Alternate Wetting and Drying (AWD)

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Why in news: Recent studies highlight that **Alternate Wetting and Drying (AWD)** in paddy cultivation **enhances water productivity**, **maintains high rice yields**, and **significantly reduces methane emissions**, making it a climate-smart rice production practice.

What is Alternate Wetting and Drying (AWD)?

1AWD is a **water-saving irrigation technique** used in **irrigated lowland rice**.

2Unlike continuous flooding, **paddy fields are intermittently dried and re-flooded** based on soil water conditions.

3It reduces water use **without compromising crop yield** when properly managed.

How AWD Works (Mechanism)

- After irrigation, water is allowed to **subside naturally**.
- Fields are re-irrigated only when the **water level drops to a specified depth below the soil surface** (often measured using a perforated field water tube).
- This cycle of **wetting and drying** continues until the flowering stage, after which shallow flooding is usually resumed.

Why AWD Reduces Greenhouse Gas Emissions

- **Methane (CH?)** in rice fields is produced due to **anaerobic decomposition** of organic matter under continuously flooded conditions.
- **Temporary drainage introduces oxygen**, disrupting anaerobic conditions.
- This **suppresses methane-producing microbes**, leading to **lower CH? emissions**.
- AWD can reduce methane emissions by **30–70%**, depending on soil and management practices.

Benefits of AWD

1Water Efficiency

- Saves **15–30% irrigation water**, improving water productivity.
- Particularly useful in **water-stressed regions**.

2Climate Mitigation:

- Reduces methane emissions, contributing to **India's climate commitments** (NDCs).

3Agronomic Advantages

- Maintains or improves yields if applied correctly.
- Encourages deeper root growth and better nutrient uptake.

4Economic Benefits

- Lower irrigation costs.
- Reduced pumping energy use.

Challenges in Adoption

1Requires **farmer awareness and training**.

2Needs **field-level monitoring** of water depth.

3Risk of yield loss if drying exceeds critical thresholds.

4Institutional support needed for large-scale adoption.

Relevance for India

1Rice is a **major water- and methane-intensive crop**.

2AWD aligns with:

o**National Mission for Sustainable Agriculture**

o**Climate-Smart Agriculture**

o**Water conservation goals**

3Important for states like **Punjab, Haryana, Telangana, Andhra Pradesh, and Tamil Nadu**.