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Agro-ecology Driven Water Management

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Actionable Area

Emphasise on bringing agro-ecology at the centre of land and water management for greater water resource efficiency, environmental justice, and attention to poor and more inter-generational equity.

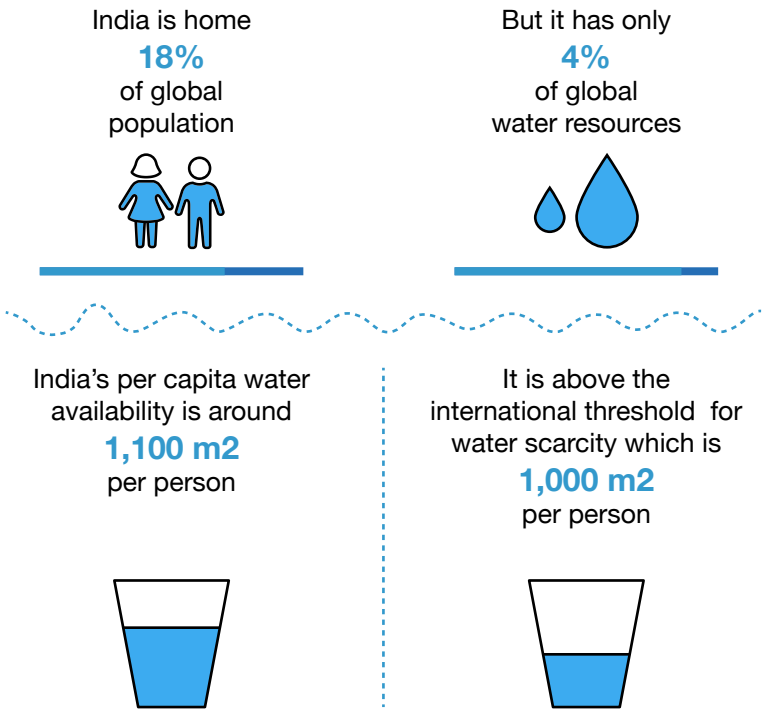
Issues

- With an average rainfall of 1105 mm and a land area of 329 million hectares, India's annual estimated water resources are about 3880 billion cubic metres (BCM). However, 30-year-studies (1985-2015) by Central Water Commission(CWC) showed that the average annual water resource available is estimated at 1999.20 BCM, out of which only 1122 BCM can actually be utilised.

- Several Indian basins like the Indus, Sabarmati, Pennar, and Krishna are already becoming “closed” basins, with little opportunity for further development. The 2030 Water Resource Group of the World Bank characterises India’s water security challenge as the problem of soaring demand, competing uses, and finite availability of water. If the current pattern of demand continues, about half of the demand for water will be unmet by 2030. At least 54% of India has been identified to be high to extremely water-stressed, and almost 600 million people are at higher risk of surface-water supply disruptions. Northwest India, the country’s breadbasket, is facing high stress.

- As the supply augmentation of water is getting increasingly difficult, attention needs to be focussed on-demand management of water on finding sustainable solutions to our water problem.

India’s water crisis: The big picture



Source: http://data.worldbank.org

- Agriculture is the largest user of water. A recent study by NABARD and ICRIER estimated that about 78% of India's annual freshwater withdrawals are for agricultural purposes. FAO's AQUASTAT database puts this figure closer to 90%. The NABARD-ICRIER study 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 irrigation distribution across crops and farmers and a strong mismatch between existing water endowments and the water demanded by these water-guzzling crops.

Status

- Farmers grow such water-guzzling crops even in areas of patent water shortage due to the structure of incentives and steady markets for these crops. Therefore, even a small reduction in the area under these crops, in a region-specific manner that does not endanger food security, would go a long way in addressing India's water problem.

- In a recent paper written for FAO-NITI Ayog National Consultation, the possible crop switches in Kharif and rabi seasons were explored. The results showed that we could save about 18-36% of the water applied in agriculture through seasonally appropriate agro-ecologically suitable crop replacements. 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. However, 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. A study also showed that the Eastern states, which are safe in their groundwater reserves, are net importers while the water-scarce regions are net exporters of water.

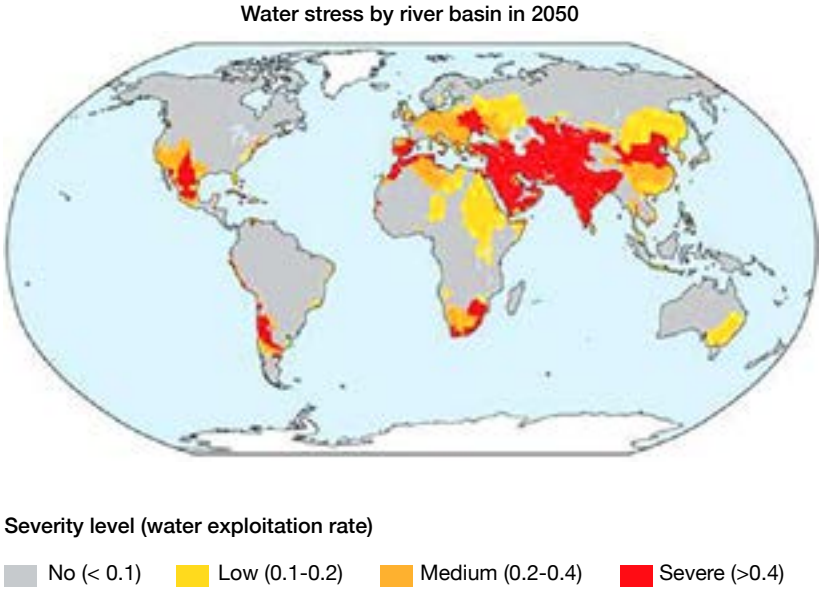
- Price incentives play a vital role in correcting the anomalies in water resource efficiency in agriculture by promoting cropping patterns appropriate to the local agroecology. However, the fundamental feature of the post-Covid food system is that it should cover a larger number of both farmers and consumers and evolve a stronger regulatory framework for agricultural markets, especially for food. Along with initiatives at rationalising water use in agriculture, we also need to focus on conserving rainwater through watershed management.

