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◀ Women in Kampung Binjai do their laundry at a murky pond near the village every day while their children swim and bathe in the water

# DROWNING IN WATER POVERTY

The problem of water poverty, especially in remote areas, is real. In recent years, efforts to enable access to clean water have increased but the consensus is that more needs to be done to tackle the problem at its roots.

**A**lthough some 71% of the world's surface is covered in water, more than a billion people do not have access to clean water. They suffer from what is known as "water poverty" and consume contaminated water which results in illness, and often, death.

H2GO founder Dr Rajiv Bhanot tells ESG: "Some 10,000 people are dying every day because they consume contaminated water. One out of two girls in developing countries drops out of school once puberty hits solely because she has no access to clean water and sanitation.

"So, when we bring clean water to a community, it's not just a matter of elevating their healthcare levels. We're also allowing young girls to go to school."

Rajiv cites former South African president Nelson Mandela, who once remarked that education is the single most powerful weapon that can be used to change the world. "And when you provide these young girls with an education, you're giving them an opportunity to change their lives. And for so many of these rural women, their job is to wake up in the morning, walk six, seven, ... 10km in the ridiculous heat to get to the closest source of water and bring it back to the village. And most of the time, the water they bring back is highly contaminated.

"So, when you bring clean water to a village, you're allowing these women time they can use to nurture their families or get a job so they can provide a second source of income, which really helps lift the economic state of the family. Water



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is tied into so many things," he points out.

H2GO Global uses a nano-filtration technology that was developed for the British military to provide clean water solutions to rural communities all over the world. To date, Rajiv says, the company has affected 3.5 million (mostly rural) people all over the world.

"I'm not saying that H2GO is the only technology out there in the world, but we do have technology that can solve this problem. There are inexpensive solutions to this problem. The production cost for our communal tanks works out to be half a US cent per litre of water. That, to me, is cheap and practical. And the solution is easy to roll out. It's very disheartening that we have a humanitarian crisis that has been going on for decades, for generations ... and nobody talks about it."

Global Peace Foundation CEO Dr Teh Su Thye points out that water poverty is covered by Sustainable Development Goal 6, which includes, among others, universal and equitable access to safe drinking water for all by 2030, as well as adequate and equitable sanitation and hygiene for all and an end to open defecation, paying special attention to the needs of women and girls in vulnerable situations.

"If you do a search online, you will see that the government says Malaysia is doing quite well in this respect – with 96.5% of our population having access to safe drinking water and 96% having access to improved sanitation," he says.

However, with a population of more than 30 million, having 4% of the population without access to clean water and sanitation is still quite sizeable, in terms of numbers. "For us, our experience is that the Orang Asli in certain districts or states are disadvantaged in terms of access to clean water and sanitation.

"Many communities that we know are still practising open defecation. They drink water from polluted rivers or wells. We don't have detailed statistics because in Malaysia, most stats are released by the government, so whatever you can find on the internet is basically it," Teh points out.

The GPF honed its approach over the years, and now it does four things to address water poverty: it supplies villagers with water filters so they can filter the water right down to the bacteria and viruses to make it good enough for



**"Water is tied to so many things."**

**RAJIV**

▼ H2GO's nano-filtration technology was initially developed by the British military for soldiers on the field to get clean drinking water

drinking and cooking; it pumps water closer to the villages so that women don't have to spend time walking great distances to haul water; it has introduced hygiene classes to teach villagers to brush their teeth, wash their hands and protect their water sources; and finally, it has started building toilets in some of the villages it works with. To date, it has worked with 96 villages to specifically address water poverty, impacting close to 2,500 villagers, and built toilets in 15 villages. It may sound impressive, but based on the need in Malaysia, it is the proverbial drop in the ocean.

The problem, especially for the Orang Asli communities, is the encroachment of deforestation, plantations and mining on their ancestral lands. Where before they could live in the forests in harmony with nature, now their water sources are polluted, forest cover is dwindling, and their livelihoods and sources of sustenance are threatened. Those without access to running rivers bore holes into the ground to make wells and the water that turns up there is often too murky and contaminated for consumption.

