

PUBLIC HEALTH TAP AND SINK DESIGN

CURRENT METHODS

Much of Rural India relies on well water as their primary water source.

Water is transported from the wells, and from place to place via steel pots or plastic buckets.

Taps are often placed outdoors and empty out into unsanitary foyeek platforms where tasks such as laundry and dish washing take place.

Grey water is disposed by running off of this platform either directly to surrounding agriculture through a small ditch in the land that leads to surrounding fields.



Tap system currently in the Gufo village in Rajasthan, India



Quick Stats (Why is This Important?)

Only 25% of the Indian population has access to safe drinking water on their premises.

67% of Indian households do not treat the water they drink.

Water is often boiled for consumption, leaving contaminated water for all other household chores and tasks.

Each year, 1.5 million children under the age of five die as a result of diarrhoea - an infectious disease...

This could be reduced by as much as forty percent by maintaining sanitary hand washing habits and a household water system.

Construction Materials

Manufacture is one of the biggest industries of construction materials, and concrete, steel and wood. However, these materials are the most expensive for the poorest villages in India. The concrete in India costs more than twice as much as in the US. The steel in India costs more than twice as much as in the US. The wood in India costs more than twice as much as in the US.



In the Gufo Village, there is a well that is used to collect water. The water is then pumped to a platform where it is used for drinking and other household tasks. The platform is made of concrete and is built on a raised area of the ground.



We also want to take the water into the surrounding agriculture through a small ditch in the land that leads to surrounding fields.

Meet the team



OBJECTIVES

- Develop a water supply system that is sustainable and meets the needs of the community.
- Ensure that the system is easy to use and maintain.
- Ensure that the system is safe and secure.
- Ensure that the system is affordable.
- Ensure that the system is environmentally friendly.



Current Water Tap Design

Design

The design is a simple, low-cost water tap system that is easy to use and maintain. It consists of a hand-operated pump that draws water from a well and pumps it into a plastic container. The container is mounted on a raised platform to prevent contamination. The system is made of locally sourced materials and is easy to repair.

House Hold Storage Tank

- Diameter 1 m
- Contains minimum of 1 day supply of water (200L)
- Under 2m high
- Made of brick

Design Assumptions

- 500 people in Gufo Village
- 100 L per capita
- 5 people per household
- Solar pumps run 8 hours a day

Plant Flow = 1.73U/s
House hold Flow = 0.017 U/s

Process Regulation

The process regulation is a key component of the water supply system. It involves the use of a hand-operated pump to draw water from a well and pump it into a storage tank. The pump is controlled by a hand lever, which allows the user to regulate the flow of water. This ensures that the water is delivered at a consistent rate and is easy to use.

Water Tapping and Box

The water tapping and box is a key component of the water supply system. It involves the use of a hand-operated pump to draw water from a well and pump it into a storage tank. The pump is controlled by a hand lever, which allows the user to regulate the flow of water. This ensures that the water is delivered at a consistent rate and is easy to use.

Flow Authority

The flow authority is a key component of the water supply system. It involves the use of a hand-operated pump to draw water from a well and pump it into a storage tank. The pump is controlled by a hand lever, which allows the user to regulate the flow of water. This ensures that the water is delivered at a consistent rate and is easy to use.

Plant Safety

- Flow regulatory
- A source of funding
- Needs to be cheap and easy to maintain
- Ensure the water storage tank
- Ensure the flow regulatory in village

QUESTIONS?

VILLAGE SUPPLY: HOUSEHOLD LEVEL SUBTEAM



PUBLIC HEALTH TAP AND SINK DESIGN

CURRENT METHODS

Much of rural India relies on well water as their primary water source.

Water is transported from the wells, and from place to place via steel pots or plastic buckets.

Taps are often placed outdoors and empty out onto unsanitary concrete platforms where tasks such as laundry and dish washing take place.

Grey water is disposed by running off of this platform either directly to surrounding agriculture through a small ditch in the land that leads to surrounding fields.



