

# Introduction

**I**t is probably a good thing that this report on the traditional water harvesting systems of India is going to be published as the 20th century and the second millennium of the Christian calendar draws to a close. It only shows how extensive are our roots and traditions and how important they are for meeting the challenges of the next century and millennium — howsoever modern and newfangled they may appear to be. Hindi litterateur Mahadevi Verma once said, it is not possible for any human being to take a step forward without putting one foot firmly on the ground. Similarly, a society which tries to move ahead without keeping itself firmly rooted in its own traditions, tends to fall.

The idea for such a report came to us because of two different reasons and events. The first was the growing anti-dam movement in the country, which was demanding less socially and ecologically destructive systems of water development. We, therefore, asked ourselves the question: What would such systems be? Could they be found in our traditional systems of water management?

The second reason was that, around the same time, we, along with Anupam Mishra of the Gandhi Peace Foundation, happened to come across the extraordinary water harvesting devices of the Thar Desert called *kundis*. In August 1987, we had been invited by a journalist and environmental activist, Shubhu Patwa, of Bhinasar village in Bikaner district, to attend a village meeting to celebrate the anniversary of their protest against village grasslands (*gauchars*) being taken over by some powerful people of the village for eucalyptus plantations. We thought it would be a good opportunity to see the Thar Desert and, therefore, decided to drive to Bikaner. Instead



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In the northeastern state of Meghalaya, a 200-year-old system of tapping stream and spring water by using bamboo pipes, is prevalent



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of taking the standard route of the Delhi-Jaipur and Jaipur-Bikaner highways, we took a small road that goes through the dry Churu district, which is full of beautiful sand dunes. Just as we crossed Haryana and entered Rajasthan, we began to see some unique structures on both sides of the road, which looked like huge concrete saucers on the landscape, with a Buddhist stupa in the middle.

After we had passed a few, we could not help being curious and stopped to inspect one closely. To our amazement, it turned out to be a structure for collecting rainwater to meet the needs of local people and animals. As we moved ahead, we saw several animal herders drawing water out of them to quench the thirst of their animals. On many structures we saw locks to protect the stored water, which showed how precious water was to them. During that journey, we saw dozens of structures of different shapes and sizes, which had been ingeniously constructed in a variety of places — in courtyards, in front of houses, in open



The *kundis* of Rajasthan are unique structures which look like huge concrete saucers on the landscape. These are used for collecting rainwater to meet the needs of the local people and animals

agricultural fields. It was an amazing discovery for us: People can be so intelligent and resourceful in making the best use of their environment.

We came across a large *kundi* in the middle of the fields and stopped to ask a local villager about the structure. He told us that it was not a private *kundi* but a community *kundi* that had been built by a philanthropist of the area. It was meant to provide drinking water for travellers passing by that road, and that is why by the side of the *kundi*, he had also built a one-room *sarai* (inn). Both the *kundi* and the *sarai* were open to anyone. We, thus, saw how well the technology had been integrated with the culture of the area.

In many ways, this discovery simply emphasised what one of us had seen a year ago in Jodhpur in August 1986, having been invited to address a town hall meeting on pollution of the river in Pali. During our Jodhpur trip we had asked S M Mohnot, a professor of zoology and an environmentalist, how the city of Jodhpur, which was several hundred years old, had historically

met its water needs in the middle of the desert. We asked him if there were any events in Jodhpur's history when the city had had to be evacuated because of water shortages. Mohnot said that there had never been such an occasion in the city's history, and suggested that we spend the morning looking at the water harvesting systems of the city. This was at the peak of the 1986 drought when the city was hardly getting piped water supply for even a few hours a day. An hour later, there was an unexpected cloudburst and as we drove along the canals on the plateau adjoining the city, we got a first hand glimpse of why the city never faced any water problem. The canals, though broken and ramshackle by now, were full of flowing water and in many places where the canals dropped to different levels, strikingly beautiful waterfalls appeared. The pictures we took that day remain our most prized photographs. What the ingenuity of Jodhpur revealed to us in 1986, the villages of Churu were showing us the same again amidst another



drought in 1987 — the whopping drought which had almost brought the Union government down.

In Bikaner, we met a journalist, Om Thanvi, from *Rajasthan Patrika*, who was also staying with Shubhu Patwa. Thanvi was very keen to travel to various desert villages and see how the local people were meeting their water needs and to what extent were those needs being met by traditional systems. We immediately agreed to provide Thanvi a fellowship (at that time, the Centre for Science and Environment [CSE] was providing 45-day fellowships to journalists for researching subjects of their interest) to undertake this study.