A key problem is, of course, the pollution of the water source itself, that is, the river. The Global Environment Centre (GEC), a non-governmental organisation (NGO) set up in 1998, has made it its business to tackle the health of rivers in Malaysia.

"As a leading NGO championing community engagement, GEC has developed the River Care Programme as well. We started in 2016 and have so far supported 39 communities in



H2GO



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almost 10 states in Malaysia, giving out a total of RM470,000," says GEC River Care Programme manager Dr Kalithasan Kailasam.

Under the programme, any group with proposed initiatives related to the care of rivers, be it clean-up and pollution management; conservation and protection; riverine biodiversity, awareness, education and capacity development; river monitoring or disaster risk management, can submit their concept to GEC. "We give them technical input as well as financial support."

Kalithasan says GEC abides by the concept that the drain is the nucleus of the river.

"First, we ask the community to adopt and clean the drains, as well as tackle the pollution at source through recycling, composting and monitoring the drains, then feed the information to the respective agencies. Basically, for them to be the eyes and ears on the ground."

He is emphatic about GEC not leading any of these community-based projects or initiatives. "They do their own respective initiatives. We empower the community to do what is needed in their area. Some communities have adopted the riverbanks, which used to be sites for illegal dumping, and turned these into community gardens. They do what needs to be done based

▲  
The water-bearing burden: An elderly widow from Kampung Gong carries heavy jerry cans daily from a well



**"Many communities that we know are still practising open defecation. They drink water from polluted rivers or wells."**

TEH

on the needs of the community and the site itself. We are not doing it for them.

"We empower and support them technically and, where possible, financially, although the size of the grant is not large ... only up to RM5,000," he adds.

The greatest impact has been in making communities better informed about their own respective river basins. "We connect people to the river. We ask everyone to know their river name and where their drinking water comes from. Do you know that the majority of Malaysians are not aware of where their drinking water comes from or where their wastewater is discharged?"

"We first make them aware of this. And then we establish community-based river monitoring, data collection and pollution reporting. We normally use WhatsApp groups to link communities with the agencies," he says.

Then the groups will work on pollution reduction at the source. "This involves the reduction and sustainable management of the waste. The other impactful



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initiative is how to put the abundant riverbank area to good use."

Before, says Kalithasan, there was a lot of illegal dumping.

"They would just dump everything on the riverbank. Once the community took over and started monitoring the rivers and turning riverbanks into parks or vegetable gardens, people didn't dare come and throw [their rubbish there]."

Another impact of this programme is that members of the community are stepping forward to participate in policy development and management plans. "We have so many examples of communities giving significant input in the development of management plans and even policies. And through GEC's involvement for more than 20 years, government agencies and even private sector players have adopted citizen science as a key programme."

Citizen science? "That is community involvement in a science-based approach. It's defined as the practise of public participation and collaboration in scientific research to increase scientific knowledge as well as initiate localised action by communities through civic science and nature-based solutions. At a global level, any data collected by the community is now being treated as citizen science. There is recognition. It is being accepted as scientific data."

But perhaps the greatest impact has been on the rivers adopted. "These have improved in terms of water quality and there has been an enhancement in their biological components. There are more local species. When communities adopt a river, they increase the habitability for the biological species."

The Department of Environment's findings seem to back his assertions. The Environmental Quality Report 2021, which was based on 8,059 sampling stations taken from 670 rivers in Malaysia, found that 78% or 489 rivers were "clean", 158 (24%) were moderately polluted and only 23 rivers (3%) were polluted.

"This is one of the highest scores over the years in terms of the number of clean rivers and the lowest in terms of polluted rivers. One time, the percentage of polluted rivers was about 11%. This is the best result I have seen in more than 15 years," he says.

Kalithasan believes that this is the result of



▲ An elderly woman in Kampung Gong showing glasses of water before and after using GPF's ultra-filtration membrane device



**"We connect people to the river."**

**KALITHASAN**

both the efforts of government agencies and the increased awareness and interventions by the communities situated around the rivers themselves.

Smart partnerships are the way forward, he says. He expressed appreciation for the fact that the government is now championing the "Friends of River Basins" programme in Malaysia. "Currently, we have a lot of community groups that are taking the lead and responsibility on river management."

