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C-PACT WATER BULLETIN

CPACT & WSP (Water Science Program) presents a news bulletin of latest news from India and abroad on debates, concerns, and events related to water.

Water Management in Indian Agriculture: Emerging Priorities

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Annual replenishable water resources of India are estimated at about 3880 billion cubic metres (BCM). Studies by Central Water Commission (CWC) over a period of 30 years (1985-2015) showed that the average annual water resource available is 1999.20 BCM, out of which only 1122 BCM can actually be utilised[1]. Several of the Indian basins like the Indus, Sabarmati, Pennar and Krishna are already becoming "closed" basin, with little opportunity for further development.[2] As the supply augmentation of water is increasingly getting difficult, we need to focus our attention more on demand management of water to for finding sustainable solutions to our water problem. Agriculture is the largest user of water. A recent study by NABARD and ICRIER estimated that about 78% of India's annual freshwater withdrawals is for agricultural purposes.[3] If the water demand is not managed in agriculture, ensuring drinking water availability will prove to be difficult. The NABARD-ICRIER study further identified three "water guzzler" crops, rice, wheat and sugarcane, which occupy about 41% of the gross cropped area and consume more than 80% of the freshwater withdrawals for irrigation. This has meant grave inequity in the distribution of irrigation across crops and farmers and also a strong mismatch between existing water endowments and the water demanded by these water-guzzling crops.

The main reason why farmers grow such crops even in areas of patent water shortage is the structure of incentives, as they find that these crops have steady markets. Public procurement of foodgrains at Minimum Support Prices (MSPs) has played a big role in entrenching such water-intensive cropping patterns even in water-scarce environments. Even a small reduction in the area under these crops, in a region-specific manner would go a long way in addressing India's water problem. The most important

[1] Central Water Commission. 2019. *Water and Related Statistics*, New Delhi: Ministry of Jal Shakti, Government of India

[2] Gulati, A., Sharma, B., Banerjee, P and Mohan, G. .2019. *Getting More from Less: Story of India's Shrinking Water Resources*, NABARD-ICRIER report, Indian Council for Research on International Economic Relations (ICRIER), New Delhi.

[3] Sharma,. B. , Gulati, A., Mohan, G. Manchanda, S., Ray, I. and Amarasinghe, U. 2018. *Water Productivity Mapping of Major Indian Crops,* NABARD-ICRIER report, Indian Council for Research on International Economic Relations (ICRIER), New Delhi

step in this direction is for the government to diversify its crop procurement operations to align with local agro-ecology and natural resource endowments.

The best way of doing this is to start procurement of crops that were prominently grown in each region before the monocultures associated with the Green Revolution set in. India's cropping pattern before the Green Revolution included a much higher share of millets, pulses and oilseeds. These must urgently find a place in public procurement operations. As this picks up pace, farmers will also gradually diversify their cropping patterns in alignment with this new structure of incentives.

If we were to make such a switch in cropping patterns, to reflect the agro-ecological diversity of India, what volume of water would we save? We have made an attempt to quantify the water that could be saved by 2030 in 11 major agricultural states: Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Telangana and Tamil Nadu. These states together accounted for about 66% of the total irrigated area of the country in 2015-16. We explored water use in the production of crops under two different scenarios of crop replacements, what we have termed as "Low Change" and "High Change", and compared it with a Business-as-Usual (BAU) scenario[4]. In these 11 states, we take the area under three most water-intensive crops, namely rice, wheat and sugarcane, and redistribute the area to the replacement crops. The replacement crops are largely pulses and nutri-cereals. The choice of the replacement crops is governed by an analysis of the cropping pattern of the concerned state in the period before the monoculture of the Green Revolution takes firm roots there. While working out crop replacement scenarios, we have kept in mind that such substitution has to be between crops grown in the same season and it must also be mindful of the specific agronomic and soil conditions of each region. The water savings were calculated as the difference between the water-use in the BAU scenario, as compared to the two crop replacement scenarios.

Our results show that through seasonally appropriate agro-ecologically suitable crop replacements, we can save about 18-36% of water applied in agriculture. Given that water-intensive crops currently occupy over 30% of the gross irrigated area in these states, the amount of water saved annually would be considerable. In our estimate, water saving could be high in states like Maharashtra (48%), Punjab (42%) and Telangana (43%). This would enable access to supplementary irrigation for millions of small and marginal farmers and also considerably reduce the pressure on rural drinking water sources. It can be argued that these crop replacements will result in a reduction in total foodgrain output because of differentials in yields across crops. We agree this is a possibility. However, it must be borne in mind that the rapidly deteriorating water situation poses a very serious constraint to maintaining the productivity levels of water-intensive crops, especially in states like Punjab and Haryana. At the same time, our proposal for aligning cropping patterns with regional agro-ecology includes raising the share of Eastern India in national output of water-intensive crops like rice. Such a change is urgently required to correct the basic anomaly in water use in agriculture in India.

