PUBLIC HEALTH
TAP AND SINK DESIGN
CURRENT METHODS
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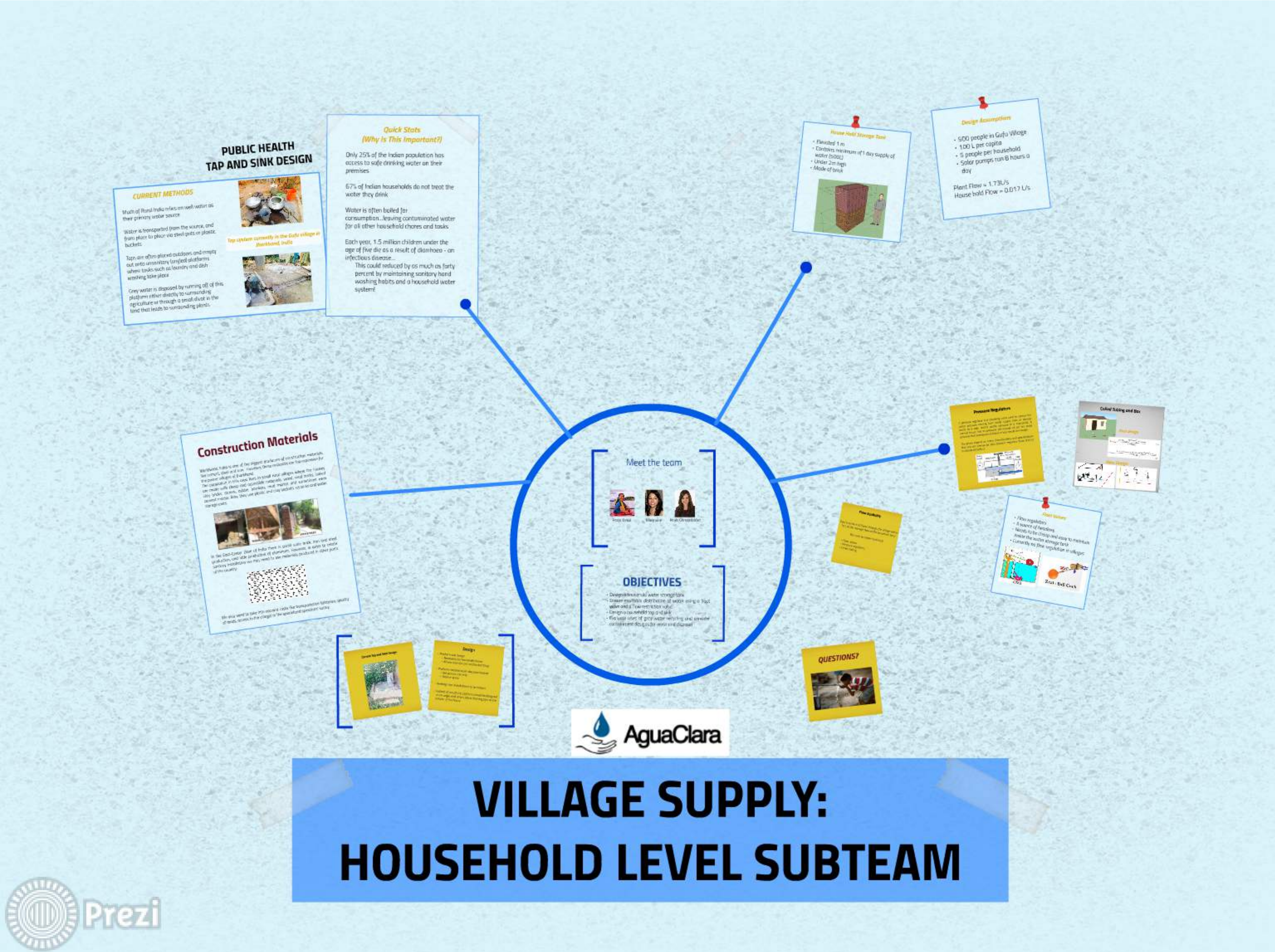
Each year, 1.5 million children under the age of five die as a result of diarrhoea - an infectious disease...
This could reduced by as much as forty percent by maintaining sanitary hand washing habits and a household water system!
House Hold Storage Tank
Elevated 1 m
Contains minimum of 1 day supply 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
Construction Materials
Meet the team
OBJECTIVES
QUESTIONS?
AguaClara
VILLAGE SUPPLY:
HOUSEHOLD LEVEL SUBTEAM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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

