Creating an Efficient Market for Clean Water: Paniwala

Team: UC Berkeley

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Paniwala
"the one who delivers water"

Executive Summary

Problem:

Billions of people are affected by lack of clean water and basic sanitation

Water is too expensive, contaminated, and hard to find.

Solution:

Our solution creates an entrepreneurial distribution market for clean water.

The initial investment empowers a "Paniwala" to provide clean water to impoverished households.

Impact:

Establish an efficient market for the delivery of clean water to reach 100 million people in 5 years

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Problem

Billions of people are affected by lack of clean water and basic sanitation

Women and children are responsible for water. Often they:

- walk 4 miles
- wait 3 hours
- must pay inflated prices
- find that water supply is limited
- can't carry enough for family
- have no guarantee of water quality

Water is too expensive, contaminated, and hard to find

Major Cause: Inefficient Market

supply and demand is disconnected

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Solution

Create an entrepreneurial distribution market for clean water:

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Individual entrepreneurs who sell and deliver clean water to households

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Solution

Empower residents by giving them a chance to fulfill a market need, earn money, and invest in their communities

1. Set-up distribution center

- Establish center to sell water containers for Paniwala to deliver water to households and chlorine (Cl_2) for disinfecting water

2. Recruit Paniwalas to distribute water

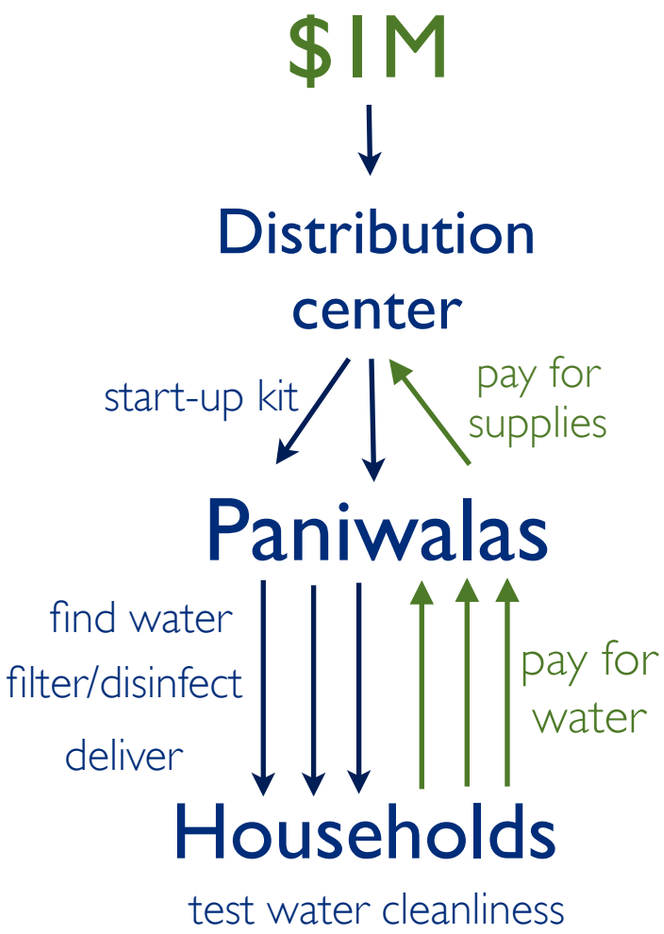
- Provide a start-up water kit to new Paniwalas

3. Paniwalas deliver clean water

- Paniwalas find sources of water (i.e. piped water, rain water harvesting, surface waters, wells), filter and disinfect it, then deliver to households for a small fee

4. Paniwalas reinvest in distribution center

- Individual Paniwala earn money to buy additional supplies from the distribution center



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Solution

How Paniwalas will deliver clean water:

1. 

