

Water for farming

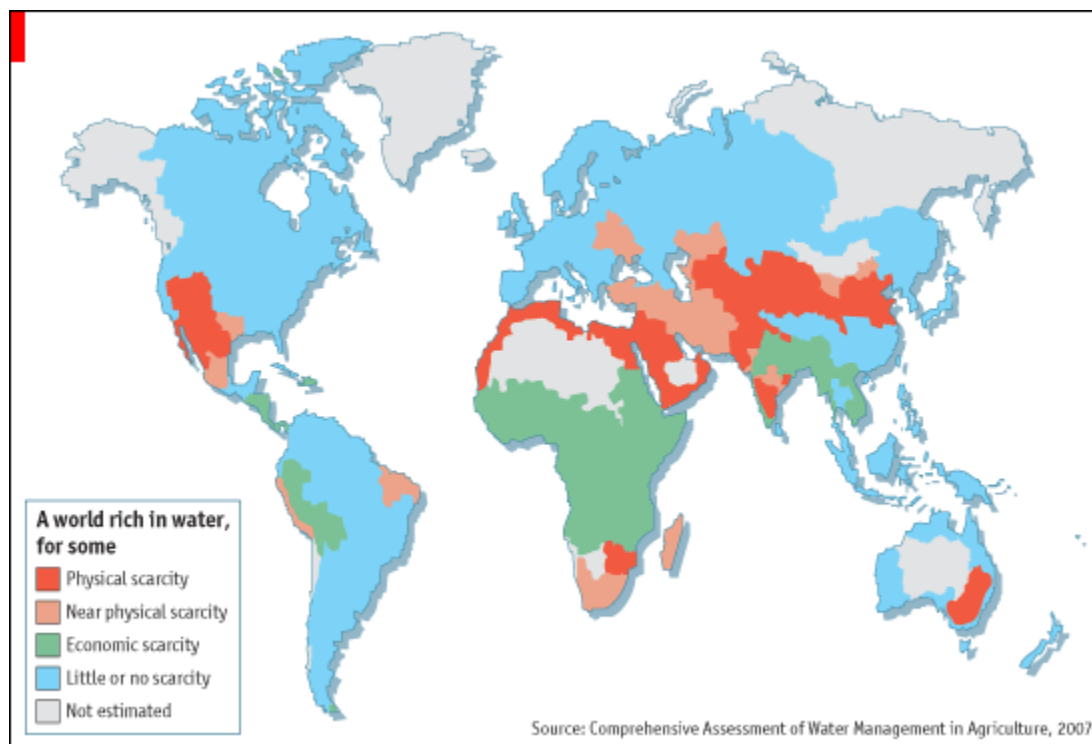
## Running dry

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### The world has a water shortage, not a food shortage

MOST people may drink only two litres of water a day, but they consume about 3,000 if the water that goes into their food is taken into account. The rich gulp down far more, since they tend to eat more meat, which takes far more water to produce than grains. So as the world's population grows and incomes rise, farmers will—if they use today's methods—need a great deal more water to keep everyone fed: 2,000 more cubic kilometres a year by 2030, according to the International Water Management Institute (IWMI), a research centre, or over a quarter more than they use today. Yet in many farming regions, water is scarce and likely to get scarcer as global warming worsens. The world is facing not so much a food crisis as a water crisis, argues Colin Chartres, IWMI's director-general.



The solution, Mr Chartres and others contend, is more efficient use of water or, as the sloganeers put it, “more crop per drop”. Some 1.2 billion people, about a fifth of the world's population, live in places that are short of water (see map). Farming accounts for roughly 70% of human water

consumption. So when water starts to run out, as is happening in northern China, southern Spain and the western United States, among other places, farming tends to offer the best potential for thrift. But governments, whether to win votes or to protect the poor, rarely charge farmers a market price for water. So they are usually more wasteful than other consumers—even though the value they create from the water is often less than households or industry would be willing to pay for it.

The pressing need is to make water go further. Antoine Frérot, the head of the water division of Veolia Environnement, a French firm, promotes recycling, whereby city wastewater is treated until it can be used in industry or agriculture. This costs about a third less than desalination, and cuts pollution. He expects his recycling business to quadruple in the next decade.

Yet as Mr Frérot himself concedes, there are many even cheaper ways to save water. As much as 70% of water used by farmers never gets to crops, perhaps lost through leaky irrigation channels or by draining into rivers or groundwater. Investment in drip irrigation, or simply repairing the worst leaks, could bring huge savings.

Farmers in poor countries can usually afford such things only if they are growing cash crops, says David Molden of IWMI. Even basic kit such as small rainwater tanks can be lacking. Ethiopia, for example, has only 38 cubic metres of storage capacity per inhabitant, compared to almost 5,000 in Australia. Yet modest water storage can hugely improve yields in rain-fed agriculture, by smoothing over short dry spells. Likewise, pumping water into natural aquifers for seasonal storage tends to be much cheaper than building a big dam, and prevents the great waste of water through evaporation.

Even when water is scarce, it is often squandered. Mr Molden cites the example of cotton-farmers in Uzbekistan, who used to receive a fixed allocation of water for irrigation whether they needed it or not, in a holdover from the days of Soviet central planning. Simply putting farmers in control of the irrigation network, and allowing them to decide how much water they needed, cut consumption by 30%.



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Cotton paying a high price for water

Similarly, rice farmers can sharply cut water consumption by flooding paddy fields only some of the time. Wheat growers in hot places such as India and Australia can conserve water by minimising tilling, leaving a layer of mulch on the fields' surface to absorb rainwater and limit

evaporation. In arid regions like the Middle East, Mark Zeitoun of the London School of Economics suggests substituting thirsty crops such as oranges with more abstemious olives and dates. Ideally, countries that are short of water would concentrate on growing the most valuable cash crops, and use the proceeds to import staples.

Agronomists are beginning to devise tools to help monitor the efficiency of water use. Some have designed algorithms that use satellite data on surface temperatures to calculate the rate at which plants are absorbing and transpiring water. That allows governments and development agencies to concentrate their efforts on the most prodigal areas.

But efficient use of water, cautions Pasquale Steduto of the United Nations' Food and Agriculture Organisation, is just one step to better agricultural yields. Even if farmers use the right amount of water they also need decent seeds and enough fertiliser. In Africa in particular, these and other factors such as pest control, storage and distribution are a bigger drag on yields than a shortage of water.

Raising yields does not always involve greater water consumption, especially when farms are inefficient. It would take little extra water to double cereal output in many parts of Africa, Mr Molden argues. IWMI reckons that some three-quarters of the extra food the world needs could be provided simply by bringing yields in poor countries closer to those of rich ones. That is more palatable than the puritanical alternative: giving up meat and other thirsty products altogether.