

An aerial photograph of a lush green field, likely a farm or agricultural plot. The field is divided into rows of small, dense green plants. In the center of the field, there is a larger, more prominent tree with broad, dark green leaves. The overall scene is vibrant and healthy, suggesting a well-maintained agricultural area.

# Wealthier With Water

*Pragya Mahendru , Thesis 2017  
MFA Design for Social Innovation*







*Wealthier With Water*  
*by Pragya Mahendru*  
*2017*

A thesis summary book from the  
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Thesis Advisor, Megan Fath

Part 1 : Synopsis

Part 2: Process



The Mahanadi River, August 2016





# Part 1: Synopsis





# The Context

Like any rural community around the world, the further you live from a source of clean water, the less likely you are to always drink clean water. Such is the problem in rural India where groundwater is the only source for survival. In the state of Odisha, the groundwater is contaminated with pollutants that make it unfit for drinking and human consumption. The World Health Organization estimates that 21% of communicable diseases in rural India are related to unsafe water. In India, diarrhea alone causes more than 1,600 deaths daily.

Some rural communities, those who can afford it, are coming to the realization that they need to drink and consume different water are now looking towards local social enterprises as a solution to their health problems.

For this thesis, I chose to innovate for a household problem. Housewives at home can never predict how much clean water they need for the entire day. This uncertainty compels them to buy the least amount of clean water sold due to budgetary constraints. Without access to this clean water, or of any instance of not having clean water at home, they fall back into old habits of risking the health of their family by boiling and drinking bad underground water.

## Existing Solutions and Barriers

Social enterprises, with their mission of uplifting communities out of poverty, have created sustainable markets for basic resources like clean water. Piramal Sarvajal is a social enterprise that serves 300,000 people across 12 states in rural India. They have installed 180+ water ATM's in villages where customers collect water as they need it. Akshay Swachh Jal, a social enterprise uses solar powered units to serve 3,697,500 people in different states, and they too use water ATM's and other dispensing vehicles while all of their technology is solar powered.

The challenge that all social enterprises face is to ensure that customers have clean water available to them at all times, and this water is affordable for them to buy.

All these social enterprises are tackling the same challenge. Paul Polak describes this as the last mile delivery challenge. His proposed solution is to design for radical decentralization that incorporates last-mile (even "last 500-feet") distribution, employing local people at local wages in a marketing, sales, and distribution network that can reach even the most isolated rural people.

## Early precursor

Spring Health is a clean water delivery service, who allowed me to study them, use their networks, intervene in their current operations to innovate a new delivery method.

In their first five years, they have reached 260 villages in rural India and provide clean water to 29,000 households representing over 146,000 people, but now their growth has stopped. Studying their business model gave me an introduction to rural communities, an in-depth understanding of the many systemic challenges of bringing access to clean drinking water, and an opportunity to build, modify and innovate on their current delivery operations.

# Ethnographic Research

Research Phase 1- On site ethnographic research in the Khurdha district of Odisha. Villages visited were Gopalpur, Harirajpur, Jatinwa Gaon and Tangi. Aim to identify key stakeholders, document current delivery operations and gain an introduction in the culture of the community.

Phase 2- Remote research with the help of research partners to conduct 78 customer interviews and 39 non customer interviews. Discussion guides and cultural probes used to gather end user needs and pain points and to gauge perception of clean water in the community.

## Current User Experience

An analysis of the all research to investigate the relationship between the end user and the delivery of clean water.

- RECEIVE 1. The woman of the house receives clean water every morning. At this time, she is asked to make a decision weather she would buy 10L or 20L for the day. A family of 5-7 people buy 10L a day, whereas a family of 10-13 people buy 20L of clean water a day. One delivery man at any point can not hold more than 2x10L cans in his hands. In times of a delivery delay, all families in the neighborhood are without clean water.
- STORAGE 2. In the entire delivery process, Spring Health transfers water 4 times from larger tanks to vessels that are convenient for transportation. Once in the home, the woman of the house further divides this water and transfers it into smaller vessels that are more convenient to drink out of.
- DRINK 3. Spring Health water is distinctly different in taste because of the added chlorine. This makes clean water easily recognized by all customers. This clean water is only consumed for direct consumption, and not for other cooking purposes in the kitchen.
- FLUX IN  
DAILY USE 4. Every 3 out of 4 respondents said that they consume all clean water at home before dinnertime and wait for clean water to be delivered the next day. Without access to this water at all times, customers are forced to boil and drink bad underground water. 62% respondents say that they would go back to drinking bad water even though they are aware of the health risks of drinking bad underground water.

## Baseline measurement of problem

Only 10L of clean water is at home everyday. 70% of all respondents fall short of the 10L of water that they buy every morning. Customers do not carry this clean water out with them when they leave the house

Due to limited knowledge of health risks around underground water, every week at least once a week, customers compromise their health and the health of their children and turn to old habits of drinking bad water.



# Current Realities

## COMMUNITY BELIEFS

1. There is a negative behavior of indifference towards underground water, that is, the perception that drinking clean water offsets the negative effects of drinking some underground water. We know that this is not true, even a little bit of underground water is bad for health.
2. Spring Health customers perceive this water as having medicinal properties, and thus purchase lesser water than they need for a day.
3. The community is most concerned with the health of their children. Loyal customers of Spring Health continue to buy this service because they have regularly seen their family and friends be taken by illnesses jaundice and diarrhea.

## MOTIVATIONS WHILE BUYING CLEAN WATER

1. Community members are thrifty in their purchasing habits. This resourcefulness makes them stretch the 10L of water that they buy for as long as possible. They may not buy water the next day just so that they can save some money.
2. Customers appreciate that this water is delivered to their doorstep every morning. They are happy with this service because carrying 10L of water is very tiring for the woman of the household.

## SUPPLY CAPACITY

The chlorination of underground water is very cheap. Almost all cost of this clean water is the delivery cost. Local entrepreneurs who chlorinate and clean the water, can supply much more than the current demand in the every village.

# Prototypes to Test Behaviors

## HYPOTHESIS FOR PROTOTYPES

An alternative way of purchasing and receiving this clean water can ensure that people in these communities are always drinking clean water.

## PROTOTYPES

1. A larger 20L vessel at home for spring health to only refill every morning, customers still consume as much as they need, but are guaranteed 20L every morning.
2. A second round of evening delivery to provide water to those who run out of water.
3. To instill pride in customers who continue to drink clean water even during water stress moments, so that they can motivate others in the community to also do so.
4. A change in subscription model by increasing access points to clean water so that customers are always drinking clean water even outside the home.

## DESIGN INSIGHTS FOR FINAL INTERVENTION

1. Customers need to take as much water as they need, whenever they need it, without having to worry about its availability.
2. Introduce community access points for clean water so that families who know and trust each other collect water from one common clean water tank.
3. The intervention must not use more manpower or introduce any new assets than it currently involves.

