



Final Report

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BACKGROUND

As of 2023, the city of Bangalore in the state of Karnataka in south India has a population of 13.6 million [1]. Known as a major tech hub in India, it resides on a large plateau and is one of the highest regions in the south of India. As a result, supplying freshwater to its inhabitants has proven to be difficult. Bangalore's water is supplied from two main sources: the Cauvery River and borewells. This water is delivered through direct-to-home piping and water tankers, respectively. Residents use a combination of one or both sources to fill underground tanks below their homes called sump tanks.

Water from the Cauvery River has to be pumped from over 100 kilometers away and up an elevation of over 500 meters, making it energy intensive and expensive [2]. Borewells extract water from the deep aquifer, depleting it faster than it can recharge. Because of this, deep borewells are drying up, but residents still heavily rely on sourcing water through water tankers. Water tankers have quickly become the most expensive source of water in Bangalore, and one of the most inconvenient as residents have to call ahead of time to schedule deliveries. Even with both of these water sources, water scarcity has become a pressing issue in Bangalore.

One solution organizations in the local area are using to mitigate this water issue is harvesting rainwater. Rainwater harvesting (RWH) occurs during the monsoon season, where rainfall is collected and stored in water tanks. RWH can be used in many ways: household activities, rejuvenation of shallow aquifers, and even consumption if filtered correctly. RWH can account for up to 70% of the city's water needs [3]. The government has recognized RWH as a solution to alleviating the water crisis and even mandates it for "roof areas no less than 108 square meters" [4].

PROBLEM

Despite the requirements imposed by the government and the severity of water scarcity in Bangalore, only about 10% of residential buildings in Bangalore have a RWH system [5]. While people may be aware of what RWH is, they often face barriers to finding informational resources on RWH that answer their questions and sites that connect them to the right contractor. Currently available websites on RWH, are long and full of details the everyday person does not care about. The additional effort required to look through these sites deters possible RWH implementers who simply want one question answered: "what's in it for me?". In addition to the problem of how RWH information is conveyed, there are issues with the current available resources for finding contractors. Potential clients either need to know a RWH contractor already or, as is the case for most people, look online. The websites that have contact information of RWH contractors in Bangalore provide minimal information on previous work they have done, if they are in a viable price range, or if the work they do is even related to RWH. This results in residents having to call multiple contractors before finding the correct professional. For those inquiring about RWH systems, this lengthy process can dissuade them from moving forward.



Evidence of Problem

Recent news articles, work with environmental NGOs and interviews with Bangaloreans revealed the water stressed state of Bangalore and the difficulty of motivating the population to pursue implementation of RWH systems. Recent news headlines cite water supply cuts and high water tanker prices that are only getting higher[6][7]. However, even with government mandates, there is still difficulty motivating the population to install these systems. With fines for those who do not have one installed, total penalties due to refusing RWH systems have amassed to over Rs 2.0 crore per month across Bangalore[3].

Furthermore, the difficulty of researching RWH systems and getting them installed is evident in the personal experience of a local RWH contractor. The contractor reported that his use of current websites leads to spending time fielding calls from people who are not inquiring about services he provides due to misunderstanding of his scope of work from misleading or lack of information on websites. In fact, only about two of every ten inquiries he receives result in actual projects showing a lack of conviction to get RWH systems installed or knowing where to start. This sentiment is confirmed by Biome, a local RWH design company, that stated only about 10% of client inquiries convert to projects.

Local survey respondents answered that while 93% of them know what RWH is, only 38% reported having a system in their place of residence. Among those who have a system, none of them responded that ‘the process of getting the information [they] needed and finding someone to do the work’ was ‘very easy’ or even ‘somewhat easy’. These responses indicate a severe lack of implementation and ease in the RWH installation process.

