

Old ways of water management spring up again in arid regions

By Michael I. Strauss

Paris Old ways of managing water in dry regions are winning new attention in the search for sustainable development in both urban and rural settings, experts in water technology say.

The old techniques were used to capture, store, transport and distribute water, and some were used for hundreds or thousands of years before they fell into disuse or disrepair as modern technology became available to replace them. One ancient method being revived is water harvesting, or capturing and storing excess rainwater so it can be available during dry periods. Cities in India that abandoned the practice during the 20th century found that the infrastructure built to replace it has not alleviated their water supply problems.

"On one hand, there is the acute water scarcity, and on the other, the streets are often flooded after the monsoons," the New Delhi-based Center for Science and Environment said in an assessment of the situation on its Web site, adding that "one of the solutions to the urban water crisis is rainwater harvesting."

In agriculture, too, where intensive irrigation is increasingly identified with resource depletion and pollution, there is a renewed interest in harvesting as a sustainable technology.

"What we call water harvesting is something we think still has some potential," said Jean-Marc Faure, the senior water resources management officer at the UN Food and Agriculture Organization in Rome. "The idea is to harvest surface water that runs off fields and very small catchment areas, and capture it for it to go to reservoirs and for crops."

Governments in unexpected places are lending support. In July, the state authorities in Texas issued a new edition of The Texas Manual on Rainwater Harvesting. The manual, aimed at individual households, says simple systems — catchment surfaces, gutters or other channels, storage tanks and gravity — or pump-driven delivery systems — are highly reliable, with costs that are "lower than or equal to those of drilling a well."

Texas has introduced sales tax exemptions and various local tax breaks to encourage water harvesting.

Another ancient technology that is being revived involves qanats, or net-

works of underground aqueducts that originated in Iran around 2,500 years ago to bring water from subterranean highland water sources to lowland users. Because qanats rely on a gravity feed rather than pumping or other mechanical delivery systems, they reduce the rate of reservoir depletion during periods of slow replenishment.

Iran has 30,000 active qanat systems, according to the International Center on Qanats, which was established by the Iranian government and Unesco in the central Iranian city of Yazd in March this year. Spread from the Islamic world to Europe in the Middle Ages, and then to the Americas, they were used by the early settlers of Los Angeles.

"There is a place for the renovation and development of old technologies, especially qanats," said Maurizio Pirozzoli, assistant program specialist at Unesco's Division of Water Sciences.

In Iran, failure to maintain some qanats has led to a deterioration of water supplies in Tehran, the capital.

In the search for solutions, "some people argue that the only way is to restore the qanats, so there is a campaign to repair them," said Terje Tvedt, a water history professor at the University of Bergen, Norway, and president of the International Water History Association.

Spate irrigation, another traditional Middle Eastern technology, which harvests flash floodwater in mostly dry rivers, is also being revived.

Spate irrigation has been used for thousands of years, from North Africa eastward to Pakistan and Mongolia, and in Latin America.

According to Faure, it accounted for more than half of all irrigated farmland in Somalia and Eritrea in the 1980s and 1990s, when data were last collected, and up to a third of all irrigation in Yemen, Kazakhstan, Mongolia, Morocco and Algeria.

Spate irrigation involves building ribbed sand into dams to channel floodwater into adjacent fields. Because heavy flooding regularly overflows and erodes these makeshift structures they require constant rebuilding.

"In the 1970s and 1980s, there were attempts to make them more robust by building concrete dams," Faure said.

"But in some areas the floods are so strong that often the concrete dams do more harm than good, because the



Ribbed field and canal systems, developed by the Incas, are being reintroduced in the Andean plateau of Peru, allowing crops to be cultivated that could otherwise not survive. (Credit: Durand/The Associated Press)

floods come with sediments that fill all the gates and canals."

In another case of technology revival, fields consisting of raised ridges up to 10 meters, or 33 feet, wide alternating with shallow canals are being reintroduced in Peru, where the Incas first developed them centuries ago, according to the Global Environment Facility, an intergovernmental agency that finances sustainable development projects in developing countries.

The canalized water, either har-

vested rain or diverted river water, absorbs heat during the day and keeps the ridged fields warmer at night, allowing the cultivation of crops that might not otherwise survive on the high Andean plateau, the agency said.

Returning to old methods makes sense when they can be shown to be cheaper or better adapted to specific local conditions than modern technology, said Pirozzoli, of Unesco. Old and new technologies can often be blended to enhance results, for example, by using

global positioning systems in determining where to dig qanats, she said.

Rehabilitation can even make sustainable development sense when the original purpose is no longer valid, Faure said.

Faure cited the example of terraced hillides in Tuscany that were originally built to retain water for crops.

"After a while it was not economically feasible — you have to maintain terraces — so they fell into disrepair until some local communities found that

they had a role in terms of the beauty of the landscape, and it was worth investing in them just for tourism," he said.

Separately, the Terrac project, linking universities and the local authorities in France, Spain and Portugal, and funded by the European Union, has been restoring abandoned farm terraces as a protection against natural disasters such as flash floods and landslides.

— Michael I. Strauss reports from Paris on financial, agricultural and energy issues.

Past methods may be better adapted to local conditions

HEALTH

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By **MICHAEL J. STRAUSS**AUG. 20, 2005

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