# Intervention

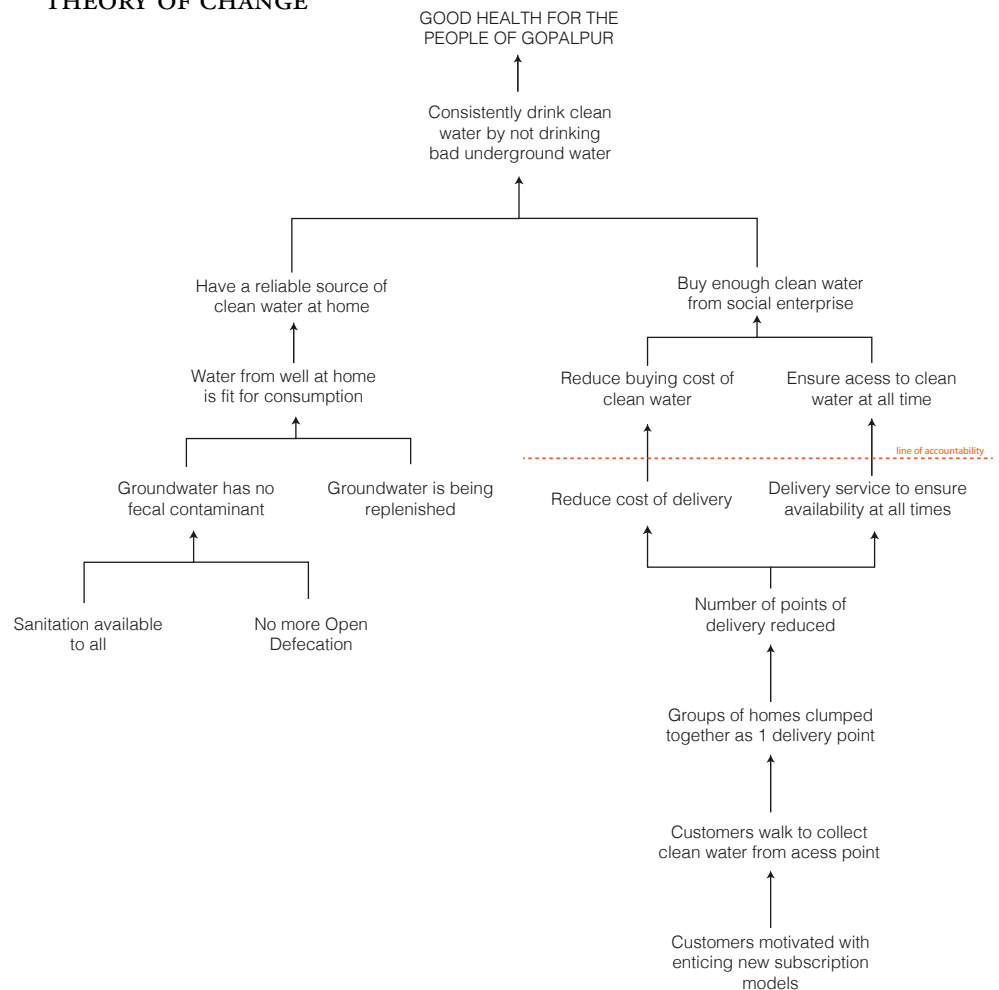
## AIM

The objective of the intervention is to prove that introducing more access points to clean water will ensure an increase in daily use of clean water by reducing the amount of bad water consumed.

## HYPOTHESIS FOR INTERVENTION

Spring Health can provide more water to customers at the same price by reducing the cost of their delivery. Ensuring an 'unlimited amount' of water will encourage customers to walk multiple times a day to get clean water from a shared community tank.

## THEORY OF CHANGE



## PRECONDITIONS FOR SUCCESS

1. All cost of water is the delivery cost.
2. In order to give more water for the same price, we need to reduce delivery time.
3. In order to reduce delivery time, we introduce community access points from where customers walk to collect water.
4. In order for people to walk to collect water they need to be motivated to walk.
5. We motivate people to walk with smaller convenient vessels and a modified enticing new subscription models.



**DESCRIPTION OF INTERVENTION**

The current 10L jerry cans are replaced by a 5L water camper, 2L water jugs, and 1L water bottle, which makes carrying water over distance much easier. Customers can now drink directly out of the vessels they collect water in.

Designated customers have unlimited access to water at all times of the day and night, as these community tanks are refilled every morning.

Delivering water to 4 access points instead of every customer home reduces the time of delivery drastically and enables Spring Health to deliver water to 4 times more the number of villages they currently serve.

**TIMEFRAME**

March 10th to 16th, a 7 day intervention

**TARGET AUDIENCE**

30 Families in the village of Gopalpur

**METHODS OF INTERVENTION**

The village of Gopalpur is divided into 3 zones, where each zone is testing a combination of

- A different way to pay for the water,
- A different way to access the water, and
- A different way to collect the water.

In Zone1(10 families) To test if people value the quantity of water purchased over the convenience and ease of access to this water.

Zone2 (7 families) To test if every individual of the family drinks clean water even when they step out of the home.

Zone3 (13 families) To formalize the current water collection habits that the community members are doing informally.

## Measurement and Evaluation

	<i>Indicator</i>	<i>Definition</i>	<i>Baseline</i>	<i>Target</i>	<i>Data Source</i>	<i>Intervention Result</i>
<i>Goal</i>	Reduce water delivery time	Calculate total time to deliver water for 7 days divided by 7	1 vehicle takes 4 hours to deliver water to 54 homes	2 hours for 54 homes by 1 vehicle	Time recording for 7 days	1hr 15 min average delivery time
<i>Outcomes</i>	Amount of clean water consumed	Total amount of clean water consumed divided by total number of families over 7 days	10L bought from Spring Health	Show increase	Self documentation by families + tokens collected at end of day recorded daily	17L average
	Use of this clean water	Observe all uses of the water collected	Only used for direct drinking	Use clean water for all consumption purposes	Endline survey + self documentation	Water used for all consumption purposes; drinking, cooking, tea
<i>Output</i>	No consumption of bad underground water	Number of times people drink bad water.	2-3 times a week	0 times	Endline survey	No family drank bad underground water

## RESULTS OF INTERVENTION

1. Average amount of clean water collected and consumed per day per family during intervention = 17L

This shows an increase from baseline measurement. This extra water at home was being consumed for all purposes of consumption, like washing vegetables, cooking food, direct drinking and making tea.

2. Average time taken to deliver water = 1hr 15min

Time includes- filling 1 large 750L tank + transfer into 2x200L tank + transfer into 1x300L tank + transportation time.

3. Number of instances of consuming bad underground water = 0

No family of the 30 target audience consumed bad underground water in this 7 day intervention time.

## Proposed Pilot Project

To see longevity, I propose the next iteration of this idea, a pilot project, now in 3 villages, serving 150 families, once again using the Spring Health network. This pilot will take place over a longer duration so that we can measure positive health impacts. This model will make the Spring Health delivery more robust and will ensure clean water availability at all times.

In this next pilot, we would sell water to clumps of houses together rather than selling water to individual households. In this new subscription 8 families would buy 200L of water everyday. Although the average is 17L, they will still be able to take more water than they need. We will aim to provide water to 4 villages using 1 delivery vehicle.



