



Climate Change : Natural Disasters

Water Management: Sharing the Source of Life

We are wasting the world's water, the one resource essential to human survival. But there is enough water for all if we just find better ways to manage it. Encouraging examples from all over the world show how this can be done.



Picture Gallery (click the image to start)

A resident collects water from a water storage tank on the outskirts of Suining, southwest China's Sichuan province (Photo: Reuters)

The way we use water has to change. Rapid population increases, surging economic development, and climate change are all conspiring to deplete the world's water resources to less than can sustain a growing a population.

"We will not be able to feed the extra billions if it remains business as usual in agriculture and water management," warns Colin Chartres, director of the International Water Management Institute (IWMI).

The problem is not that there is insufficient freshwater, nor that there are too many people using it, but that they are using it so inefficiently. One reason for this lavish use is that water is used by many different people for many different purposes - agricultural, industrial, and domestic. Often people do not realize that they are all sharing the same limited resource.

Related Articles

[Water Conflicts: Fight or Flight?](#)

[The Business Case for Sanitation](#)

"The classic example is where groundwater is managed totally separately from surface water, by different government agencies," says Chartres. "But in reality, 90 percent of groundwater is linked to surface water. We have to manage water holistically and in an integrated manner."

Chartres says an example of better practice is the recently established

collaboration between federal and state governments in Australia to address the problems of the drought-stricken Murray-Darling river basin. In the past two years, the volume of water flowing into the Murray from the rivers that feed it was the lowest since records began in 1892. Eighty percent of water taken from the basin is used by agriculture; inefficiently by some, illegally by others.

Authorities plan to invest ten billion Australian dollars to improve efficiency in the entire river system and halt environmental damage by protecting wetlands and helping farmers to invest in more efficient irrigation systems. "They will then take some of those savings in terms of water and reinvest them," says Chartres.

Different strategies are required for different situations. Sub-Saharan Africa requires water supply infrastructure. In much of the West and Asia, basic infrastructure is already in place, but needs improvement to reduce demand and rehabilitate ecosystems. In the Indian state of Gujarat, farmers with ready access to subsidised domestic electricity supplies used to pump groundwater continuously. The state government has now separated the electricity supply to the pumps from the domestic supply, only powering the pumps for a few hours a day.

"They dramatically cut down groundwater extraction while maintaining crop productivity, groundwater levels improved and the farmers didn't suffer," says Chartres. In many cases, preserving groundwater simply means putting water back into the ground. Excess monsoon waters can be harvested and fed into wells and underground aquifers.

In much of the developing world, expansion of wastewater management infrastructure is critical. Here, almost 70 percent of effluent from agriculture, industry, and people's homes is discarded untreated. As a result, water sources are polluted and a vicious circle starts, whereby water quality degradation aggravates scarcity and decreasing water quantity concentrates pollution.

Chartres says an example of better practice is the recently established collaboration between federal and state governments in Australia to address the problems of the drought-stricken Murray-Darling river basin. In the past two years, the volume of water flowing into the Murray from the rivers that feed it was the lowest since records began in 1892. Eighty percent of water taken from the basin is used by agriculture; inefficiently by some, illegally by others.

Authorities plan to invest ten billion Australian dollars to improve efficiency in the entire river system and halt environmental damage by protecting wetlands and helping farmers to invest in more efficient irrigation systems. "They will then take some of those savings in terms of water and reinvest them," says Chartres.

Different strategies are required for different situations. Sub-Saharan Africa requires water supply infrastructure. In much of the West and Asia, basic infrastructure is already in place, but needs improvement to reduce demand and rehabilitate ecosystems. In the Indian state of

Gujarat, farmers with ready access to subsidised domestic electricity supplies used to pump groundwater continuously. The state government has now separated the electricity supply to the pumps from the domestic supply, only powering the pumps for a few hours a day.

"They dramatically cut down groundwater extraction while maintaining crop productivity, groundwater levels improved and the farmers didn't suffer," says Chartres. In many cases, preserving groundwater simply means putting water back into the ground. Excess monsoon waters can be harvested and fed into wells and underground aquifers.

