

## Water - another global 'crisis'?

By Richard Black

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**If you look at the numbers, it is hard to see how many East African communities made it through the long drought of 2005 and 2006.**

Among people who study human development, it is a widely-held view that each person needs about 20 litres of water each day for the basics - to drink, cook and wash sufficiently to avoid disease transmission.

Yet at the height of the East African drought, people were getting by on less than five litres a day - in some cases, less than one litre a day, enough for just three glasses of drinking water and nothing left over.

Some people, perhaps incredibly from a western vantage point, are hardy enough to survive in these conditions; but it is not a recipe for a society that is healthy and developing enough to break out of poverty.

"Obviously there are many drivers of human development," says the UN's Andrew Hudson.

"But water is the most important."

At the United Nations Development Programme (UNDP), where Dr Hudson works as principal technical advisor to the water governance programme, he calculated the contribution that various factors make to the Human Development Index, a measure of how societies are doing socially and economically.

"It was striking. I looked at access to energy, spending on health, spending on education - and by far the strongest driver of the HDI on a global scale was access to water and sanitation."

### Different lives

Two key questions arise, then.

Why do some communities have so little access to water? And how will the current picture change in a world where the human population is growing, where societies are urbanising and industrialising, and where climate change may alter the raw availability of water significantly?

The UNDP is unequivocal about the first question.

"The availability of water is a concern for some countries," says the report.

"But the scarcity at the heart of the global water crisis is rooted in power, poverty and inequality, not in physical availability."

Statistics on water consumption appear to back the UN's case.

Japan and Cambodia experience about the same average rainfall - about 160cm per year.

But whereas the average Japanese person can use nearly 400 litres per day, the average Cambodian must make do with about one-tenth of that.

The picture is improving to some extent.

Across the world, 1.6bn more people have access to clean drinking water than in 1990.

But population growth and climatic changes could change the picture.

In some regions, "the scarcity at the heart of the global water crisis" could become one of physical availability, especially in places where consumption is already unsustainably high.

"There are several rivers that don't reach the sea any more," says Mark Smith, head of the water programme at the International Union for the Conservation of Nature (IUCN).

"The Yellow River is one, the Murray-Darling (in Australia) is nearly another - they have to dredge the mouth of the river every year to make sure it doesn't dry up.

"The Aral Sea and Lake Chad have shrunk because the rivers that feed them have been largely dried out; and you can see it on a smaller scale as well, where streams that are important for small communities in Tanzania may go dry for half the year, largely because people are taking more and more water for irrigating crops."

## **Wet and dry**

Last year the Intergovernmental Panel on Climate Change (IPCC) took an in-depth look at how the raw availability of water might alter in the future as climatic patterns change.

Its projections are derived from computer models of the Earth's hugely complex climate system, and as such are far from being firm forecasts.

A warmer climate overall means a wetter climate; warmer air can hold more moisture.

But weather patterns are likely to shift, meaning that water will be deposited in different places with a different pattern in time.

"In general we see drying in the sub-tropics and mid-latitudes, from southern Europe across to Kazakhstan and from North Africa to Iran," recounts Martin Parry, who as co-chair of the IPCC's working group on climate impacts oversaw the water report's compilation.

"And the drying extends westwards into Central America. And there are equivalents in the southern hemisphere - southern Africa, Australia."

In some populated parts of North Africa and Central Asia, he says, people may struggle simply to get enough to drink.

Other areas, meanwhile, are projected to receive more rain - considerably more, in some cases.

The question then is whether societies can make use of it.

"If you look at India, Bangladesh and Burma, there are indications of an increase in water availability," says Professor Parry.

"But when you look in more detail you see that monsoonal precipitation will become more intense - there'll be a heavier downpour but over fewer days - so you might just end up with more runoff, which could actually mean less availability of water to the community."

## **Thirsty work**

A changing climate is only one of the factors likely to affect the amount of water at each person's disposal in future.

A more populated world - and there could be another 2.5 billion people on the planet by 2050 - is likely to be a thirstier world.

Those extra people will need feeding; and as agriculture accounts for about 70% of water use around the world, extra consumption for growing food is likely to reduce the amount available for those basic needs of drinking, cooking and washing.

Industry can also take water that would otherwise have ended up in peoples' mouths.

On the other hand, as a society industrialises it tends to become less reliant on farming - which could, in principle, reduce its local demand.

It is a tremendously complex picture; and forecasting its impacts makes simple climate modelling look a trivial task by comparison.

Researchers at the University of Kassel in Germany, led by Martina Floerke, have attempted it.

Their projections suggest that some regions are likely to see drastic declines in the amount of water available for personal use - and for intriguing reasons.

"The principal cause of decreasing water stress (where it occurs) is the greater availability of water due to increased annual precipitation related to climate change," they conclude.

"The principal cause of increasing water stress is growing water withdrawals, and the most important factor for this increase is the growth of domestic water use stimulated by income growth."

The modelling suggests that by the 2050s, as many as six billion people could face water scarcity (defined as less than 1,000 cubic metres per person per year), depending, most importantly, on how societies develop - a significant increase on previous estimates.

## **Ideas pipeline**

The irony is that the richer societies are the ones most likely to be able to adapt to these changes - perhaps relatively easily.

A century ago, a 500km-long pipeline was built to bring water from the Western Australian coast to the parched inland goldfields around Kalgoorlie; the economics of gold made it viable.

Now that the coastal capital Perth is drying out, there is talk of building an even longer pipeline to bring water from the north of the state.

The state recently acquired a desalination plant - an effective, but expensive, way of increasing the raw supply of clean water. A number of Middle Eastern countries are doing the same; it is even being contemplated near London.

Rivers can be diverted huge distances, as China is contemplating. Spain and Cyprus can take water deliveries by ship.

But can all societies afford such measures?

In any case, is adaptation possible to some of the really big projected changes, such as the rapid shrinking of Himalayan glaciers which may lose four-fifths of their area by 2030, removing what is effectively a huge natural reservoir storing water for more than a billion people?

"In principle you could do it, if you're equipped to do the engineering," says Mark Smith.

"But societies are going to have to get much better at deciding how they're going to use their water.

"And very often, in developing countries where institutions are not well established, decisions are made in a very ad-hoc way - someone says 'yes let's use this much for irrigation' but you're already using that much for a sugar mill, and before you know it you've allocated more than you actually have."

Two years ago I stood in a forest clearing in the west of the Amazon basin talking to researchers studying the deforestation and fires that are an increasing plague in the region.

They told me that some villages around there were experiencing water shortages.

How can that happen, I asked incredulously, in the middle of the Amazon rainforest, in one of the most luxuriously verdant places on Earth?

What had brought the shortages was a combination of increased human settlement, deforestation, and a drying of some streams, possibly related to climate change.

If even the Amazon can feel these pressures, it is difficult not to think that the same picture will be played out in much starker and possibly much messier colours in parts of the world that are already feeling the heat of dwindling supplies and growing needs.

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