SOLUTION

RainRuler is a centralized website designed to promote the construction of RWH systems by providing clearly conveyed information and streamlining the connection between RWH system customers and contractors. RainRuler’s simple and easy to navigate website provides personalized information to site visitors using their home address or roof area. Information specific to the user is calculated and displayed such as: RWH potential of the house, cost of a system, savings on water each year, and the highlighting of personal convenience. To make the website accessible to a wider audience, we put information into alternative and relatable metrics used to portray the sustainability benefits and increase in convenience for the household, like how many small tanker trucks could be filled with the water saved.

RainRuler provides more than just information; it offers a direct connection between the customer and a RWH system contractor. Using the ‘Find Installation Professionals’ page, customers can discover RWH system contractors in their area. A description and pictures of the contractor's previous projects and contact information will be available on their profiles.



Providing information about prospective contractors will benefit both the customer and contractor. The user has the necessary information to make a decision on who to install their system, and the contractor gains clients by having their information published on the site.

CUSTOMERS & BENEFICIARIES

RainRuler's customer base is RWH contractors. RWH contractors generate business by installing RWH systems, and require customers for business. As we motivate users to install RWH systems, we will direct clients towards the RWH contractors posted on the site, increasing their business. Thus, to be posted on the site, contractors will be required to pay a monthly subscription and be the clientele financially supporting RainRuler.

While we hope RainRuler is utilized by all people in Bangalore, the beneficiaries we will target are from three demographics: apartment owners, apartment residence committees, and homeowners in apartments and homes that do not have a RWH system but could install one. By using our website, they will benefit from having their RWH questions clearly answered and in a centralized place. By bridging the gap between information and implementation we make installing systems feasible for those who found installing a system to be not worth the effort. After installing a system, the beneficiaries will have a more convenient water supply, a larger water reserve, and a decreased water bill. All Bangalore residents will be secondary beneficiaries for RainRuler, as an increase in RWH systems mean less water demand on public sources and overflow from RWH systems can help replenish groundwater.

IMPACT

RainRuler will make a difference because it addresses the knowledge gap about the installation of RWH systems. It serves to advertise the user-specific benefits of these systems and provides simple steps that can be taken to install a RWH system. Additionally, we found in interviews with RWH contractors that a webpage dedicated to RWH would be beneficial in advertising their businesses to the relevant consumers. When showing our prototype to Bangaloreans we surveyed, 100% of residents said yes to the question 'Do you think this tool would be useful to those who are not sure about installing a rainwater harvesting system?'. Additionally, 82% of respondents answered 'yes' to the question 'If you did not have a rainwater harvesting system, would the information on this website motivate you to get one?'. We believe that people in Bangalore want to aid in alleviating water scarcity, but don't know where to start or don't have the time and energy to look into a RWH system. By streamlining the process from advertisement to construction, we make RWH a reality for those who didn't previously think they could contribute to the water crisis in Bangalore.

RainRuler will have a long-term impact as well. By increasing the installation of RWH systems, the general public will have more confidence in them and be less hesitant to install. It will



increase the knowledge of and demand for RWH systems and, with a high installation rate, will be a prominent source of water for Bangaloreans during the monsoon season each year.

BUSINESS MODEL

Operation

The core function of our business is the connection between RainRuler contractors and users. In order to create this connection, we need to work with key partners like investors, RWH contractors, and water experts to produce a well-rounded and accessible website. Part of this will be partnering with organizations like Urban Waters, a collective of environmentally focused NGOs, where we will garner mutually beneficial relationships. We will provide value to our users through personalized RWH system calculations and quick connections to contractors. On the other side, we will provide value to contractors by directing potential clients to them. By fostering good relationships with our partners, customers, and users, we will create a strong network for our operations.

Our enterprise will first prioritize acquiring accurate data for calculations and overall functionality of our website. After creation, our main focus will be centered around maintaining good relationships with our customers (contractors) and partners. Adjacent to this, we will concentrate on finding new ways to gain a broader customer and beneficiary reach, whether that be through word of mouth, advertising, or updated business models.

The combination of these pieces culminates in a comprehensive platform that serves as a one-stop-shop for all things RWH. Our user-friendly interface ensures ease of access to personalized information, establishing our platform as a convenient source for individuals interested in RWH. By providing a centralized resource that seamlessly connects users with local contractors, we not only facilitate information acquisition but also foster a community dedicated to sustainable water practices.

