

When the rains fail

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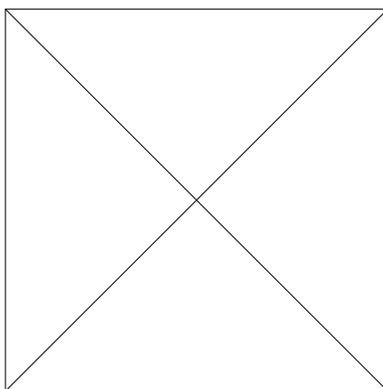
Many of India's problems are summed up in its mismanagement of water. Now a scanty monsoon has made matters much worse



Reuters

RAINFALL last month encouraged Haniya, a middle-aged member of the Lambada tribe of southern Andhra Pradesh (AP), to inspect his one-acre (0.4-hectare) field. Some speckles of green, to show the red earth had held enough water for weeds to shoot, would have tempted him to sow cotton. But, towards the end of AP's monsoon rainy season, the field was parched and bare. If it rains again, Haniya may sow. If not? He gave the reply of peasant farmers in India and poor, dry places everywhere: "Only God knows."

Back in his village of Veeralapalam, light-skinned Lambadi farmers gathered. Most had scattered some cotton or lentil seed after the rain. But it had better rain again: none had access to irrigation from a dozen wells sunk 90 metres into central India's lava bedrock by richer high-caste Hindu farmers. A few expected to buy a dousing or two of costly piped water, brought by the same neighbours from a nearby storm-creek. Even if affordable, said Saidanayak, this would not sustain his hoped-for acre of cotton. Without more rain, it will fail, adding to his 125,000-rupee (\$2,500) debt—a big sum, when the dowry for a Lambada bride is \$1,200.



With no crop, no money and three daughters to marry off, he would join the only reliable flood in AP in these drought days: of thousands of tough, skinny peasants into Hyderabad, the state capital, in search of a day-wage. Asked what he would do there, Saidayanak pushed out his fists and shifted from foot to foot, as if cycling a rickshaw—and laughter diluted the gloom.

Many Indians share his worries. Around 450m live off rain-fed agriculture, and this year's monsoon rains, which between June and September provide 80% of India's precipitation, have been the scantiest in decades. Almost half India's 604 districts are affected by drought, especially in the poorest and most populous states—such as Bihar, which has declared drought in 26 of its 38 districts. Uttar Pradesh (UP), home to 185m, expects its main rice harvest to be down by 60%. The outlook for the winter wheat crop is also poor, with India's main reservoirs, a source for irrigation canals, one-third below their seasonal average. That also means less water for thirsty cities, including Delhi, where 18m people live and the water board meets around half their demand in a good year.

Belated cloudbursts in AP and other states have brought relief. But late sowing tends to produce a thin harvest. AP counted some 20 farmer suicides last month, and there will be more. A short drive from Hyderabad, Koteswara Rao watched as four Hindu outcasts and two blue-horned bullocks ploughed his 16 acres (14 of them leased) for cotton. If it fails he will be left with a \$4,000 debt and, being of lofty caste, he said, he could never sweat it out as a labourer. "Suicide would be easier."

No one should starve, at least. None of India's previous five big post-independence droughts caused famine. And after two bumper years, the government says it has enough wheat and rice in store to prevent serious food-grain price inflation. With agriculture accounting for only 18% of GDP, compared with 30% in 1990, the drought will in fact cause relatively little damage to India's economy; it should still grow by over 5% this year. Lavish spending on rural welfare since 2004, when the Congress party won power in Delhi, will also help. Almost 30m people have benefited from the government's chief public-works project, the National Rural Employment Guarantee Scheme (NREGS).

Yet the drought underlines a grim truth. India's extremes of hydrology, poverty and population present vast difficulties for water management which it has never mastered. And they are growing. Increasingly frequent droughts may be a sign of this—if, as some think, climate change is to blame. It will accentuate India's problems, with the monsoon rains, which supply over 50% of much of India's annual precipitation in just 15 days, predicted to become even more contracted and unpredictable. At the same time, the rapid melting of Himalayan glaciers promises to deprive the great rivers of the Indian sub-continent, the Indus, Ganges and Brahmaputra, of their summertime source. This threatens a triple whammy: of longer dry seasons, in which these rivers do not flow, and more violent wet seasons. That would mean more bad news for flood-prone eastern India, including Bihar, where over 3m were displaced last year when the Kosi river burst a crumbling embankment.

