



OORJA IMPACT REPORT 2022

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INTRODUCTION

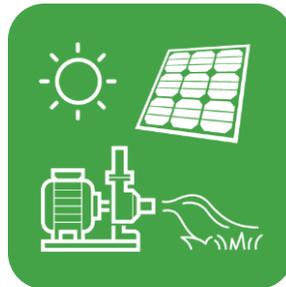
Oorja is a Farming as a Service company working at the intersection of sustainable agriculture and renewable energy. It provides solar-powered services of irrigation, milling and cooling and climate-smart farm advisory to smallholder farmers who were previously reliant on diesel engines for their on-farm energy needs.

Oorja offers a climate-smart platform for smallholder farmers to become profitable and sustainable. We have pioneered the Pay Per Use business model in the agriculture sector. Oorja installs and maintains community-scale solar infrastructure at the farm and sells farming services that are affordable, inclusive, reliable and low-carbon.

OUR SERVICES

Irrigation-as-a-Service:

A solution for farmers to increase their income by saving on diesel fuel for irrigation and growing crops year-round.



Cooling-as-a-Service:

A solution for traders and farmers to increase their income by keeping their produce fresh for longer and reducing food waste.



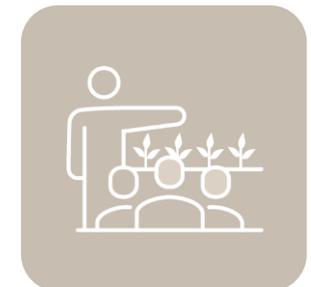
Milling-as-a-Service:

A solution for farming households to save time and money by milling their grains and spices cost-effectively at the village level.



Farm Advisory:

A solution for farmers to increase their productivity and income and increase efficiency of input use by learning and adopting climate-smart agricultural practices.



VISION

To ensure that every farmer can grow crops profitably and sustainably to achieve a better standard of living.

MISSION

To empower 1 million farmers globally by 2030 with the agricultural services they need to sustainably increase their income and quality of life.



VALUES



IMPACT MODEL

- Food security
- Gender inclusion
- Reduced inequalities

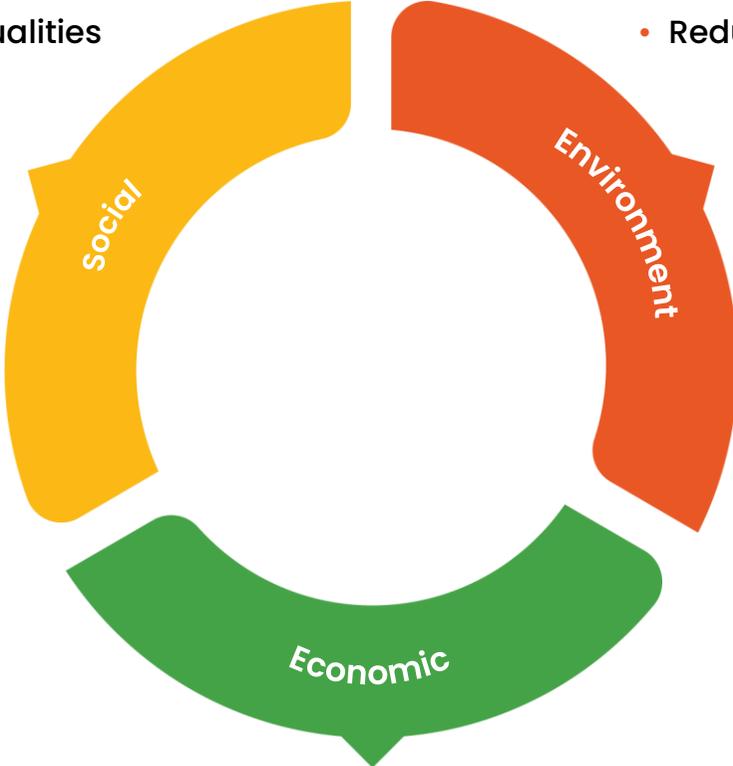
- GHG emissions reduction
- Climate resilience
- Reduction in food waste



SDG 5
Gender Equality



SDG 10
Reduced Inequalities



SDG 7
Affordable and Clean Energy



SDG 13
Climate Action

- Cost saving
- Increase in crop yield
- Crop diversification
- Job creation
- Strengthened livelihood
- Increased income



SDG 1
No Poverty



SDG 8
Decent work & Economic growth

ENVIRONMENTAL



Switching from diesel fuel to solar power reduces fossil fuel consumption, greenhouse gas emissions, and improves air quality.