Picture Gallery



In developed countries, this is known as artificial groundwater recharge, a sustainable alternative to dumping wastewater from agriculture, industry, and homes. Some Californian sewage is treated and pumped back into the ground where micro-organisms continue the recycling.

In much of the developing world, expansion of wastewater management infrastructure is critical. Here, almost 70 percent of effluent from agriculture, industry, and people's homes is discarded untreated. As a result, water sources are polluted and a vicious circle starts, whereby water quality degradation aggravates scarcity and decreasing water quantity concentrates pollution.

In developed countries, this is known as artificial groundwater recharge, a sustainable alternative to dumping wastewater from agriculture, industry, and homes. Some Californian sewage is treated and pumped back into the ground where micro-organisms continue the recycling.

Agriculture

Seventy percent of all water taken from rivers and groundwater is swallowed up by agriculture, 20 percent is taken by industry, and the remaining 10 percent goes on domestic usage, according to the OECD. Consequently, some of the most immediate and largest improvements in water management can and will be made in the fields, particularly in developing countries where existing irrigation systems are wasteful.

"Smallholder farmers possess the greatest unexploited potential to directly influence land and water use management," argues the IWMI. Simple water management techniques would help them conserve water.

One such "crop-per-drop" improvement is drip-irrigation, which distributes water to crops more precisely and reliably than conventional systems. Instead of using huge sprinklers or channels, water goes directly to the plant through a network of small pipes, drippers, or micro-sprinklers. Often these systems are fed by treadle pumps that can

extract water from up to seven meters down using only leg power.

Another is the revival of small-scale rainwater harvesting. In the arid Indian state of Rajasthan, the restoration of traditional water-harvesting structures has allowed farmers to gain a second cropping season and reduce groundwater pumping.

Conservation tillage, which disturbs the soil as little as possible to avoid soil moisture loss, is another technique practiced widely in South and North America. Extensive ploughing leads to erosion that drains the soil of its nutrients and pollutes rivers and lakes.

"These techniques hold under-exploited potential for quickly lifting the greatest number of people out of poverty and for increasing water productivity, especially in Sub-Saharan Africa and parts of Asia," says the IWMI.

Industry

As consumer of one fifth of the world's water - for cooling, heating, and as a product ingredient - industry also has a huge part to play in advancing water management techniques. The most egregious misuse of water in the industrial world occurs when factories use fresh water for industrial uses when wastewater would do the job just as well. Put another way, recycling water is the biggest contribution that industry can make to water preservation.

One recycling method would be to eliminate single-pass cooling, whereby water is circulated once through a piece of equipment and then discarded. Single-pass systems can use as much as 40 times more water than a cooling tower reusing water, calculates the U.S. Environmental Protection Agency (EPA).

The EPA itself upgraded one of its facilities with a "re-circulated chilled water loop" making 80 percent water savings in the process. By installing a closed-looped, re-circulated cooling water system, an aluminium rolling mill can cut its water consumption by 93 per cent, according to aluminium manufacturer Alcan.

At Home

Domestic water management, meanwhile can be improved primarily by making every drop count, preferably twice, thrice, or even ten times by using recycled water. Water recycled can be used for fighting fires, washing cars, flushing toilets, and watering the garden. In urban areas, this requires two sets of piping: one for drinking water and another for recycled water - termed "dual reticulation." For years, Tokyo city authorities have encouraged the fitting of new office blocks and apartments with dual reticulation. It is only practical in new buildings, but with the world population expanding rapidly and the construction industry booming, there is enormous scope for water savings.

If nothing changes, water supply problems will result in a grim equation. According to the Swiss Agency for Development and Co-operation, by 2025, two out of three people in the world will suffer from water shortages - they will simply not have enough water to waste.

editor: James Tulloch

Publishing date: March 19, 2008

© Allianz 2007, All Rights Reserved