Low Cost Portable Toilets
For the Agariyas of the Little Rann Of Kutch
Challenge Statement

OPEN DEFECATION

The villagers of Kharagoda and the salt farmers of the Little Rann of Kutch have to walk miles everyday to defecate in the open
Primary intended beneficiaries and other stakeholders

Target Audience

Primary Beneficiaries
- Salt Farmers (Specially the female members)
- Villagers without access to toilet

Other Stakeholders
- Local shopkeepers
- Daily wage local workers
- Sanitation workers
Interaction with the Agariyas
Field visit

Observations

- Agariyas spend **8 months** in LRK annually
- Everyone was **willing to use a toilet**.
- **90%** Agariyas had **never seen a toilet**
- Few families did not use the toilet in their homes either, but were compelled to do so during monsoon
- They could only afford to invest **₹2-5k** on a toilet
They use toilets for excretion and wash the solid waste away.

They dig shallow pits about 1-1.5m deep, use it for excretion. After every use they cover the solid waste with the soil.
Current Designs

After one year of use by a family pit 1 will be almost full. Pit 2 will be empty or filled with compost.
“KOI BANA KAR DE DE TO KAIYHAN ISTAMAAL NA KAREIN!”
Design Objectives

The toilet design must cater to the primary needs of Agariyas:

- WATERLESS
- PORTABLE
- PRIVACY
- INDIAN SEAT
- CHEAP
Existing Technologies

Regular Toilets
- Easy to use
- Widely accepted
- High Water Use
- Not portable
- Regular Maintenance required
- Material not locally available
- Very expensive

Composting Toilets
- Waterless
- Easy to use and maintain
- Environment friendly
- Cheap
- Portable
- Difficult to accept
- Cleaning concerns

Bio Digester Toilets
- Waterless
- Easy to use and maintain
- Environment friendly
- Bacteria inoculant availability
- Not Portable
- Expensive

Pros
Cons
Prototype I

A composting toilet made of locally available material that uses a disposable biodegradable bag to collect solid waste.
Working
Flow of waste into the toilet
# Costing

<table>
<thead>
<tr>
<th>S.No</th>
<th>Particular</th>
<th>Amount (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bamboo</td>
<td>550</td>
</tr>
<tr>
<td>2</td>
<td>Barrel and Hardware</td>
<td>520</td>
</tr>
<tr>
<td>3</td>
<td>Plastic Rope and Jute Rope</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>Phenyl Balls</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>Screws + Hooks</td>
<td>59</td>
</tr>
<tr>
<td>6</td>
<td>Cover (Tarpal)</td>
<td>200</td>
</tr>
<tr>
<td>7</td>
<td>Transport</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1509</strong></td>
</tr>
</tbody>
</table>
Community Feedback

- Ergonomic issues
- Poor workmanship and execution
- Need to simplify the design
- Ventilation problem
- Jute ropes were unreliable
- Acceptance was a problem
Prototype II

**Pipe Outlet**
For better ventilation to avoid odour issues

**Toilet Seat**

**Jute Bag**
Secured with plastic ropes which are stronger than jute ropes

**Cover**
Improved aesthetics

**Centrifugal Fan**

**Bamboo Enclosure**
Connected the seat with the enclosure and provided support with stairs

**Lid**
Added a lid to cover the toilet seat when not in use

**Barrel**
Increased the size of holes in the barrel for better seepage of liquid waste

**Plastic bag**
To make stairs for providing support

[Improvements made]
Construction
# Costing

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Particular</th>
<th>Amount (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bamboo</td>
<td>510</td>
</tr>
<tr>
<td>2</td>
<td>Barrel</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Hardware</td>
<td>140</td>
</tr>
<tr>
<td>4</td>
<td>Jute Bag</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>Cover (Tarpal)</td>
<td>570</td>
</tr>
<tr>
<td>6</td>
<td>Fan</td>
<td>150</td>
</tr>
<tr>
<td>7</td>
<td>Pipe and connector</td>
<td>70</td>
</tr>
<tr>
<td>8</td>
<td>Transport</td>
<td>50</td>
</tr>
<tr>
<td>9</td>
<td>Labor</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>2114</strong></td>
</tr>
</tbody>
</table>
Pros

• Portable (modular)
• Uses locally available materials
• Three step DIY
• One tenth the cost of normal concrete toilet construction.
• No odour
• Proper ventilation
• Treatment of both liquid and solid waste.

Cons

• Not tested yet, so weak proof of concept.
• Construction not completed on field due to bad weather.
• Misses aesthetic criterion
• Assumption made on the durability of jute bag for storing faeces for 30 days
Our process is easy

1. Dig the pit
   The pit must be 400mm deep

2. Place the Barrel
   Add Naphthalene balls and attach the jute bag

3. Attach the Seat
   Tie the seat ends tightly with the barrel and the bamboo column

4. Build the Enclosure
   Fix tarpan on three sides of the enclosure. Secure the entrance with a jute bag curtain.
Community Feedback

Better aesthetics increased acceptance among our target audience and the Agariyas were willing to switch to this design.
Thanks!

Meet Our Team

Avani Saraswat
Lalit Gautam
Arushi Rana