Tap system currently in the Gufo village in Rajasthan, India



Quick Stats (Why is This Important?)

Only 25% of the Indian population has access to safe drinking water on their premises.

67% of Indian households do not treat the water they drink.

Water is often boiled for consumption, leaving contaminated water for all other household chores and tasks.

Each year, 1.5 million children under the age of five die as a result of diarrhoea - an infectious disease...

This could be reduced by as much as forty percent by maintaining sanitary hand washing habits and a household water system.

Construction Materials

Mumbai is one of the biggest agglomerations of construction materials in India. Steel and concrete are the primary materials used in the construction of buildings. The concrete is made from a mix of cement, sand, and gravel. The steel is made from iron and carbon. The concrete is made from a mix of cement, sand, and gravel. The steel is made from iron and carbon.



In the Gufo Village, there is a well water tank. The well and tank are made of concrete and steel. The well is made of concrete and the tank is made of steel. The well is made of concrete and the tank is made of steel.



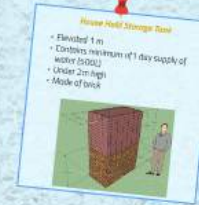
We also want to take the material into the transportation facilities. Quality of materials in the village is the most important factor.

Meet the team



OBJECTIVES

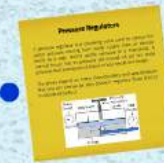
- Develop technical water strategies
- Develop suitable distribution of water and a few restriction rules
- Develop a suitable tap design
- Develop uses of grey water recycling and consider appropriate designs for reuse and disposal



Design Assumptions

- 500 people in Gufo Village
- 100 L per capita
- 5 people per household
- Solar pumps run 8 hours a day

Plant Flow = 1.73 U/s
House hold Flow = 0.017 U/s



VILLAGE SUPPLY: HOUSEHOLD LEVEL SUBTEAM



Meet the team



Pooja Desai



Mary John



Paula Gómez Núñez

OBJECTIVES

- Design a household water storage tank
- Ensure equitable distribution of water using a float valve and a flow restriction valve.
- Design a household tap and sink
- Evaluate uses of grey water recycling and consider containment designs for reuse and disposal

Design

design
for household chores
in for pot and bucket fill up



QUESTION

Meet the team



Pooja Desai



Mary John



Paula Gómez Núñez

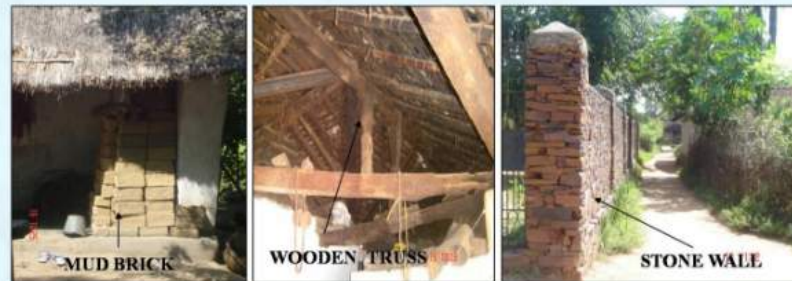
OBJECTIVES

- Design a household water storage tank
- Ensure equitable distribution of water using a float valve and a flow restriction valve.
- Design a household tap and sink
- Evaluate uses of grey water recycling and consider containment designs for reuse and disposal

Construction Materials

Worldwide, India is one of the biggest producers of construction materials like cement, steel and iron. However, these materials are too expensive for the poorer villages of Jharkhand.

The population in this area lives in small rural villages where the houses are made with cheap and accessible materials: wood, mud bricks, baked clay bricks, stones, adobe, bamboo, mud mortar and sometimes even cement mortar. Also, they use plastic and clay buckets as sinks and water storage units.



In the East-Center Zone of India there is small scale brick, iron and steel production, and little production of aluminum. However, in order to create sanitary installation we may need to use materials produced in other parts of the country.

