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Reducing emissions and promoting agricultural resilience

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IWMI

International Water
Management Institute

Water has a large carbon footprint

- Emissions from water can be both natural and anthropogenic
- **Natural:** Streams, rivers, lakes, wetlands, etc.
- **Anthropogenic:** artificial reservoirs, water lifting, groundwater pumping, water treatment, wastewater systems, desalination, etc.
- Mitigation activities can focus on reducing emissions from both sources.



<https://www.valueofwater.ca/water-facts/how-do-our-water-systems-work/>

Preserving natural habitats in South-East Asia

MITIGATE +: Within the Low-Emission Food Systems activities in Vietnam, we looked at how preventing land conversion and mangrove forest restoration can mitigate emissions.

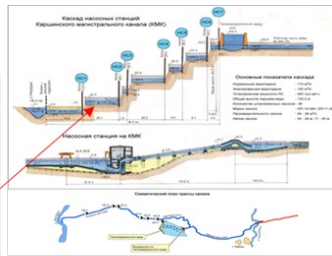
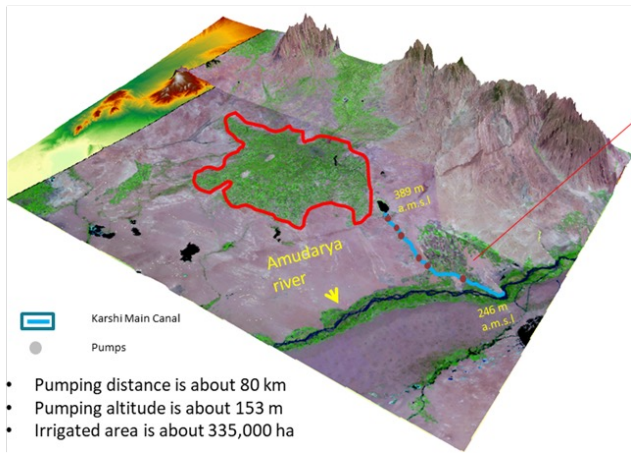
Model results show that preventing conversion of grassland (type of wetland) to rice, avoids release of about 214 t CO₂e ha⁻¹ over a 30-year period.

Similarly, mangrove forest restoration in Vietnam can lead to an annual average emissions saving of 13.7 t ha⁻¹ (cumulative savings of 412 t CO₂e ha⁻¹ over a 30-year period).



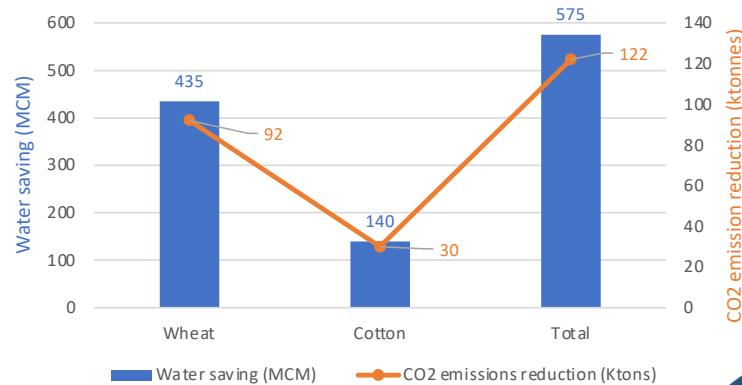
Improved irrigation practices in Central Asia

Within the USAID's Partnership for Enhanced Engagement in Research (PEER) program, we calculated that in Uzbekistan, better irrigation practices can reduce emissions associated with electricity use in pumped irrigated areas.



Results: reducing volume of lifted water through improved irrigation practices leads to reduced electricity use and smaller associated GHG emissions. 122 ktonnes of emissions can be prevented each year by improving irrigation practices in about 220,000 ha.

Potential savings from improved irrigation



Study area: Karshi Steppe, Uzbekistan





Impacts of Solar Irrigation in South Asia

Evidence from SDC-SoLAR

Mitigation

8 to 11% of South Asia's total carbon emissions come from groundwater pumping

- Evidence from the four countries has shown that SIP farmers are using less diesel, and that SIPs can be a viable mitigation strategy, if suitably scaled up.
- Capacity building interventions in India have been instrumental in improved energy outcomes.