The Mahanadi River, December 2016







Part 2: Process





*How easy it is for us to kill,  
Kill our rivers kill our waters,  
Kill those who make  
Our existence possible.*

*Hi, I'm Pragya.  
I like to go on long walks  
To find hidden waterfalls,  
And this is my hypothesis.*





### *Defining a Social Problem*

January 2016, it was the beginning of this thesis journey. I didn't know where I would end up, but I knew I wanted to work with water. I love all kinds of water; saltwater, freshwater, spring water, underground water and especially falling water. I wait for the monsoons eagerly, and if that's far away, I'd stand under a waterfall for hours. My personal love

for this gift of God, combined with my concern for this depleting resource convinced me to investigate into social problems revolving around water. Before finding a community to study, I explored different social interventions that I liked in the world. I identified a few which further led me to understand what I expected of myself,

1. Design and co-create sustainable solutions with communities to address the needs of the growing population of rural India.
2. Find vulnerable communities who are affected by climate change to understand their challenges and investigate solutions.
3. And finally, create something that has the potential to live on in the world.



## *Searching for a Community*

April 2016, I was introduced to Paul Polak when he spoke at the weekly Wednesday guest lecture at DSI. He encouraged all of us to design for people who live on less than 2 dollars a day. He introduced us to ideas like the last mile delivery challenge of providing everyday resources to rural communities, aspirational branding and more.

Cheryl Heller, the chair of DSI offered me the opportunity to work with Paul's organization, Spring Health in Odisha, India. My personal aim for this thesis was to do a pilot project at the end of the journey, something I had never done before and was eager to try for myself. I wanted to put to use everything that I had learned at DSI, and I was up for the challenge.

Paul Polak, in his book 'A business solution to poverty' explains 12 steps to practical problem solving for communities who live on less than 2 dollars a day. I decided to use these principles to start my thesis journey. It all started with going to the community, in Odisha, India.

Twelve steps to practical problem solving.

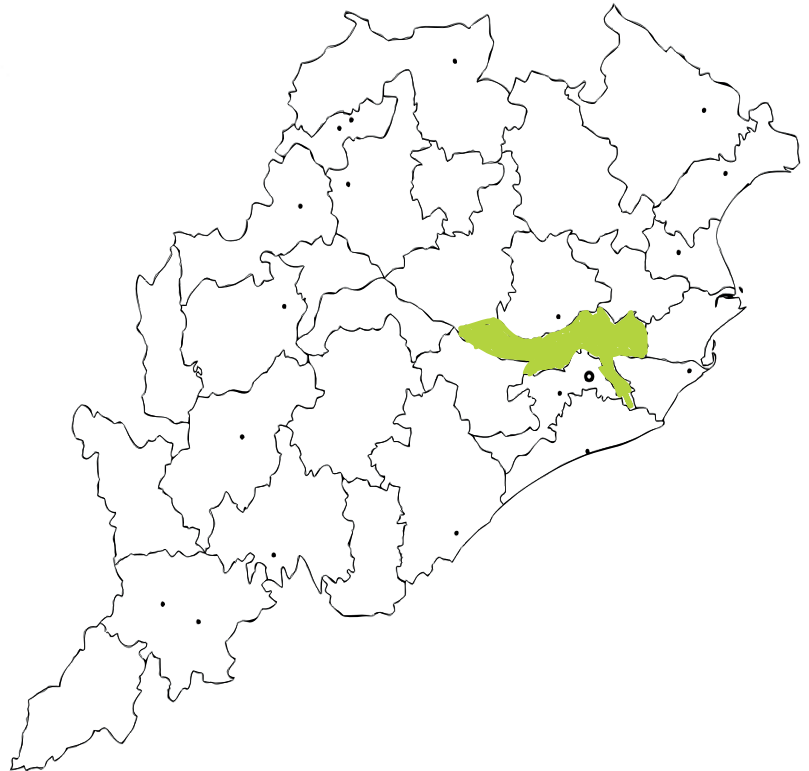
1. Go to where the action is.
2. Talk to the people who have the problem and listen to what they say.
3. Learn everything you can about the problem's specific context.
4. Think big, act big.
5. Think like a child.
6. See and do the obvious.
7. If somebody has already invented it, you don't need to do so again.
8. Measure positive impact- Scale to at least 1million.
9. Design to specific cost and price targets.
10. Follow practical three year plans.
11. Continue to learn from your customers.
12. Stay positive: don't be distracted by what other people think.

Paul Polak's guidelines to practical problem solving,  
A business solution to poverty.



*So all I want to do,  
 all I really want to do,  
 is go to these communities  
 with a lens of access to freshwater,  
 use these principles as my methodology,  
 amplify all of this with my learnings at DSI,  
 all to create a pilot project.*







### *Odisha and I*

Traveling to Odisha for the first time was an exciting experience. I did not know what to expect, and thus was free of preconceived notions of what I was to find. Honestly, I didn't know what I was looking for. In retrospect, I see that even though I am from India myself, I am very disconnected from rural India, and exploring the lives of rural communities

was an enriching experience that has added value to my life.

My aim was simple, to where the action was happening to familiarize myself with the culture of rural Odisha. I wanted to map the ecosystem of the problem I'd find, and uncover all the contributing factors that influenced it.

Secondly, I was determined to talk to as many people as I could about the problem. With nothing but two cameras and empty SD cards, there wasn't a moment I witnessed that I didn't document.





### *Ethnographic Research on Site*

August 2016, I visited the Khurdha district of Odisha. I spent six days on site conducting ethnographic research interviews, intercepts and observation tools to gain an understanding of the ecosystem of clean water. Day one was spent orienting myself to the new environment. Day two I traveled to Gopalpur village, where I interviewed

many households about their relationship with Spring Health. Day three I traveled to Harirajpur village where again I met with Spring Health employees who provide water to the village. The fourth and fifth day I traveled to Jatinwagaon where I followed the Spring Health delivery man on his morning routine and mapped his entire experience.





The biggest challenge was my language barrier. I am fluent in Hindi and English. But communities in the Khurdha district of Odisha only speak Odiya. All along, I felt handicapped. But with the help of Spring Health employees, I was accompanied with a translator everywhere. Eventually this was helpful to me, as I gained maximum insight into their daily operations.

Life in the Khurdha district of Odisha is slow. People are kind and welcomed me into their homes. Every house I entered, the lady of the home would make me tea and waited next to me until I was finished.









### ***Water in Rural Odisha***

In the villages that I visited, groundwater is the only source of all water. Government pipelines were laid a few years back, but within two months all pipelines were running dry.

All groundwater is replenished by the Mahanadi river that flows from Chhattisgarh through Odisha. I visited Odisha during the monsoon season. The Mahanadi river was overflowing and flooding the nearby villages. On the banks of the Mahanadi river, villages like Harirajpur flood regularly and thus the people of Harirajpur have started to build more stories on their homes to accommodate people during this unpredictable. But, within the next four months when I went back there, this river was dry. In December the entire breadth of the river, 2077 meters was dry.

Although this is a seasonal shift, people of Odisha have not witnessed this kind of drought in the last forty years. Forty years back, when the river was dry and wells had no water, people from the village would walk 15-20 km in search of water and carry it back home. For the people of rural Odisha, this groundwater is their primary source of water. Wells in Odisha run 40 feet deep, and when that is not enough to hit groundwater, they install tube wells that go down 150-200 feet to find groundwater.

The larger problem that makes this groundwater unclean is the fact that it is contaminated with fecal coliform, feces particles have seeped down into this groundwater. Because there are no toilets in this part of rural Odisha, open defecation still is the normal way of life.

Today, there are 1600 deaths daily in India due to diarrhea. This is because people continue to drink unhygienic underground water. This is true for rural Odisha, and especially the villages that I visited. Communities here have realized the negative health effects of drinking bad underground water and are thus looking to outside solutions for their health problems.

