

# Agtech startups and the business ecosystem for agricultural water use in India

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March 2023



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**WATER**  
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GLOBAL INSTITUTE  
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# The business ecosystem for agricultural water use in India

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Nearly half of India's agriculture is irrigated, making it an ideal testbed for irrigated agtech business models. We see an increasing number of entrepreneurial ventures seeking to make an impact in the agricultural water sector to support smallholders. However, little information exists about the irrigation business ecosystem, limiting the ability of entrepreneurs and other stakeholders to understand challenges and take full advantage of opportunities. In order to address this, we identified and mapped startups and other stakeholders within the ecosystem.

There is a complex network of actors and organizations involved in supporting irrigated farmers in India, including a mix of:

**Government Organizations:** This includes public organizations, ministries and departments responsible for agriculture, horticulture, and rural development, government schemes and programs (such as Pradhan Mantri Krishi Sinchayee Yojna) at national and state levels, power provision, etc. They exercise a regulatory role, develop infrastructure, develop watersheds and make irrigation policies at the central and state level. Examples: the Ministry of Water Resources, State Departments of Agriculture, Central Ground Water Board, etc.

**Research and Development:** This category includes a variety of organizations that fulfill functions related to research, advocacy, development, and policy support to stakeholders in irrigated agriculture to implement programs and irrigation infrastructure. Some organizations such as The World Bank, GiZ India, Aga Khan Foundation, and others have research arms but also provide funding support in the sector.

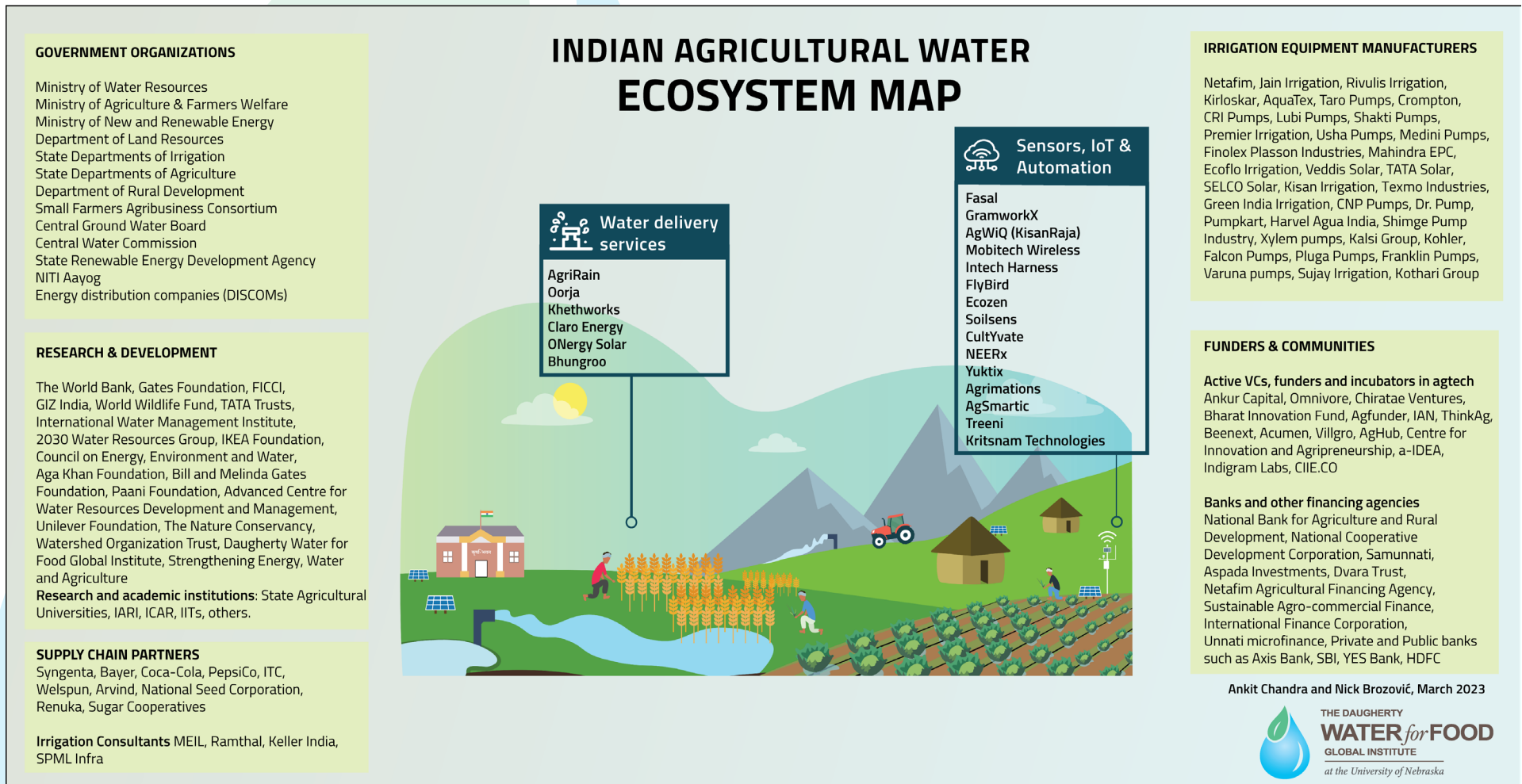
**Irrigation Equipment Manufacturers:** These are private irrigation companies that manufacture and distribute irrigation pumps, irrigation systems, and equipment to the end-user, mainly farmers. Examples: CRI Pumps, Jain Irrigation, Netafim, Kirloskar, Crompton, TATA Solar, etc.

