Learning lesson from past, Indians build traditional dams

The johads, or earthen embankments, which fell out of favor during India's push to modernize, are used to collect and store rainwater that would otherwise escape in the arid land.

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BHAONTA-KOLYALA, India -- The old farmer stepped onto the stone lip of the well, crouched down on one knee and scooped up a handful of clear water.

"In my father's lifetime, this well was empty. Now, you see, it is full," Arjun Gujjar said, a crooked smile creasing his dark, weathered face.

For 60 years, the Arvari River, which supplies water to this arid region in India's far western state of Rajasthan, had run dry. For most of his life, Gujjar, 55, had never seen the river flow. A dusty track had lain in its place.

But two decades ago, Gujjar met a man who said he could bring water back to the village of Bhaonta-Kolyala. His name was Rajendra Singh, the then-27-year-old leader of a nongovernmental organization called Tarun Bharat Sangh -- the Young India Society.

Singh instructed Gujjar and his neighbors to build a series of johads, traditional earthen embankments, in the drainages of the Aravali Mountains that rise above their village.

Johads had been constructed in Rajasthan until the mid-19th century, but in India's push to modernize, this ancient technique of capturing rainfall had been discarded in favor of hand-pumps, tubewells and piped water.

Singh told the villagers the structures would prevent rainwater from being lost as runoff and would allow moisture to seep into the parched ground.

The farmers built the embankments and almost immediately saw results. The water table rose. Their wells filled. They were able to grow two crops a year rather than one.

And in 1995, as drought struck other parts of Rajasthan, the Arvari River returned.

"Even in the middle of summer, the river flows," Gujjar said with pride.

ONCE TREATED as a relic, rainwater harvesting is catching on again in India. The revival comes as the country struggles to find a solution to a water crisis that many Indians believe will only deepen as the

population of 1.1 billion people -- the second-highest in the world behind China -- continues its rapid growth and places a greater strain on already dwindling supplies of fresh water.

In the years following independence from British rule in 1947, the nation built dams and canals to bring water to India's most arid regions. In 1954, at the start of a two-decade period of agricultural development that would come to be known as the "Green Revolution," Jawarhalal Nehru, the country's first prime minister, famously called dams "the temples of modern India."

But for all the money the government spent on big infrastructure, its approach yielded remarkably poor results in areas outside the so-called "breadbasket" states of northern India. A recent World Bank report disdainfully called the strategy "build-neglect-rebuild" and concluded that a lack of community involvement, corruption and poor maintenance doomed many large projects.

"There was a gross mismanagement of this finite and precious resource," Ramaswamy R. Iyer, the retired secretary of water resources for the country, said in an interview earlier this year.

In recent years, the government has begun to promote small-scale alternatives. In June 2004, in his first address to the nation after becoming prime minister, Manmohan Singh said rainwater harvesting and other "cost-effective and community-based solutions" needed to be considered to manage the country's water.

"Groundwater replenishment and management and rainwater harvesting require close cooperation between government, local body institutions, and nongovernmental organizations," he said.

Now, people are looking to Rajasthan, India's driest state, to see whether Tarun Bharat Sangh's successes can be duplicated in other parts of the country. They believe that if water shortages can be eased in a region that receives about half the national average of 43 inches of rain a year, similar results are possible elsewhere.

SINGH IS 48 now, and his thick beard is flecked with gray. His work has made him a national figure. He is known as the "water man of Rajasthan." In 2001, he won the Magsaysay Award for community leadership, one of Asia's highest honors.

His organization has built thousands of johads in hundreds of villages. Fields that were once barren now yield reliable supplies of wheat, millet and vegetables.

Singh arrived in Alwar, a district in northeast Rajasthan, in 1984 with a plan to bring better education to people in India's lowest castes and the adavasis, members of the country's indigenous tribes.

But not long after he arrived, a tribal elder named Manku Meena told him that he was wasting his time on building schools. The government had declared Meena's village, Bhikampura, a "dark zone" for water. Trees in the surrounding hills had been cut down for firewood, soil eroded and the village's water supply soon dried up.