Paniwalas perform sari filtration to remove dirt particles and microbes over 20 microns.*

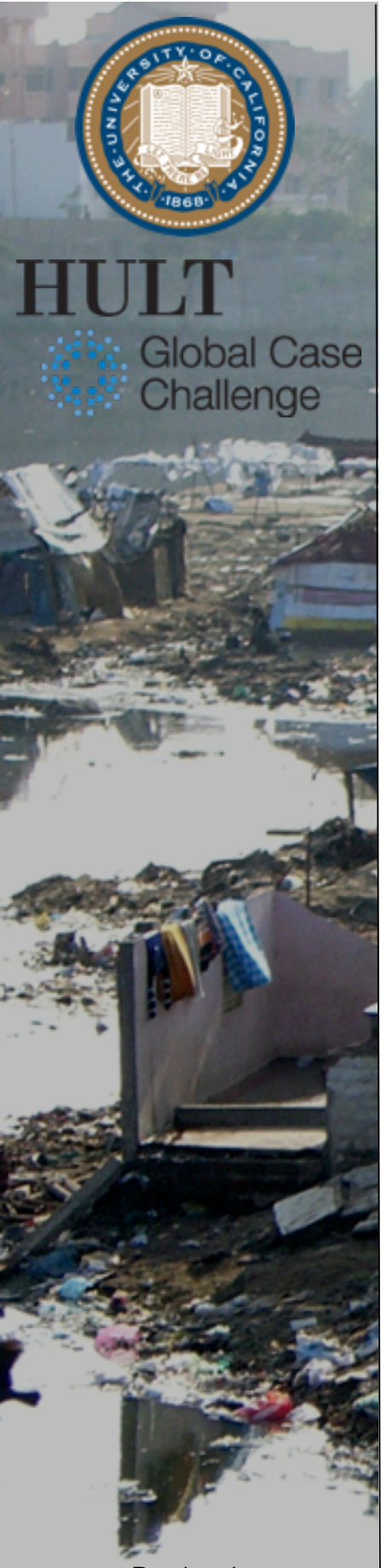
2. 

Paniwalas use chlorine to kill remaining microbes.

3. 

Paniwalas control amount of chlorine added. Households check for water quality using test strips.

*Colwell, R., *et al.* Proc. Natl. Acad. Sci. (2002), 100(3): 1051–1055. Huq, A., *et al.*, Appl Environ Microbiol. (1996) 62:2508–2512.



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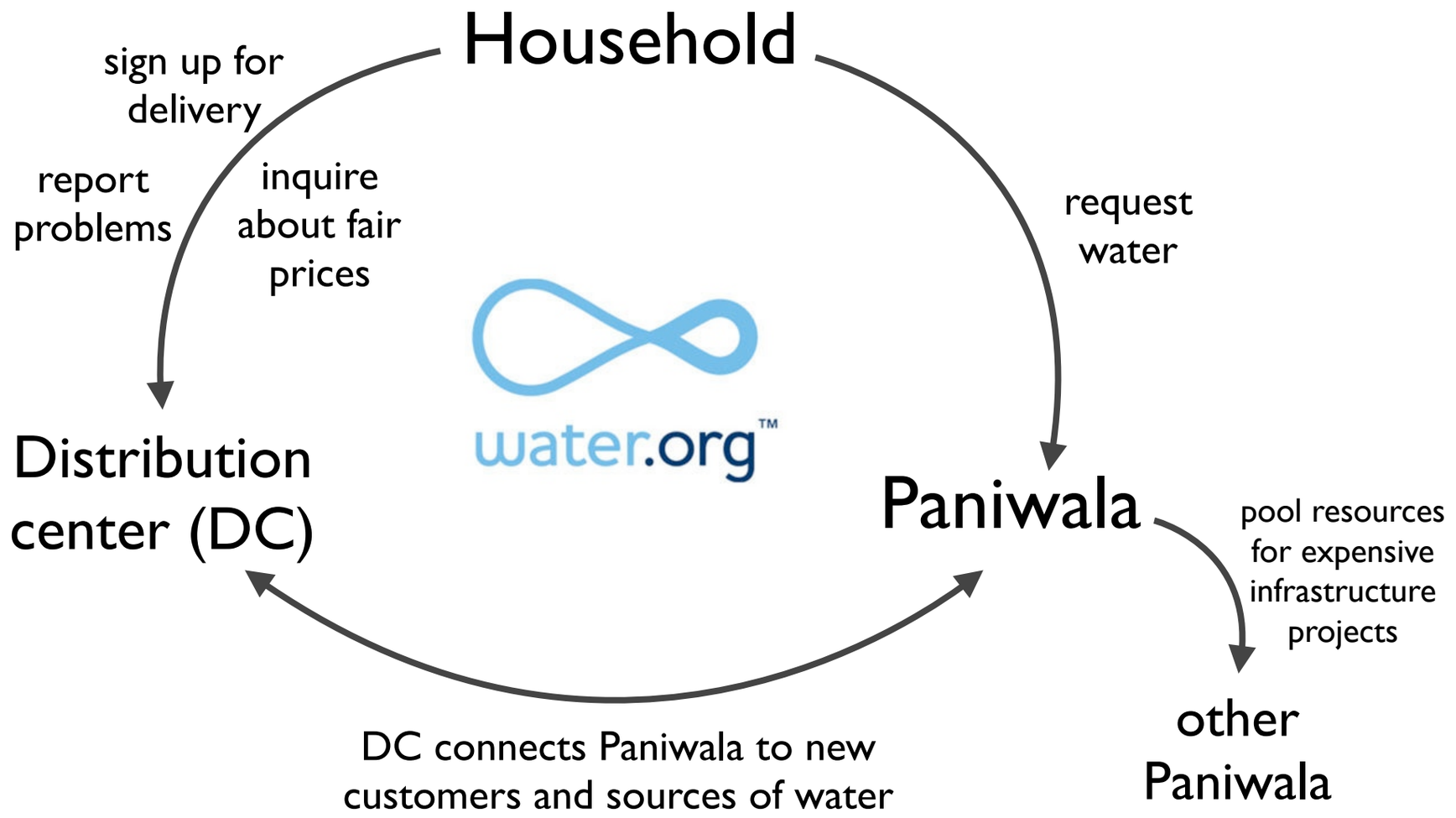
Solution

