

POWERING PROGRESS: SOLAR IRRIGATION FOR WOMEN FARMERS IN RURAL INDIA



In this Good Practice Note, Sejal Agarwal explores how a Pay-Per-Use business model is transforming the lives of women farmers in eastern Uttar Pradesh by providing access to solar-powered irrigation services affordably and conveniently.

CONTEXT

In the eastern districts of Uttar Pradesh (India)—Bahraich, Barabanki, Hardoi, Sitapur, and Lucknow—women contribute significantly to farming, yet often without land titles, recognition, or voice. These areas face persistent challenges, including irregular rainfall, high diesel costs, and patriarchal norms that limit women's autonomy in farming tasks such as irrigation.

Traditional irrigation methods, such as diesel pumps, are expensive, hard to operate, and environmentally unsustainable. For women, the burden is heavier: carrying heavy pumps, storing hazardous fuel at home, and coordinating irrigation around male availability becomes both physically taxing and emotionally disempowering. This burden worsens when male family members migrate for work, leaving women dependent on neighbours or relatives to irrigate their fields.



A woman farmer irrigating her field using Oorja solar pump in Bahraich (Photo credit - Sharon Avraham)

Oorja, a social enterprise (see Box 1), addresses these issues by enabling access to [community-scale solar infrastructure](#), offering affordable, reliable, solar-powered irrigation.

Box 1: Oorja

Oorja is a Farming-as-a-Service (FaaS) company delivering clean energy solutions and advisory services to smallholder farmers in northern India through an affordable Pay-Per-Use (PPU) model. By offering solar-powered irrigation, Oorja replaces diesel-based alternatives, eliminating upfront costs associated with solar technology. This model makes clean energy accessible to farmers with less than 2 acres of land and annual incomes of around INR 60,000. Farmers also receive digital and in-person advisories on scientific and climate-smart practices, helping them maximize the benefits of irrigation, diversify crops, increase yields, and improve incomes.

GOOD PRACTICES

Oorja adopted a gender lens to ensure women farmers could access clean energy solutions. Key practices are described below.

Pay-Per-Use Solar Irrigation Service

Women farmers are often excluded from subsidies or capital-intensive technologies and need equitable, accessible solutions. Oorja's Pay-Per-Use system addresses this by eliminating upfront costs and charging users volumetrically—INR 2–4 per m³, varying by region. After irrigation, the pump operator notes flowmeter readings and collects payments accordingly. While payment is ideally made immediately, a two-week credit window adds flexibility.

This financial model empowers women by allowing them to access irrigation independently, without relying on male family members or incurring debt. In our annual impact assessment, 73% of women respondents (n=48) reported managing irrigation independently through solar pumps—a significant step toward autonomy.

A 47-year-old woman farmer from Rajapur, Bahraich, shares:

"I had to leave my children alone and couldn't keep up with household work. Today, thanks to Oorja's solar pump, I can cook on time, help my children study, and still manage my farm."



Women farmers in Bahraich (Photo credit - Sharon Avraham)

No Requirement for Land Ownership

To promote inclusivity, Oorja removed the requirement of land ownership for registration, recognizing that many women farm without having land titles due to customary inheritance practices. As a result, 18% of our registered users (n = 3,047) are women. We aim to increase this to 25% or more by 2027.

A woman farmer from Sarvantara shares how switching to solar irrigation reduced her diesel expenses and enabled her to grow a second crop, doubling her income:

“I no longer depend on anyone and have diversified my traditional cropping pattern. This has changed my life.”

Stories like these show that time saved is more than just convenience—women are gaining flexibility, confidence, and decision-making power at home and on the field.

Enhancing Technical Capacities

We provide climate-smart agricultural training to farmers, with 15–20% of current participants being women. These sessions cover seed selection, crop planning, soil health, input management, and water use efficiency—areas traditionally unfamiliar to many women.

Our in-house agronomist and farmer advisors, drawing from both digital knowledge and field experience, develop these modules. They conduct 1–2 hour in-person, group-based training sessions every 10 days, tailored to crop cycles and farmer availability. They also interact with individual farmers—both in person and digitally—on a daily basis, especially those who require special attention, with an emphasis on the needs of women farmers.



Oorja's Farmer Advisor training on scientific agricultural practices in Bahraich (Photo credit - Oorja)

To encourage participation, 43% of our farmer advisors are women, each with over five years of experience, creating a relatable and safe learning environment. We aim to raise women's participation in our training programs to over 30% next year.

Promoting Green Jobs

Oorja is also generating green jobs within villages. A local pump operator manages up to four pumps and earns a monthly honorarium plus a 20% commission on sales.

Currently, 3 of our 128 pump operators are women. We are actively working to train and recruit more, especially single mothers or sole earners, to take on these roles, which offer income, community respect, and personal growth.

OUR INTERNAL COMMITMENT TO GENDER EQUALITY

To better support women farmers, we aim to increase our women staff from the current 21% to over 30% by 2027. We uphold the [Sexual Harassment of Women at Workplace \(Prevention, Prohibition and Redressal\) Act, 2013](#) across all offices.

Gender sensitization workshops—both online and offline—help staff recognize gender roles, unconscious biases, and how they can become change agents in their personal and professional lives. We also promote inclusive leadership, ensuring women are involved in decision-making from the field to the boardroom.



Interaction with women farmers using Oorja irrigation services in Bahraich (Photo credit - Sharon Avraham)

END NOTE

Women in rural India have long held the knowledge and resilience needed to drive agricultural change. What they lacked were tools, recognition, and platforms. Oorja's mission is to put those tools in their hands and walk beside them as partners in change.

“For years, we worked from dawn to dusk in the fields and at home, but no one ever asked us what we needed.”

—A woman farmer, Bahraich, Uttar Pradesh

Too often, development efforts are “gender neutral,” treating men and women as if they begin from the same baseline. At Oorja, we strive to move from gender neutrality to a gender-responsive—and ultimately gender-transformative—approach, one that recognizes power imbalances and seeks to redress them at the root.

As India grapples with climate change and agrarian distress, including women in clean energy and agricultural transformation is not just morally right—it is strategically essential. Through solar irrigation, knowledge-sharing, and inclusive hiring, Oorja is lighting the path to empowerment for thousands of women.

“We always worked hard. But now, we also feel proud.”

—A woman farmer, Hardoi

And that pride is the seed of transformation.

Sejal Agarwal is an Impact Manager at Oorja with over six years of experience in gender, livelihoods, and poverty alleviation across for-profit and non-profit sectors. A graduate of the Indian Institute of Forest Management (IIFM, Bhopal), she previously worked with CRISP on digital agricultural extension for women farmers. At Oorja, she leads Gender Mainstreaming and Climate-Smart Farmer Advisory initiatives and monitors overall environmental and social impact. She can be reached at sejal.agarwal@oorjasolutions.org.

AESA Secretariat: Centre for Research on Innovation and Science Policy (CRISP)
Road No 10, Banjara Hills, Hyderabad 500034, India

www.aesanetwork.org

Email: aesanetwork@gmail.com