MATERIAL	QUANTITY	COST IN RS	COST IN \$
Cement	1 sqf	70	1.15
Steel	1 kg	100	1.6
Aluminum	1 kg	180	2.95
Copper	1 kg	450	7.38
Nickel	1 kg	1200	19.69
Brass	1 kg	330	5.41
PVC	1 kg	116	1.9

We also need to take into account costs like transportation (distance, quality of roads, access to the village) or the specialized operators' salary.

ation we may need to use materials produce

MATERIAL	QUANTITY	COST IN RS	COST IN \$
Cement	1 sqf	70	1.15
Steel	1 kg	100	1.6
Aluminum	1 kg	180	2.95
Copper	1 kg	450	7.38
Nickel	1 kg	1200	19.69
Brass	1 kg	330	5.41
PVC	1 kg	116	1.9

to take into account costs like transportation

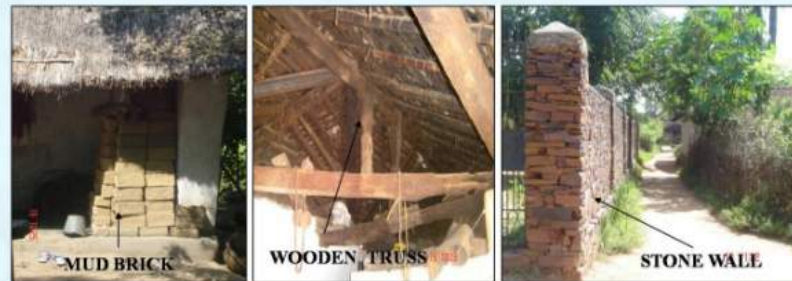


Prezi

Construction Materials

Worldwide, India is one of the biggest producers of construction materials like cement, steel and iron. However, these materials are too expensive for the poorer villages of Jharkhand.

The population in this area lives in small rural villages where the houses are made with cheap and accessible materials: wood, mud bricks, baked clay bricks, stones, adobe, bamboo, mud mortar and sometimes even cement mortar. Also, they use plastic and clay buckets as sinks and water storage units.



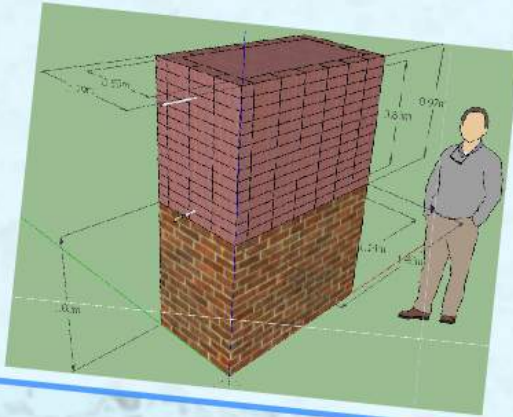
In the East-Center Zone of India there is small scale brick, iron and steel production, and little production of aluminum. However, in order to create sanitary installation we may need to use materials produced in other parts of the country.

MATERIAL	QUANTITY	COST IN RS	COST IN \$
Cement	1 sqf	70	1.15
Steel	1 kg	100	1.6
Aluminum	1 kg	180	2.95
Copper	1 kg	450	7.38
Nickel	1 kg	1200	19.69
Brass	1 kg	330	5.41
PVC	1 kg	116	1.9

We also need to take into account costs like transportation (distance, quality of roads, access to the village) or the specialized operators' salary.