India's water future was worrying even without climate change. Despite daunting seasonal and regional variations, it should have ample water for agricultural, industrial and household use. But most of it falls, in a remarkably short time, in the wrong places. India's vast task is therefore to trap and store enough water; to channel it to where it is most needed; and, above all, to use it there as efficiently as possible. And on all three counts, India fares badly. Without huge improvements, according to a decade-old official estimate, by 2050, when its population will be a shade under 1.7 billion, India will run short of water.

There are already signs of the conflict this would cause. Having bickered for decades over their rights to the Krishna river, AP and upstream Maharashtra and Karnataka are now furiously building dams and diversions that the river might not support even in flood. In Orissa 30,000 farmers—for whom over 80% of India's water is reserved—laid siege to a reservoir in 2007 to try to stop factories using its waters. The desert state of Rajasthan has seen similar protests against the diversion of water to its growing cities. In one, five farmers were shot dead by police.

The government is worried: "2050 is a very frightening sort of a picture," says A.K. Bajaj, chairman of India's central water commission, which provides technical support to the state governments who control India's water. Its main solution is to build more large dams (390 are under construction), and river diversions, including a long-mooted extravaganza of 30 linkages which would unite most of India's river basins. Indeed, India needs more water storage: it has 200 cubic metres per person, compared with 1,000 cubic metres in China. But given the decrepitude of much of its existing water infrastructure, and its profligate ways with water, its more urgent priorities are to repair and reform.

Worshipping old gods

Famine-prone for most of its history, India's attachment to dams is understandable. Its ability to feed itself owes much to a splurge on big dams and canal projects in the 1950s-70s—for example, the colossal Bhakra dam in Himachal Pradesh, completed in 1963 and described by the then prime minister, Jawaharlal Nehru, as a "new temple" of India. The Bhakra brought 7m hectares of north-west India, chiefly Punjab and Haryana, under irrigation. This prepared the way for the Green Revolution of the 1960s, when the introduction of new seeds and chemical fertilisers hugely boosted farm yields in those states and in the coastal region of AP—which was irrigated in the 19th century by a British engineer, Sir Arthur Cotton, who is still worshipped there as a god.

But, the world over, without expensive maintenance to prevent siltation in reservoirs and leakage from canals, grand dams and irrigation schemes tend to be as inefficient as they are environmentally destructive. And India's corrupt, underfunded and overmanned state irrigation departments—UP's, for example, employs over 100,000 people—often provide no maintenance at all. As a result, each year India is estimated to lose the equivalent of two-thirds of the new storage it builds to siltation. Bad planning, often as a result of inter-state rivalries, causes more waste. Thus, between 1992 and 2004 India built 200 large and medium-sized irrigation projects—and the area irrigated by such schemes shrank by 3.2m hectares.



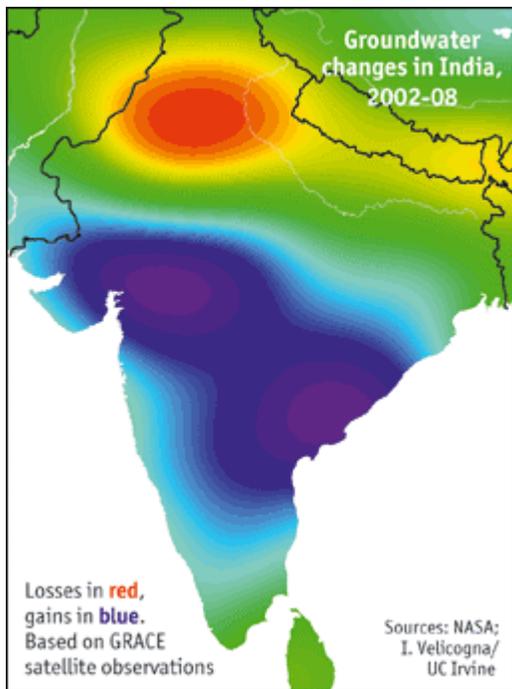
The village of Veeralapalam offers a snapshot of this, and of the losers in a political economy where water is the main currency. From the early 1960s it received occasional water in a small canal, at the tail-end of a system off the Krishna river. But this has been dry since 1985 because of leakage up-channel and, the Lambadi farmers say, illegal tapping by members of a more favoured community. The canal was re-dug last year under the NREGS, but seems unlikely to get any water.

