

# Every drop counts the politics of water

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## The Cinderella problem: thousands die every day for lack of sanitation

Polls of the poor prove that sewage is their top priority but toilets are taboo to donor nations

John Vidal

If a country were invaded, and the enemy killed hundreds of children every day, what would its government do? The question was asked by a Tanzanian woman at a meeting in Africa last month. She went on: "Would they write a proposal for action? Would they convene a meeting for next year? Would they commission research? Would they spend years debating which ministry should be responsible for preventing the attack? Would they find the money to respond?"

They were rhetorical questions, but this was a meeting about water and sanitation, so everybody knew she was talking about the fact that more than 1 billion people – twice as many as live in the whole of Europe and North America – have no access to clean water. And more than 2.5 billion people – a whole China and an India combined – still have no safe place to go to the toilet.

The result, says the World Health Organisation, is a linked global water and sanitation crisis that now kills as many as 5,000 children a day from entirely preventable diseases; 80% of all illnesses worldwide are caused by unsafe water, and every day, bad sanitation kills five times more children than does HIV/Aids. At least 400m school days are lost each year because of disease caused by diarrhoea.

Statistics are one thing, but nothing prepares you for the moment you meet the crisis face to face. I saw it in Bangladesh five years ago. I had been talking to women in a Dhaka slum and casually asked a group of about 10 which of them had lost a child because of diarrhoea. I expected one or two at most. But eight hands went up. We went outside, and they showed me why. A disintegrating tube well, no clean water, no toilets, and festering drainage ditches. Result: needless misery.



Pitcher perfect... Bangladeshi women carry drinking water back to their homes Jewel Samad/AFP/Getty

We talked to the city authorities. "Find Dhaka \$800m and we will transform the city," said the head of the city's water company. We talked to the UK government and the World Bank, which had to be convinced that "investing" in sanitation was a wise use of public money.

Last month I went back to Dhaka. That particular slum was much better because public toilets had been installed, but I was told there were still only 12 such blocks for the whole city. That's like a city such as Birmingham in the UK sharing one toilet.

But things are moving. Development economists can now show categorically that there is no single policy intervention that brings greater public health returns than investment in basic sanitation and hygiene. The UN says that for every \$1 spent on sanitation, the return on investment is about \$9.

It reckons it will cost an extra \$10bn every year until 2015 to reach the UN's millennium development goals, which commit countries to halve the proportion of people without access to adequate sanitation by that year. It adds that the annual cost of not meeting the water and sanitation goals is about \$38bn a year.

But at the current rate of progress, 74 countries will miss the goal completely, and the target will not be reached in sub-Saharan Africa – where the number of people without access to sanitation has actually increased from 335 million to 440 million – until 2076. Only parts of Asia, northern Africa and Latin America are on track to meet the target.

It sounds impossible and very expensive, but agencies like Water Aid and Tearfund, which are working in three continents, say it can be tackled quickly and does not mean rich coun-

tries would have to put up the money.

"Most of the money would come from households themselves. In our experience, if you can unlock the demand, people will invest in their own sanitation facilities," says Oliver Cumming, policy officer at Water Aid. "Sanitation is the Cinderella of all the global problems. It's so obvious. Everyone knows about the problem. But there is a blindspot at all levels."

For a start, it's still a taboo subject – and certainly not politically glamorous. Politicians, health ministries, businesses and non-governmental groups still do not see much gain in it. It's easier to demonstrate results for things like malaria and vaccination. Preventing death, which is what access to clean water and sanitation does, is harder to measure.

There are also real problems for governments, which may have their budgets limited and directed by

## Every drop counts

# Gaza: taps don't run, toilets don't flush

Israel's blockade has left water and sanitation systems near collapse

Annie Kelly

This time last year a lake of human sewage breached its temporary embankments and surged downhill towards Umal-Nasser, a small Bedouin village in northern Gaza. Five people, including three children, drowned as a wave of human waste, sand and earth covered the village in seconds. More than 1,000 people were evacuated and hundreds of homes were destroyed.

The lake was one of the many makeshift solutions to Gaza's desperate struggle to provide its 1.5 million inhabitants with clean water and sanitation. Built as an overflow for another of the growing lakes of sewage, it was only a matter of time before the lagoon caused tragedy for the people living close to its embankments.