House Hold Storage Tank

- Elevated 1 m
- Contains minimum of 1 day supply of water (500L)
- Under 2m high
- Made of brick



Design Assumptions

- 500 people in Gufu Village
- 100 L per capita
- 5 people per household
- Solar pumps run 8 hours a day

Plant Flow = 1.73L/s
House hold Flow = 0.017 L/s



Design Assumptions

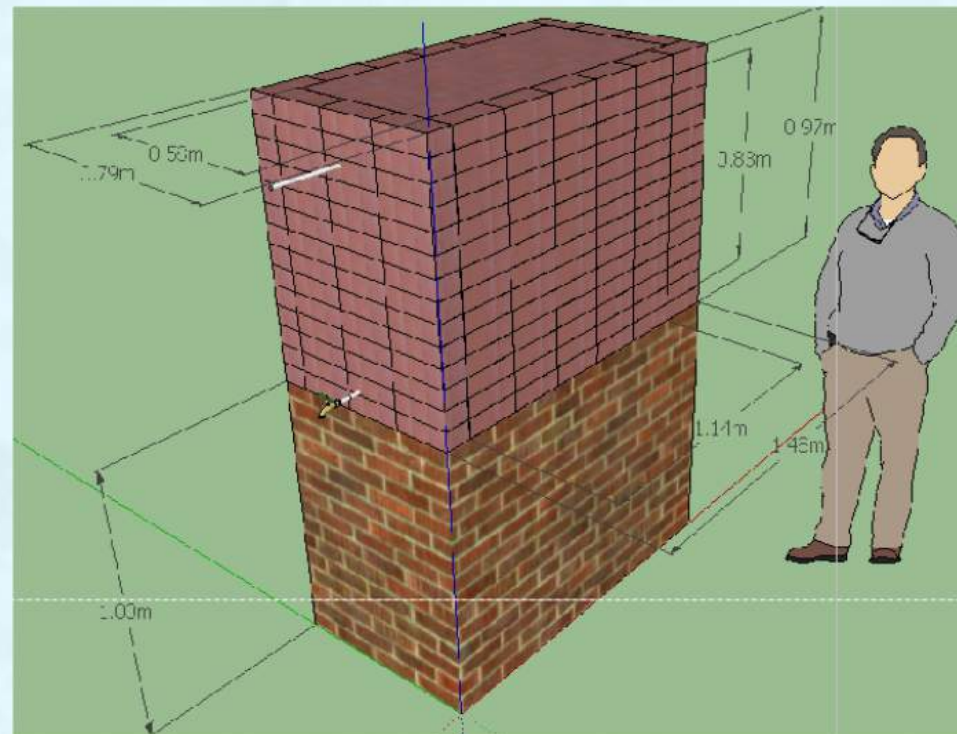
- 500 people in Gufu Village
- 100 L per capita
- 5 people per household
- Solar pumps run 8 hours a day

Plant Flow = 1.73L/s

House hold Flow = 0.017 L/s

House Hold Storage Tank

- Elevated 1 m
- Contains minimum of 1 day supply of water (500L)
- Under 2m high
- Made of brick



Flow Equitably

Goal is to have all flows through the village within 10% of the average flow at the household level

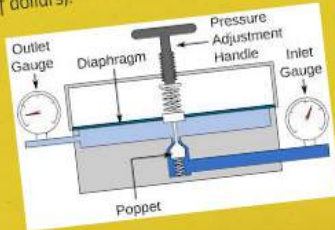
We need to create head loss!

- Float valves
- Pressure regulators
- Coiled tubing

Pressure Regulators

A pressure regulator is a plumbing valve used to control the water pressure coming from water supply lines or storage tanks to a safe and/or usable pressure in a household. A normal house has its pressure set around 45 psi but could estimate that a pressure of 40 psi or less would be enough.

The prices depend on many characteristics and specifications that you can choose for your pressure regulator (from \$10 to hundreds of dollars).