Adaptation and resilience

Farmers in the region are highly vulnerable to the impacts of climate variability and change

- Evidence from Bangladesh, Nepal and Pakistan show farmers with SIPs are able to diversify their cropping patterns including e.g. to high-value orchard crops (Pakistan), summer paddy (Nepal).
- In India, capacity building on the use of SIPs (e.g. selling to the grid) has led to improvements in income generated.

GESI

Equity outcomes of SIPs are not well understood.

- Following engagement with the program, in Nepal, the AEPC has advocated for explicit selection criteria to prioritize women, marginal farmers, and smallholders in government subsidy disbursement.

Groundwater sustainability

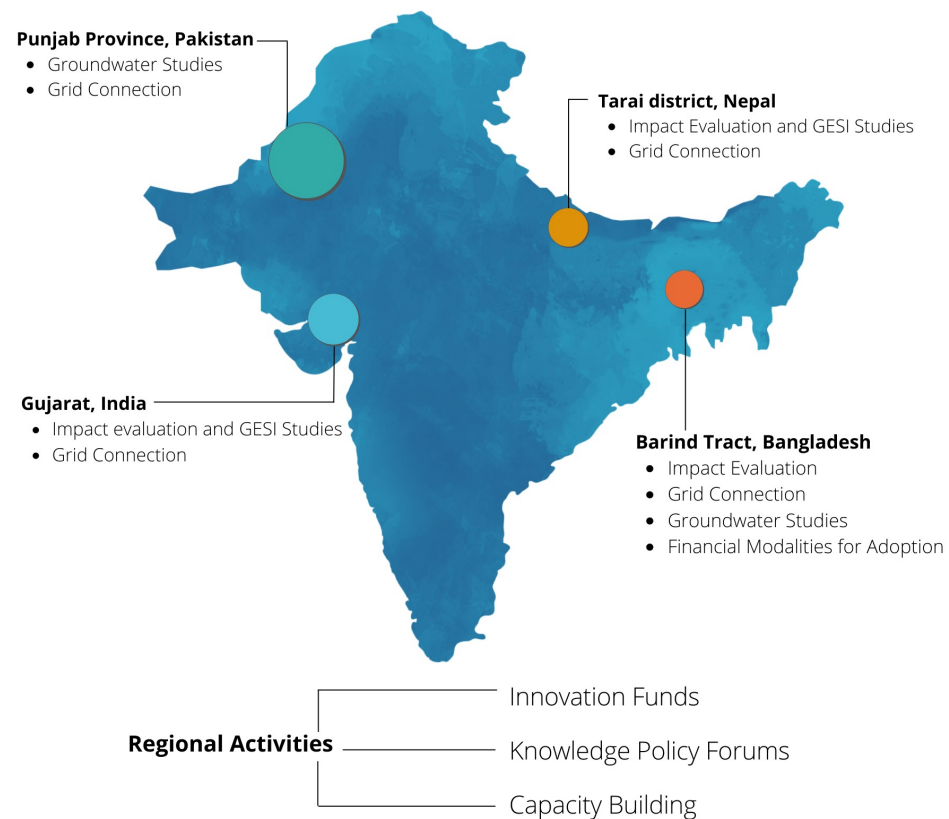
One of the key concerns raised against SIPs are the likely implications on groundwater over-abstraction, particularly in regions where there is scarcity.

- Early evidence from a one of its kind study from SoLAR in Bangladesh and India shows there is no substantial difference in groundwater application between solar and diesel/electric pumps. Further research on socio-economic outcomes is underway.

SoLAR and the wider policy environment

SoLAR is shaping clear shifts in policy - contributing to ambitious, inclusive and effective policy development.

- **Pakistan** – Research from SoLAR has contributed to recent huge investments by the Government of Pakistan;
- **Nepal** - Policy recommendations have been proposed for better subsidy disbursement and incentivizing grid integration, including higher buyback rate and selective net metering;
- **Bangladesh** - In June 2023, the Bangladesh government (PM) declared the aim to completely shift to solar energy, replacing diesel irrigation pumps;
- **India** – The 2019 PM-KUSUM scheme - a major initiative to add solar capacity of 30,800 MW by 2022 - has been extended to 2026. The team is working to support stronger implementation of the scheme.





Thank you

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