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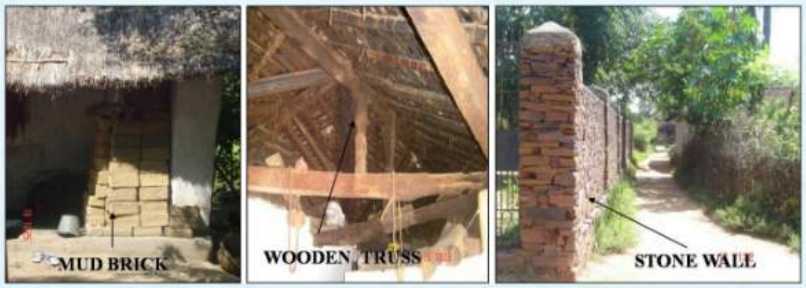
Construction Materials

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.

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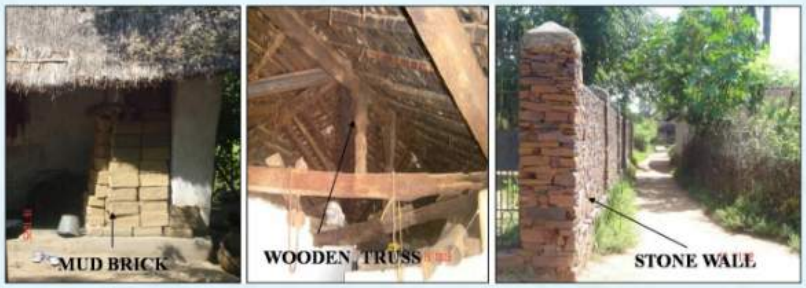

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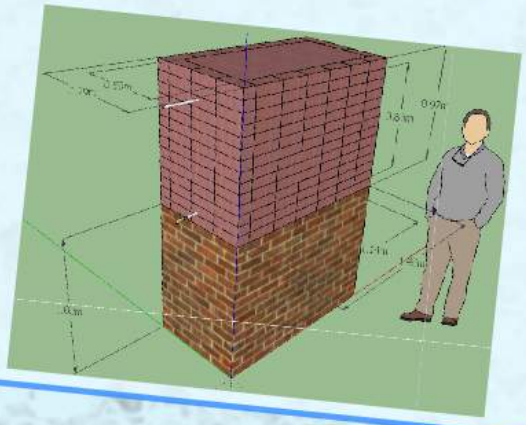

