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📌 *One of the Great African River Prawns from the Upstream Alliance's trials. These native of the Senegal River eat parasitic larvae causing schistosomiasis.*

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to produce the gel in Australia as well. “The ultimate goal is worldwide adoption of these materials for prevention projects so that we as a broader community can be more proactive at addressing the risks of wildfire,” Appel says. “We hope that this approach allows for more proactive fire management that will be cheaper and more effective than the reactive firefighting we currently do, freeing up resources to improve overall forest management.” ■

HEALTH

River Helpers

BY HILARY DUFF

Prawns are likely not the first answer that comes to mind when asked how to reduce rates of one of the world’s most persistent tropical diseases. And yet, in the Senegal River basin in West Africa, the crustacean is an unlikely ally of the global health community.

Schistosomiasis infects an estimated 200 million people annually and puts 700 million more at risk. Chronic infection is acquired through exposure to freshwater parasitic worms and leads to anemia, abdominal pain, and blood in the stool and urine. The disease causes “a lot of suffering, and that burden disproportionately affects the poor of the world,” says Susanne Sokolow, a disease ecologist at Stanford University. Ninety percent of schistosomiasis cases occur in sub-Saharan African countries like Senegal.

Disease rates spiked after the construction of a dam along the Senegal River disrupted the life

cycle of the native African river prawn. Survival of the prawns hinged on a migratory journey to the brackish waters near the Atlantic Ocean. Impeded by the dam, the prawns became locally extinct upriver from the site.

The prawns had been predators of the freshwater snails that host the parasitic larvae causing schistosomiasis, which is transmitted when the larva leaves the snail shell and burrows into someone’s skin. With no predator, the snail population quickly grew, expanding prime territory for the parasite and increasing disease transmission.

Schistosomiasis is treatable with a drug called Praziquantel. However, the drug’s benefits are minimal in the Senegal River basin because people are consistently exposed to parasite-infested waters and are therefore unable to escape the cycle of the disease. “This is a population living in a subsistence economy with no access to clean water,” explains Giulio De Leo, a Stanford University biologist. “People have no choice but to go to the river for their daily chores, and if the water is contaminated, they get infected again.”



In 2015, a multidisciplinary team called the Upstream Alliance confirmed its hypothesis: that reintroducing freshwater prawns into the Senegal River could reduce schistosomiasis transmission. Field studies were supported by the Bill & Melinda Gates Foundation, the National Science Foundation, and Grand Challenges Canada.

The Upstream Alliance was cofounded by Sokolow, De Leo, partners in Senegal, and advisors in eight other countries. The group seeks solutions that not only reduce schistosomiasis, but also help restore ecosystems and alleviate poverty.

Their next step is to promote a locally run social enterprise that expands the prawn hatchery initially built for scientific studies. A portion of domesticated prawns would be sold at restaurants in Senegal’s major cities.

Profit generated from those sales would fund the social impact arm of the business: the free distribution of prawns in at-risk Senegal River village water-access points. Here, the prawns would provide lasting relief against disease transmission by keeping snail populations

in check. Once fully grown, the crustaceans could be eaten or sold at market, improving food security and helping families edge away from the poverty line.

A challenge for the Upstream Alliance is the expansion into a nascent aquaculture sector in an emerging market. “It takes a good seven to 10 years for aquaculture ventures to really scale and be a thriving business,” says Sara Minard, an economist who previously ran a fish aquaculture business in Senegal.

The Upstream Alliance’s business model is designed so that funding would come from different types of investors, including commercial lenders. The complex financing system is designed to be mindful of the venture’s longer timescale, greater and more complex business risks, and need to accomplish its social impact mandate.

“From a financial perspective, the complexity is designed to reduce risk. A reduction in risk means that [the venture] should be able to raise lower-cost capital,” says Constantin Gurdgiev, a professor of finance at the Middlebury Institute of International Studies at Monterey and the economist who developed the business model.

The model uses a financial mechanism called *convertible equity*, where ownership can be converted to immediately payable debt if the business doesn’t fulfill its social impact mandate of supplying prawns to villages to reduce human disease. Gurdgiev says the venture’s risk-adjusted returns on investment are comparable to those currently expected by commercial investors in West Africa.

WHAT'S NEXT

The Upstream Alliance has found other parts of the world where dam building has increased schistosomiasis transmission risk. After testing its business model in Senegal, the organization could scale to other places where native migratory prawns have been affected by dams and where aquaculture operations could help restore them. Initial research in Brazil already shows promise.

“If it’s successful, we would have proven that impact investment can be used for a win-win—addressing a global health concern, helping the environment, and raising people out of poverty,” Sokolow says. “That could be a breakthrough.” ■

HUMAN RIGHTS

Language Justice

BY YULA ROCHA

Migrants and asylum seekers arriving in the United States today face a long and treacherous process.

They must navigate not only the current administration’s policies but also the barrier of language.

“We talk about Trump’s wall, but honestly there are already word walls and paper walls in place, so the idea of a wall is redundant,” says Ariel Koren, the founder of Respond Crisis Translation.

Respond was created in October 2019 by a collective of professional translators and interpreters devoted to what they call “language justice.” In partnership with migrants’ grassroots organizations and nonprofits such as RAICES and Al Otro Lado, they offer pro bono translation of legal documents and testimonies and interpretation services for clients in detention centers in the United States and Mexico. By May 2020, they translated 8,500 pages of documents and served 875 clients.

Volunteers at Respond hope to give migrants and asylum seekers a fair chance to defend their claims and make their legal case to remain in

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the United States. More than 44 million immigrants live in the United States, and one in seven US residents are foreign born, according to a 2018 Pew Research Center study. Most are integrated and speak English, but many still need help navigating US bureaucratic structures. While the United States is one of the most linguistically diverse countries in the world, it is extremely inflexible in regard to language. It requires, for example, that all asylum evidence be submitted in English, which makes it almost “impossible for non-English speakers to navigate its systems,” Koren says.

“Most migrants, if not all, suffer from language barriers