Financials

In order to get RainRuler up and running, we will require an initial investor who would be willing to pay the start-up cost of getting our website fully developed. Based on research about web developer salaries in Bangalore and the amount of work that's required to create similar styled websites, we have determined that we would require an upfront investment of around ₹4 lakh. We will specifically seek investments from organizations working within the water sector because we believe our tool provides a great opportunity to further their goals and ideals. The combining of our skills will create a well rounded product. After the initial investment and startup of the website, we further determined that it will require monthly updates and maintenance to ensure continually accurate outputs. For this we will either contract the initial web developer or an IT professional to work one day per month (daily salary of ₹8,000).



As for revenue, we will charge contractors a set monthly fee in order to have their information posted on the website. After talking with contractors about what they pay for their current advertising platforms, we found that they pay around ₹2,000/month. We decided to price our website at ₹1,500/month in order to be competitive with comparable websites. While we could charge an equal amount if not more due to the additional value we add with our tool, we decided to go for a lower cost to generate greater use of the tool to help further our underlying goal of getting more RWH systems implemented. In order to get contractors on our website immediately after launch, we will offer a three month free trial where they can test-run RainRuler for themselves at no risk to them. As the user base grows and more revenue is generated from contractor subscriptions, we will put the additional money towards scaling, translating the website, and developing it further to be accessible in other cities throughout India.

Since all costs are covered by our investors and our contractor customers, we are able to make our website 100% free for users. RainRuler's 'free' business model is designed to strike a balance between user accessibility, contractor engagement, and financial sustainability. By prioritizing the needs of both users and contractors, RainRuler aims to make a lasting impact in the water management space. The platform focuses on delivering convenient and connected experiences, showcasing the benefits of RWH to the residents of Bangalore, all while ensuring a sustainable and thriving business.

MINIMUM VIABLE PRODUCT

Our website has two main features that are considered the minimum viable product and the combination of these is what makes the site the perfect one stop shop for RWH. However, we believe both of these aspects stand on their own. They are the RWH potential calculator and the connecting to contractors pages.

The minimum viable feature of the calculator is using roof area to calculate rainwater available for capture and the cost savings this will provide. A minimum viable product would be a form or website that allows users to enter a roof area and information about their water supply and outputs information about the cost of a system savings per an interval and the years to pay for this system. This is something that allows users to get a quick estimate of what a system would cost. For the contractors page, the base features are a system that allows contractors to create a profile and pay to have it posted on a site in which users can view and find contact information for RWH professionals by inputting their address.

For feedback on the MVP, these two aspects would be combined for prototype testing with potential beneficiaries and customers. We would also ensure a roll out to smaller communities and connect with contractors in those communities who would like to be featured on our site.



WHAT'S NEXT?

Before beginning, it is essential that we establish and maintain relationships with related partner organizations. These organizations will aid us in providing a source of experts to reference, increasing our credibility, and increasing outreach. The launch of RainRuler will occur in three phases. Phase one will be two months and consist of the actual creation of the website. We will start by acquiring investor funding and use that money to hire a freelance web developer to create our site. We will consult RWH experts to ensure the accuracy of our calculations and connect with at least five RWH contractors who are interested in piloting our site. Then, we will post RainRuler to the web. The following three months will be phase two. Throughout this phase we will contact contractors bi-weekly to hear their feedback and make any necessary changes. We will also use web analytics to track the usage of our site, and connect RainRuler to our partner organizations' websites. Finally, phase three will continue through our first year of operations. During this year, we will prioritize expanding our contractor network. We will also conduct post-installation surveys for both the website users and contractors to ensure satisfaction on both sides of the site.