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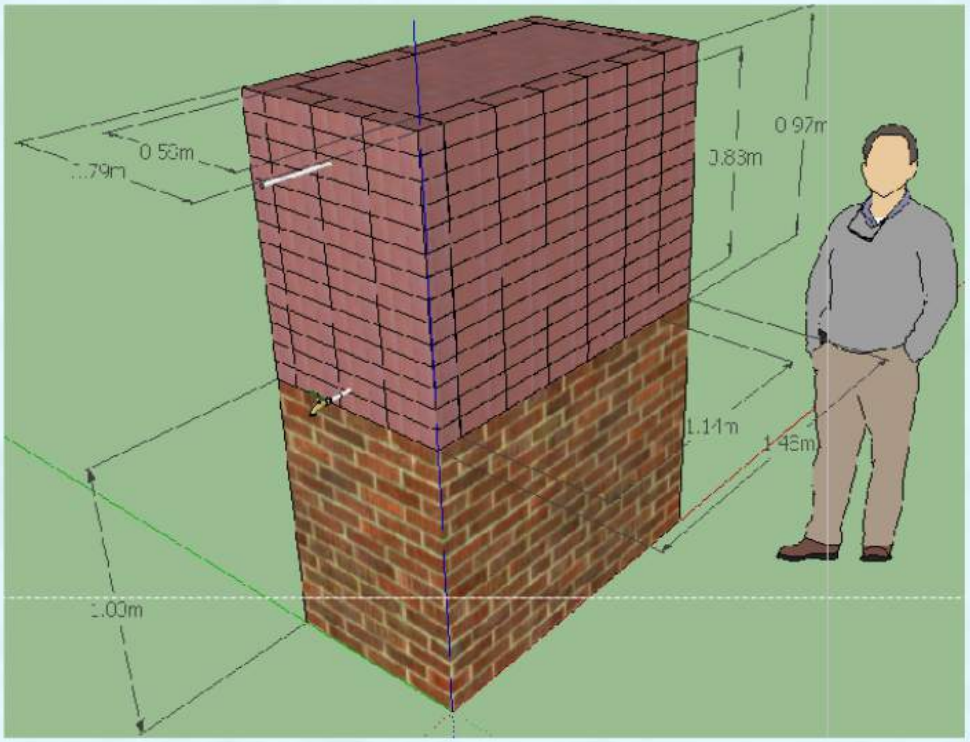


Flow Equitably

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

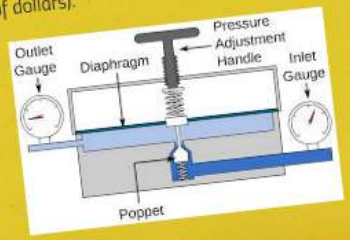
We need to create head loss!

- 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).



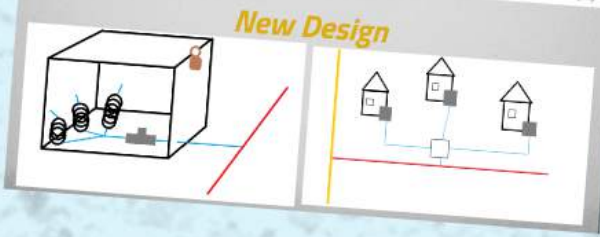
Coiled Tubing and Box

Past design

$$L_{Tubing} = \frac{g * h^2_{Tubing} \left(\frac{\pi D^2_{Tubing}}{4}\right)^2 * D_{Tubing}}{f * Q^2_{Tubing}} \quad (12)$$

$$L_{Additional} = \frac{g * |Elevation_{House} - Elevation_{Tank}|^2 * \left(\frac{\pi D^2_{Pipe}}{4}\right)^2 * D_{Tubing}}{f * Q^2_{Total}} \quad (13)$$

New Design



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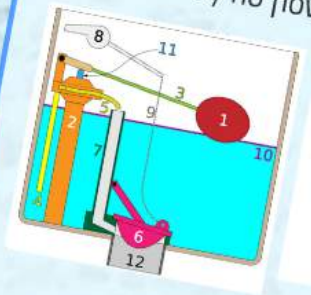

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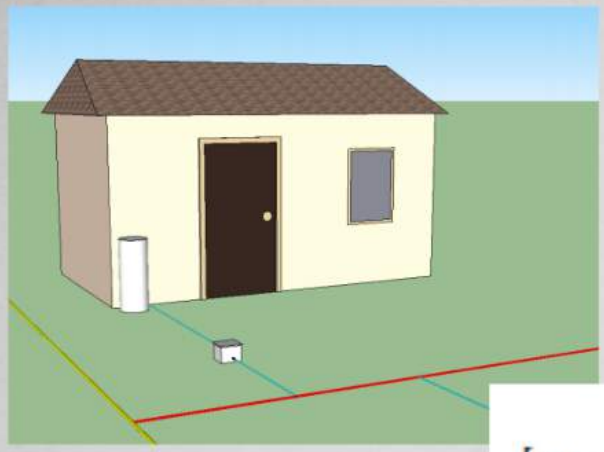