Eight months after Israel declared Gaza a "hostile territory" and cut its electricity and petrol supplies, aid agencies are warning that Gaza's water and sanitation systems are near complete collapse. Gaza's 130 drinking water wells, three treatment plants and four storm-water pumping stations, which all ran on petrol and electricity, are almost at a standstill. Only 37 of the 122 water supply pumps have fuel and, according to Gaza's water authority, 40% of households are without running water.

The blockade imposed on Gaza last June is also preventing delivery of the materials desperately needed to fix the crumbling water plants and sewage treatment facilities.



Trashed . . . garbage and sewer water mire a Gaza street Sipa Press/Rex

"Since last June there has been an increasingly tight definition of what the Israeli forces consider basic human needs," says Martha Myers, country director for Care International in the West Bank and Gaza. "The list of non-accepted goods now seems to include pipes and maintenance materials needed to maintain a basic water and sanitation system in Gaza. It's totally unacceptable." The Palestinian Water Authority last month told Gazans to boil all water before cooking or drinking, following a shortage of hypochlorite, the chemical used to clean water.

A report in January by a human rights agency, the Centre on Housing Rights and Eviction, said the wastewater treatment facilities in Beit Lahia, Gaza City and Khan Younis were at high risk of flooding due to their state of disrepair and disruptions to energy supplies for operating the systems' pumps.

It warned that heavy rains could cause the waste-water reservoir in Beit Lahia to overflow, sending 1.5m cubic metres of sewage into surrounding districts, which it said would "unleash a humanitarian and environmental disaster of epic proportions".

Gaza's Coastal Municipalities Water Utility, the body responsible for clean water and sanitation in Gaza, says that unless the water and sewage pumps are fixed it will be unable to stem the growing contamination of groundwater. The closure of many of Gaza's sewage processing plants means that 60 tonnes of untreated sewage is being pumped into the sea every day, and this is seeping into the water table.

Michael Bailey, an Oxfam worker in Gaza, describes the water situation there as inhumane. "I was in Gaza last week and there was raw sewage pouring down the street," he says. "There were high levels of poverty here before

the blockade last year, but no access to clean water takes the situation to new levels. When you're living in such a deeply stressful environment, the taps not running or the toilet not flushing is taking away people's basic humanity."

In a report this month a coalition of international aid groups, including Amnesty, Care and Oxfam, call the humanitarian situation in Gaza "worse now than its been at any time since the beginning of the Israeli occupation in 1967". They warn that the state of Gaza's water and sewage systems will almost inevitably lead to outbreaks of water-borne diseases and chronic dehydration.

"The risk to public health of a breakdown of the water and sanitation system is a massive case for concern. Israel must immediately allow fuel into Gaza to avoid any further civilian suffering. Cutting off water to civilians is immoral and illegal, no matter what the provocation may be," said Barbara Stocking, Oxfam's chief executive. "The international community has allowed this chronic emergency to deteriorate and has the responsibility to help solve this crisis."

With temperatures rising seasonally, the situation is going to become worse. "Water is a basic human right and should not be used as a tool of conflict," says Bailey. "What is happening here in Gaza is illegal under international law. Aid agencies working here aren't allowed to get equipment in to help maintain the water and sewage supplies . . . It's now a question of when, not if, the system collapses and when it does we'll have an apocalyptic situation on our hands here. Without water it will be simply impossible for these people to survive."

## The Cinderella problem: thousands die every day

«Continued from page 1 international organisations, and which also find that sanitation falls between health and planning, education and environment departments.

Because no one person, or ministry, is responsible, nothing happens. On the international level sanitation is still bundled up with the provision of water, and that means that few rich countries can even estimate how much they spend on it.

But all the polls show that water and sanitation are services the poor always list among their top three priorities. "Yet the international development community and developing country governments still treat them

predominantly as marginal issues," says Cumming.

"The volume of spending on the sector has remained largely stagnant over the past decade – and it has actually fallen in terms of the relative increases in overall aid spending, and spending on health and education."

But the argument is slowly being won. Last month 32 African leaders signed a declaration recognising the crisis and committing their countries to setting up coordinating bodies, action plans and monitoring.