Coiled Tubing and Box

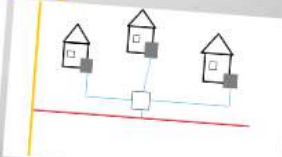
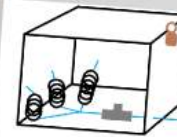


Post design

$$L_{\text{tubing}} = \frac{g + h_f^2 \text{tubing} \left(\frac{2.31 \text{ ft/gal}}{4} \right)^2 + D_{\text{valve}}}{f + Q_{\text{tubing}}^2} \quad (12)$$

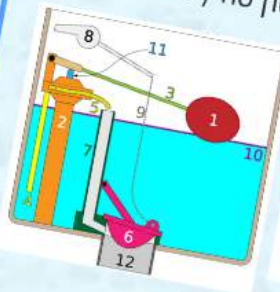
$$L_{\text{Additional}} = \frac{g + |Elevation_{\text{down}} - Elevation_{\text{up}}|^2 + \left(\frac{2.31 \text{ ft/gal}}{4} \right)^2 + D_{\text{valve}}}{f + Q_{\text{tubing}}^2} \quad (13)$$

New Design



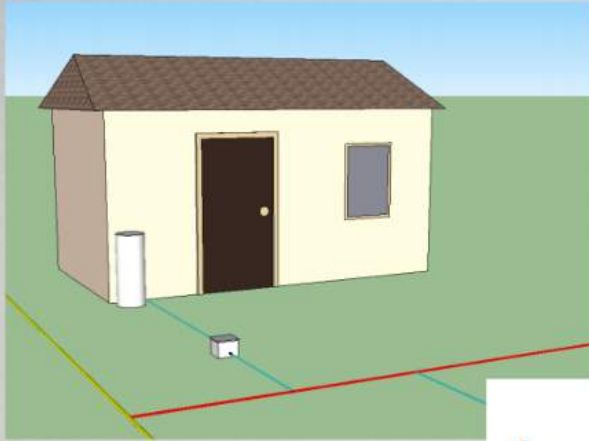
Float Valves

- Flow regulators
- A source of headloss
- Needs to be cheap and easy to maintain inside the water storage tank
- Currently no flow regulation in villages



Zeal : Ball Cock

Coiled Tubing and Box

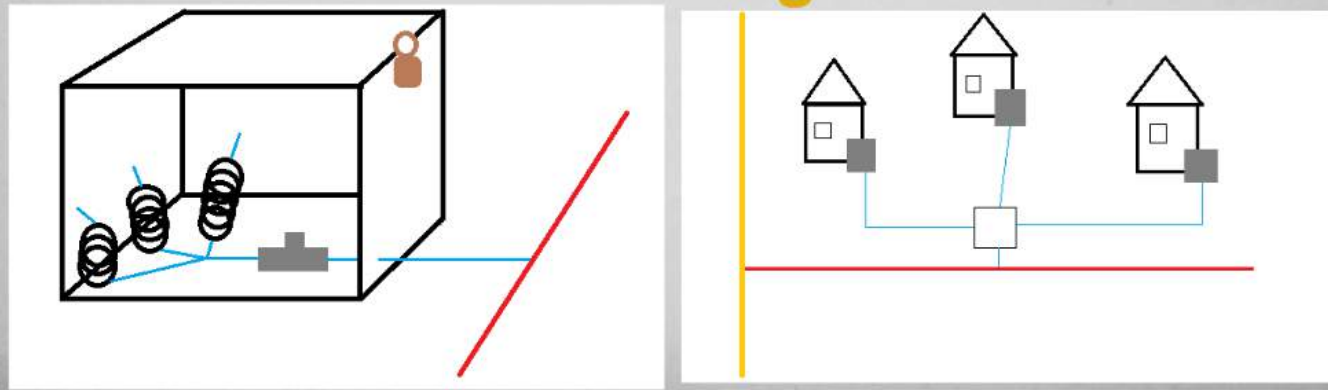


Past design

$$L_{Tubing} = \frac{g * h_{f,tubing}^2 * \left(\frac{\pi D_{Tubing}^2}{4}\right)^2 * D_{Tubing}}{f * Q_{Tubing}^2} \quad (12)$$

$$L_{Additional} = \frac{g * |Elevation_{House} - Elevation_{In}|^2 * \left(\frac{\pi D_{Tubing}^2}{4}\right)^2 * D_{Tubing}}{f * Q_{Tier3}^2} \quad (13)$$