Deploying clean energy infrastructure helps achieve renewable energy targets and promotes a just, equitable, and sustainable energy transition for rural communities.



Training on climate-smart agriculture saves water and chemical inputs, promotes sustainable practices and natural resource stewardship, including responsible use of groundwater.



Access to refrigeration helps reduce post-harvest food losses by extending the shelf life of produce and reducing food spoilage.



Farmers become more resilient to climate shocks by accessing expert agronomy advisory on appropriate seed varieties and sowing time to adapt to extreme weather, as they adapt and become more resilient to climate change.



ECONOMIC



Access to affordable energy sources reduces fossil fuel expenditure and hence the cost of cultivation.



Localized and timely irrigation meets water needs of crops, increasing crop yields and boosting farmers' productivity by transitioning from rainfed to irrigated agriculture.



Farmers can diversify into high-value crops such as okra, brinjal, peppermint, garlic, onion, and chili, which have a higher market price than traditional crops.



Farmers can expand from two to three cropping seasons, including the potentially lucrative zayed (summer) season, to grow crops year-round and increase farm profits and income.



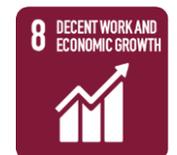
Doubling household income from farming reduces poverty in underserved rural areas and enables investment in critical services such as health and education.



80% of jobs we create are customer-facing roles in rural areas, providing job opportunities within communities.



Women farmers save time and money on post-harvest processing activities.



SOCIAL



Promoting diverse crop cultivation, including vegetables, herbs, and fruits alongside traditional crops, can boost cropping intensity and enhance household consumption of nutritious foods, thereby improving food security for the entire community.



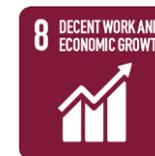
Technology adoption by female farmers and promoting employment opportunities for rural women can improve gender equality even in patriarchal environments.



Access to reliable energy sources can reduce farmers' drudgery and stress by eliminating the need to travel and purchase diesel fuel or haul heavy diesel pumps to their fields.



Targeting low-income and marginalized users, who often lack access to technology that could improve their lives and livelihoods, can lead to reduced inequality.



THEORY OF CHANGE

Problem: Lack of access to clean, affordable and reliable energy for productive use in rural communities

Solution: Build and install distributed solar systems and sell farming services to small and marginal farmers

Stakeholders:

Primary: Founders, Employees, Customers, Suppliers

Secondary: Community Members, Local NGOs, Investors, Board Members, Advisors, Technology Suppliers, Partners.

Inputs:

Investment and working capital, solar equipment, human resources, business operations, training

Activities:

Finance, install, own, operate and maintain solar equipment, train field staff, acquire customers, supply farming services, collect payments and data, provide customer servicing

Outputs:

- # of systems installed (kWp)
- # of customers
- # of farmers trained
- Savings from replacement of fossil fuels
- Increase in cropping cycles
- Increase in produce quality
- Increase in produce shelf life
- Involvement of women

Indicators:

- # of farmers receiving farming services
- Water /milling / refrigeration delivered (m³ / kg / crates); asset utilisation
- Crop varieties and growing seasons reported by customers
- Agricultural productivity and income reported for customers
- # of jobs created
- GHG reductions from decrease in diesel or other fuel use
- Reduction in use of chemical inputs

Outcomes:

- Higher crop yields and greater income within farms
- Creation of direct full-time local employment
- Reduced diesel consumption and GHG emissions
- Reduced chemical input use

KEY IMPACT INDICATORS



Number of direct and indirect users



Crop yields and seasons



Farmer income



GHG emissions saved



Jobs created

Our impact indicators are aligned with the IRIS metrics (GOGLA standardised metrics).