While our initial product will be launched in Bangalore, we plan to scale RainRuler to all of India and maximize our impact. Currently, there are 21 cities in India facing water scarcity [8]. We will adjust our site to include these locations one city at a time. During this process, we will use localized information to maintain the accuracy of our calculations and to ensure users are connected to contractors in their area. Finally, RainRuler will be translated into multiple languages, ensuring accessibility for a broad audience. By scaling RainRuler throughout India, we will have an even greater impact and be able to alleviate water scarcity one RWH system at a time.



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APPENDICES

Appendix 1: 16 Questions

Problem:

1. What problem are you working on?

- a. Even with the cost and water saving benefits of rainwater harvesting (RWH) systems, there is low implementation among Bangaloreans
- b. Part of the reason why people are not installing RWH systems is because online resources are overwhelming and difficult to navigate, specifically ones encompassing everything from informational resources on RWH to connecting users with qualified contractors for installation.

2. What evidence do you have that this is a problem?

- a. Recent news articles, work with environmental NGOs and interviews with Bangaloreans revealed the water stressed state of Bangalore and the difficulty of motivating the population to pursue implementation of RWH systems.
- b. Even with government mandates for RWH systems and fines incurred by those who don't have systems, only 10% of residence buildings in Bangalore have a RWH system in place.
- c. A contractor we interviewed expressed the drawbacks of current platforms like JustDial, citing a lack of information leading to unnecessary calls and a low turnover rate.

3. Who faces this problem?

- a. Bangaloreans attempting to investigate RWH systems or get one installed.
- b. Contractors trying to attain clients through postings on websites with poor user-interface.

4. Why does this problem exist?

- a. Lack of readily accessible, simple, and compelling information about RWH.
- b. Difficulty finding and connecting with the right contractor.

Customer:

1. Who is your customer/beneficiary?

- a. Rainwater harvesting contractors are our customers and beneficiaries as they pay to be a part of the site while benefiting from receiving clients.
- b. The other beneficiaries are Bangalore residents who are concerned about water accessibility and have the space to build a RWH system but have not built one yet.

2. Why do they face this problem?

- a. Contractors face this problem because Bangalore residents are not compelled enough to commit to installing a RWH system or get lost trying to find the right contractor.



- b. Bangaloreans face this problem because the time and energy it takes to research RWH and get the right contractor working on the project is discouraging.
- 3. What evidence do you have that they consider this issue to be a problem?**
- a. A contractor interviewee stated only two out of every ten calls he received inquiring about installing a RWH system actually converted to projects. People often become confused due to misunderstanding of their scope of work due to misleading or lack of information on websites.
 - b. Residents find the information on RWH overwhelming and struggle with installation due to difficulties in understanding the process.
- 4. Why haven't they solved this problem themselves?**
- a. Contractors do not have the time or technical skills to develop a clear website centered around their services and rely on the websites currently available to them.
 - b. Residents don't have accessible and comprehensive information regarding the RWH installation benefits or process.

Solution:

- 1. What is your solution?**
- a. RainRuler, a centralized website providing information about RWH. Users will input information specific to their households and receive personalized information on the finances of their system, sustainability and convenience benefits, and then create a connection between customers and RWH contractors. The goal of the website is to quickly and clearly convey information about RWH and connect users to contractors to get started.
- 2. How will this solution help the problem? (social value proposition/theory of change)**
- a. Our website boosts the confidence in RWH for users. By centralizing important information and resources into a single website, we create a simple, one-stop-shop for RWH information and first steps.
- 3. What evidence do you have that the solution will help this problem?**
- a. In an interview, a contractor said he would be interested in being on a website like The RainRuler.
 - b. After being shown our prototype, 100% of survey respondents said yes to the question 'Do you think this tool would be useful to those who are not sure about installing a rainwater harvesting system?'
 - c. 82% of said respondents answered 'yes' to the question 'If you did not have a rainwater harvesting system, would the information on this website motivate you to get one?'
- 4. How do you sustain yourself financially?**



- a. Acting as a subscription service for RWH contractors, we collect a Rs 1,500 fee every month from contractors after a 3 month free trial. We then use the profits for ongoing maintenance to keep the website up to date and accurate.
- b. We appeal to RWH contractors by offering a cheaper, more effective alternative to advertise their businesses than comparable sites they currently use.