Men who had earned their living as farmers left to find work in distant cities. Forced to fetch water from miles away, children no longer had time to attend classes.

"This man said that education would only come when there is enough water in the village," Singh recounted at Tarun Bharat Sangh's office in Bhikampura. "I was an educated man, and he was an adavasi. I had my own ideas, but I thought maybe he could be right."

Singh did what Meena said. He built the first johad by himself under the old man's direction. It took three years of backbreaking labor, during which Singh often thought of giving up.

But he persisted, and when monsoons passed through the district the following summer, he saw how the small dam could store water that would have otherwise washed out of the village's rocky valley.

After that first success, Singh moved on to Bhaonta-Kolyala and set about reviving the Arvari River.

As water returned, the villages downstream joined the endeavor. Seventy communities eventually formed a sansad, a water parliament, to manage the Arvari and ensure the river would never run dry again. It prohibited felling trees around the river and restricted the growth of sugarcane and other water-intensive crops.

The river's revival also freed children from spending their days retrieving water. Bhajan Lal, 20, is only the second person from Mandelwas, a village of 650 people with no electricity or telephone lines, to enroll in university. He's not sure if he would have made it through school if his family didn't have a ready source of water.

"Nobody had a chance to go to school before," he said, standing on the johad above his family's fields as a herd of speckled goats wandered by. "We do now."

Lal is studying to become a teacher and plans to return to Mandelwas after he graduates and work in the village school.

THESE DAYS, the Arvari River cuts a slender path through Alwar. Peepul, neem and other native trees line its banks. It has become a symbol of what rainwater harvesting can achieve.

"What Rajendra and the villagers have done is like giving birth to a river," said Himanshu Thakkar, head of the South Asia Network on Dams, Rivers and People, an advocacy group in Delhi. "They say that only gods can do that. These people have done wonders in Alwar."

Encouraged in part by the success in Rajasthan, politicians have made rainwater harvesting mandatory in other parts of India. Delhi, Bangalore and most other major cities now require new buildings to build rooftop collection systems, the urban equivalent of what Singh has done in rural Rajasthan.

And state governments are promoting rainwater harvesting in rural sectors in an effort to replenish groundwater.

It may be essential for political survival. Three-quarters of the country's population lives in the countryside. Observers believe that Prime Minister Singh won the 2004 election because many rural Indians blamed the previous administration for lagging development in the countryside. Access to adequate water is an essential part of the economic growth of rural India.

Despite the progress in the promotion of rainwater harvesting, some Indians worry that Tarun Bharat Sangh's techniques are catching on too slowly in their country, where, according to a United Nations study, nearly two-thirds of all cultivated land is dependent on rainfall, 80 percent of which falls during the monsoon season from June to September.

"These places that harvest rainwater are exceptions," said Sudhirendar Sharma, a development analyst in Delhi. "In a land of half a million villages, only a handful are doing this. There's a huge gap."

Still, Sumita Dasgupta, of the Center for Science and Environment, an influential Delhi-based think-tank, said Tarun Bharat Sangh's work has had one important effect.

"Rainwater harvesting is a term that every Indian can understand now," she said. "That simply wasn't true five years ago."

LAST FALL, a group of village leaders from the state of Maharashtra, in central India, went to Bhikampura to meet Singh.

Maharashtra has several major rivers and receives a good supply of rain, yet Vazir Attar, an engineer with the state Irrigation Department, said many villages still suffer water shortages. He wondered if Tarun Bharat Sangh's systems for trapping rainwater could be brought to his state.

"We have something to learn here," he said during a meeting one evening underneath a stand of bamboo.

One of his colleagues asked Singh if he believed that was true.

"People often ask if our work is applicable to other parts of the country," Singh replied. "Whether you can do these projects or not, first attitudes must change, then water will follow."

That's what happened in Bhaonta-Kolyala. The work has been so successful there that Gujjar and the other farmers in the village recently completed a second, much larger johad.

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EDITOR'S NOTE: Journal staff writer Alex Kuffner visited India last fall on a fellowship sponsored by the International Reporting Project at Johns Hopkins University's School of Advanced Studies.