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FEATURES | **SRI LANKA** YESTERDAY

Sri Lanka: Ancient innovations combat water woes

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In a village of abandoned wells, ancient water management techniques are throwing a lifeline to desperate villagers.



A resident of the small village of Puhudiwula stands beside her neglected rainwater harvesting tank [Tharuka Dissanaiké/ UNDP/ Al Jazeera]



by [Smriti Daniel](#) [@smriti_daniel](#)

Puhudiwula, Sri Lanka - In the district of Anuradhapura in Sri Lanka, Puhudiwula is a village of abandoned wells. Though new and well-built, these wells can be found in every garden, costing around 100,000 rupees (\$700) to build. The villagers, however, will not drink or even cook with the water, which they believe is driving an epidemic of the deadly Chronic Kidney Disease of Unknown Etiology (CKDu) in this area. While the illness is not the end of the community's troubles, many of their woes are tied to water.

These are the hottest months of the year in Puhudiwula, deep in the island's dry zone. The local water tank is nearly dry - its bed is ribbed with cracks as the clay changes colour, hardening under the sun. This year, to save their crop of paddy, the farmers ordered bowsers to deliver water to their fields. Climate change in these parts means more dry days and higher temperatures; it also means that people have to dig deeper wells to meet their needs, inadvertently increasing the risk of the contamination

of their drinking water.

As a former border village on the frontlines of a nearly three-decade long civil war, the villagers lived with sporadic violence and terrible uncertainty. Now, seven years after the conflict ended, times are still tough, but the village of Puhudiwula is about to be thrown a lifeline.

In 2016, Sri Lanka became one of the first 15 countries in the world to receive a grant from the Green Climate Fund. The Ministry of Mahaweli Development and Environment, with the assistance of the United Nations Development Programme (UNDP), procured \$38.1m to help communities adapt to the impacts of climate change. Over the next few years, an estimated 770,500 people in the dry zone, including those in Puhudiwula, **will experience direct benefits** from this programme.

Somewhat remarkably, the whole proposal turns on Sri Lanka realising that the best answer to their modern woes is an ancient innovation.

Scrabbling for answers

A sign in Sinhalese by 40-year-old Bandula Silva's door in Puhudiwula reads "May Buddha Bless this House". Inside, however, its owner has been dealt a death sentence. Eleven months ago, the 40-year-old from Puhudiwula was diagnosed with CKDu. He began treatment but the disease had already ravaged his body. The father of three is barely able to walk and cannot keep his food down, except just after a session of dialysis, when the treatment brings some relief. It is difficult to predict how much time his weekly visits to the hospital will buy him.

Just down the road from Silva, G Premawathie has the same disease - the elderly widow's kidneys have

begun to fail her and fluid retention has left her feet and ankles swollen. She has another neighbour, a 29-year-old farmer who was recently diagnosed. Though the intensity of the condition can vary, villagers know the outlook is grim: Two days ago, they attended the funeral of a man who had succumbed to CKDu. The diseased was a close relative of Piyasiri Soyza, president of the local farmers' association. Soyza estimates that there are currently more than 100 people battling CKDu in this area. He lost his own father to the disease.

Since he was diagnosed, Silva and his family have stopped drinking water from their well. Premawathie and her family also buy their water, paying by the litre.

"The water from our well tastes of rust," she tells Al Jazeera. Soyza, who is hale and fit at 57 years old, says for years now he has travelled several kilometres each week to bring his family water from another village where there is a spring and no occurrence of CKDu.



Children in a village near Horowpathana can only drink from this tank, which must be refilled frequently. The water from their well is unusable [Tharuka Dissanaiké/ UNDP/ Al Jazeera]

CKDu has been reported in many countries, yet the disease remains poorly understood. In Sri Lanka, studies have explored multiple causes, most notably the possibility that the heavy use of **agrochemicals** is to blame. The fact that men are most at risk of developing the condition has led researchers to consider what role **dehydration and outdoor farm work** might play, though it is likely to be a combination of many factors.

In a presentation earlier this year, Sarath Amunugama, of the Ministry of Health, **noted** that there was a need to move away from a single cause explanation to multi-causal explanations when trying to understand the disease.

According to a Government Medical Officers Association study in 2013, a total population of 400,000 are affected across the country. Some 1,400 lives are claimed every year, while the death rate in North Central Province is 19 per month - the island's highest (**PDF**).

In the face of this ongoing tragedy, everyone is scrabbling for answers. Providing clean water seems to be the most obvious first solution, and it is one the affected communities themselves are seeking out.

"The entire population is affected by drought, but the most disadvantaged and most vulnerable group are women," says AADWS Pradeep, a divisional officer at the Department of Agrarian Services. "Women are responsible for providing drinking and household water, and when the wells and tanks dry up, they have to go far away to find it."

Men often migrate to areas where there is water, because seasonal labourers are sought to work on fields. Left behind, women must manage not only the

needs of their households for cooking and sanitation, but ensure their domestic animals have enough to drink and their home gardens are watered, or they risk being unable to feed their families.