Spring Health came to these villages only a year ago and one fourth of all families of the village now buy this clean water everyday. So now families have two sources of water at home. One clean source of water that they buy from Spring Health, and the other bad underground water that they collect from their wells or tube wells for all other purposes at home.

### *Stakeholder Involved*

Paul Polak, Chairman of Spring Health is building the rural economy of Odisha by employing rural workforce to tackle a social need in the community.



Paul Polak

Jacob Mathew, Director and design lead is concerned about the time and cost of the current delivery model.

Kishan Nanavati, CEO, is concerned about the future growth of Spring Health. In five years they have grown to 260 villages, whereas their aim was to provide water to 1000 villages.



Jacob Mathew



Kishan Nanavati

Vikram Das, the head of sales, and Ms. Vijaylaxmi are concerned about expanding the Spring Health market. They are also the ones who build relationships with future partners to install chlorinating plants in villages.



Vikram Das



Vijaylaxmi

Senior executives at Spring health take care of the day to day operations of Spring Health. They are responsible for the quality checks around different villages to ensure the right amount of chlorine in the water they provide. Customers come to them with multiple complaints and they troubleshoot everyday problems.

The delivery men at Spring Health simply want easier operations. While observing their daily job, I noticed redundancies within the model, that I will explain later.



Duryudhan



Prashant



Manoj Pradhan



Dipankar



Sushant







Reena



Chaaya



Saroshi Santosh



Nomita



Sarojini Pradhan



Vimla Das



Lily Maharana



Shradha



Jayanthi



Kavita



Auroshree



Netramani



Manju Maharana



Manjolita Pradhan

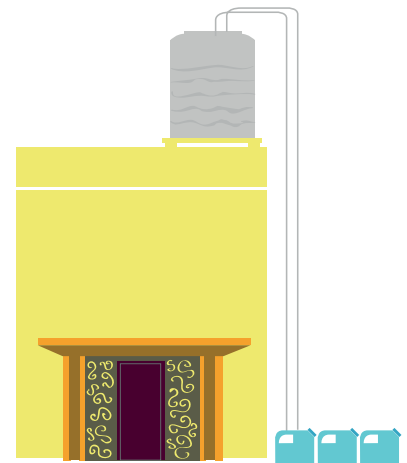
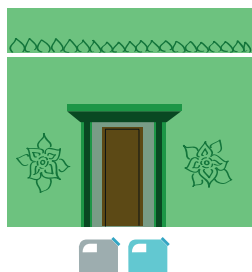


Kavita

I spoke to various women in the community. These women are housewives and are the ones who collect water for the home. We had rich discussions about their past experiences with drinking bad water, their present interactions with Spring Health and their future hopes for their family and community.

*Thesis Statement 1- Hypothesis*

The time and cost to deliver water from a Spring Health plant to the homes of a Spring Health customer is too high. An increased role of Self Help Women in these daily operations can make this delivery efficient.



### ***Current Delivery Operations***

Spring Health has partnerships with local entrepreneurs to extract water from their wells every day. This water is then filled into large 2000L tanks, ready for chlorination.



Once the water is pumped into the large tanks, chlorine is added to purify the groundwater and rid it of all its fecal contaminants. It takes 30 minutes for water to be chlorinated. This clean water is then tested by Spring Health executives before it is filled into smaller vessels for transportation.



This is the home of an entrepreneur, also a chlorination plant. After the chlorination process is completed, clean water is filled into 10L blue jerry cans ready to be taken to customer homes. White jerry cans stay in the customer homes.



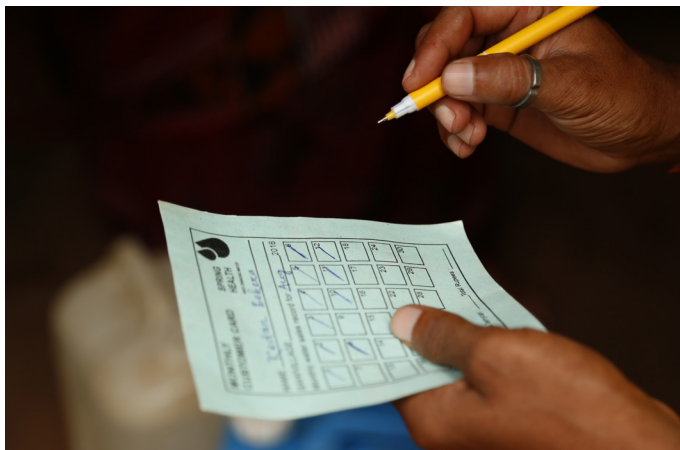




The delivery man then fills each jerry can individually and loads the cans onto his delivery vehicle. Each vehicle can only fit 25 jerry cans at a time, so the delivery man has to do at least 2 rounds to deliver water to 1 village.



To make a delivery to 55 homes, the vehicle has to make 20 stops along the way. Every time the vehicle makes a stop, the delivery man takes the 10L blue jerry cans out of the vehicle and walks to the customer homes. Even though some homes are clumped together, he can only walk with 2 jerry cans in his hand at a time.



Customers know when to expect the daily delivery of this clean water. Once at the doorstep, the delivery man has to sign a 'collection card' that documents the amount of water that the customer bought every day of the month.



After signing the collection card, the customer brings the white jerry can forward. The delivery man then transfers the water from the blue filled jerry can to the white jerry can. He also has to make sure that the white jerry can is clean and not has not been used for other purposes. Once he has transferred the water, he then moves onto giving water to other homes in the village.





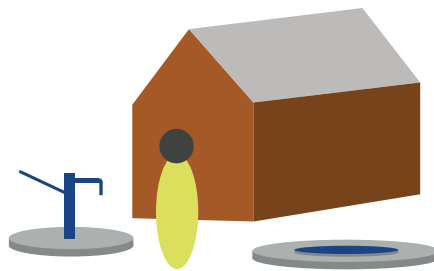


## *Understanding End Users*

I realized that within the villages that I had visited, there were three different kinds of households. The primary source of water for these households makes them distinctly different in their water consumption habits.

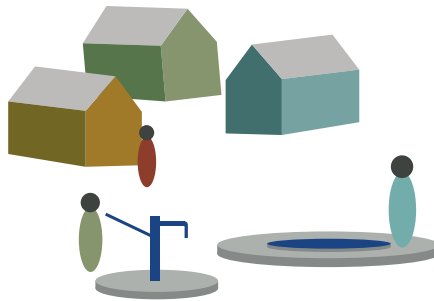
### *End User 1*

These users have a well or a tube well in their own home premise. They do not need to go out of the home to get water. These families are also wealthier than others in the village, thus they have their own source of water. These families may or may not have their own water filter at home which allows them to filter water for their drinking.



### *End user 2*

These users do not have their own source of well or tube well at home. They get all of their water from the closest community well. They have to carry this water back to their homes. This well is a shared resource point for at least 15-20 families who live close to it. These families can take as much water as they want at any time of the day.



### *End user 3*

These users do not have a well or tube well at home and live far from the nearest community well. These families live in very tiny alleys. Thus it is hard for the Spring Health delivery vehicle to reach them directly because they have to maneuver narrow village roads. The delivery man has to walk on foot for a long time with two cans of water in his hand to deliver to these homes.