Make it real:

1. Do you have primary data?

- a. Yes, we collected information from the Bangalore public by doing in person interviews on the street and sending survey links over WhatsApp, receiving 45+ survey responses.
- b. We also conducted in person interviews with an Architect, a RWH contractor, two school headmasters, and our partner organization Biome.

2. Have you received outside feedback on your ideas? (prototype/minimum viable product)

- a. Yes, we received prototype feedback from 10+ Bangaloreans using follow up surveys with those who opted to provide their contact information after taking our initial survey. We received positive feedback with 100% finding the website intuitive.
- b. We also received feedback from a RWH contractor. He had positive feedback on the interface aesthetics and expressed genuine interest in using a website with our offerings. He believed that fellow contractors in his network would share the same sentiments.

3. Do you have a clearly articulated plan for the next steps?

- a. Phase 1 (months 1-2):
 - i. Acquire investing
 - ii. Hire a freelance web developer to do the initial web design for Rs 4 lakh
 - iii. Work with professionals to ensure accuracy of calculations
 - iv. Use current contractor and partner connections to find 10 contractors interested in piloting the site
 - v. Launch the site in Bangalore in both English and Kannada
- b. Phase 2 (months 3-6):
 - i. Contact pilot contractors bi-weekly to hear feedback and make necessary changes
 - ii. Track web analytics to see website usage
 - iii. Connect RainRuler to partner organizations' websites
- c. Phase 3 (year 1):
 - i. Expand contractor network
 - ii. Conduct post-installation surveys for users and contractors to ensure customer satisfaction



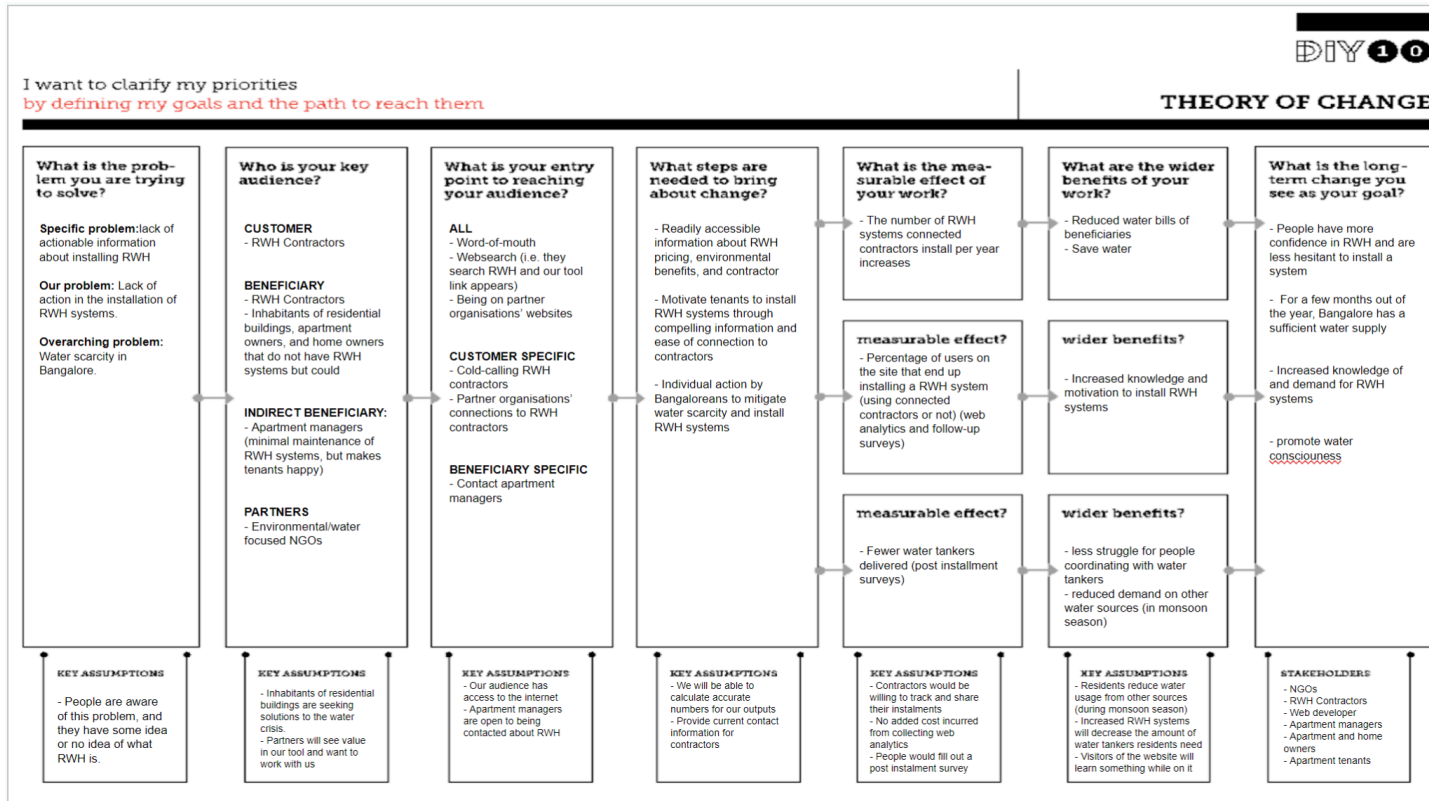
4. Do you have the right partners+team; have you identified who you would like to work with/bring into your team?