**Startups:** In the startup category, we have irrigation agtech startups that are focusing primarily on innovation in agricultural water management. Examples: AgWiQ, Mobitech Wireless, AgriRain, GramworkX, NEERx, Fasal, Bhungroo and others.

**Funders and Communities:** There are several types of funders and investors in this category, including private equity firms, venture capital firms, angel investors, incubators and accelerators, impact investors, and others who are active in supporting agtech innovation ecosystems. Additionally, this category includes banking institutions, donors, and government funding sources. The National Bank for Agriculture and Rural Development (NABARD), for instance, provides irrigation system loans to farmers with government funding.

**Supply Chain Partners:** These include entities on both sides of the agricultural value chain (upstream and downstream), such as input providers, off-takers and contract farming businesses, irrigation advisory services, and consulting agencies. For example, Bayer's Better Life Farming alliance allows farmers to purchase seeds, crop protection inputs, and irrigation solutions, as well as provide improved market access. Some of these corporate entities also engage in agricultural water management through the lens of environmental, social, and governance goals. Also, some irrigation consultants are also included in this category.





**Figure 1: The business ecosystem for agricultural water use in India, illustrating major actors and organizations within the landscape**

The Indian agricultural water ecosystem map captures irrigation agtech startups, as well as the broader irrigation and agricultural ecosystem. It includes government agencies, private irrigation companies, researchers, advocates, offtakers, funders and communities. The scope of our understanding of the broader ecosystem is not intended to be exhaustive. We do not attempt to describe all the actors in detail. Instead, we will focus on irrigation agtech startups in this report.

Our study identified and mapped 21 agtech startups active in the Indian agricultural water use ecosystem (Figure 1), which includes 15 startups backed by private equity or venture capital. Private equity funders, VCs and accelerators such as Omnivore, Indian Angel Network, Acumen, Villgro, Indigram Labs, Center for Innovation and Agripreneurship, and others have an active presence in the ecosystem.

The irrigation agtech space is attracting investors, but the private investments flowing in the space have been low relative to the size of the industry. Finding traction can be hard for agtech startups because customer adoption of new technologies occurs around growing seasons, and there are only a limited number of these each year. This creates slower growth trajectories for agtech startups than in other sectors and reduces the appeal of agtech investments for many investors.

The irrigation agtech market has seen an investment amount of about \$52M over the last five years. The overall investment and transaction sizes are small; however, this does not necessarily represent the actual total investment in the space. This is because there are additional funding sources, such as grants, non-dilutive financing and philanthropic contributions, that are not fully captured by the available funding information.

Moreover, almost half of the irrigation agtech startups mapped here have female co-founders (Table 1). Beyond that, some of the startups actively promote women smallholder farmers under their mandate e.g., Bhungroo. Overall, the current level of gender inclusiveness within irrigation agtech startups is much higher than within the broader agtech startup community. While women have played an integral role in agriculture, a number of socio-economic hurdles have restricted their roles. However, technological intervention in agriculture has encouraged women to participate actively in the industry.