In return, it now needs G8 donor countries to ensure that no country's plans fail for lack of funding – something that Japan is expected to push

for at G8 meetings this year. Some countries are just not waiting. Bangladesh is already committed to going well beyond the millennium goals by 2015. Senegal, Mali, South Africa and Ethiopia are all making progress.

Donor countries are beginning to see the benefits.

A parallel can be made with Britain in the late 19th century, towards the end of the industrial revolution. A growing philanthropic movement linked with companies that wanted strong workforces, and together they pressured government to act. The result was that massive investments were made which led directly to a 30% cut in childhood mortality.

More recently, countries such as Korea, Malaysia, Singapore and Brazil have begun their development with sanitation. In a sense the rich world has been built not by great inventors and scientists but by the more humble installers of drains and toilets

"Diseases like cholera killed tens of thousands of British people in the mid-19th century. We discovered the link between poor sanitation and illness, putting an end to wholesale suffering and death," says Laura Webster, policy adviser at Tearfund. "It is, quite simply, a scandal that we allow millions of people in the developing world to die for the same reasons. Sanitation is the last taboo."

## Every drop counts

# Provinces pay price for Beijing's Olympics

Water is being diverted to the capital from areas already hit by drought

**Jonathan Watts** Beijing

When seven white swans made a home on the Chaobai river in north-east Beijing last year, it was hailed as an Olympic success story. Until a few years ago the waterway was so exploited that the bed was cracked dry.

Now the river has been refilled and the wildlife brought back, ready for rowing events in August. For Beijing it was a showcase of how the "green" games can improve the environment. But now green activists are asking whether this and other cosmetic clean-ups are depriving arid regions of water during a particularly severe drought.

Thanks to a huge diversion, the Shunyi Olympic rowing park project has turned a dry river and its banks into a lush resort with a water surface of 63 hectares and a green area of 53 hectares. It is not the only hydro-engineering facelift. Beijing is diverting millions of litres of water to ensure this dry and dusty city looks its best during the Olympics. Meteorologists are even firing silver iodine crystals into the clouds to induce rain.

This work means other needy areas going dry. Last year farmers in neighbouring Hebei were told to grow corn or wheat instead of water-intensive rice. Tens of thousands of people have been relocated for a 300km section of the water diversion project, which will redirect 300m cubic metres of water from Hebei to the capital. In any year this would be a sacrifice, but this year's drought is severe.



Diversions tactics . . . pools of water in a partially dried-up river in Hubei province Reuters

Like many other Olympic projects, the water diversion was being planned anyway. Beijing needs more water because it has more flush toilets, more building sites and more people. The population – nearly 18 million – has more than quadrupled since the 1960s. But the Olympics is an excuse to accelerate development. The games are such a national priority that few dare risk being accused of lacking patriotism. Tensions are apparent.

Activists accuse Beijing of sacrificing its neighbours. "Using drinking water from Hebei and other poor provinces to provide for luxuries in Beijing is wrong," said Dai Qing, a leading environmental activist. "Beijing will ensure the city has enough clean water in August, but it will only be tempo-

rary. In the longer term, the water crisis will worsen."

She said the rowing park at Chaobai was the worst example of waste because it required filling a dry river, greening parched earth and building one of the world's biggest fountains.

The water's origins are mysterious. The government insists the river is being filled from the Wenyu, a smaller Beijing waterway used for effluent, but Dai says the volume is insufficient and the quality too low. She suspects the Chaobai is being filled from already depleted groundwater supplies and reservoirs.

It is difficult to assess. Despite reports that the Olympics will push up water consumption by 30%, the Beijing city water bureau insists supplies

diverted from Hebei and Shaanxi are for normal use, urban development and the increase in population.

Such is the sensitivity that even the scale of the drought is hard to confirm. "We can't give you any statistics. Our reservoir is too important to Beijing and to the Olympics," said an official of Miyun reservoir, who declined to give his name.

But the director of the rowing park, Zhang Xiangdong, said: "This was dry seven years ago. From last year, 40m cubic metres of water is flowing into the Chaobai every year. We now have more than 100 kinds of trees that produce 50,000 tonnes of oxygen. Last autumn, we had our first swans. Can you imagine how excited we felt? And by August, the Chaobai will be full."