OUR METHODOLOGY

Oorja conducts annual impact assessments to measure the social, economic and environmental impact of our services on customers. These assessments allows us to measure and monitor farmers' agricultural productivity, cropping patterns, use of inputs, income and livelihood improvements before and after accessing Oorja's services. We aim to measure the depth and scale of impact experienced by our customers, monitor whether we are achieving our goals, identify the gaps and address them to deepen the impact.



Impact evaluations are conducted pre-intervention (baseline) and annually



In-person data collection for better reliability



Collection of quantitative data using semi-structured interviews using a cohort study (customers vs comparison group)



World Bank's multi-tier approach (ESMAP) used to measure energy access



Data is gender-disaggregated where possible



GHG mitigation potential calculated based on off-grid solar replacing diesel



Target sample of customers surveyed: **15%**



Impact numbers displayed live on Oorja website: www.oorjasolutions.org

2022 SURVEY

Oorja conducts an annual impact assessment on a subset of its customers (treatment group) and non-customers (comparison group). A snapshot of the 2022 survey is given below.

Frequency:

ANNUAL

Sample size:

**150 RESPONDENTS
(100 CUSTOMERS,
50 NON-CUSTOMERS)**

Reporting period:

**RABI (OCT 2021- MAR 2022),
ZAYED (APR - JUN 2022),
KHARIF (JULY-OCT 2022)**

Scope:

**IRRIGATION AND
MILLING SERVICES**

Geography:

**19 VILLAGES IN
BAHRAICH DISTRICT,
UTTAR PRADESH, INDIA**

Data collection period:

**NOVEMBER -
DECEMBER 2022**

Baseline assessment:

2020



BENEFICIARY PROFILE: IRRIGATION & MILLING CUSTOMERS

Gender

7%

Female

93%

male

Education level

- No formal education:  **30%**
- Primary education:  **19%**
- Secondary education:  **42%**
- Graduate or above:  **9%**

Traditional crops grown:

**Rice, wheat,
maize**

Average age:

45

years

Landholding:

1.94

acres

Household size:

6-7

members

Primary occupation:

Agriculture

Secondary occupation:

**Shop owner,
labourer**

Land fragmentation:

**Moderate
(1.7 plots)**



IMPACT AREAS & RESULTS



CROP DIVERSIFICATION

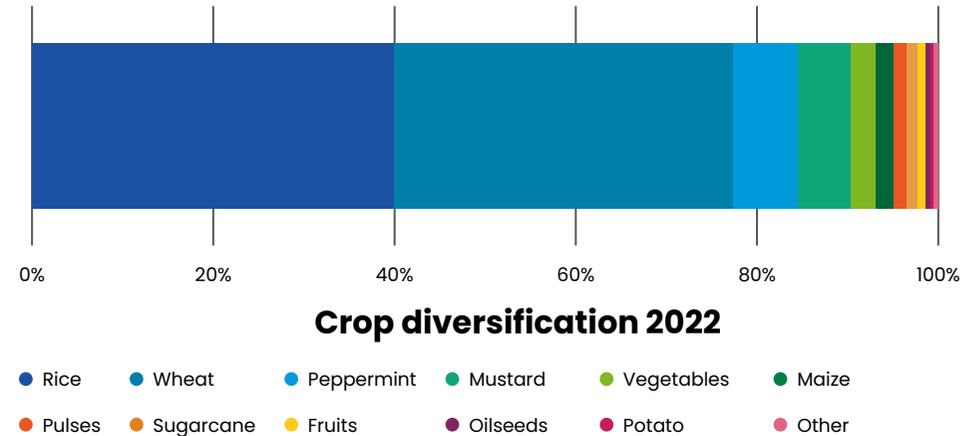


With access to affordable and reliable solar irrigation, farmers can grow crops year-round and diversify. Oonnati irrigation customers have diversified from 2-3 traditional crops to 15+ varieties of crops including garlic, peppermint, potato, onion, sugarcane, okra, chili, coriander, tomato, cauliflower, spinach, coriander, pointed gourd, bitter gourd, and many more.