Kalithasan also spoke about the Water Sector Transformation 2040 blueprint. "I have seen so many transformation blueprints over the years but for the first time, the GEC is happy with the content. There were a lot of stakeholder consultations in this blueprint and for the first time, the Malaysian government took advice from NGOs that clearly defined people as the driver for the transformation. They put in a note that all agencies needed to work with the people. For the first time, it is written in the blueprint and approved in parliament."

There are two more points he would like to cover with regard to engaging people in river care management. Firstly, there is a need to standardise recognition and acknowledgement for local leaders or river champions. And secondly, whistleblower protection for those who report on wrongdoing such as illegal dumping.

"Last time, they didn't bother. Now, they are prepared to come forward but one of the issues they highlighted to us is, what will happen to them? Are they protected under these laws? This we cannot answer because even big NGOs like GEC are not protected." 🐼 By Jennifer Jacobs



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# Accessing the right technologies to address water poverty

**D**r Rajiv Bhanot, the founder of H2GO, was a medical doctor serving out his two years of government service at Hospital Tengku Ampuan Rahimah, Klang, when he stumbled across a water filtration technology that would change his life (and as of this writing, the lives of 3.5 million people around the world).

Some friends were visiting from Moscow, where he had studied medicine, and they were exhibiting some technology at a booth in a military expo in Kuala Lumpur. Visiting their booth, he came across British troops demonstrating

how they could convert very dirty water into sterile drinking water with a nano-filtration system they had used out in the field. “It absolutely blew my mind. I was watching technology perform what looked like a magic trick.”

He did some research about how many people could benefit from the technology and the numbers shocked him. Over one billion people are suffering from water poverty on this blue planet where water is abundant.

Rajiv reached out to the small British company that had developed the technology. “I started collaborating and working with them, and over time, when I had raised enough capital, I bought out the intellectual property (IP). Then I put together a team of extremely talented engineers and we worked very hard to improve the technology.”

As a military technology, the filtration system could produce a few drops of clean water a minute. H2GO developed communal tanks that could produce 18 litres of clean drinking water a minute. It also brought down production costs to US\$0.005 (RM0.02) a litre.

“That, to me, is cheap and practical. It’s very

▼  
H2GO carry-cans filter enough water for a family while the bottle is for individual use





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disheartening that we have a humanitarian crisis that has been ongoing for decades and for which there are solutions but not enough being done to address it."

The crux of the problem, as he sees it, is that the victims are "invisible". "Water poverty only affects the poorest of the poor, those who live in the most rural parts of the planet."

H2GO did its first rollout in a small village in Indonesia in the southern part of Jakarta. It also did some work in Malaysia and participated in relief efforts when a typhoon hit the city of Tacloban in the Philippines.

"We started off on a very regional basis and then we got ourselves involved in a few expos and a few of our videos were shared and they went viral in different parts of the world. From there, we had groups coming in and wanting to work with us."

H2GO has been around for 12 years. It is now in Malaysia, Indonesia, the Philippines, India, Bangladesh, Ghana, Nigeria, South Africa, Colombia, Chile, Peru and North America (outdoor camping and hiking market).

Right now, H2GO is looking to develop its own line of atmospheric water generators.



▲ H2GO hauling filters to the most remote parts of the country where people still have no means of piping or a decent source of power and are forced to drink river water, which frequently makes them sick

Atmospheric water generators are basically generators that pull water out of the atmosphere. There are already some on the market but Rajiv finds them prohibitively expensive and energy guzzlers. "If it's going to cost me more to use a technology that will provide me with water versus buying bottled water, then I'm going to end up buying bottled water." 🐼 By Jennifer Jacobs



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# Addressing the water poverty of the 4%

When Global Peace Foundation (GPF) CEO Dr Teh Su Thye first decided to chuck his job in the medical profession and start volunteer work to make a difference, he had not identified tackling water poverty as the way to go. That came later when he saw where the need really was.

He had followed a friend to an Orang Asli village near Bandar Muadzam Shah, Pahang, to build houses for poor families in the village. But when they got there, the village people told them that they did not need the housing; they needed clean water.

“We realised they had no running stream and basically had to dig the ground to find water,” he tells ESG. However, even when they did “dig the ground” the water that surfaced was murky and contaminated.