## Less ice on Great Lakes leads to raft of problems

**Kari Lydersen**  
Washington Post

A decade ago, Chicago winters meant monumental ice hillocks and caves forming along the lakeshore, skirted by interlocking ice sheets like a giant jigsaw puzzle. Today it is rare to see more than a thin frozen shelf or a few small ice floes sloshing in Lake Michigan below the city's skyline.

Decreased ice cover on the Great Lakes, probably caused by increasing air and water temperatures and high winds, is a major culprit in lowering water levels, which have hurt the shipping industry, forced lakeside power plants to extend their cooling pipes,



Not so great Lake Michigan

frustrated recreational boaters, dried up wetlands and left coastal landowners with docks extending over yards of unsightly muck.

The low water has forced freighters that haul iron ore, steel, limestone and other raw materials to lighten their loads and change their routes to avoid running aground in shallow harbours and waterways.

Environmentalists are concerned that the drying of wetlands along the shores will have serious effects on commercial and recreational fishing.

"We firmly believe the changes we're seeing are impacting fisheries, possibly in a dramatic way," said Jeff Skelding of the Wildlife Federation.

Marc Gaden, spokesman of the Great Lakes Fishery Commission, said the changes may be conducive to some species and harmful to others. The same can be said for people.

"Whether low lake levels are a good or bad thing depends on how you use the Great Lakes," said Cameron Davis, of the Alliance for the Great Lakes. "It's a problem for commercial shippers, recreational boaters, fishery managers. For people who love the beach it's probably a good thing."

More than 99% of the Great Lakes' water is left over from melting glaciers, and less than 1% is replenished each year through groundwater, rainfall and snowmelt.

## Every drop counts



Lost horizons . . . site of the proposed reservoir at Ringmer in East Sussex, and some of the creatures, wild and farmed, that will lose out **Andrew Hasson**

# Future will submerge England's past

## Building a reservoir in the most overcrowded region of Britain means destroying diversity

**Paul Evans**

From the top of Clay Hill, you can see the East Sussex countryside rolling between the South Downs and Ashdown Forest. The shallow valley below Clay Hill rises to Plashett Wood and encloses the 200 hectares of Plashett Park farm. But if plans by South East Water (SEW) get government approval, this farm, the valley and its wildlife will be drowned by a new reservoir.

The first surprise about the area is how quiet it is: there is no aircraft noise and the only traffic is the farm tractor. The only dwellings are the farmhouse and two cottages. The landscape looks timeless, with its many small fields, high hedges and scattered copses – yet Brighton is only 20km away.

"I have lived and worked in 14 countries and finally put down roots here," says forester Mike Cameron, who works the 175-hectare Plashett Wood and lives in one of the cottages. "It is not just my abode I am worried about losing, it is the uniqueness of this place that will be lost too."

Spring is stirring on Plashett Park farm. A large flock of lapwings wheels over the fields, where crops are grown in a traditional five-year rotational system, where stubble is left on arable fields over winter, and where there are 57 hectares of unimproved permanent pasture. Among the hedgerows, there

are large open-grown oak trees. Many survive from a time when this was a deer park. They provide habitat for a wide diversity of invertebrates, birds and bats. The oaks and hedgerows link the patchwork of open fields across the valley to Platchett Wood, providing corridors for animals, including one of Britain's rarest mammals, Bechstein's bat (plus the uncommon Barbastelle bat). There is a stream, with small ponds, also making connections along which kingfishers flash through the valley out to the river Ouse.

Water has always been an important feature in this landscape. There are remains of medieval fish ponds from a time when this was a hunting estate owned by archbishops of Canterbury. Earliest records of Plashett Park go back to 1285.

The parkland has fragmented into a number of farms, but the overall feeling is of a landscape much older than the surrounding farmland. "My dad came here in the 1930s," says Mark Peters, the latest of three generations to have worked Plashett Park farm. "He restored the hedges instead of removing them, he didn't convert the farm buildings, and we kept the same amount of permanent pasture."

Peters' farming and Cameron's forestry connect the farms that make up the old Plashett Park estate. They are profitable because they pool resources and cooperate. "I've spent my life on this farm," says Peters. "When I was at school, I had to write an essay about where I'd be in 10 years' time. I wrote about my ambition to take over the farm and run it traditionally."