Average number of crop varieties grown in one year

	2020	2021	2022
Customer	2.3 (± 0.5)	3.3 (± 0.8)	3.3 (± 1.2)
Comparison	2.0 (± 0.0)	2.0 (± 0.0)	2.2 (± 0.5)

Percentage of farmland dedicated to crops between start of Rabi 2021 and end of Kharif 2022 (Customers)



More farmers were able to expand from two to three growing seasons. 47% of customers grew a zayed crop in the summer season from April to June 2022. This is a lucrative season to grow high-value crops, but it requires frequent irrigation.

Proportion of farmers growing zayed crop

	2020	2021	2022
Customer	9%	65%	47%
Comparison	0%	0%	8%

PRODUCTIVITY & INCOME GROWTH

Average yield change from 2021 to 2022 for Oonnati customers



Agricultural income by season

Income per farmer (NB. Does not factor in differences in acres cultivated and household size).

	2021				2022			
	Kharif	Rabi	Zayed	TOTAL	Kharif	Rabi	Zayed	TOTAL
Treatment	28,776	26,460	20,207	75,443	42,046	42,264	11,820	96,130

Overall change in income **INR 20,687 per farmer | 27% increase in 1 year**

INCENTIVE TO MOVE TO CLEAN ENERGY

Decreased reliance on diesel pumps



Current source of irrigation for farmers	Treatment Group (%)	Comparison Group (%)
Solar pump	98%	0%
Diesel or petrol pump	4%	66%
Electric pump	1%	40%
Rainfed	0%	0%

96%
of Oonnati
customers
stopped using
diesel pumps

97%
lower diesel
consumption
by farmer group

From
69
litres/year to
<2
litres per year
per farmer

GREATER CONVENIENCE & SATISFACTION

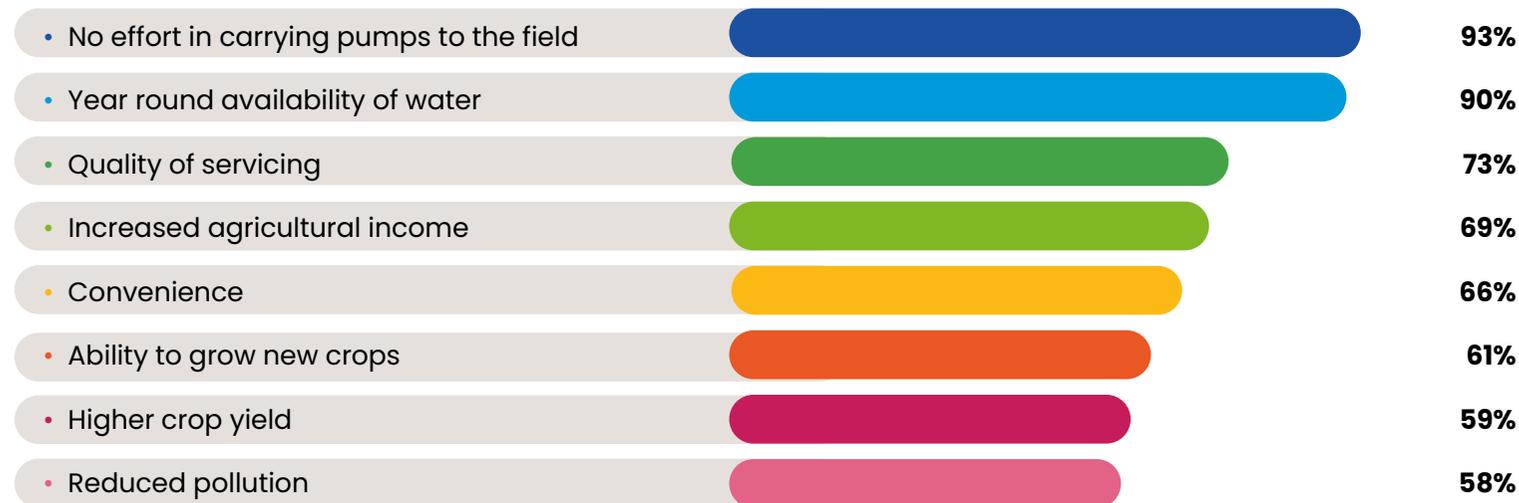


Farmers' perception of...