Installing solar panels at Kampung Bukit Baru



Deploying a water pump next to a well in Kampung Padang



Orang Asli villagers in Kampung Patah receiving training on the use and maintenance of the water filters





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However, if someone googled the problem of water poverty in Malaysia, which falls under Sustainable Development Goal 6, it appears that Malaysia is doing well, with 96.5% having access to safe drinking water and 96% having access to improved sanitation. What about the remaining 4%?

The surprising thing was that for these people, the problem had become worse rather than better over the years with the increased logging of the forests, which hitherto had provided them with food, water and livelihoods, as well as the mining and plantations all around them.

GPF does four things to address water poverty: It started out by providing water filtration systems that could filter the murky water so thoroughly that it was good enough to use for cooking and drinking. Then, it installed water pumps so people (usually women) would not have to make multiple trips to the well to haul water. After that, GPF introduced the W.A.S.H. programme to teach them about personal hygiene – handwashing, brushing their teeth

▲  
Teh demonstrating  
the use of a water  
filter to an Orang  
Asli family

and protecting their water source.

Finally, once there was running water in the village, the women would ask them to build proper toilets. Although these villagers had practised open defecation before, they were no longer comfortable doing it because they had lost access to forests and rivers with which to clean themselves after.

How does GPF get funding to carry out its projects? “A lot of water projects are funded by corporates such as Nestle, Coway and Atlas Copco, which are very committed to their corporate social responsibility activities. They have supported multiple projects benefiting many villages.”

For Teh, it is not just about immediate outcomes, but consistency that has real impact. “We work with the same community for years and observe the changes. There are NGOs that move around the country but the disadvantage is that they cannot follow through. If they install a pump and it breaks, the Orang Asli don't even know how to contact them, so the equipment is abandoned.” 🐾 By Jennifer Jacobs



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## Flood or famine

**T**here has been an increase in floods in Malaysia over the years, but although the key drivers have remained constant, not enough has been done to tackle the issue head on.

Global Environment Centre River Care Programme manager Dr Kalithasan Kailasam has spoken to many people about this over the years but a lot of what he has said has fallen on deaf ears.

The issue, he maintains, has three different levels. "The first one is the rain pattern and density of rainfall. Climate change is real. It has influenced the rain patterns and density of rainfall. Look at some of the recent incidents where the rain of one day is equivalent to one year of rainfall previously," he points out.