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An ancient innovation

Though climate change threatens to exacerbate the situation to a dangerous degree, Ranjith Punyawardena, chief climatologist at the Department of Agriculture tells *Al Jazeera* that people in Sri Lanka's dry zone have always struggled to find enough water. Some of [the small village tanks](#) in this area have been in operation for more than 2,000 years. The best estimates place the total number of both functioning and abandoned tanks in Sri Lanka at 18,387 [\[PDF\]](#).

Over generations, these tanks evolved into cascade systems connecting these earthen water reservoirs - resembling ponds and lakes - with each other using a system of canals.

"The cascades were a counter for this natural climate variability," says Punyawardena, adding that without these innovative water management systems, cultivation in the dry zone would have been impossible.

According to Herath Manthrithilake, head of the research programme at the International Water Management Institute in Sri Lanka, the tanks "eventually evolved into a new kind of hydrological civilisation."

Manthrithilake explains that some tanks would be water holes, serving as upstream sediment traps. Forest tanks in the upper catchment area were for

local wildlife and kept animals from competing with humans for water. Others were especially designed to replenish ground water or support seasonal irrigation.

The ancients even developed their own sluice gate design, allowing water to be collected from the surface of the tank, rather than its murky depths.



The restored bund is so broad it is now a main point of access for this Galgamuwa village. It is used to transport crops and bring materials to the fields. [Tharuka Dissanaiké/ UNDP/ Al Jazeera]

Now the funds from the GCF are going to be invested in restoring a number of these cascade systems in the dry zone, including the one adjacent to the village of Puhudiwula.

Experts say rehabilitating the network of small village tank irrigation systems means protecting the forests even as farmers get the water they need to cultivate their crops, ensuring food security in a very vulnerable region. It also means that groundwater could be replenished and that water quality in the village wells around the tank would improve as a result.

Villagers would not have to dig so deep to reach the liquid, and pockets of contaminated water would

become less likely, offering some protection against diseases such as CKDu.

The relatively linear arrangement of these tanks, explains Manthrithilake, allows for the installation of monitors that can then function as an early warning system, alerting villages along their length to the threat of floods.

"Water is the big player in this whole scenario; this is the medium through which we experience climate change," says Manthrithilake.

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It all comes down to water management, both in excess and scarcity. However, restoring and maintaining these cascade systems in a time of widespread environmental degradation, poor intergovernmental coordination, and the ever greater challenges posed by climate change, is a monumental task.

"The current approach is very sectoral," says Tharuka Dissanaike. A policy specialist with the UNDP, Dissanaike says that there is a marked lack of coordination between irrigation and drinking water authorities from state to village level.

"What we are now coming up with is a transformative model that treats drinking and irrigation water as a single local resource - much like the ancients did. It is important to value both uses equally since small irrigation systems contribute to drinking water availability in these villages."



A father and daughter go to collect water. These are the thirstiest months in the dry zone, and the family travels several kilometres twice a week to a shop. [Tharuka Dissanaiké/ UNDP/ Al Jazeera]

Adapting to climate change

Some cascade systems are currently being restored, with heartening results. Sampath Bandara Abeyrathne, the project manager of the Climate Change Adaptation Project at the UNDP, has been directing a team of researchers and engineers, overseeing the restoration of the 28 tanks that are part of the Maha Nanneriya tank cascade system in Galgamuwa in the Kurunegala district.

Abeyrathne grew up in these parts and explains that the de-silting of these tanks must be done very carefully, ensuring that the natural clay seal remains intact to prevent seepage and that the holding capacity of the tank is not affected. The ratio of depth versus spread of the water in the tank is critical to managing issues like salinity, water evaporation and flow within the cascade.

Abeyrathne points out that a catchment area is only as good as the forest it relies on. But a drone he sent up recently came back with images that revealed huge patches of deforestation and chena, or shifting cultivations, in this stretch.

Despite these issues, one fully restored tank in the Maha Nanneriya cascade has held its water during the driest months. Standing on the tank bund, AMA Adikari, a retired school principal and member of the local farm organisation, says that for the first time, farmers are contemplating cultivating through three seasons instead of staggering through just one - a move that will have a profound impact on their food security and incomes.

WATCH: Sri Lankans struggle to find clean water

It is essential that the community take an active hand if the cascade systems that have been repaired are to survive, emphasises Buddhika Hapuarachi, a technical adviser at Sri Lanka's Comprehensive Disaster Management Programme, the UNDP's national partner on the Maha Nanneriya cascade project.

"Galgamuwa is one of the most drought-prone divisions in Kurunegala, and in fact, the whole country," adding that restoring this cascade system is "essentially the pilot project for Sri Lanka on climate change adaptation. We have to see how to incorporate climate change adaption into our development planning process."

The project will also help fuel a quiet revolution in Sri Lanka's approach to water management.

In years ahead, local farmers say they hope to borrow from ancient systems of labour and land sharing, which emphasised a community approach in all things.

"We had a very good democratic system to manage scarce resources as a collective, without creating unnecessary competition," says Adikari. This generation, he believes, still has a lot to learn from

their ancestors.



This restored tank in the Maha Nanneriya cascade will allow villagers to cultivate three times a year, and offers separate spots for bathing, fishing and cattle [Tharuka Dissanaik/ UNDP/ Al Jazeera]

Source: Al Jazeera

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