A few miles up-channel in Uliasaipalam, a village dominated by high-caste Hindus, there is water, but more problems. Wading shin-deep, P. Venkat Reddy transplants dark green paddy into his two acres of irrigated, but undrained, land. When there is water in the canal, for around four months each year, it is waterlogged, fit only for paddy. But in recent years the canal has held insufficient water for a full paddy crop—forcing Mr Reddy to supplement it with groundwater. He pumps this, with electricity given free to farmers in AP, from a borehole drilled 45 metres into his land.

Since the 1970s, when affordable water pumps became available and electricity reached many more places, millions have done the same. India is the world's biggest user of groundwater, with some 20m bore-holes providing water for over 60% of its irrigated area. Being entirely in farmers' hands, this is up to three times more productive than canal irrigation. In 2002, by a conservative estimate, it was worth \$8 billion a year to the Indian economy—more than four times what the central and state governments spend on irrigation schemes.

Groundwater irrigation has transformed the lives of millions. It has also rectified problems, of water-logging and salination, caused by canals. But in many places, including productive Punjab and Haryana, whose rather well-off farmers also get free or cut-price electricity, the rate of groundwater extraction is unsustainable. Nearly a third of India's groundwater blocks were defined in 2004 as "critical, semi-critical or over-exploited". The World Bank reckons that 15% of India's food is produced by "mining"—or unrenowable extraction of—groundwater, including in 18 of Punjab's 20 districts. Satellite maps released by America's NASA last month showed that north-western India's aquifers had fallen by a foot a year between 2002 and 2008: a loss of 109 cubic km (26 cubic miles) of water, or three times the volume of America's biggest man-made reservoir.

This is storing up trouble. As bore-holes run dry, as those over the hardrock aquifers of southern-central India do on a monthly basis, many poor people may be deprived of safe drinking water. Currently, 220m Indians lack this. Not all India's groundwater is potable anyway; in places, it is getting seriously polluted. And India's groundwater reserves will be especially missed when climate change makes surface-water sources even more sporadic. Their depletion will accentuate this, with springs, which could have provided a trickle of run-off during the extended dry seasons, increasingly failing.



Pump and be damned

Some excuse this resolute destruction by saying that India's farmers do not understand groundwater. But they know when it is running out, as an impromptu conclave in the Punjabi village of Lubana Teku showed. "Punjab will become a desert, like Rajasthan," said Jarnail Singh, a stately, orange-turbaned grower of rice. When Mr Singh began pumping groundwater in 1973, turning his 14 acres from cotton to paddy, it took a three-horsepower engine to bring it up from 1.5 metres. Now the groundwater is 20 metres down, and he requires a 15-horsepower pump to sluice his green paddy-fields. "We know the water is going," said Mr Singh. "But we're not going to change our ways unless the government makes us."

Rather, it encourages him to keep pumping. Besides paying nothing for his water or electricity—seven hours of it a day—Mr Singh knows the government will buy all the rice he can grow, at a pre-ordained "minimum support price". Set against this package, Punjab's efforts to conserve its groundwater, mainly by telling farmers not to transplant paddy before the monsoon rains, are rather puny.

State governments know that this is madness. Over a quarter of India's electricity is given free or cut-price to farmers. As a result, the state power utilities are bust. Understandably, however, politicians balk at reform. Two chief ministers recently tried charging farmers for electricity, in AP and Madhya Pradesh, and were kicked out of office. The Congress party chief minister of Haryana, which is going to the polls in October, will not make that mistake. He is demanding \$200m from India's Congress-led central government as a contribution to Haryana's agricultural-power subsidy.