## *Remote Research*

I realized that even though I know about where the end users get their water from, I did not know a lot about their use and consumption of this clean water. I partnered with two enthusiastic friends from home who then became my research team throughout this process. I provided to them a basic discussion guide along with a cultural probe. The research team went to a total of 117 people, 78 customers of Spring Health and 39 non customers. I tried to understand their beliefs and motivations while purchasing clean water. My assumption was that the delivery model had some inherent flaws that created pain points for the customers daily experience. I wanted to identify behaviors experienced by a large number of customers.





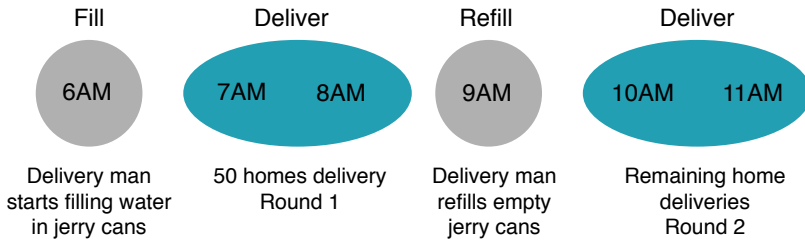


### *Self Documentation*

To further gauge accurately the use of their water, I gave 12 families disposable cameras to document their daily use of water. With very little guidance provided by me, they documented all instances where they interact with water. I got some very interesting photos back that helped me further understand and decipher what was happening in the homes of the users. I learned that even though these users get 10L of water daily in the jerry cans, they always transfer this water again into smaller vessels that they can drink out of. This was something that Spring Health was also unaware of.

AM	6AM	7AM	8AM	9AM	10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM	10PM	11PM	12AM	1AM	2AM	3AM	4AM	5AM
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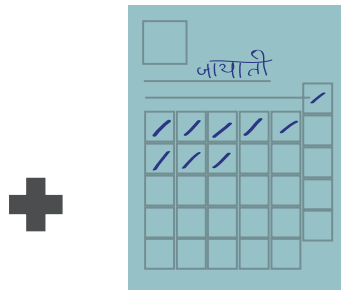
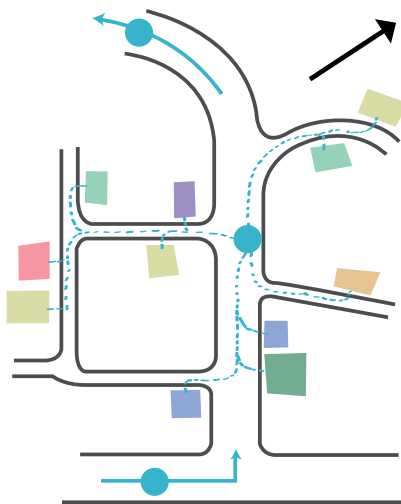
1. Customer receives the water



"The customers know when to expect us"  
- Executive, Jatinwagoan

"When we are not on time, they(customers) do not hesitate calling the helpline to shout at us. They have been waiting for water and we are not there on time."  
- Manoj Pradhan, Senior Executive

DELIVERY DELAY



Customer has to be reminded to bring the collection card to sign.

Customers in the second round of delivery complain more than the first round.

**Journey Map**

With all of the data that I gathered, I created a journey map that illustrates how and when the user interacts with clean water. The process of making this map was very helped me declutter all of the excess information and highlighted for me the larger problem that I needed to address.

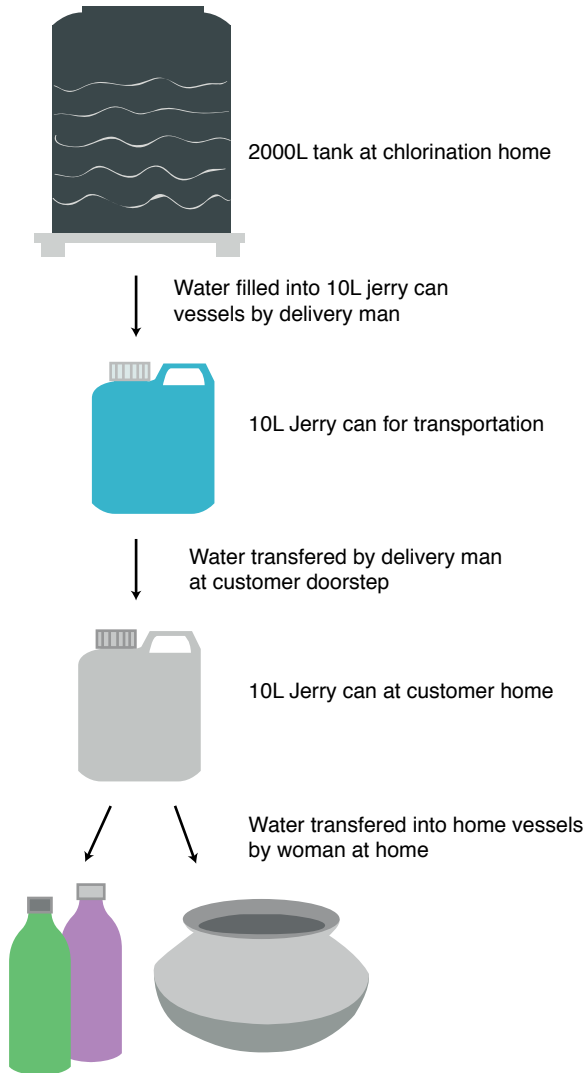
1. *Customer receives the water.*  
Everyday, the customer knows when to expect the delivery man. Whenever there is a delay, customers call and complain to the helpline. Customers who receive water in the second round of delivery complain more than those who receive water in the first round of delivery. Delays are inevitable in the current Spring Health operations model. This

is because customers always have to be reminded to bring out the collection card. Furthermore, whenever there is a delay in delivery, no home in the village has clean water. Customers can not ask their neighbor for clean water because no one has received any. In times like this, customers are forced to drink bad underground water.



5AM	6AM	7AM	8AM	9AM	10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM	10PM	11PM	12AM	1AM	2AM	3AM
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## 2. She stores the water



### 2. Storing the water

Once customers receive 10L in the white jerry cans, they then transfer the water into smaller vessels. They do this because it is not convenient to drink out of the 10L jerry can.

Time and energy is wasted while transferring water for both the customer and Spring Health. Because the customers transfer the water out of the white can

every morning, this makes the white jerry can always empty at home. Thus, others at home mistake the white jerry can for other uses like fuel or petrol. When the white can is dirty, the delivery man has to take it back to the chlorination plant where he has to clean it.