The second level is that there is no longer

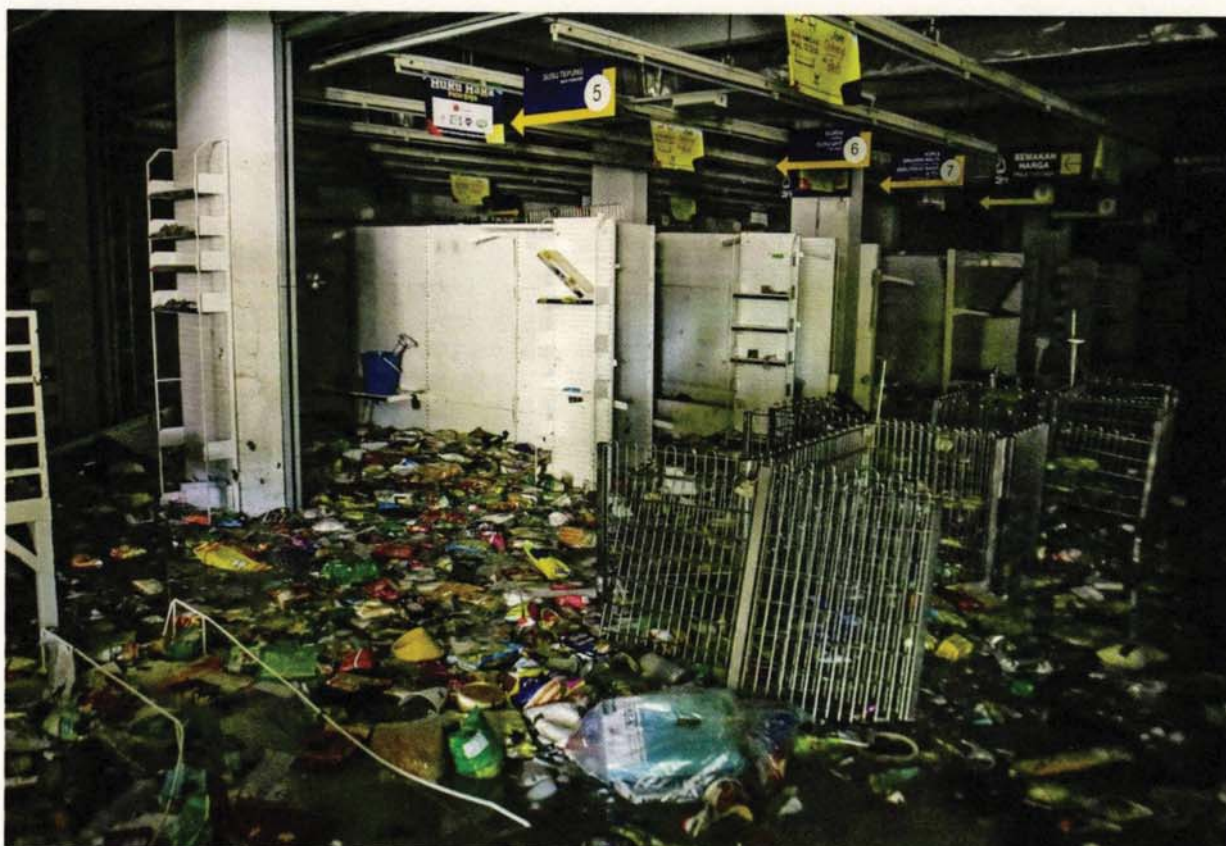
▼ Nature's revenge:  
What happens  
when you develop  
flood-prone areas  
and natural water  
spaces

any significant "storage space" for the rain when it comes. "Water needs space. Last time, the space was in the forests themselves; they were the catchment areas. When rain fell, it would be absorbed into the roots and move into the soil which would hold the water and release it slowly.

"Now, you have removed these areas through logging and tarred the surfaces so it doesn't allow time for water to absorb into the soil. Consequently, a larger volume goes into the drain and that's why we have flash floods."

But it is not only the forests that have been dwindling. Other catchment areas such as ponds and lakes have also been disappearing. "There are six lakes or ponds in KL that have been approved for development. So, we have lost six holding ponds. Where will the water for that place go?"

And it doesn't stop there. "The third factor is the body of water itself. The drains and rivers are not functioning at their optimum carrying capacity. The drains are full of rubbish. Under the law, the drains are meant for rainwater only. But unfortunately, in reality, everything goes into the drain except for rainwater.





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“That’s why, by the time the rainwater comes, it overflows because the drains are full of rubbish and the rivers are choked with sludge and rubbish. When the water goes into the river, the carrying capacity is reduced because it is full of sludge and other types of waste. If the depth of the original river was, say, 10m, it is now only 5m. This reduces the carrying capacity of the river by half or even three quarters, so it cannot even hold the water.”

How can we address this? “Firstly, we need to increase the number of holding ponds. Secondly, we need to desludge the rivers and remove the sediment to open up capacity. And this is a very costly effort.”

Kalithasan says increased development has reduced the holding capacity of places for rain. Tarring surfaces has reduced their permeability, so the water can no longer go into the soil. “This is why the water will flush through quickly to

▲ Taman Seri Muda is a flood-prone area and should not have been developed, said Kalithasan

the nearby monsoon drains and rivers.

“It’s due to the housing areas, industrial parks, all these things. You reduce the exposure area that is still in its natural condition.”

Is this a result of poor planning? Kalithasan doesn’t think so. “It’s more about implementation. Sometimes, the town and country planning department has already designated a particular place as a flood-prone area, so no development should be carried out there.

“Taman Seri Muda is a classic example of how bad a flood can be in an urban area. Everyone knows that area is a flood-prone area. It’s meant for flooding; it’s a water space. So, when it was put up for development, I know all the related agencies in question turned it down and rejected the idea. But it went through anyway. And look at what has happened. A lot of people bought property there not knowing it was a flood-prone area.” 📖 By Jennifer Jacobs