The subsidy raj is not confined to farmers. Many municipal governments price water well below cost, and therefore struggle to supply it. Delhi, where the water board's revenues cover only 40% of its operating costs, should have plenty of water. It draws 220 litres per citizen, more than Paris. But half of it disappears from leaky pipes. To mend these, workmen, having no underground maps, must dig up and sift through a tangled mass of pipes and cables, like untrained surgeons manhandling intestines.

Predictably, for a couple of hundred rupees a month, posh south Delhi gets the best water supply. When its taps run dry, the locals, including India's political and bureaucratic elite, pump groundwater—often illegally. By one estimate, bore-holes provide 40% of the capital's water; and south Delhi's groundwater, which underlies the offices of India's Central Groundwater Authority, is being depleted by up to three metres a year. But tube-wells, which cost around \$600, are no option for Delhi's poor, including 4m slum-dwellers. To augment their supply they must buy water, of dubious quality and at extortionate prices, from a well-connected water mafia.

In fiery June residents of Sangam Vihar, a poor suburb of south Delhi, rioted after getting no water for two weeks. In normal times, according to Vishnu Sharma, a 36-year-old resident, he and his family receive, at unpredictable times, around an hour and a half of muddy piped water each week. They pay \$2 for this, he said—and another \$20, or a quarter of his factory wage, to private water-sellers in cahoots with corrupt water-board officials. "So why bother complaining?" he said angrily.



EPA An increasingly precious load

Who could deny that rich Delhiites must pay more for water, so the city's poor can get more? The rich, of course. In 2005 a World Bank-sponsored effort to reform the water board was shot down by local NGOs. As well as worrying, reasonably, about the bidding process for contracts, they were outraged to discover that, in return for round-the-clock clean water, the targeted households would be charged about \$20 a month—or what Mr Sharma pays his local water don.

Pay more, use less

To make farmers use less water, they must pay, or pay more, for electricity. The longer state governments wait to institute this, the higher the cost of pumping groundwater will go—and the more difficult reform becomes. Nor is pricing alone a panacea. According to a World Bank study, farmers are already paying rather a lot for subsidised but poor-quality electricity. In Haryana, farmers with electricity spent 25% of their incomes on it and on repairing burnt-out pump-engines; those without electricity spent 31% of their incomes on diesel. To charge farmers more for electricity, utilities will have to improve supply. And farmers must learn to use water more efficiently.

Selling groundwater to cities, as farmers outside Chennai have done, is one possible answer. Another, to keep up India's food production, is to spread the use of modern seeds and other technologies—such as an improved system of paddy cultivation that uses half as much water and has boosted yields in Tamil Nadu and AP. Ideally, commercial cultivation of thirsty sugar-cane and paddy should also be shifted eastwards, to the poor and sodden parts of Bihar and West Bengal. For now, alas, the political trade-offs and mammoth infrastructure development this would require make it seem unimaginable.

Farmers on arid, rain-fed land need help of other sorts. Even if they had electricity—which 400m Indians do not—they could hardly pay for it. Nor would it be altogether desirable for them to pump groundwater unless they could be enjoined to sow appropriate crops, such as pulses and millet, and water them wisely. In dry areas, where profligate water-use by one farmer can make many wells run dry, farmers have been persuaded to share information on rainfall, groundwater levels and cropping, and so collectively regulate themselves. One attempt at this in central AP involves 25,000 farmers.

And India must have more dams. These need not be large; indeed, given problems of maintenance and resettlement, it would be better if they were not. For these and other reasons, most experts also seem to want the ambitious river-basin-linkage idea to be scrapped. In most places, urban and rural, India's state governments would do better to concentrate on building and restoring millions of small water storages, tanks and mini-reservoirs, and put local governments in charge of them. There is no simple solution to India's complicated water crisis. But if prayers are necessary, let them be offered in small shrines, not vast concrete temples.