

Major river basins have enough water to sustainably double food production | Consortium of International Agricultural Research Centers

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An extensive study of the water resources in Asia, Africa and Latin America views “efficiency” and not “scarcity”, as a core concern.

While water-related conflicts and shortages abound throughout the rapidly changing societies of Africa, Asia and Latin America, there is clearly sufficient water to sustain food, energy, industrial and environmental needs during the 21st century, according to a special issue of the peer-reviewed *International Water Journal* released today at the XIV World Water Congress.

A call for more efficient and fair use of water

The report from the Challenge Program on Water and Food (CPWF) of the CGIAR finds that the “sleeping giant” of water challenges is not scarcity, but the inefficient use and inequitable distribution of the massive amounts of water that flow through the breadbaskets of key river basins such as the Nile, Ganges, Andes, Yellow, Niger and Volta.

“Water scarcity is not affecting our ability to grow enough food today,” said Alain Vidal, director of the CPWF. “Yes, there is scarcity in certain areas, but our findings show that the problem overall is a failure to make efficient and fair use of the water available in these river basins. This is ultimately a political challenge, not a resource concern.”

Producing more food with the available water

“Huge volumes of rainwater are lost or never used,” he added, “particularly in the rain-fed regions of sub-Saharan Africa. With modest improvements, we can generate two to three times more food than we are producing today.

While Africa has the biggest potential to increase food production, researchers identified large areas of arable land in Asia and Latin America where production is at least 10 percent below its potential. For example, in the Indus and Ganges, researchers found 23 percent of rice systems are producing about half of what they could sustainably yield.

The analysis – which involved five years of research by scientists in 30 countries around the world – is the most comprehensive effort to date to assess how, over vast regions, human societies are coping with the growing need for water to nurture crops and pastures, generate electricity, quench the thirst of rapidly growing urban centers, and sustain our environment. The findings also present a picture of the increasingly political role of water management in addressing these competing needs, especially in dealing with the most pressing problem facing humanity today: doubling food production in the developing world to feed a surging population, which, globally, is expected to expand from seven to 9.5 billion people by 2050.

Study on ten river basins

The ten river basins that were studied include: the Andes and São Francisco in South America; the

Limpopo, Niger, Nile and Volta basins in Africa; and the Ganges, Indus, Karkheh, Mekong, and Yellow in Asia. The basins – distinct and gargantuan geographic areas defined by water flows from high-ground to streams that feed major river systems – cover 13.5 million square kilometers and are home to some 1.5 billion people, 470 million of whom are amongst the world’s poorest.

According to Vidal, the ten basins were selected for study because they embody the full measure of water-related challenges in the developing world. The research examines the role of policy and governance in managing water resources in ways that reduce poverty and improve living standards for the greatest number of people

“The most surprising finding is that despite all of the pressures facing our basins today, there are relatively straightforward opportunities to satisfy our development needs and alleviate poverty for millions of people without exhausting our most precious natural resource,” said Dr. Simon Cook, of the International Center for Tropical Agriculture (CIAT) and Leader of the CPWF’s Basin Focal Research Project (BFRP).

Interview with Dr. Simon Cook

For example, Cook and his colleagues found that if donors and government ministries put more emphasis on supporting rain-fed agriculture, food production can increase substantially and rapidly. In Africa, it was found that the vast majority of cropland is rainfed and researchers found that only about four percent of available water is captured for crops and livestock.

“With a major push to intensify rainfed agriculture, we could feed the world without increasing the strain on river basins systems,” said Cook.

Not only crops, but also livestock and fish

The authors also note that boosting food production in the basins studied requires looking beyond crops to consider more efficient uses of water to improve livestock operations and fisheries. Water policies often ignore the role livestock and fish play in local livelihoods and diets. For example, the researchers found that in the Niger basin, freshwater fisheries support 900,000 people while 40 million people in the Mekong depend on fisheries for at least part of the year. In the Nile, researchers note that almost half of the water in the basin flows through livestock systems.

“The basin perspective is critical in order to assess the upstream and downstream impacts of water allocation policies, and to determine opportunities for optimizing the sum of benefits across many residents,” said Dennis Wichelns, Deputy Director General at the **International Water Management Institute (IWMI)**, which was a major partner in the research.

Identifying the hot spots

The researchers contrast the poor use of water resources within river basins observed in many areas – which they refer to as “dead spots” for agriculture development – to “bright spots” of water efficiency. They said bright spots can be found in the large areas of the Ganges, Nile and Yellow River basins, where farmers and governments have responded to development challenges by vastly improving the amount of food produced from available water. They also single out “hot spots” – which can be found in the in the Indus, Yellow, Nile and Limpopo river basins – where there is mounting concern and conflict over sharing water resources and reaching consensus on development approaches.

Confronting the “Complete Fragmentation” of Water Management

Cook and his colleagues caution that while globally there is enough water to sustain human development and environmental needs, water-related conflicts will continue if particular issues like

food security and energy production are considered in isolation from one another. Cook observed that in most areas there is a “complete fragmentation of how river basins are managed amongst different actors and even countries where the water needs of different sectors – agriculture, industry, environment and mining – are considered separately rather than as interrelated and interdependent.”

“In many cases, we need a complete rethink of how government ministries take advantage of the range of benefits coming from river basins, rather than focusing on one sector such as hydropower, irrigation or industry,” the authors stated.

More information on the Basin Focal Research Project

CGIAR’s Challenge Program on Water and Food organises the 3rd International Forum on Water and Food in South Africa on November 14-17 later this year. ([More information](#))