Thanvi's findings were quite revealing. He discovered that in many villages where people had cared to maintain their traditional water systems, even after the arrival of piped water supply systems, there was no drinking water scarcity. But in villages that had neglected their traditional systems, the drying up of the Rajasthan Canal had meant waterless pipes and hence an acute water crisis.

Later in the decade, we organised a seminar in Jodhpur on 'Life and Survival in the Thar Ecosystem: Lessons for the Future'. At the seminar eminent musicologist Komal Kothari amazed us with his knowledge of how people related to water in the desert. He had found a number of folk songs related to water and this made him interested in the subject. And what he told us was like music to our ears.

The seminar also brought forth many discordant noises. As Rajasthan has long been awaiting the completion of the massive Rajasthan Canal, that is bringing perennial waters from the Himalayan rivers to the parched desert, there is a lot of expectation associated with the canal. Many people from Jodhpur felt that talking about traditional systems was effectively telling them that they should not try to get the benefits of modern technology which has the potential of massive inter-basin water transfers. "If we are citizens of one country, then why should only the people of Punjab, Haryana, Uttar Pradesh or Bihar alone get the benefits of the Himalayan rivers?" one participant asked. As we ourselves come from Delhi and Uttar Pradesh, we felt that we were being confronted with an accusation of being water colonialists.

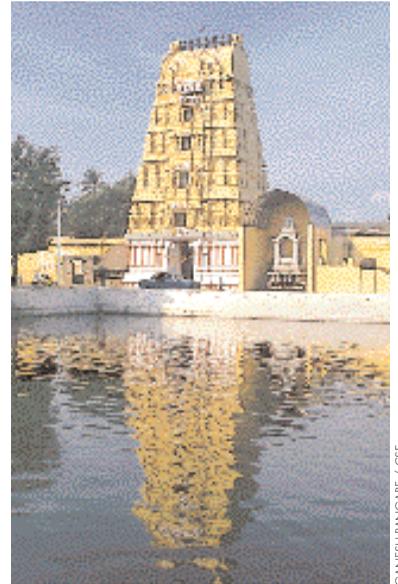
Another participant said, "I refuse to agree that our current water crisis is because of the neglect of traditional water harvesting systems. It is because of a lack of political will to meet people's needs. If the government is sincere, water can even be brought on airplanes in modern times." We then realised the strong feelings that can be aroused if people are told about the importance of using simple traditions. There is something very

attractive about modern technology, howsoever irrational or ecologically-destructive it may be on occasions. Yet, in the same city, just a year before, people of a particular locality had banded together to clean up a beautiful stepwell which had been filled up to the brim with municipal wastes by the town municipality. The drought had forced the community to remember its own traditional structure. Thanvi also put up an exhibition of his pictures at the meeting, some of which were absolutely stunning and beautiful, which showed how much care and effort people put into making these structures.

During the 1980s, CSE also organised a series of workshops in northeastern states on wastelands development. Visiting Mizoram and Nagaland was another fascinating experience. In Mizoram, as

our plane circled to land on a strip near Aizawl, it was impossible to see the houses below. The sun was reflecting off the roofs in a manner that was blinding. Later, as our friend drove us into Aizawl, we understood the reason for those blinding flashes of sunlight. More than any other hill town in India, Aizawl has taken up a massive programme to get households to cover their roofs with corrugated iron sheets in order to encourage rainwater collection. As Mizos would often go to war with each other in the past, they built their villages only on hilltops so that marauding invaders could be seen from a distance. But with deforestation, hilltop springs began to dry up, leaving the people with a water crisis. The Mizoram government found a simple solution in rooftop water harvesting.

In Nagaland, irrigation engineer R Kevichussa, took us to his home village, Khonoma, some miles away from Kohima. Khonoma is also the home village of the famous Naga dissident leader, A Z Phizo. The people of Khonoma showed us the beautiful channels they had made to divert streamwaters to their terraced paddy fields and explained the detailed thinking behind the management of these channels, including some fascinating concepts regarding community and individual property rights over the irrigation water. They also showed us the thick forests that were never touched because they lay in the watersheds of the streams that brought them irrigation water. The forests were full of humus



Temples in south India played a pivotal role in irrigation. Temple endowments were used to maintain tanks and irrigation channels, and cultivate temple lands

*Kuis* (on the facing page) are found in abundance in Bikaner and Jaisalmer. These are *kuchcha* structures dug near tanks to collect the seepage. They are usually covered with planks of wood

and, therefore, enriched the nutrient quality of the runoff that went down to the streams, which is very important for the otherwise poor soils of the hills.