**Table 1: Irrigation agtech startups mapped in the ecosystem, with the amount of capital raised and founders’ details.**

Startups (H.Q.)	Company Description	Capital raised (in mm USD)	Founders (year established)
Oorja (New Delhi)	<ul style="list-style-type: none"> <li>A solar irrigation-based pay-per-use model to serve smallholder farmers, intended to reduce irrigation costs</li> <li>Also provides other post-harvest services to farmers, such as cooling and milling.</li> </ul>	1.3	Amit Sarogi & Clementine Chambon (2008)
Claro Energy (New Delhi)	<ul style="list-style-type: none"> <li>Designs, installs, and maintains solar-powered irrigation systems that are cost-effective, reliable, and efficient.</li> <li>Also offers solar energy solutions for commercial, industrial, and residential clients.</li> </ul>	3.1	Kartik Wahi and Soumitra Mishra (2012)
AgriRain (Hyderabad)	<ul style="list-style-type: none"> <li>Irrigation service provider that uses hose reels and rain guns to serve smallholder farmers in India and other countries.</li> <li>Key customers are farmers who cannot afford irrigation equipment.</li> </ul>	1.0	Sri Malladi (2017)

(Contd.)

Startups (H.Q.)	Company Description	Capital raised (in mm USD)	Founders (year established)
<b>Bhungroo (Ahmedabad)</b>	<ul style="list-style-type: none"><li>Harvests rainwater in an underground structure called “Bhungroo” meant to transport irrigation water through pipes as needed.</li></ul>	Bootstrapped	Biplab Ketan Paul and Trupti Jain (2011)
<b>Fasal (Bangalore)</b>	<ul style="list-style-type: none"><li>Provides IoT/AI-based crop monitoring and irrigation solutions to farmers.</li><li>Products include sensors that measure soil moisture, temperature, and humidity, as well as controllers that automate irrigation systems based on crop needs.</li></ul>	5.7	Ananda Verma and Shailendra Tiwari (2018)
<b>GramworkX (Bangalore)</b>	<ul style="list-style-type: none"><li>IoT and sensor-based farm management solution that helps farmers guide, optimize, and monitor agricultural water use.</li><li>Offers analytical insights into crop water use patterns and irrigation automation.</li></ul>	1.0 (Merged/ Acquired)	Kumarapuram Gopalakrishnan & Supriya Ananthakrishnan (2019)
<b>AgWiQ/ KisanRaja (Bangalore)</b>	<ul style="list-style-type: none"><li>Provides a combination of hardware and software-based irrigation management.</li><li>AgWiQ’s KisanRaja is an interactive voice response irrigation automation device that helps farmers control their irrigation pumps remotely.</li></ul>	Undisclosed	Vijay Bhaskar Reddy (2010)
<b>FlyBird (Hyderabad)</b>	<ul style="list-style-type: none"><li>Provides precision irrigation solutions to farmers.</li><li>Offers soil moisture sensors, automated irrigation systems, and data analytics tools that help farmers optimize their water use.</li></ul>	1.01	Satish KS and Shwetha Rangaswamy (2018)
<b>NEERX (Ahmedabad)</b>	<ul style="list-style-type: none"><li>Offers agribusinesses and farmers sensors for soil and crop monitoring (called “Shool”) that require no internet connectivity to address irrigation, fertilizer needs, and salinity.</li></ul>	0.15	Harsh Agrawal and Nikita Tiwari (2019)
<b>Yuktix (Bangalore)</b>	<ul style="list-style-type: none"><li>Offers the Gidabits crop management solution that estimates ET-based crop water requirements and helps automate irrigation on farms.</li><li>Provides solutions for disease/pest management and soil health using IoT/automation.</li></ul>	0.13	Rajeev Jha and Shailendra Singh (2013)
<b>Agrimations (Nashik)</b>	<ul style="list-style-type: none"><li>Provides farmers with precise and automated irrigation and fertigation systems.</li></ul>	Undisclosed	Ajit Ingle (2018)
<b>AgSmartic (New Delhi)</b>	<ul style="list-style-type: none"><li>Offers hardware (sensors) and software (Croplytics) for smallholders and polyhouse farmers, that captures soil-moisture data to provide real-time insights into water requirements of crops for scheduling irrigation and disease management.</li></ul>	0.02	Rashi Verma, Abhishek Verma and Nupur Bhatnagar (2017)

(Contd.)