Communication creates a more efficient market for water by connecting supply and demand

Nearly every household has a cellphone which will help connect stakeholders in the water market



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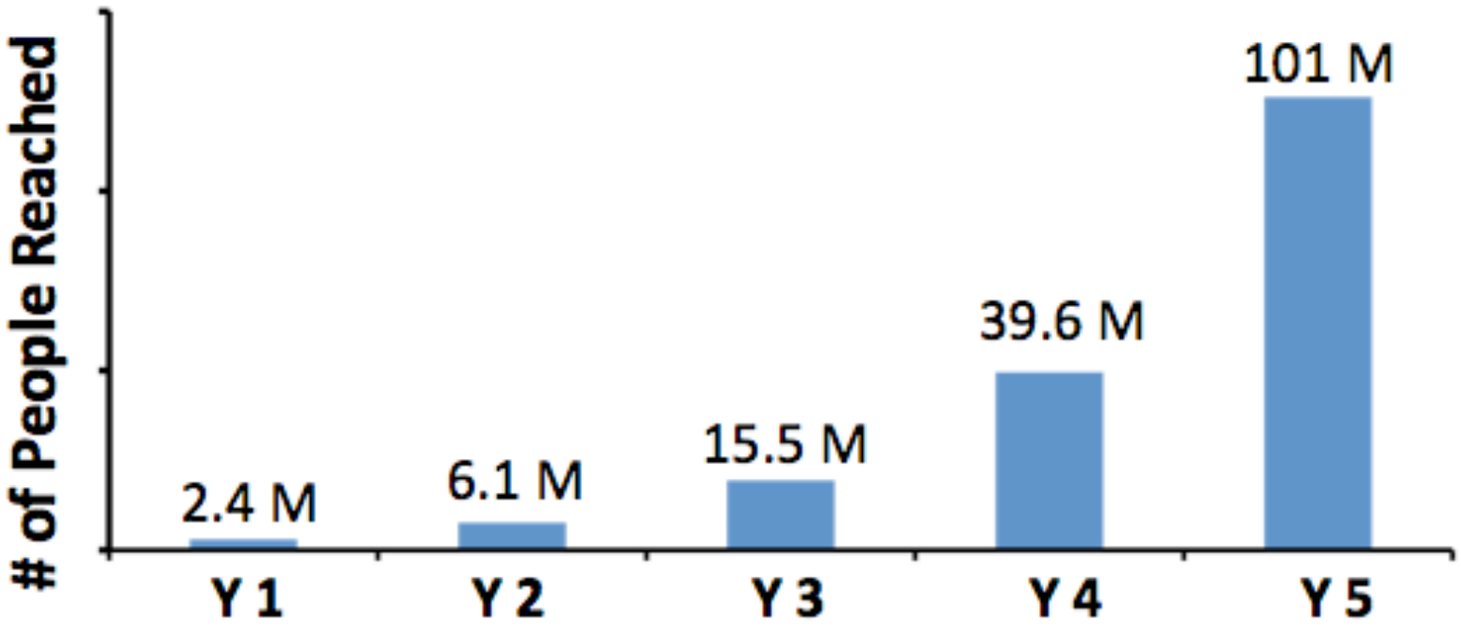
Reaching 100 Million People in 5 years