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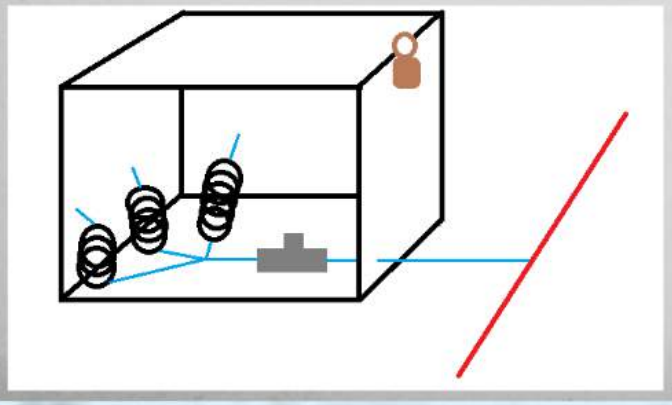

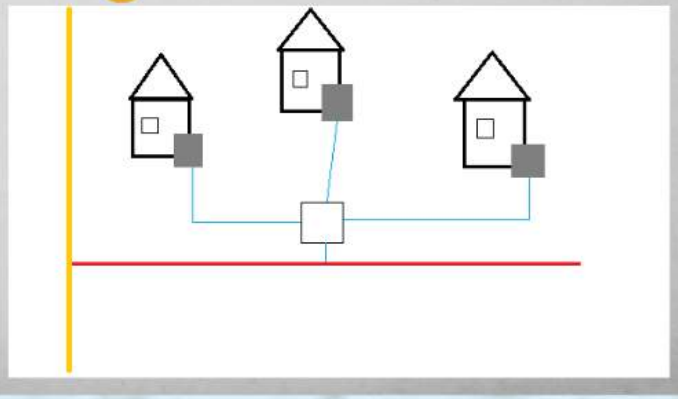

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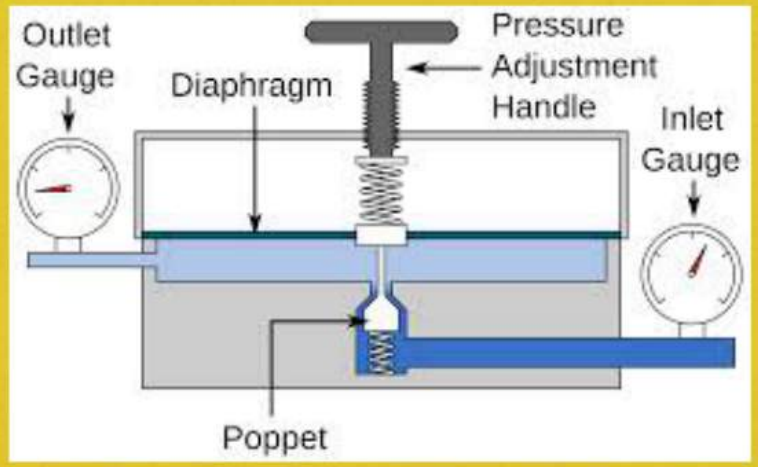

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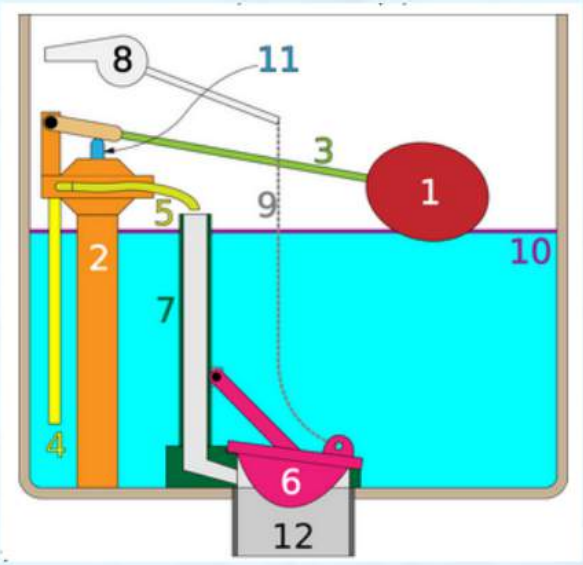