Startups (H.Q.)	Company Description	Capital raised (in mm USD)	Founders (year established)
<b>Mobitech Wireless (Erode)</b>	<ul style="list-style-type: none"><li>Offers a suite of irrigation automation products to smallholders and large farmers such as cell phone based pump starters, drip irrigation valve controllers, wireless generator monitors, and fertigation automation.</li></ul>	Bootstrapped	SP Rajakumaran (2010)
<b>Intech Harness (Pune)</b>	<ul style="list-style-type: none"><li>Provides farmers with IoT-enabled pump controllers for electric pumps that can also log data from the field to the cloud directly.</li></ul>	Undisclosed (pre-seed)	Tarang Patel and Priya Patel (2019)
<b>Ecozen (Pune)</b>	<ul style="list-style-type: none"><li>Offers solar-powered cold rooms (Ecofrost) and a range of energy-efficient irrigation systems and irrigation pump controllers (Ecotron) that help farmers to optimize their water use and increase crop yields.</li></ul>	36	Devendra Gupta, Prateek Singhal, and Vivek Pandey (2010)
<b>Soilsens (Mumbai)</b>	<ul style="list-style-type: none"><li>Provides tools to agribusinesses, universities and others to help make decisions about precise application of water and fertilizer.</li><li>Offers smart moisture meters for precise irrigation and NutriSens for onsite soil health (nutrients, pH, EC) analysis.</li></ul>	0.12 (grants)	Rajul Patkar, Vinay Palaparthy, Jobish John and Mangesh Gurav (2017)
<b>Cultyvate (Bangalore)</b>	<ul style="list-style-type: none"><li>Provides irrigation, fertigation and polyhouse automation support for commercial and horticultural farmers using a suite of sensors, IoT, remote sensing, cloud analytics and on-field support.</li></ul>	0.75	Mallesh TM, Bhavana Mallesh, and Arun Raveendran (2016)
<b>Treeni (Pune)</b>	<ul style="list-style-type: none"><li>Provides water management and irrigation solutions to businesses and governments.</li><li>Products and services include water audits and ESG reporting to build enterprise resilience.</li></ul>	N/A	SP Rajakumaran (2010)
<b>Kritsnam (Hyderabad)</b>	<ul style="list-style-type: none"><li>Offers ultrasonic water flow meters (called Dhara Smart) that help audit water flow, pump run time and use for tracking and ESG reporting.</li></ul>	0.8	Sri Harsha, Pruthvi Sagar, Vinay Chataraju and Niraj Roy (2015)
<b>Khethworks (Mumbai)</b>	<ul style="list-style-type: none"><li>Provides smallholder farmers with low-cost and efficient solar irrigation kits (a submersible centrifugal solar pump, a controller and two solar panels) for irrigation access.</li></ul>	1.0	Katie Taylor and Victor Lesnieweski (2015)

## This brief will detail four entrepreneurial models:

- 1 AgWiQ/KisanRaja
- 2 GramworkX
- 3 AgriRain
- 4 Oorja

### 1. AgWiQ/KisanRaja

With more than 55,000 customers, AgWiQ provides a combination of hardware and software-based irrigation management. In particular, AgWiQ's KisanRaja is an interactive voice response irrigation automation device that helps farmers control their irrigation pumps remotely to conserve water and energy. With AgWiQ, farmers can communicate using their mobile phones to turn their irrigation valves on and off. The innovation mainly caters to farmers housed at a distance from their fields who want to manage irrigation remotely. Their automation devices alert the farmer when the water level goes down in the borewell, when there are voltage/power fluctuations (a potential cause of irrigation pump failure), or when there is an attempt to vandalize the device.

#### Key Pain Points

- Farmers housed far away from their fields to manage their irrigation pumps effectively
- Erratic power supply
- Pump failure or motor burn due to faulty power conditions
- Groundwater shortage
- High labor cost for managing irrigation

#### Value Proposition

- Remote control irrigation pump using a mobile phone; reduce recurring labor costs
- Reduce water and energy use, and associated costs

#### Key Customers

- Farmers who want to manage their irrigation remotely
- Development Organizations (GiZ India, NABARD, etc.)