That is exactly what he did, but the

future beyond that 10-year vision is now very uncertain. The first proposal to turn Plashett Park farm into a reservoir, in 1972, was rejected. But 2km away is Branscomb reservoir, owned by SEW and with its own pumping station to draw water from the Ouse.

The feasibility study at Plashett Park farm to create a similar reservoir, Clay Hill, taking water from the Ouse, is coming to an end. It will be included in SEW's draft water resource management plan, which will go to public consultation in the summer before being submitted to the environment secretary, and then to the industry regulator, Ofwat, in 2009. This process, and the compulsory purchase of the land, will involve a public inquiry, but if approved, the reservoir could be completed by 2015.

The challenge facing SEW, in what Britain's Environment Agency designates a water-stressed area, is to keep pace with rising demand. Droughts and potential restrictions on abstraction from underground aquifers add to the shortfall of water for south-east England.

"It is not an option to sit back and do nothing," says Paul Seeley, asset director at SEW. "The impact of climate change in the south-east region could mean longer, drier summers and

shorter, wetter winters. We have clear obligations to deliver a secure supply of water . . . so it is imperative we act now to secure water supplies."

Peters says: "SEW claims Clay Hill reservoir will supply 18m litres of water a day, but the company is losing 63m litres of water a day from leaks. It will cost £300m to repair the leaks and £150m to build the reservoir. I think this is just a big project for big business."

Seeley counters: "Our investigations show demand management initiatives such as leakage, metering and water efficiency are still not enough . . . New water resources are also required."

Tony Whitbread, chief executive of the Sussex Wildlife Trust, says: "We're building too many houses and then rushing around trying to find water for them. This is not environmentally sustainable. The landscape at Plashett Park farm is attractive, with good habitats and biodiversity abutting Plashett Wood site of special scientific interest, which is of national importance. The trust is generally opposed to new reservoirs because they engulf what's there and replace it with something of lesser value . . . We need to build on our biodiversity assets, not push them aside."

At Plashett Park farm, the 30m deep clay is perfect for holding a 145-hectare body of water. Apart from being a water supply, a reservoir could provide water sports and leisure opportunities, as well as habitats for aquatic life and wildfowl. But five-and-a-half centuries of history would vanish into its depths.

**'We have obligations to deliver a secure supply of water. It is imperative we act'**

## Every drop counts

# Looking to the sky for inspiration

Uganda's rainy season is due to start soon, and harvesting the water is a top priority

Richard Kavuma

As Katine braces itself for the rains this month, the African Medical & Research Foundation (Amref) is thinking strategically. How can it help local people harvest the water for use in the community, and especially for use in schools? The answer is a water tank. Amref project officers have delivered five plastic water tanks and corresponding gutter lines to schools facing particularly dire water shortages.

The primary schools to benefit are Ojago, Oimai, Merok, Ajonyi and Adamasiko. At Oimai, two teachers looked on disbelievingly as the giant 10,000-litre tank was offloaded from the delivery truck. "This will help us store water for the children," says one, Bernard Opece. "We had a borehole here at school, but it broke down. Now the nearest source of water is the borehole at Aber village, 2km from here."

Ignatius Epuwat, Amref's water and sanitation officer, handed over each tank to the schools. He says priority was given to schools that had no borehole and no other rainwater-harvesting facility. As well as delivering the tanks, Amref is also installing them, which costs \$2,000 each. In the past, other NGOs have donated tanks only for them to be left unused for years because the schools couldn't find the money to install them.

"In a rainy season, 10,000 litres is just enough to keep a school going for a while," Epuwat says. "And the rains here are not bad; on average we get 1,200mm throughout the season."

Amref intends to promote rainwater harvesting at household level, to provide an alternative source of safe water. Initially, Epuwat says, Amref will distribute promotional water jars to some households. But after that, the focus will be on sustainability. "We'll train the people to make the rainwater jars themselves, because they only require simple technology."

Although rainwater harvesting is widespread in Uganda, there is a problem in Katine: most people sleep in grass-thatched huts rather than huts with iron roofs. That will reduce the amount and cleanliness of the water that can be harvested from run-off.