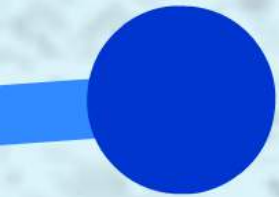
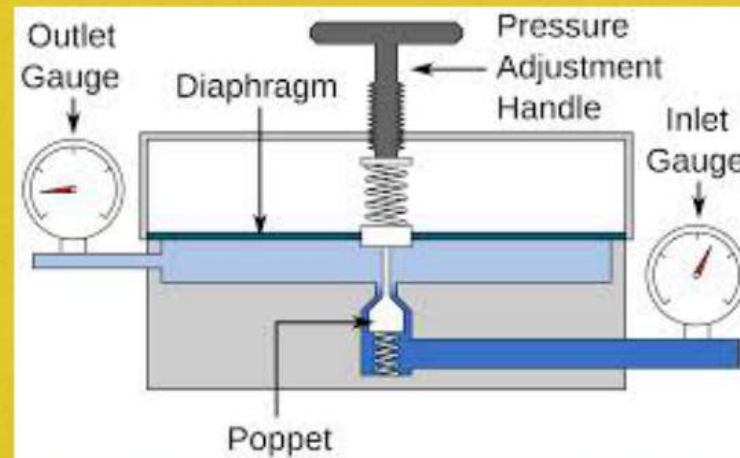
New Design



Pressure Regulators

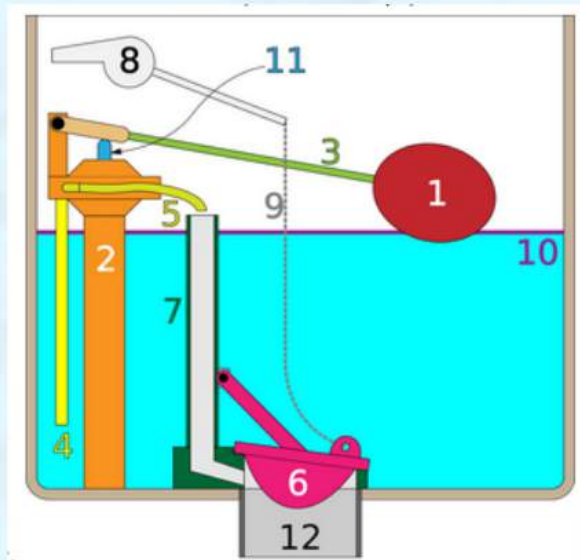
A pressure regulator is a plumbing valve used to control the water pressure coming from water supply lines or storage tanks to a safe and/or usable pressure in a household. A normal house has its pressure set around 45 psi but could estimate that a pressure of 40 psi or less would be enough.

The prices depend on many characteristics and specifications that you can choose for your pressure regulator (from \$10 to hundreds of dollars).



Float Valves

- Flow regulators
- A source of headloss
- Needs to be cheap and easy to maintain inside the water storage tank
- Currently no flow regulation in villages



PUBLIC HEALTH TAP AND SINK DESIGN

CURRENT METHODS

Much of Rural India relies on well water as their primary water source

Water is transported from the source, and from place to place via steel pots or plastic buckets

Taps are often placed outdoors and empty out onto unsanitary (angled) platforms where tasks such as laundry and dish washing take place

Grey water is disposed by running off of this platform either directly to surrounding agriculture or through a small divot in the land that leads to surrounding plants



Tap system currently in the Gufu village in Jharkhand, India



Quick Stats (Why Is This Important?)

Only 25% of the Indian population has access to safe drinking water on their premises

67% of Indian households do not treat the water they drink

Water is often boiled for consumption...leaving contaminated water for all other household chores and tasks

Each year, 1.5 million children under the age of five die as a result of diarrhoea - an infectious disease...