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[4] The details of the methodology of calculating water use and water saving is discussed in Mihir Shah and PS Vijayshankar "Transforming Water and Agriculture in India", paper presented at the National Dialogue on Indian Agriculture Towards 2030, organised by FAO-MoA-NITI Ayog , 21st January 2021.

Latest News

Bihar may introduce licenses for bore wells

The state Minor Water Resources Department (MWRD) has prepared a draft manual on the instruction of the state government. “Chief Minister Nitish Kumar directed the department to prepare a fresh manual to restrict overexploitation of groundwater in the state in view of reports of water crisis during the summer,” an official said. Read More:

Challenges to India’s urban water security and future growth patterns

The Sustainable Development Goal (SDG) 11 calls for inclusive, safe, resilient, and sustainable cities. This cannot be achieved without innovation in the water sector with in-depth broad thinking, research and analysis on the links between economic growth and the future of our urban spaces. Read More:

UN-Water Joint Statement: 31st Special Session of the General Assembly in response to the COVID-19 pandemic

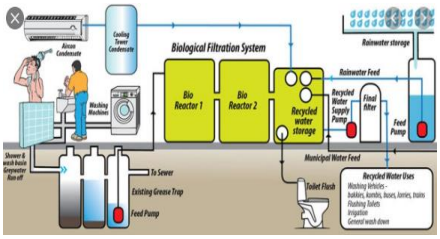
Water and sanitation: the first line of defense, but unavailable for billions of people

Poor people tend to get hit harder by the health and socio-economic consequences of COVID-19. This crisis has clearly revealed the dire inequalities that result from chronic underinvestment in a basic public health measure: water and sanitation services. Read More:

India plans dam on Brahmaputra to offset Chinese construction upstream

India is considering a plan to build a 10 gigawatts (GW) hydropower project in a remote eastern state, an Indian official said on Tuesday, following reports that China could construct dams on a section of the Brahmaputra river. Read More:

IISc researchers devise new wastewater recycling system



A decentralised wastewater treatment and recycling system developed by the Centre for Sustainable Technologies (CST), Indian Institute of Science (IISc), helped 180,000 litres water in a year in Berambadi, a village in Karnataka. Read More:

World's largest lakes reveal climate change trends

NASA-funded research on the 11 largest freshwater lakes in the world coupled field and satellite observations to provide a new understanding of how large bodies of water fix carbon, as well as how a changing climate and lakes interact. Read More:

Academic news: scholarships

Climate change and COP26 - Open call for creative commissions

British Council is the UK’s international organisation for cultural relations and educational opportunities. The British Council is inviting applications for creative commissions that bring together art, science and digital technology and offer innovative responses to climate change. Read More:

Title: Water & Energy for Food Grand Challenge - Call for Innovations & Prizes 2020

WE4F is a joint international initiative which is focused on environmentally sustainable innovations aiming to improve energy and water efficiency in the agricultural sector. Read More:

PhD Scholarship, Water for Change 2020

CEPT University, India invites applications for PhD Scholarship: Water for Change 2020 from outstanding PhD researchers interested in sustainability transitions and resilience in general and in urban water systems and governance in particular. Read More:

Conference/ Course/ Training Seminar Workshop/Contest:

UNESCO International Conference on "Water, Megacities and Global Change"

1st December 2020 - 4th December 2020 Bringing together scientists, operators, policy makers and civil society to address water security and global challenges in Megacities. Read More:

EauMega Online Pre-Conference 7-11 December 2020

Following the postponement of the Second International Conference "Water, Megacities and Global Change" to December 2021. The Steering and Programme Committees have decided to hold an online pre-conference event from 7 to 11 December 2020. Read More:

Virtual workshop on financing transboundary water cooperation

A Virtual workshop on financing transboundary water cooperation and basin development took place online on 16 and 17 December 2020.

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Student Highlight

Lecture on "Wetland Restoration and Management-Case of Vembanad Wetland" by Mr. Jojo T. D. (Ashoka Trust for Research in Ecology and the Environment (ATREE), November 17th 2020. Organized by the M.Sc. Water Science and Policy (class of 2020-2022).

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