Number of Paniwalas grows exponentially, doubling every 9 months

- Distribution center makes initial investment in 32,000 Paniwalas (with initial $1M)
- Paniwalas earn money through sales of clean water
- Paniwalas purchase new supplies from distribution center
- Profits from sales at distribution center fund new Paniwalas



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Impact

Current Situation		After Implementation
Insufficient clean water supplies	→	Meet nearly **100%** of clean water needs
Can take an average of one day to obtain water	→	Time can be devoted to jobs, education and family care
Water is expensive	→	Water price is reduced by **12x**
Sources of income are limited	→	Increase Paniwala's household income by **50%**
Charitable projects lose funding	→	Sets up self-sustaining market

Creating an efficient market for clean water

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Team

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Post-Doctoral Researcher - UC Berkeley, Chemistry

2009 - Ph.D. Chemical Physics - Harvard University.

Scientific and entrepreneurial experience in environmental issues

Charlotte D. Smith

Ph.D. Candidate - UC Berkeley School of Public Health, Environmental Health Sciences

Internationally recognized expert on drinking water quality

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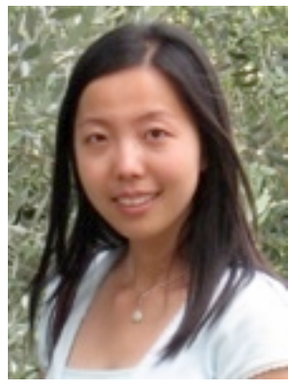
Planning and commercialization of health technologies

Chenlu Hou



Ph.D. Candidate - UC Berkeley College of Engineering, Electrical Engineering

Innovator of diagnostics for global health

Appendix

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Key criteria

1. Is the approach demand-based rather than supply-driven?

Yes, Paniwala seek a supply of water based on the demand of the households they deliver water to.

2. Is it philanthropically efficient?

Yes, we expect costs to be minimal because the project is economically sustainable.

3. Is it effective from the perspective of the customer?

Availability: Each family receives 100 L of clean water per day
Accessibility: Delivered right to household at 12x less the current cost
Drinkability: Filtered and disinfected, quality ensured at delivery
Sustainability: 100% after small initial investment
Scalability: Free-market approach, completely open value chain including the entrepreneurial Paniwala, sources of water, and household end customers

4. Is the approach actionable in the next 6 months?

Yes, plan uses existing technology with little set-up. Site assessment and project evaluation: water.org.

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Reaching 100 Million People in 5 years

- **Number of Paniwala funded at beginning of Year 1:**

$$\frac{\$1\text{M}}{\text{start - up fund for 1 paniwala}}$$

Assume start-up fund is $32 → 31250 Paniwala funded at beginning of Year 1

- **Number of Paniwala doubles every N month:**

$$N = \frac{\text{start - up fund for 1 Paniwala}}{\text{monthly payment from 1 Paniwala to fund future Paniwala}}$$

Each Paniwala pays back $0.12/day from buying supplies at distribution center → number of Paniwala doubles in less than 9 month

- **Number of Paniwala at the end of Year 5:**

$$\frac{\$1\text{M}}{\text{start - up fund for 1 paniwala}} \times 2^{\frac{60}{\text{N}}}$$

Each Paniwala delivers to 6 households (30 people) → 100 M people reached at the end of Year 5