In 1989, we wrote a publication called *Towards Green Villages*, in which we tried to develop a set of macro-policies that could be derived from the highly successful village natural resource management projects that started in the 1970s and 1980s. Among them, we were deeply impressed by the success of the Sukhomajri project and the work in Ralegan Siddhi. Both these projects had relied on small, village-level, community-managed water harvesting projects to bring water to their parched fields or to recharge groundwater wells.

In all, therefore, it was becoming very clear to us that small water harvesting systems had a very important role to play in empowering local communities, in creating economic wealth in poor villages, in promoting integrated village ecosystem management — a form of sustainable development which had the potential of making a big dent in the apparently endless problem of rural poverty and unemployment — and in overall improvement of the nation's environment.

Keeping this in mind, we set up a group in CSE to research and document traditional water harvesting systems and to organise a national seminar on the subject. The seminar held in October 1990 brought together many people from across the country who have a deep interest in the subject. They provided immensely valuable material in the form of papers and an excellent statement on what needs to be done, including a

proposal for a fascinating system of water rights to promote rainwater harvesting. This is an excellent example of what economists would say: To do anything well, get your property rights correct.

But we decided to supplement that material with

- information from old British-time gazetteers which provide fascinating details about these systems in the last century or in the early part of this century;
- information gathered through field trips to collect information about traditional systems that had not been described in the papers at the seminar; and,
- information from field trips about current efforts to revive traditional water harvesting systems.

Thus, Anjani Khanna and Tapan Chowdhry spent months going through gazetteers collecting information. While S Ramanathan went to the Northeast, Ganesh Pangare travelled several times to Gujarat, Rajasthan, Madhya Pradesh, Bihar and Maharashtra. Later, to look at current efforts he went twice to Maharashtra, Karnataka and Tamil Nadu. As time went by, the Grassroots Project team of CSE began to collect more information about recent efforts to develop small water harvesting systems which were also published in the magazine *Down to Earth* on a regular basis. Ganesh Pangare and the Grassroots Project team, particularly Amit Mitra, have thus made a substantial contribution to the development of this report.

*Virdas* are the principal means of water harvesting by the nomadic Maldharis of Gujarat. These are shallow wells dug in low depressions called *jheels* to collect rainwater





CSE

Putting pictures together for this report has been a very difficult task. Which picture library would give us pictures of these far-flung systems? Photographers, therefore, had to be specially commissioned to visit remote areas in the Khasi hills to shoot the bamboo drip irrigation system; to Phek district in Nagaland to shoot local village efforts; to Dhule district in Maharashtra to take pictures of the *phad* system; to various hill forts of Rajasthan; to southern Bihar districts where *ahars* and *pynes* abound; and, finally, towards the completion of the report, to Orissa to bring pictures of the structures built by the Gond kings and to Tamil Nadu, Andhra Pradesh and Karnataka for pictures of tanks and temple inscriptions that show the antiquity of these systems. At least, CSE now has probably the best and most extensive photographic collection of water harvesting systems of India. And a videotape to go along with the report.

For us, personally, putting this book together and editing it has been a long-drawn and painful exercise. As material began to accumulate in the early 1990s, we got deeply involved in the politics of the Rio Conference which reduced the time available for us to digest the piles of information that had been collected and to put a coherent structure to it. Then, we started *Down to Earth* in mid-1992 which further distracted our attention. But we spent a considerable amount of time in 1993 — squeezing in time in trains and planes wherever we went — editing the manuscripts and developing a structure

for the book. In early 1994, cancer intervened and as the only treatment available for Anil was in a research hospital in the US, we could not do anything further. In 1995, Srabani Sen, a copy editor, joined the Centre and took on the work of editing the final copy and even though Anil's cancer recurred in late 1995, and he had to leave the country again for a prolonged period for treatment, she went on with the work on the report, keeping in touch with Anil on the e-mail and sending him draft chapters back and forth for comments in between all the trauma of the chemotherapy. But it was a pleasure doing the work.

Finally, the report has come to an end and we hope that like earlier reports on the State of India's Environment, this one will also have a major impact on the consciousness of the country. For us personally, this report is the result of a decade-long journey and in many ways it constitutes the determining idea of a lifetime. It was one thing to say in our first report in 1982 that India has a major environment problem looming ahead, it is quite another thing now to say that some of the answers to this crisis may lie in our own traditions, in the hands of our communities, and at a pretty low cost. For this reason, we have dedicated this report to the Native Wisdom of the Rural Communities of India. And despite all the gloom, it projects a ray of optimism.

The Spiti area of Himachal Pradesh depends on diversion channels called *kuls* for irrigation. They carry water from glaciers to villages

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