PUBLIC HEALTH TAP AND SINK DESIGN

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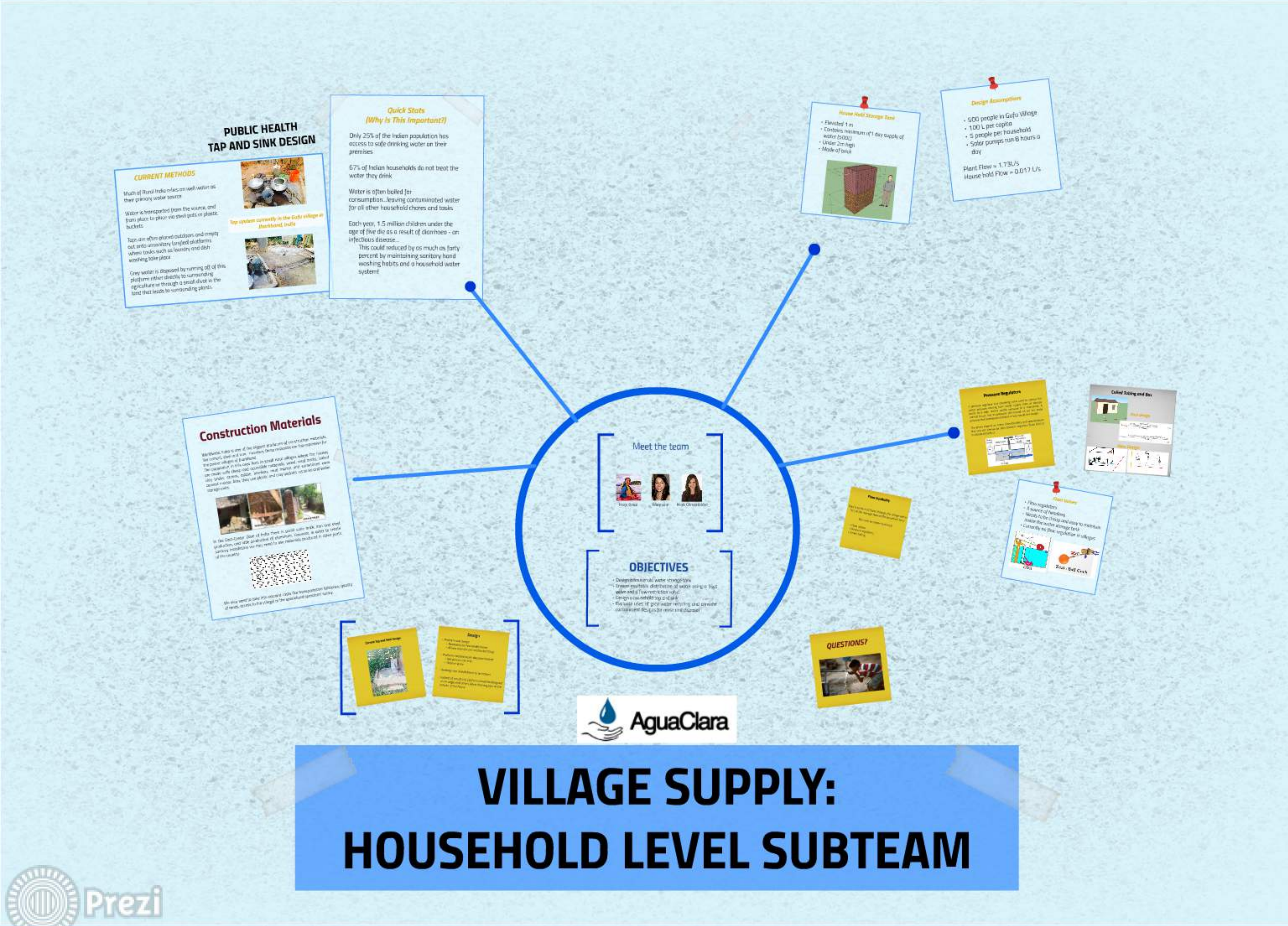

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