GRAM OORJA

GROUP IRRIGATION IN REMOTE COMMUNITIES

June 17, 2020
ACEF
Who are we?

Gram Oorja fulfils the electricity, cooking fuel and water needs of tribal communities in the remote regions of India. We have set up over 280 community scale projects impacting over 70,000 lives.

Our Solutions

- Micro-Grids: 69+
- Solar Pumps: 145+
- Biogas Cooking Grids: 7

Where?

In villages all across the tribal belt of India
Where we work
Where we work
Circle of Success

- Preferably to communities
- Ownership Transfer
- Community Interaction
- Design for Aspirations
- Metering for every user

To ensure sustainability and discipline

Determined by ability to pay

Deep community interaction through social organizations

Tailor-made solutions
Accomplishments

• Every project has a local governing body set up for the villages by the villagers.
• Over 90 percent of projects set up are operational and continue to serve the communities.
• Earliest micro-grids and pumping systems over 8 years old.
• Independent assessment by third party evaluators show a high degree of customer satisfaction, technical, economic and institutional sustainability.
Challenges faced by Farmers

• Inaccessibility and remoteness
• Water availability and usage for second crop
• High cost and unavailability of diesel
• No grid extension till farm or water source
• Unreliable supply of electricity
SOLUTIONS

निमित्तमात्रं भव

Be only an instrument
Community Interaction

- **Understand** the socio-cultural reality and needs in each community.
- **Build partnership** with local organizations providing knowledge and expertise
- Formation of groups of farmers
Design for Aspirations

Considerations for design of system:

• Number of Farmers in a group
• Area of farmer as well as the group
• Source of water
• Type of Irrigation
• Distance and height of farmland from water source
• Pipeline length
• Crop to be cultivated
Tariffs are fixed using a principle that it is:

• Affordable for all
• Enabling the group to be financially autonomous for long term Operations and Maintenance of pumping system

**FINANCIAL**

Assist farmers while opening group bank account to manage flow of deposits and accumulate savings

Tariff structure and costing mechanism is decided mutually by local organisation and farmer’s groups.
Costing Mechanisms

• **Day based** charges
  Fixed charges of half-day and full day for each farmer.
  (For example: INR 30 per day)
  Site based on this system: Saritkhel (30 HP)

• **Monthly Fixed** charge
  Fixed charge for each farmer to be contributed monthly for pump usage.
  (For example: INR 100 per month)
  Site based on this system: Valhaipada (6 HP), Paraspada (10 HP)

• **Initial Contribution plus Monthly** charge
  Fixed charge contributed before the implementation of the project in addition to fixed monthly charges.
  Site based on this system: Dongripada (20 HP), Nishet (15 HP), Tilse (20 HP)

• **Income based** charges
  Farmer group contributes 10% of their income generated from the crops
  Site based on this system: Tulyachapada (87.5 HP)
Ownership Transfer

Group takes all the main decisions for the pump including the schedule for operation for the farmers

With the help of local organization, group is involved in sale of farm produce and resolve the dispute in group
CASE STUDIES
# Tulyachapada

<table>
<thead>
<tr>
<th></th>
<th>Before 2019</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Pump</strong></td>
<td>Diesel</td>
<td>Solar</td>
<td>Solar</td>
</tr>
<tr>
<td><strong>Type of irrigation</strong></td>
<td>Flood Irrigation</td>
<td>Drip Irrigation</td>
<td>Drip Irrigation</td>
</tr>
<tr>
<td><strong>Farmers: Number, Groups, Land for Cultivation</strong></td>
<td>11 to 12</td>
<td>98</td>
<td>108, 10, 1-acre</td>
</tr>
<tr>
<td><strong>Cultivated Area &amp; Period</strong></td>
<td>6-7 acres</td>
<td>37 acres</td>
<td>55 acres, 95 to 100 days annually</td>
</tr>
<tr>
<td><strong>Crops</strong></td>
<td>Groundnut</td>
<td>Groundnut</td>
<td>Groundnut, onion, Garlic, Lond bean</td>
</tr>
</tbody>
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**Technical Set-up**
- 10 solar pumps are installed.
- 87.5 HP collective capacity
- Setup can help to irrigate up to 110 acres
Tulyachapada
Ambyachapada

- 2014 --> 2 farmers cultivated 0.5 acres land using 90-95 liters of diesel
- 2015 --> Area increased from 0.5 acres to 1.5 acres using 190 liters of diesel
- 2016 --> Installation of Solar water pumping system- The number of farmers increased from 2 to 6 with an increase in area from 1.5 acres to 4.4 acres. Type of irrigation shifted from flood irrigation to drip irrigation.
- 2017 --> Increase in cultivation area from 4.5 acres to 6 acres
- 2018 --> 7 acres of land after monsoon months with minimum usage of diesel.
Projects

Valhaipada
Installed in May 2018
Number of groups: 2
Number of Farmers: 14
Installed Capacity: 6 HP
Major crops grown: Chilli

Ambyachapada
Installed in April 2016
Number of groups: 1
Number of Farmers: 6
Installed Capacity: 3 HP
Major crops grown: Okra, Beans, Groundnut
Projects

Saritkhel
Installed in July 2017
Number of groups: 6
Number of Farmers: 50
Installed Capacity: 30 HP
Major crops grown: watermelon, cucumber, pumpkin

Wada Cluster, India
Installed in March 2020
Number of groups: 13
Number of Farmers: 145
Installed Capacity: 120 HP
Major crops grown: Bitter Gourd, Okra, Cucumber
IMPACT
Based on independent reviews
Long-term sustainability and impact of Solar water pumps

- Reduction in migration
- Reduction in use of diesel
- Cash crops are more economically viable
- Once the farmers earn income from farming, they can increase the farming area along with the system capacity by themselves
- Helps in food security
- It helps to reduce poverty and malnutrition (as they grow vegetables in a small area for their family)
- Generation of skill among the stakeholders for maintenance of irrigation system
- Women Empowerment in remote areas
Multidimensional sustainability and impact of solar micro-grids

Based on a study by Dr. A. Katre, University of Minnesota Duluth
Breadth and depth of Community participation in solar micro-grids

Based on a study by Dr. A. Katre, University of Minnesota Duluth
Conclusions

- Plentiful opportunity in remote areas across many countries to replicate, scale and create larger impact
- Interventions with the initial 500 odd farmers addresses concerns on farmers’ ability to pay
- Boundary conditions
  - Surface water on which the community has rights
  - Ability to come together in groups
  - Readiness to work for a second or third crop
- Explore partnerships to support development of agriculture supply chains and the local value addition to crops
Tribal Culture and Local Traditions
THANK YOU

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