As new boreholes are being sunk in Katine, Amref is moving to ensure that the communities will be able to maintain them. One of these measures is the training of hand-pump mechan-



Katine: the story so far

### The project

The Guardian is supporting Amref's three-year development project to improve the lives of the 25,000 inhabitants of Katine, a village district in Uganda. The project is run in partnership with Amref and Barclays. Farm-Africa is delivering the livelihoods component.

### Key developments:

#### Water

- Schools get water tanks
- The training of mechanics to maintain water sources
- Boreholes have been dug

#### Health

- Village health teams trained on how to prevent disease
- Primary schools receive health and sanitation kits
- Training for traditional birth attendants
- Training for teachers on passing on hygiene tips to pupils

### Education

- Workshops for primary school managers
- Distribution of text books
- Inspection of primary schools with local government officials
- Plans and drawings made of sites where new classrooms are to be built

### Donations

To date, Guardian and Observer readers have raised £742,696 (if direct debits are maintained for the three-year duration of the project). This is match funded by Barclays Bank, which has donated a further £500,000.

### Website

For news updates on the project, blogs, video, audio and the chance to contribute your views visit [guardian.co.uk/katine](http://guardian.co.uk/katine).

Collector's item... a tank for storing rainwater is delivered to Merok school, which faces dire water shortages **Richard Kavuma**

ics within the community. The hope is that if a borehole breaks down, the water source committees will contact these mechanics to fix them.

Epuwat says that training local mechanics will be more sustainable than calling in a contractor to fix every problem. Two of the three men chosen to be hand-pump mechanics were already mechanics, so the training was a kind of refresher course. The other, Emmanuel Eriu, a secondary school drop-out, was a farmer.

Those who were already mechanics have acquired new skills and can now deal with a wider range of boreholes. Richard Eilu and John Obwalet were trained in the mid-1990s by the NGO Youth with a Mission. They were left on their own to help fix Katine's boreholes, but spells of instability caused by Karimojong tribesmen and, later, Lord's Resistance Army rebels, made things difficult. And there were other challenges. "After the training we were deployed, but were not given enough tools," Obwalet, 37, said.

When the mechanics found money, they hired tools, but "at times we could not hire them because the owners of the tools wanted cash before you could take them."

Another problem was that some communities were unable to raise money to buy spares or to meet labour costs. Those are the team's fears: will the village communities raise enough money to maintain the boreholes? Will they have tools for the job?

Epuwat says emphatically: "Yes, they will. We are going to place one toolkit at the sub-county office, which will be accessible to any of the mechanics... The second toolkit will remain at the Amref office for the duration of the project. But after that the two sets will revert to the sub-county."

Eriu, says he was pleasantly surprised to be invited for training. Until he got Epuwat's letter in December, he was growing sorghum and millet for his wife and three children. The new skills, he says, will give him another source of income besides his farming.

At the end of the five-day training in Katine, the sub-county's representative at the District Local Council, John Enomu, handed over bicycles – bought by Amref – to help the mechanics get around. Enomu urged the excited mechanics to guard the bicycles jealously. "These bicycles are now yours but they are also ours, because they are given to you so that you can reach us easily," he said.



## Every drop counts

# Learning to keep it clean across the globe

Climate change has encouraged growth in studies of sanitation and water management

Stephen Hoare

After graduating in geography and taking a gap year, Eve Mackinnon decided on a career in water management – ideally working for an NGO doing relief work in Africa. That is why she chose to study the MSc in community water and sanitation at Cranfield University. She said: “The master’s is very practical and hands-on, and engineering seemed to be the way forward.”

She chose Cranfield mostly because it offered the opportunity to do field work overseas. She said: “International NGOs and aid agencies are not employing so many expats and are recruiting more from within the countries where they operate. To stand a chance of being considered you need relevant experience.”

Mackinnon believes the big challenge facing NGOs working in the developing world is to come up with a non water-based system of sanitation. “The system we have for sanitation in the West uses so much water that to roll it out as a way forward goes against all we know about the future. Third world cities with no sewerage systems and very little water per head of the population need a completely different technology. There is a lot of scope for innovation.”

