reduce schistosomiasis while at the same time addressing food, energy, and water shortages.

OUR SUSTAINABLE SOLUTION

Eliminating a devastating disease like schistosomiasis starts with its hosts. Our team of scientists uses validated, satellite imagery-based approaches to map where the snails live, therefore highlighting schistosomiasis hotspots. Next, they clear the submerged aquatic plants, effectively removing the habitat for snails that cause schistosomiasis. Not only does this process significantly increase open water access necessary for obtaining water for cooking and washing clothes, it has already resulted in a 103-fold reduction in snails and significantly decreased schistosomiasis reinfection rates among Senegalese children in field trials.

Next, we turn aquatic plant biomass into food and energy production—a process that is taught to villagers to keep the solution sustainable. To accomplish this, our team is evaluating the cost-effectiveness of three complementary approaches: feeding aquatic vegetation to livestock to increase milk and meat production; using the vegetation to fuel biodigesters that produce fertilizer and gas for cooking or electricity production; and converting aquatic vegetation to compost. The compost has already been shown to significantly increase crop yields and thus food production. As a result, we are defusing a global crisis by simultaneously and sustainably addressing disease, food, energy, and water issues with a solution that can be scaled throughout the developing world.

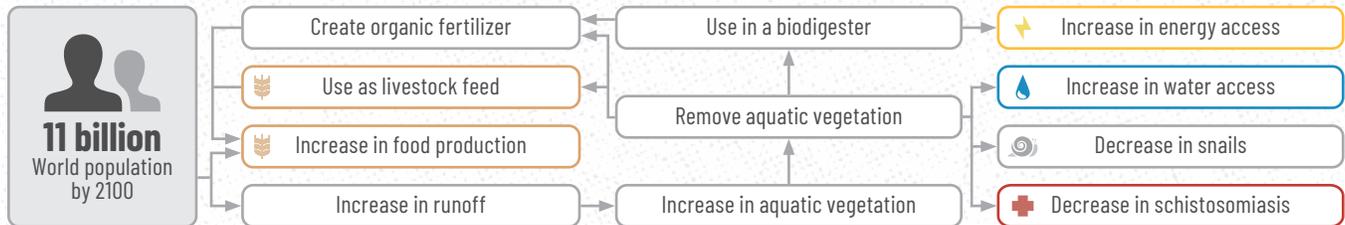


OUR GOALS



The most immediate short-term goal for this project is to train villagers in Senegal to implement this innovative solution and sustain it in the future. Additionally, the team seeks to test different methods of inducing compliance with ongoing vegetation clearing and to track this over time by quantifying vegetation and open water in test areas.

Long-term, our project seeks to reduce schistosomiasis by 25% or more, increase open water by 75% or more, and increase crop, milk, livestock, and energy production by 25% or more, and additionally prove that these changes will improve the quality of life for people in affected regions—in Senegal, throughout Africa, and beyond.



Funding at any of the three levels will be used to accomplish the corresponding aims:

\$1 million

Implement and scale the intervention locally

- Finalize research on the effects of vegetation removal on livestock and energy production
- Conduct economic analyses to determine the most cost-effective use of the removed vegetation
- Generate maps of schistosomiasis risk in West and East Africa
- Develop materials to teach villagers the intervention
- Scale the intervention training locally in collaboration with the Ministry of Health and Social Action

\$5 million

Implement and scale the intervention regionally

Complete all at \$1 million level, plus:

- Assess intervention compliance and sustainability without foreign assistance
- Implement tests of incentive programs to maintain cleared waterways
- Hone and apply validated remote sensing models in new regions
- Monitor and evaluate, and course correct where needed
- Scale the intervention training regionally in collaboration with the Ministry of Health and Social Action

\$10 million

Implement and scale the intervention throughout Senegal

Complete all at \$5 million level, plus:

- Scale the intervention training throughout Senegal in collaboration with the Ministry of Health and Social Action
- Implement monitoring, evaluating, and learning by an independent third party
- Begin development of a cell phone alerting system
- Begin plans for scaling beyond Senegal—across Africa and to other parts of the world, including Southeast Asia, South America, and the Caribbean

With proper funding, this project has the potential to simultaneously and sustainably combat disease, food, energy, and water issues—and save lives—well into the future.