5AM	6AM	7AM	8AM	9AM	10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM	10PM	11PM	12AM	1AM	2AM	3AM	4AM	5AM
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### 3. They drink the water

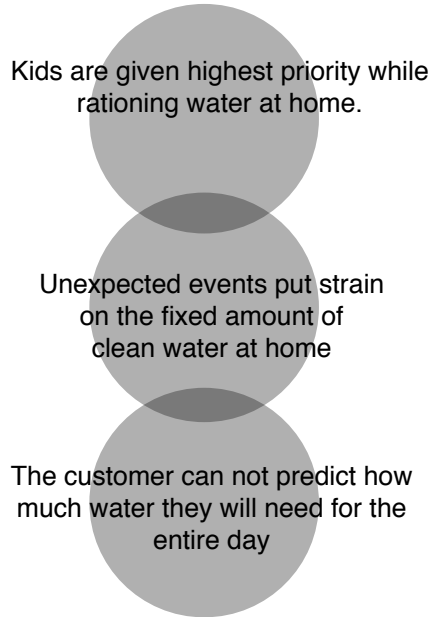
“We buy Spring Health water so that the younger kids don’t get ill.”  
- Vimla Das, Gopalpur Village

“My kids got very sick with tube well water. The doctor advised against it, so I started buying Spring Health water”  
- Sushmita Gosai, Harirajpur Village

“I know that they add medicine to the water”  
-Reena Behra, Gopalpur Village

“My water gets over on days when my entire family is at home, or when we have guests over.”  
- Savita Panda, Gopalpur Village

“My water gets over every time I have people at home”  
- Chaya Maharana, Gopalpur Village



#### 3. Drink the water

Customers are happy and satisfied with the current 10L of water they buy and can see the positive health benefits as they are no longer falling ill. Children at home are given maximum priority when it comes to rationing this water. However, the amount of water needed in the customer home is always in flux. Unexpected events put a strain on the

families use of this water, and too often families run out of this 10L of water everyday. Thus, customers are buying lesser water than they actually need at home. Even though Spring Health offers an option to buy 20L of water daily, they prefer to buy less and save the extra money.



5AM	6AM	7AM	8AM	9AM	10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM	10PM	11PM	12AM	1AM	2AM	3AM
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4. They wait for more water

8PM

Waiting for water

8AM

All Spring Health water is consumed by 6-8PM and is over before dinnertime.

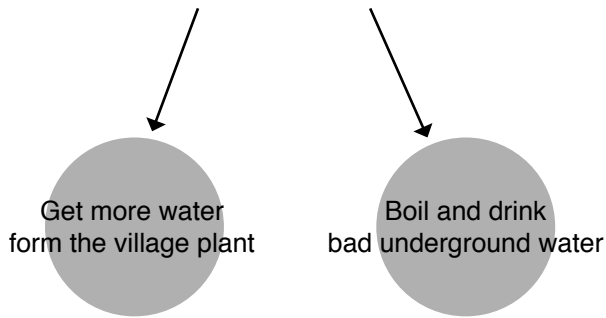
“Many years ago, our wells were dry, we never had any tube wells. That time 15-20 of us walked to neighboring villages to get water back.”

- Sarojini Boi, Customer, Harirajpur Village

“There is no other alternative close to us. We cannot walk to the chlorination plant, so we have to boil and drink underground water.”

- Chandrami Gorhat, Customer, Harirajpur Village

Whenever water is over



4. *Wait for more water*

My research showed me that all of the 10L that customers buy is used for direct consumption. That is that they do not use this water for anything else but for direct drinking.

The entire amount of clean water is over before dinnertime and the customer is always waiting for the delivery man to come in the morning. At times when

they do not have access to this clean water, the customer is left with two options, to go to the village plant to get more water, or to boil and drink bad underground water. Customers do not hesitate drinking bad underground water because they have done so for a very long time in the past.



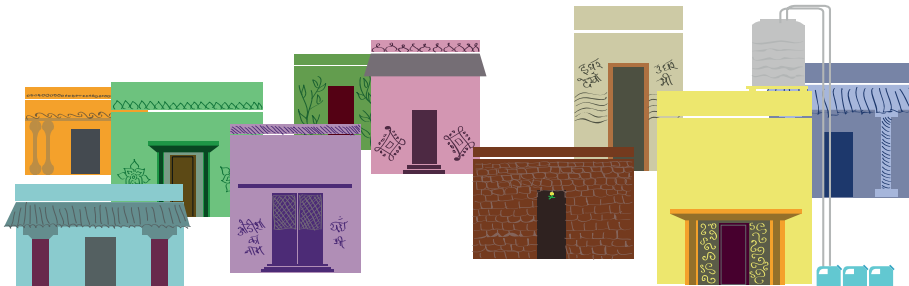
### *Synthesis of Problem*

Customers receive water in the morning. At this point, the customer is asked to make a decision on the spot to decide how much water they will need for the entire day. This water is only used for drinking or making tea, and the entire amount is consumed by dinnertime, thus the water can is empty by nightfall. From dinnertime till next morning, customers are left with two options, to go collect more water from the chlorinating plant, or boil and drink bad underground water.

I wanted to solve for this waiting time, so that no family has to drink bad underground water. I decided to investigate ways to make this delivery of water meet the fluctuating demand of Spring Health customers.

### *Reframing the problem*

While troubleshooting for this waiting time, the broader question that excites me is if this Spring Health delivery model can ensure that the people of these communities are always drinking clean water. My hypothesis was that an alternative way of buying and receiving this water can ensure that people they always have access to this clean water.









## *Community Beliefs*

While I had enough insight about the use of the clean water at home, I was also able to extract more insight about the communities beliefs around clean water. There is a negative behavior of indifference towards underground water, that is, the perception that drinking clean water offsets the negative effects of drinking some underground water. We know that this is not true, even a little bit

of underground water is bad for health. Spring Health customers perceive this water as having medicinal properties. They believe that the chlorine they taste in the water is actually medicine that Spring Health adds to make the water better quality. It is this perception of medicated water that makes them buy lesser water than they need everyday. The community is most concerned

with the health of their children. Loyal customers of Spring Health water continue to buy this service because they have seen their own family be taken by jaundice and diarrhea. On the other hand, there are still community members who do not buy Spring Health water or any other clean water. These people continue to use underground water as their only source of clean water because.





Their belief is that for generations their families have been dependent on drinking well water and thus they trust it. I learned that they are aware of their deteriorating health but they do not want to spend money on buying water.

### ***Motivations While Buying Water***

I learned that all community members, costumers and non costumers are extremely thrifty in their purchasing habits. They are skilled at conserving their resources and are thus willing to stretch the 10L of water that they buy for as long as possible. They may not buy water the next day just to be able to save that extra money.

Customers are satisfied with their door-step delivery of clean water. Carrying 10L of water is a tiring job and therefore they are happy with this delivery and its added services because they do not have to collect more water from the village well.

### ***Spring Health Capacity***

I was surprised to know that the entire chlorination process is extremely cheap. All cost of water that the customer bears is the delivery cost. The water that they extract from the ground is free and unlimited for all to use.

While on site during research, I noticed that the amount of water that was chlorinated daily was far more than the amount being transfered into the 10L vessels. Spring Healths' capacity to supply water is much greater than is the current demand in the village.







Once I had identified the desired behavior change, I came up with multiple ideas to test. While generating ideas, I used the *Ten Types of Innovation: The Discipline of Building Breakthroughs* a book by Brian Quinn, Helen Walters, Larry Keeley, and Ryan Pikkell, referred to me by my thesis advisor, Megan Fath. This book gave me an introduction to the different kinds of innovations tactics that can be used to grow any business.

