Irrigation Problems of India

Mains Syllabus: GS III - Different types of irrigation and irrigation systems.

Why in the News?

Recently , the 2020 Young Farmer Award recipient farmer , from Maharashtra, died by suicide, citing unaddressed irrigation demands.

What are the irrigation problems of India?

The agricultural sector accounts for almost 80% of the water withdrawal in India.

- **Accessibility Issue** - While India reports the highest water usage in agriculture globally, access to water for irrigation remains a contentious issue.
- **Inequitable Access** - The problem of water scarcity in India is multifaceted, indicating the co-existence of actual physical shortage with economic scarcity due to inequitable access and management.
- **Inequity in Distribution** - while inequity has declined in canal, tank, and well irrigated systems, it has increased in the tube well irrigated system.
- **Regional Disparities** - States like Punjab have high irrigation coverage (around 98%), while eastern and southern states have less developed infrastructure, leading to unequal access to water.
- **Social Inequalities** - Marginalised groups do not have adequate irrigation access for their crops.
- **Water Intensive Crops** - The majority of the area under water-guzzling crops such as rice, wheat, and sugarcane is currently in the water-scarce north-west and sub-tropical belts of the country.
- **Unsustainable Irrigation Expansion** - According to a study published in Nature Water (2024), India alone accounted for 36% of global unsustainable irrigation expansion that happened between 2000 and 2015.
- **Sub-optimal Water Use Efficiency** - While irrigation systems in India report an operating efficiency of 38%, in developed countries it is 55%.
- **Low Irrigation Water Productivity (IWP)** - Coupled with misaligned cropping patterns and inefficient water use practices, irrigation water productivity (IWP) has also remained low in the major irrigation belts of the country.
- For example, Punjab, which claims the highest land productivity in rice, has one of the lowest IWPs for the crop.
- Similarly, in sugar cane, Tamil Nadu records the highest land productivity with IWP being dismally low.

- **Decline of Groundwater Tables** – It is both the cause and consequences of unsustainable irrigation system.
- **Unpredictable Monsoons** - Indian agriculture heavily relies on the monsoon, which is becoming increasingly unpredictable and prone to delays due to climate change, affecting water availability for irrigation.
- **Inter-state Conflicts** - Irrigation in India is a state subject, leading to disputes between states over the sharing of river water, which can affect the planning and implementation of irrigation projects.

What are the impacts of irrigation issues?

- **Reinforces Existing Inequalities** - Even as irrigation has been proven to drive economic prosperity, various studies have reported that uneven progress has reinforced existing inequalities, between and within States.
- **Decline in Groundwater Table** - Due to over extraction, almost 17% of India's groundwater assessment units are deemed 'over-exploited' while 3.9% are in a 'critical' state.
- **GHG Emission** - Intensive pumping has also resulted in massive energy consumption resulting in excessive carbon emissions.
- As per the latest data, 45.3–62.3 MMT of annual carbon emissions is attributed to groundwater irrigation, which constitutes 8-11% of India's total carbon emissions.
- **Cropland Emissions** - With continuous flooding of rice as the major water management practice, paddy rice is the biggest contributor to global cropland emissions.
- **Soil Degradation due to Irrigation** - Improper irrigation practices can contribute to soil erosion, leading to the loss of fertile topsoil.

What is the way forward?

- Further attempts to improve the irrigation system of the country need to be built on efficient water-saving technologies, improved irrigation efficiency, and alternative sources of irrigation.
- Changes in cropping patterns and ground water usage regulations could be made through policy decisions.
- Advancing irrigation technologies and practices based on sustainable intensification can be prioritised.
- Better irrigation efficiency may be aimed through the improvement of conveyance and application efficiency of irrigation systems.
- In geographies where water withdrawals and GHG emissions have been highest, alternative water management technologies such as alternate wetting and drying, which can result in significant water saving and reduced emissions, may be popularised.
- Micro-irrigation systems such as drip irrigation, with minimal application losses, may be popularised in crops such as sugar cane.
- Solar-powered irrigation and/or bundling solar pumps with micro-irrigation systems can be promoted.
- However, with the marginal cost of pumping being zero, this should not result in

increased groundwater depletion and should be regulated through initiatives such as assured grid connection offering economic incentives for efficient utilisation.
- Rain water harvesting structures and tail water storage pits may be popularised as supplementary irrigation sources.

Reference

The Hindu | Irrigation Problems