This could be reduced by as much as forty percent by maintaining sanitary hand washing habits and a household water system!

HEALTH LINK DESIGN



Recently in the Gufu village in
Jharkhand, India



Quick Stats (Why Is This Important?)

Only 25% of the Indian population has access to safe drinking water on their premises

67% of Indian households do not treat the water they drink

Water is often boiled for consumption...leaving contaminated water for all other household chores and tasks

Each year, 1.5 million children under the age of five die as a result of diarrhoea - an infectious disease...

This could be reduced by as much as forty percent by maintaining sanitary hand washing habits and a household water system!

CURRENT METHODS

Much of Rural India relies on well water as their primary water source

Water is transported from the source, and from place to place via steel pots or plastic buckets

Taps are often placed outdoors and empty out onto unsanitary (angled) platforms where tasks such as laundry and dish washing take place

Grey water is disposed by running off of this platform either directly to surrounding agriculture or through a small divot in the land that leads to surrounding plants



Tap system currently in the Gufu village in Jharkhand, India



Current Tap and Sink Design



Design

- Platform sink design
 - Necessary for household chores
 - Allows room for pot and bucket fill up
- Platform material easily decontaminated
 - Not porous concrete
 - Steel or stone
- Redesign tap and platform to be indoors
- Instead of runoff, the platform should be designed on an angle, and empty into a draining pipe on the exterior of the house

Current Tap and Sink Design



Design

- Platform sink design
 - Necessary for household chores
 - Allows room for pot and bucket fill up
- Platform material easily decontaminated
 - Not porous concrete
 - Steel or stone
- Redesign tap and platform to be indoors
- Instead of runoff, the platform should be designed on an angle, and empty into a draining pipe on the exterior of the house

QUESTIONS?



PUBLIC HEALTH TAP AND SINK DESIGN

CURRENT METHODS

Much of Rural India relies on well water as their primary water source.
Water is transported from the wells, and from place to place via steel pots or plastic buckets.

Taps are often placed outdoors and empty out onto unsanitary concrete platforms where tasks such as laundry and dish washing take place.

Grey water is disposed by running off of this platform either directly to surrounding agriculture through a small ditch in the land that leads to surrounding fields.



Tap system currently in the Gufo village in Rajasthan, India



Quick Stats (Why is This Important?)

Only 25% of the Indian population has access to safe drinking water on their premises.

67% of Indian households do not treat the water they drink.

Water is often boiled for consumption, leaving contaminated water for all other household chores and tasks.

Each year, 1.5 million children under the age of five die as a result of diarrhoea - an infectious disease...

This could be reduced by as much as forty percent by maintaining sanitary hand washing habits and a household water system.

Construction Materials

Manufacture is one of the biggest segments of construction materials, and concrete, steel and wood. However, these materials are the most expensive for the poorest villages in India. The poorest villages in India have the least access to these materials, which are often sold in bulk to large contractors and suppliers. The poorest villages in India have the least access to these materials, which are often sold in bulk to large contractors and suppliers.



In the Gufo Village, one of India's poorest, water is not treated, and the water is often contaminated with dirt and debris. The water is often contaminated with dirt and debris. The water is often contaminated with dirt and debris.



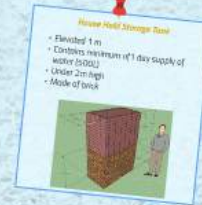
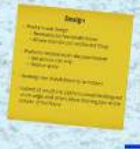
We also want to take this material into the surrounding villages, quality of materials in the village is the most important factor.

Meet the team



OBJECTIVES

- Design a household water system that is easy to use and maintain.
- Design a household water system that is easy to use and maintain.
- Design a household water system that is easy to use and maintain.
- Design a household water system that is easy to use and maintain.



VILLAGE SUPPLY: HOUSEHOLD LEVEL SUBTEAM