● Solar ● Diesel



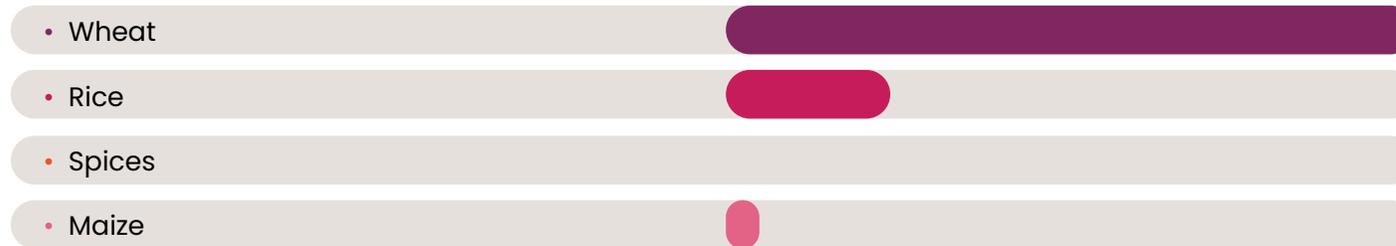
Benefits experienced by Oonnati customers



LOCALISED SERVICES



Produce milled by farmers in 2022



Users' perception of...



Benefits experienced by Oojjwal customers



GENDER EQUITY

WOMEN AS A CUSTOMER GROUP

In 2022, Oorja started working towards gender mainstreaming in its farming services. The 2022 impact assessment questionnaire focussed on capturing the impact of irrigation and milling services on women farmers.

Average income of women farmers from income-generating activities:
INR 3,760

Sources of income:



Stitching



Cooking
mid-day meals



Running
a shop



Selling milk
and vegetables

13%

of women are part of a women's self-help group (SHG)

84%

of women farmers having at least one household member who is an Oonnati member had used the irrigation service at least once



CUSTOMER TESTIMONIALS

“Previously, we could not irrigate our land on time as diesel pumps required a lot of manual labour on operation and maintenance. Now we can grow high-value crops which give us higher yield with less investment.”- **Ajay Kumar Verma, Gandhaura village, Bahraich district, Uttar Pradesh**



“The quality of wheat flour processed from Oorja’s mill is refined and so much better than that from the diesel mill. There is no comparison in terms of quality.” – **Chunnu, Kishunpur Mafi village, Bahraich district, Uttar Pradesh**



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APPENDIX:

MULTI-TIER APPROACH TO MEASURING ENERGY ACCESS

We use the World Bank's multi-tier approach to measuring energy access.

	Tier 1	Tier 2	Tier 3	Tier 4	Tier 2
Capacity	≥3 W	≥50 W	≥200 W	≥ 800 W	>2 kW
Duration	4–8 hours		8–16 hours	16–22 hours	>22 hours
Reliability	Unreliable energy supply			Reliable energy supply	
Quality	Poor quality of energy supply			No voltage problems	
Affordability	Unaffordable energy supply		Basic service costs less than 5% of household income		
Legality	Illegal energy supply			Legal energy supply	
Health and safety	Unhealthy and/or unsafe			Absence of accidents	
Use of appliances	Task lighting and phone charging	General lighting, charging + TV/fans	Tier 2 + medium-power appliances	Tier 3 + high-power appliances	Tier 2 + very high-power appliances
Daily consumption (kWh)	≥12	≥200	≥1,000	≥3,425	≥8,219
Annual consumption (kWh)	≥4.5	≥73	≥365	≥1,250	≥3,000