- MGNREGA is currently being used by many government and non-government agencies for public investment in water infrastructure. Since the outbreak of Covid-19, the uptake of MGNREGA has considerably increased, which could be leveraged for greater water conservation and groundwater recharge with locally appropriate technologies. Another major point of action is the management of our irrigation commands.

Vision 2030

Implement science & technology-based agro-ecology-driven inclusive and productive water and land management for food system transformation in India. By bringing agro-ecology at the centre of land and water management, science and technology interventions operate within limits set by the ecosystem.

India will face severe water stress



Note: Water stress is a measure of the total, annual average water demand of freshwater in a river basin compared with the annual average water available (precipitation minus evapotranspiration) in that basin.

Source: OECD (2012), Environmental Outlook to 2050: The Consequences of Inaction.

Pathways

POLICY

Integrate water policy within other policies such as energy and food considering the water-energy-food nexus.

Set up irrigation management fund to finance private players to take up irrigation reform and canal maintenance.

Use MGNREGA as a tool for channeling public investment in the water infrastructure.

Develop incentives for farmers to move towards crops requiring lesser water.

Adopt mechanisms like MSPs along with market-based price incentives and base marketing and branding campaigns on the efforts put on water saving.

Evolve a concept wherein market prices are aligned with the water footprint of products. Adopt the concept of social MSP whereby farmers growing low water-requiring crops are compensated in terms of higher prices. This can be seen as a payment for the ecosystem services (ESS) rendered by them.

Explore a market development for crop diversification with an enhanced role of private sector players. In this context, Farmer Producer Organisations (FPOs) can play an important role.

Implement financial mechanisms for water use efficiencies like Jal Samruddhi in Maharashtra or Haryana's direct cash transfers for shifting to low water-requiring crops.

Look at ongoing projects, digital interventions, and capacity-building initiatives to draw learnings from these for upscaling and replication.

Use an area or landscape-based approach for subsidizing the micro irrigation systems.

Pathways

IMPLEMENTATION

Increase the irrigation efficiency in agriculture through systems like micro irrigation or public and private partnerships.

Promote PPP models around irrigation infrastructure.

Support further research on micro-irrigation systems.

Take up irrigation management of canal commands to cover the IPC-IPU gap.

Realign cropping patterns with agroecology-based practices to reduce the water footprint in agriculture.

Realign crops and crop varieties based on the agro-climatic regions.

Enhance farmer's coverage by diversifying the system of public procurement MSP and extending it as support for farmers to grow less favoured crops in rainfed regions.

Link the public distribution to food-based entitlement programmes such as Integrated Child Development Services and provision of noon meals in schools. This could go a long way in reducing the nutritional poverty of the most vulnerable.

Emphasise the importance of water budgeting with a focus on water reuse and recycling.

Recognise soil moisture and utilize it as a tool for reduced water use. Ground irrigation scheduling on soil moisture and other measures to improve soil health.

Promote water-saving methods and technologies such as Direct Seeding of Rice (DSR), pre-monsoon sowing, etc.

Enhance the area under micro-irrigation technologies such as drips and sprinklers.

Develop financial mechanisms and incentives.

Provide affordable finance for sustainable solutions within the banking sector. The "Umbrella Programme for Natural Resource Management (UPNRM)" project from GIZ & NABARD is an example of combing a hybrid model of loans and capacity building.

Finance the products through NBFCs.

Explore a blended approach of outcome-based financing around soil, water, climate, GHG emission transitions together.

Pathways

KNOWLEDGE AND RESEARCH

Implementation (Contd)

Enable smallholder farmers financially through micro-credits.

Rainwater use efficiency is enhanced through decentralised water harvesting, promoting the revival of traditional water harvesting structures, spring rejuvenation, wastewater recycling, and soil moisture management.

Address the village or watershed level water and energy use footprint. Within this set, a clearer focus on aquifer management and storage.

Bring together progressively an ecosystem services approach in water management to augment the water supply through a watershed approach and demand-side management at watershed, sub-basin, and basin levels.

Support the formation of more river basin organizations (RVOs) as well as their management, governance, and institutional management.

Involve Gram Panchayats in the planning of technology-based approaches creating infrastructure for water use and storage.

Create innovative solutions for enhancing water efficiency and promoting the role of private sector players and CSOs.

Pilot water-efficient technologies for large-scale adaptation.

Examine the social barriers and enablers to change water use behavior - Gender, local water practices, and dietary preferences all shape what is grown and how. Use a value chain-based approach to increase the benefits of farmers.

Establish crop advisory services along with technology introduction to enhance an optimum return on farmers' investment. The private sector has a great role in this.

Scale up the adoption of smart irrigation scheduling technologies.

Administer climate-based information and advisory to farmers.

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