Cranfield is one of the biggest and most popular postgraduate water management providers; it runs two streams within its water management MSc and attracts 60 students a year. Community water and sanitation is the preferred choice for students wanting to work for an international NGO as it combines engineering with the economics and politics of water supply and its impact on society.

Most students are recent graduates, 40% from the UK and 20% from outside the European Union. Many are mature students already working in water aid. James Webster, MSc course leader, said: “All community water and sanitation students are going on to work in developing countries. The three to four months of overseas experience we give them, from which they have to write an 8,000-word dissertation, helps them get a toe in the door.” To work for an international NGO you will need both a postgraduate degree and relevant field experience.

Flood prevention work, drainage schemes and environmental assessment are driving demand for postgraduates in the UK. Postgraduates hope to



work for environmental consultancies and government departments such as the Environment Agency.

Imperial College, Birmingham, Newcastle, Loughborough, Glasgow Caledonian and Sheffield Hallam are among the top UK universities offering MScs in water and environmental management, and engineering. Internationally, US and Australian universities compete strongly in the postgraduate distance learning market.

Dundee University has gone one step further and has introduced a water and environment MBA for people aiming at the upper reaches of management in the industry. Dundee has a long established water and law master’s, the LLM. It is recognised as a Unesco centre for water law, policy and science and is partnering other EU water research institutions, such as IHE Delft in Holland. The LLM course leader, Andrew Allan, said: “Governance of water resources is a growing political issue that divides nations.”

Newcastle University has been expanding its postgraduate provision.

Its school of civil engineering and geosciences offers 20 different MScs, and there are three full-time and three part-time postgraduate degrees; the main ones are sustainable management of water environment and a MSc in environmental engineering. The newest MSc, in applied hydrogeology, starts this autumn.

While full-time postgraduate study attracts many overseas students, part-time is more popular with UK students. Newcastle entered the part-time distance learning MSc market three years ago and is expanding its provision.

Dr Geoff Parkin, who is senior lecturer in hydrology and water resources, said: “Distance learning degrees typically take three years to complete, so we’re expecting our first graduates this year.”

Parkin explains that distance learning students are early career professionals looking to improve their prospects. A master’s degree can count towards chartered professional status – which can also be achieved by experience and part-time study – and

**Pipe dream . . . an Indian engineer repairs a water pipe at Panjharpur, north of Mumbai AFP/Getty Images**

is a rung in the ladder to higher-paid, more senior jobs.

Parkin said: “Our degrees are accredited by the chartered institute of water and environmental management (Ciwem). Our degree counts towards chartered status. It makes it a lot easier to get through the hoops.”

Part-time distance learning courses are a cost-effective alternative to a full-time master’s, said Parkin. “Students graduating from university with large amounts of debt aren’t rushing to pay for an MSc. They are waiting several years and then studying part-time while they build their careers.”

Newcastle’s other growth area is in continuous professional development short courses for the Environment Agency. The university runs courses in groundwater chemistry, contamination and groundwater modelling, all subjects that meet specific requirements.

But Newcastle’s pride is its Euro-Aquae MSC, an EU-funded master’s run jointly by the UK university and four partner institutions – the University of Nice, the Brandenburg University of Technology at Cottbus, Budapest University of Technology and Economics, and The Technical University of Catalonia. Students from outside the EU compete for 25 scholarships, and numbers are rationed to one or two per country.

There are currently 20 different nationalities on the programme. The course leader, Vedrana Kutija, said: “We have 500 students from all over the world applying each year. The competition is fierce and the standard of students exceptional.” At the end of the two-year MSc most will work in the EU, many in the UK where they might join leading water consultancies.

Imperial College’s MSc in environmental engineering is geared towards water, drainage and sanitation with waste management thrown in; 80% of students are from overseas.

The course leader, Chris Cheeseman, said: “We have the advantage at Imperial of a branded name. We’re highly recognised worldwide. Most alumni go on to work in the UK with environmental consultancies such as MWH, Mansell, Jacobs and Sita.”

Postgraduate degrees in water and sanitation have got a lot more popular in recent years. Why?

Cheeseman explained: “A lot of it is to do with climate change and the importance of fundamentals like clean water. A lot of highly motivated young people want to make a difference to the planet.”