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China's clever water use boosts food yields

Source: [SciDev.net](#)

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China produces more food for the same amount of water than other countries in Africa and Asia, researchers have found.

The report, completed by Li Baoguo and colleagues from the China Agricultural University, found that China produces 1–1.5 kilograms of wheat and corn per cubic metre of water, compared with Ethiopia's 0.1–0.2 kilograms, India's 0.2–0.7 and Kazakhstan's 0.2–0.3.

The researchers calculated China's crop water productivity (CWP) by analysing national food production statistics and weather data, and using hydrological models.

China's success is down to its multi-cropping practice, effective farm management and water-saving techniques, explained Li.

Techniques include reusing wastewater for irrigation, plastic and straw mulching — growing crops through openings in thin plastic sheeting or a layer of straw to reduce evaporation — and fostering drought-tolerant species.

The efficiency is achieved despite a decline in water resources from almost 3,500 billion cubic metres in 1998 to just more than 2,500 billion cubic metres in 2007. Agricultural water accounted for 750 billion cubic meters — or 30 per cent of total water resources — in 2007.

The report is the first to break down China's agricultural water resources into 'blue water' and 'green water', based on concepts initiated by Swedish scientist Malin Falkenmark.

Blue water refers to water stored in aquifers, lakes and dams, and green water is the moisture stored in soil, which is conventionally ignored. In China, green water accounts for almost 60 per cent of agricultural water.

'Green water contributes more than blue water to the gross water potentially available for crop use,' Li told SciDev.Net. 'To boost CWP, we should improve

efficiency of both irrigation (blue water) and natural precipitation (green water).'

David Molden, deputy director-general for research at the **International Water Management Institute (IMWI)** in Sri Lanka, said that IMWI has found differences in water productivity between countries to be less clear cut than Baoguo's research suggests.

'For example, our information shows that the range of values in India overlaps with that of China,' he said.

He added that in enhancing water productivity China must also take ecological sustainability into account.

'For example higher fertiliser use raises water productivity but adds pollution to the environment. China will have to solve problems of water productivity, but in addition solve second and third generation problems of pollution and competition for water supplies.'

The report also revealed that there is a major geographical difference within China: the CWP in northern China was 1.2 kilograms per cubic metre, while in southern China the figure is 0.7–0.9 kilograms. Northwest China reaches less than 0.4 kilograms.

Li believes that this discovery will help reform China's farming policies. 'For example, the farmland of winter wheat should be reduced in northern China, while southern China, rich in water resources, should maintain multi-cropping.'

'If the CWP of northeast and southern China can reach that of northern China, China's food security and ecological safety will be ensured,' concludes the report.

The research was published as a book in December 2009.



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