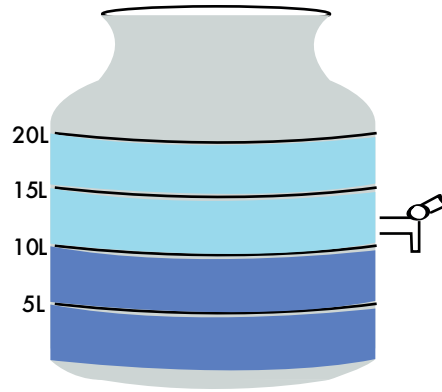
I had an understanding of the delivery operations of Spring Health and was able to use the following innovation types to generate prototypes-

1. Profit model innovation-Introduce flexible pricing or memberships to Spring Health customers
2. Structure innovation- With decentralized management
3. Product performance innovation- Increase the customers level of confidence and security in Spring Health
4. Product system innovation- Product bundling and integrated offerings for customers
5. Service innovation- Create personalized services
6. Channel innovation- Through direct selling methods
7. Customer innovation- Simplify the lives of Spring Health customers.



**Prototypes to Test**

December 2016, I traveled to Odisha once again, this time with the intention to test prototypes that I had previously generated and selected. Some of these prototypes were hard to implement, some were fun to conduct. I learned enough during this site visit and collected more insights to bring back to the thesis.

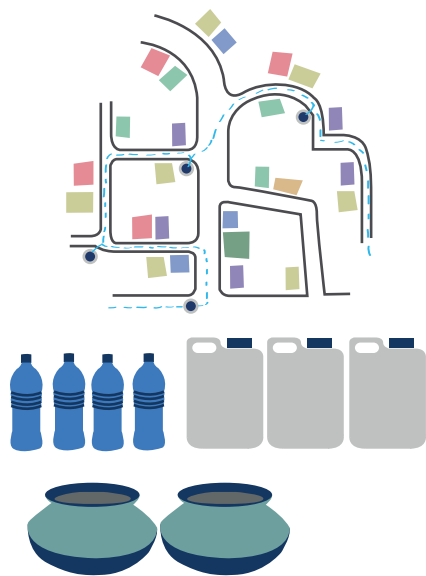


For this prototype, I wanted to test if I can ‘guarantee’ 20L of clean water to customers every morning by refilling a larger can with water. This way customers will never run out of clean water at home.

In this prototype, I wanted to provide an evening hawker delivery of clean water by cycle, especially for people who run out of clean water in the evening.

GUIDING INSIGHT	People buy the least amount of water sold by Spring Health because of thriftiness.	Customers run out of water after 6pm.
ASSUMPTION/HYPOTHESIS	Customers need more than 10L of water for any one given day.	Customers will buy water twice a day if they have the option to.
BEHAVIOR TO TEST	For a SH customer, having double the amount of clean water at home will ensure that they are always drinking clean water.	Customers are thrifty with their money and thus buy lesser water than they need for the day.
DRAWBACKS OF PROTOTYPE	This delivery model assumes that 10L of water will be delivered to the customer home every morning. This does not happen.	Spring Health does not have the resources and assets to employ and invest in more labor.
LEARNINGS	People use/collect water as per the need presents itself. Having known that there is no evening delivery available, people walk to collect more water when they need more at home.	In the evening, kids are sometimes asked to go collect/fill a home vessel with water from the chlorination plant.





While in Odisha, I saw that even though children drink clean water at home, they do not have access to this water in school, and not everyone carries this water with them when they leave home. To address this, what if I were to provide clean water at multiple community hot spots, like schools, bus stops or Kirana shops.



People look to their neighbors for inspiration, tips and tricks around everything. I noticed that families paint the walls outside their home with celebrations of marriage and welcome signs. In this prototype I want to recognize these outspoken families and paint a Spring Health pattern or a mural on their wall to signify their loyalty towards clean water, so that they can take pride in their actions and motivate others to do the same.



There are Self Help Groups of women in every village. These women are highly respected within their community and are also part of a larger network that connects these women to others like them from different villages. They are independent, entrepreneurial and community driven. What if we were to use their network to supply water to a group of families rather than to individual families.

Customers do not carry SH water with them when they leave the home.

There is a negative behavior of indifference towards bad water.

Customers are thrifty and do not want to buy excess water.

Access to clean drinking water at multiple community hot spots can ensure that people drink clean water

Showcase the few households of the community who actually drink clean water. This will make others curious, as well as instill pride in those who do drink clean water.

Women can collect water from the same source, without getting into conflict over amount of water drawn individually.

People are willing to walk to nearby areas in the community to collect clean water.

What conversations come out of a visual representation like this?

Communal sharing of a water resource

Carrying water back into the house over a distance of 200ft is unreasonable.

First mural partially successful. Confusing and incomprehensible.

Not all SHG women live close to each other. It is important to look at neighbors who have good relations with each other.

Carrying water over distance is dependent on the vessel that people use. Women are the only ones in the family who collect and redistribute water

This element can not just be a map. It must be embedded within the Spring Health branding.

Use this culture and the relationships between women of the village to benefit Spring Health delivery.

## ***Intervention Planning***

### *Learnings from prototypes*

Through the process of prototyping I learned that customers prefer to collect water as the need presents itself at home. Having known that there is no evening delivery available, customers who live close to the chlorination plant collect more water in their own vessels.

When the women come to collect more water from the chlorination plant, they bring vessels that they drink out of at home. These are usually 'matkas' that are held at the hip. I believe that women are willing to walk short distances to collect water, but this is directly dependent on the vessel used to carry water. Moreover, women are the only ones in the family who collect walk to collect water.

And over time, I had come to understand the culture of the community members, their interactions with the each other, and their willingness to share resources. Women who live close to each other have formed a unique bond with each other. They trust each other entirely and easily enter and exit each others' homes.

### *Intervention Aim*

With these learnings in mind, I was convinced that customers, especially women from the community, would be willing to walk to collect clean water, just like they would do with their well water at home.

The objective of the intervention became to prove that introducing more access points to clean water would ensure an increase in daily use of clean water by reducing the amount of bad water consumed.

### *Theory of change*

To ensure an increase in clean drinking water it is necessary for me to provide clean water at all times and in unlimited amount to the customers. I knew that all cost of delivery was the delivery cost. Thus my hypothesis was that I can provide more clean water customers at the same price by reducing the cost of Spring Health delivery. I also assumed that ensuring an 'unlimited amount' of water will encourage customers to walk multiple times a day to get clean water from a shared community tank.







### ***Methods of Intervention***

To test this intervention, I had a few variables in mind to test.

I wanted to test a different way to access the clean water, a different way to pay for the water, and a different set of vessels to collect the water.

I plan to test different combinations of these in three different zones. While in Odisha, I drew maps of the village of Gopalpur. I knew that this is where I wanted to situate my intervention, as I had formed connections with the locals over time and they understood my intentions. I mapped all the customer homes of Spring Health along with the chlorinating plant and the existing wells and tube wells that customers use to collect underground water. This mapping process further allowed me to identify zones based on the interactions that I had observed amongst the women in the village.

5 out of the 7 families in Zone 1 were cousins and thus trusted each other whole heartedly. Similarly in Zone 2, these set of women were part of an SHG group and thus had been working together for some time. This made it easier for me to ask them to share their water for the upcoming week. In Zone 3, households were selected on the basis of their friendship with Ms. Jayanthi, the homeowner of the chlorinating plant for the village of Gopalpur.





	Zone 1	Zone 2	Zone 3
Access to the clean water	Tank located in Kirana Shop. Access available 3hr morning and 3hr evening	Community tank close to home and access to all other community tanks available	Access to water at chlorinating plant available all day
Payment of the water	Booklet subscription. Customers buy 2L or 5L coupons which they can redeem at Kirana shop.	Prepaid subscription	No change from current model
Vessels to carry water	5L camper + 2x2L water jugs	5L camper + 2L water jug + 1L bottle	Customers use own vessels/ white jerry cans and are given a set of six glasses with a tray.

