



SMART-SIP+: Beyond Irrigation

“Innovative approaches to downstream energy utilisation from solar irrigation pumps in Bangladesh”



(The project is led by Birmingham City University in partnership with Bangladesh Agricultural University and NGOs including Bright Green Energy Foundation and Water & Sanitation for Urban Populations. It is funded by UK Research and Innovation through the Ayrton Fund, which supports low-carbon innovation in developing countries.)

The Challenge: A Paradox of Surplus and Scarcity

Bangladesh faces a unique paradox.

On one hand, the country is rapidly expanding **solar irrigation pumps (SIPs)** to replace 1.2 million diesel pumps. 40 to 60% solar energy remains unused when irrigation is not required.

On the other hand, communities struggle to access safe and pure drinking water. Rural and Peri Urban communities mostly consume untreated contaminated ground water, which is affected by arsenic, iron and Fecal Coliform, etc.

The SMART-SIP+ Mission

SMART-SIP+ explores to demonstrate diversified options in support of productive uses of excess power from SIPs. The uses include running cold storage, EV charging station, water purification system, etc.

The project aims to turn solar irrigation systems into useful energy resources beyond irrigation

WSUP joins in this consortium to demonstrate the business model and viability of water purification and sale.

Our "Smart" Solution

SMART-SIP+ is developing a farm-based micro-energy system that uses surplus solar electricity to power community services.

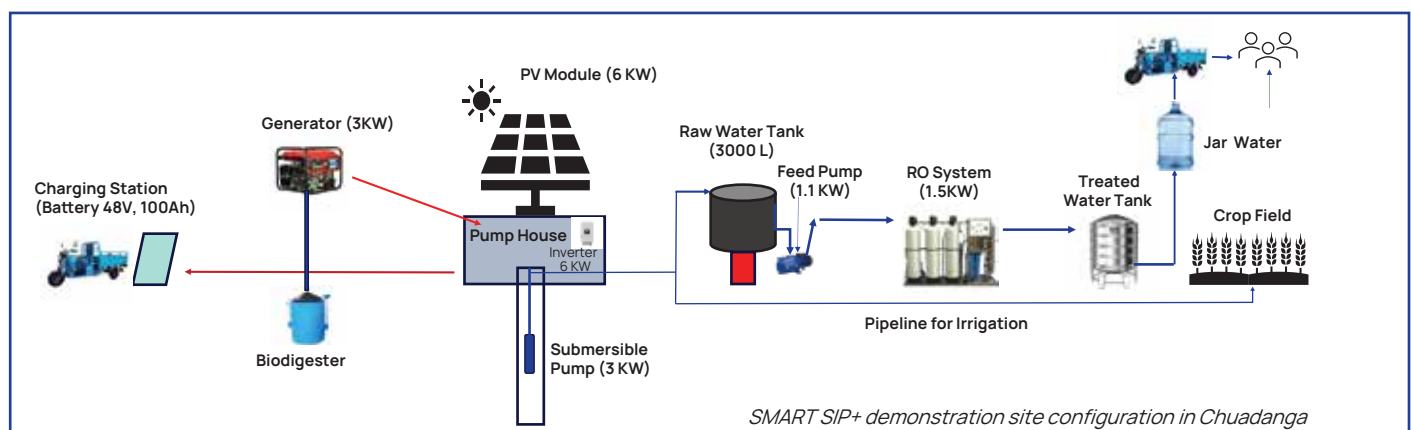
- o **Safe Drinking Water:** Solar-powered treatment systems using Reverse Osmosis (RO) and UV technology to produce 3,000–6,000 liters of safe drinking water per day, removing harmful contaminants such as arsenic, iron, pathogens, etc..
- o **Green Mobility:** Solar and biogas based combined powered battery charging system for electric delivery vehicles which will be used for distribution of purified water jars to consumers.
- o **Reliable Energy:** To ensure stable power even during cloudy periods or at night, the system integrates biogas-based electricity generation using locally available biomasses including municipal solid waste.

A Real-Time Learning Platform

SMART-SIP+ is a living research platform and will use IoT system to measure and track real time data on:

- ✓ Energy generation and use
- ✓ Water production and quality
- ✓ System performance
- ✓ Financial viability

This evidence-based decision support tools will influence policymakers, investors, and development partners for scaling up **SIP+ across Bangladesh and beyond.**





Demonstration Site: Go Green Centre

The SMART-SIP+ demonstration site is located at the Green Park, operated by WAVE Foundation. The park is for Agroecology learning hub. Surplus solar energy from irrigation pumps is being transformed into real community services.



What Happens at the Site

Solar-Powered Safe Water: Treatment systems provide thousands of liters of safe drinking water every day.

Clean Energy for Mobility: EV charging provision support battery charging for electric vehicle/ e-bikes used for water delivery.

Circular Economy Approach: Biomass will be collected and used for bio-electricity generation. This power will supplement for water purification and transport to consumers. This site demonstrates how rural solar infrastructure can support health, livelihoods, and climate solutions at the same time.



Creating New Opportunities

SMART-SIP+ also creates economic benefits for rural communities.

1. Additional Income for SIP Owners

Solar irrigation pump owners can earn additional income by providing electricity for water purification and sales.

2. Valuing Waste

Conversion of unused biomass will reduce open dumping and carbon emission and create opportunity for income and employment.

3. Local Green Businesses

SIP+ research will contribute to demonstrate the idea for green businesses around the nexus of water and energy



Impact That Matters

SMART-SIP+ delivers benefits across multiple sectors.

Public Health: Increased and doorstep access to safe drinking water reduces exposure to arsenic and other contaminants.

Gender Equality: Water delivery services reduce the time women and girls spend collecting water, allowing more time for education and economic activities.

Climate Action: Replacing diesel pumps and vehicles with solar and electric alternatives reduces



Influencing the Future of Clean Energy

SMART-SIP+ is a **36-month research initiative** that will generate practical evidence to support national and regional clean energy strategies.

The project will help:

- ✓ Inform Bangladesh's roadmap for expanding solar irrigation systems
- ✓ Support development of sustainable rural energy models
- ✓ Provide a scalable blueprint for millions of pumps across South Asia



Working Together for a Sustainable Future

SMART-SIP+ brings together international researchers, development organizations, and local partners to turn unused solar energy into real community impact.

By combining innovation, research, and local expertise, the project shows how rural energy systems can support health, livelihoods, and climate resilience at the same time.