#### Distribution channels

- Retailer channels (BigHaat, Amazon, etc.)
- Rural entrepreneurs distributing products through local agriculture retailers and shops

#### Revenue model

- Sale of irrigation pump and valve controlling IoT devices
- Freemium irrigation management subscription



## 2. GramworkX

GramworkX is an IoT and sensor-based farm resource management solution that helps farmers guide, optimize, and monitor agricultural water use. GramworkX claims to decrease water and energy use and improve crop yield by providing analytical insights into crop water use patterns and irrigation automation.

### Key Pain Points

- Over or under irrigation resulting in low crop yield
- Excessive input use resulting into less net profits
- Lack of standards and procedures (good agricultural practices, etc.) for corporate compliance

### Value Proposition

- Data-driven irrigation decision making
- Improved crop yield, productivity, quality (grade), and overall farm management

### Key Customers

- Medium to large farmers, especially horticultural farmers
- Agribusiness companies and Farmer Producer Organizations (FPOs)

### Distribution channels

- Word of mouth: influential farmers
- Co-operatives, FPOs
- Ag retailers

### Revenue model

- Selling hardware and software solutions
- Subscriptions for farm management insights (weather, API, NDVI package, etc.)



### 3. AgriRain

AgriRain is an irrigation service provider that uses hose reel and rain gun technology to serve smallholder farmers in different parts of India and several other countries. Their primary customers are farmers who cannot afford irrigation equipment. AgriRain deploys in-house trained water entrepreneurs on fields. These micro-entrepreneurs help farmers make irrigation decisions based on local weather, soil, and crop parameters. AgriRain uses low-cost handheld soil moisture sensors to measure the soil moisture content and schedule irrigation.

#### Key Pain Points

- Smallholders cannot afford irrigation equipment
- High irrigation and maintenance cost
- Low crop yield due to over or under irrigation

#### Value Proposition

- Affordable access to irrigation with no capital or training costs
- Increased cropping area in the dry season, supplemental irrigation in the wet season
- Data driven irrigation scheduling and advice

#### Key Customers

- Smallholder and large-scale farmers
- Co-ops and FPOs
- NGOs & development organization (Syngenta Foundation, National Seeds Corporation, etc.)

#### Distribution channels

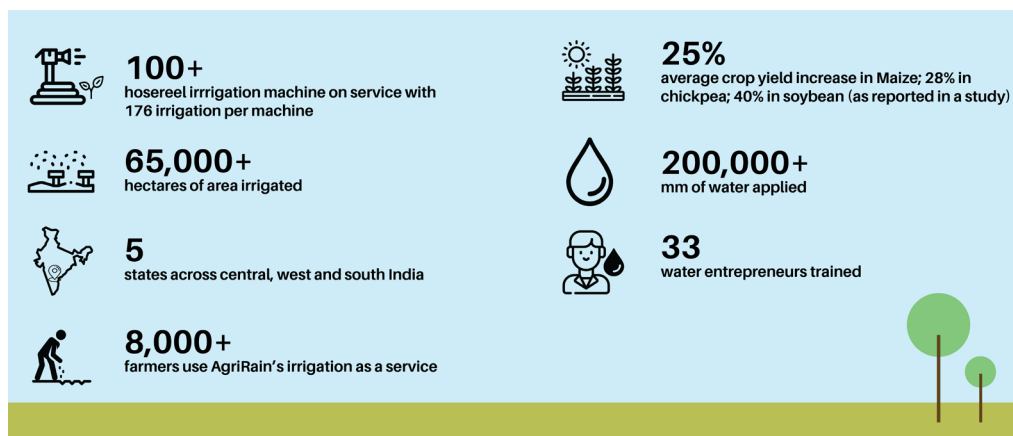
- Large-scale farmers and local operators (water entrepreneurs)
- Dealers & distributors: seed, fertilizer, ect.
- FPOs, Government, NGO facilitation and donors

#### Revenue model

- Irrigation fee charged based on the applied water volume
- Sale of equipment to large-scale farmers or FPOs or NGOs

*It's important to note that some of AgriRain's key customers are also their distribution channels such as NGOs and government agencies. This kind multi-sided business models aim to benefit a large number of farmers by piggybacking on their distribution network.*

In India, AgriRain has worked with 20 different crops in several agro-climatic zones. In research conducted by AgriRain in 2018, the findings reported that using their irrigation method resulted in a 25% higher crop yield for maize and a 28% higher crop yield for chickpeas compared to flood irrigation.