### *Intervention Implementation*

March 2017, I traveled once again to Odisha to implement the latest intervention and test hypothesis. Not everything went to plan. Details of the different zones changed slightly, but the overall hypothesis was tested.

I spent 7 days during my spring break to implement this intervention. First, to introduce the intervention to the Spring Health executives was challenging. Not everyone bought into the idea of the intervention. It was only after I spoke to them about the theory of change and made them see the larger vision behind what this intervention could be, did they agree to help. Moreover, Ms Jayanthi, the entrepreneur of the chlorinating plant in Gopalpur refused to comply with my intervention guidelines because she felt as though she would lose customers if they liked my model better. It was tough to get everyone on board, but with the help of a very special lady, everything worked out.

I received the Alumni Scholarship Award at SVA, and this helped fund the intervention project. Now, the only thing left to do was run the project in 3 zones.







### *Zone 1 - What happened*

Participants: 10 families

Customers had access to water at their neighbors backyard. This water was available all day. Customers collected this water in their water camper and jugs after they deposited coupons into the collection box. Each family had special colored coupons of 2L and 5L, this made it easier for me to count how much water each family collected that particular day.

The first of the seven days, the families finished the water in the tank. But over time, together they consumed an average of 170L a day, and each family consumed an average of 17L of clean water every day.

One interesting fact is that the family who hosted the water tank during the intervention was consuming double the amount of water than everybody else. This was because this tank was at her disposal always and she felt entitled to take as much as she desired.





### *Zone 2*

Participants: 7 families

Customers had access to unlimited water from a tank on their neighbors porch. Families were provided with 3 different vessels of different sizes to collect water. They documented their use of this water themselves via a tool I provided to them.

Together, these families consumed a total of 876L of clean water over 7 days. Every family individually consumed 17L of clean water a day. In these families, children were also asked to collect water in the smaller vessels that they could hold conveniently. The added 7L of water was used for cooking, washing vegetables and making tea.







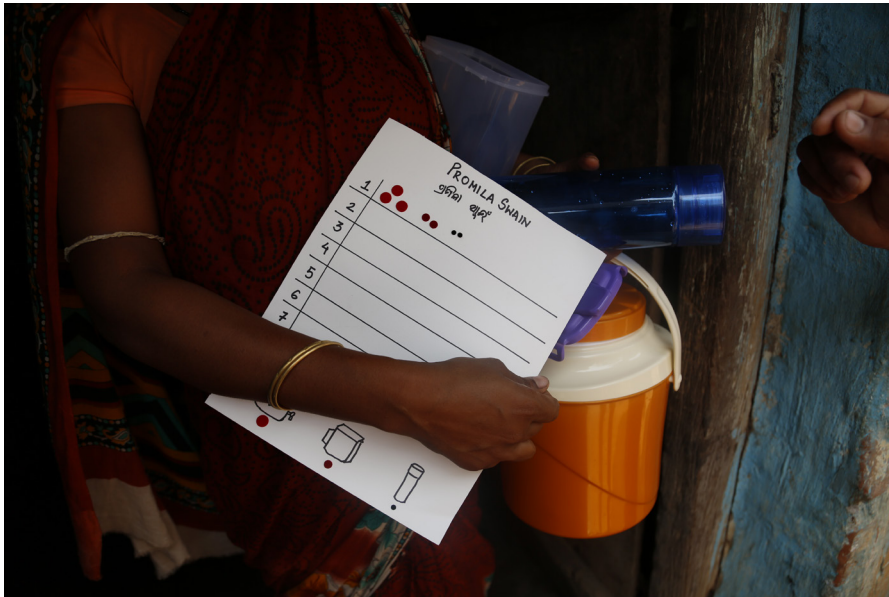
### *Zone 3*

Participants: 13 families

Customers had access to the main source of clean water at the chlorinating home where all the water is cleaned for the village. They took as much water as they desired for the same price that they pay right now. They used their own vessels, and the 10L jerry cans they have at home to carry this water. I incentivize them to walk to collect water by giving them a Spring health glass set to acknowledge their loyalty towards always drinking clean water.



In this zone, customers collected water not more than twice a day. They found difficulty in carrying the 10L of water themselves and were often requesting the younger people of the neighborhood to carry this water for them.



### *Data Collection for Impact Analysis*

With this intervention I had a few things to test:

1. Does the delivery time reduce drastically if more access points are introduced instead of doorstep delivery?
2. What motivates customers to walk to collect water?
3. Will customers misuse this 'unlimited' resource of water?
4. And lastly, can this intervention ensure that people in these communities are not drinking bad underground water?

Tools used for measurement and evaluation:

1. Self documentation using stickers for each trip made to collect water in Zone 2
2. Tokens for the amount of water collected at every trip, 2L or 5L in Zone 1
3. Endline survey to gather use of this water
4. Net Promoter Score



### ***Results of Intervention***

Average amount of clean water collected and consumed per day per family during intervention = 17L

This shows an increase from baseline measurement. This extra water at home was being consumed for all purposes of consumption, like washing vegetables, cooking food, direct drinking and making tea.

Average time taken to deliver water = 1hr 15min

Time includes- filling 1 large 750L tank + transfer into 2x200L tank + transfer into 1x300L tank + transportation time.

Number of instances of consuming bad underground water = 0

No family of the 30 target audience consumed bad underground water in this 7 day intervention time.

Net promoter score: Families in Zone 1 and Zone 2 were happy with this service and there was a 75% adoption for this service if it were to be offered in the future. Families in Zone 3 were not very happy with this service and there was almost 0 future adoption to the service they received.

Chilka Lake, August 2016





### *Conclusion*

Social enterprises all have the mission of providing clean drinking water to communities who do not have any. It is also their responsibility to ensure that their customers are always drinking this clean water and not risking their health.

This proposed delivery model may not necessarily apply to other regions in rural India, because they are all so culturally different. And all of them have different business models, but this process of using design thinking methodologies to innovate and enhance existing businesses can ensure that these communities are always drinking clean water.

Wrapping it up,  
this journey that I took,  
of going to a place I'd never been,  
of learning everything I could about a community,  
of talking to as many people as I could have,  
of addressing a problem and intervening for the better,  
all of this has left me **Wealthier With Water**.



### *Acknowledgments*

A big thanks to my advisor, Megan Fath for her mentorship throughout this thesis process. To all thesis advisors at DSI, thank you for your suggestions and guidance for last 18 months.

Special thanks to Cheryl Heller, for her continued faith and confidence in my creative abilities.

To Paul Polak and the entire Spring Health team, thank you for your time and investment in introducing me to the real challenges faced by social enterprises.

To Ajay and Sonu Bhaiya, the most enthusiastic research partners, and Richa, a very special lady, thank you for your support in delhi and in Odisha.

Thanks to the cohort of 2017, the family I found in New York far away from home. And lastly, the entire Design for Social Innovation community, thank you for inspiring me to strive harder, so now I am finally part of the army that we are.









**Design for Social Innovation**  
**School of Visual Arts, New York**

**Pragya Mahendru**  
**2017**