Current as March 2022

## 4. Oorja

Oorja is a social enterprise that leverages a solar irrigation-based pay-per-use model to serve smallholder farmers, mainly in Northern and Eastern India. Their offerings intend to reduce irrigation costs and decrease the dependency on diesel pumps by leveraging clean energy. They install, operate, and maintain solar irrigation pumps, which are each shared by 15 to 20 smallholder farmers. Oorja also provides other post-harvest services to farmers, such as cooling and milling.

### Key Pain Points

- Affordability of irrigation and reliance on diesel pumps (high energy costs)
- Dependence on rainfall; climate change has led to crop failures and yield losses
- Borewell failure due to groundwater depletion

### Value Proposition

- Pay per use solar irrigation
- Additional post-harvest management solutions

### Key Customers

- Groups of smallholder farmers with less than 2 acres in north or east India

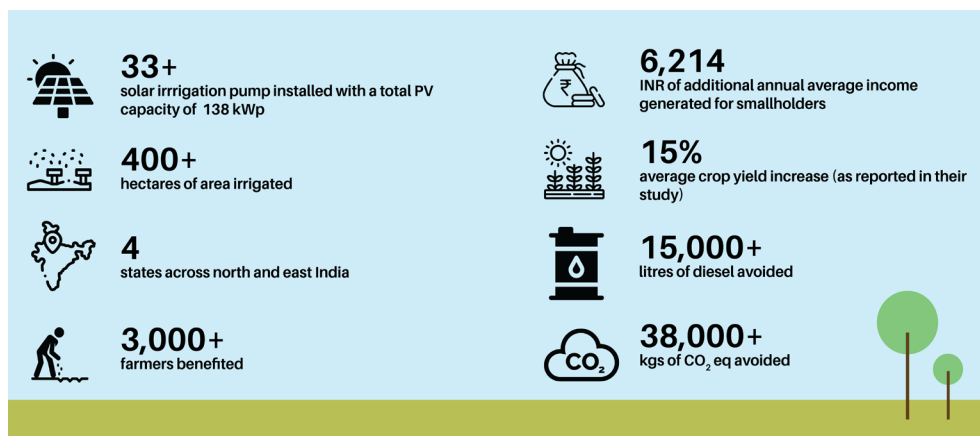
### Distribution channels

- Local partners and NGOs (Village panchayats, Aga Khan Foundation, Tata Trusts, etc.)
- Institutions: FPOs, co-ops, government

### Revenue model

- Irrigation fee charged based on the applied water volume
- Bundled post-harvest services such as cooling and milling
- Annual subscription fee for FPOs

Oorja conducted a study in March 2021. Their customers cited cheaper water for irrigation and year-round service availability as the main benefits of Oorja's offering. Oorja's analysis suggested that their customers achieved an additional annual income of INR 6,241 (~\$75) per farmer (representing about a 29% increase) and saved around INR 4,590 (~\$55) per year on diesel fuel for irrigation. In an inter-seasonal analysis, the study reported a 15% average increase in crop yield. The study also observed that the Oorja farmers started growing new crops such as potato and peppermint during a new, third growing season which didn't exist before due to lack of irrigation affordability and accessibility.



Current as March 2022

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## Citation

Chandra, A., Brozović, N. 2023. Daugherty Water for Food Global Institute. Agtech startups and the business ecosystem for agricultural water use in India. 12 p.

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The University of Nebraska founded the Daugherty Water for Food Global Institute in 2010 to address the global challenge of achieving food security with less stress on water resources through improved water management in agricultural and food systems. The institute is committed to ensuring a water and food secure world while maintaining the use of water for other vital human and environmental needs. The institute's approach is to extend the University of Nebraska's expertise through strong partnerships with other universities and public and private sector organizations. DWFI develops research, education, and engagement programs in a focused effort to increase food security while ensuring the sustainability of water resources and agricultural systems. The institute works locally and internationally, bridging the water and agriculture communities and worlds of small- and large-holder farmers to deliver innovative solutions to this complex global challenge.

See the DWFI website for more information at [waterforfood.nebraska.edu](http://waterforfood.nebraska.edu), stay informed through the institute's Facebook page at [facebook.com/waterforfoodinstitute](https://facebook.com/waterforfoodinstitute), Twitter [@water4food](https://twitter.com/water4food), Instagram [@waterforfood](https://instagram.com/waterforfood), and YouTube [@waterforfood](https://youtube.com/waterforfood).

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