Who we would bring to our team:

- a. Web Developer: will initially create our website and provide ongoing maintenance and updates as necessary for the website.
- b. Environmental Organizations: Once the website is up and running, we will partner with organizations like UrbanWaters, which is a collective of water focused NGOs in India to increase credibility and drive user traffic. We will also use these partnerships as our resource for water professionals.
- c. Financial professional: We will need a person with experience in finances to handle the financial management side of our startup.



Appendix 2: Theory of Change



Appendix 3: Randomized Control Trial

Our randomized control trial (RCT) will test the effectiveness of the RainRuler website in promoting the adoption of rainwater harvesting (RWH) systems among Bangalorians. Our unit of analysis for the RCT will be residential buildings. For our selection criteria, we will select 30,000¹ residential buildings across Bangalore that do not have a RWH system but could install it. We will put the selected buildings into three equal groups such that each group has a similar mix of socioeconomic status, housing types, and diversity of residents.

The residential buildings will be randomly assigned to one of three groups. All groups will receive information via a paper pamphlet that is delivered to their house stating that it is for a study and outlining the Bangalore water crisis. Two groups will be able to access link(s) from QR code(s) also printed on the pamphlets. The groups are: (1) the 'RainRuler' group which will have a QR code to the RainRuler website, (2) the 'current resources' group which will have QR codes to the top five websites that come up when one searches RWH, and (3) the 'control' group which will receive just the pamphlet of information and no QR codes.

We will recontact the tenants of the residential buildings once every three months over the course of a year through similar pamphlets with QR codes to google surveys. Through these surveys, we will gather information on participants' decisions regarding the implementation of RWH systems in their residence without explicitly stating that the study is about RWH implementation to ensure results aren't skewed. This approach aims to maintain the integrity of the control group, minimizing potential influences on their decisions. Furthermore, the extended timeframe accounts for seasonal variations that influence individuals' decisions regarding RWH.

During the data collection we will record participants' actions regarding RWH, including the number of residence buildings that implemented RWH systems, the time taken for implementation, and any reported challenges. We will then conduct statistical analysis to compare the adoption rates of RWH systems between the three groups.

The anticipated outcomes include insights into the effectiveness of the RainRuler website in influencing residential buildings' decisions to implement RWH systems as opposed to what currently exists online or the situation as-is. We also intend to better understand potential challenges and barriers faced by participants in adopting RWH systems through our survey questions. This RCT seeks to offer comprehensive insights into how effective RainRuler is in creating action among residents of Bangalore in their decision to implement a RWH system.

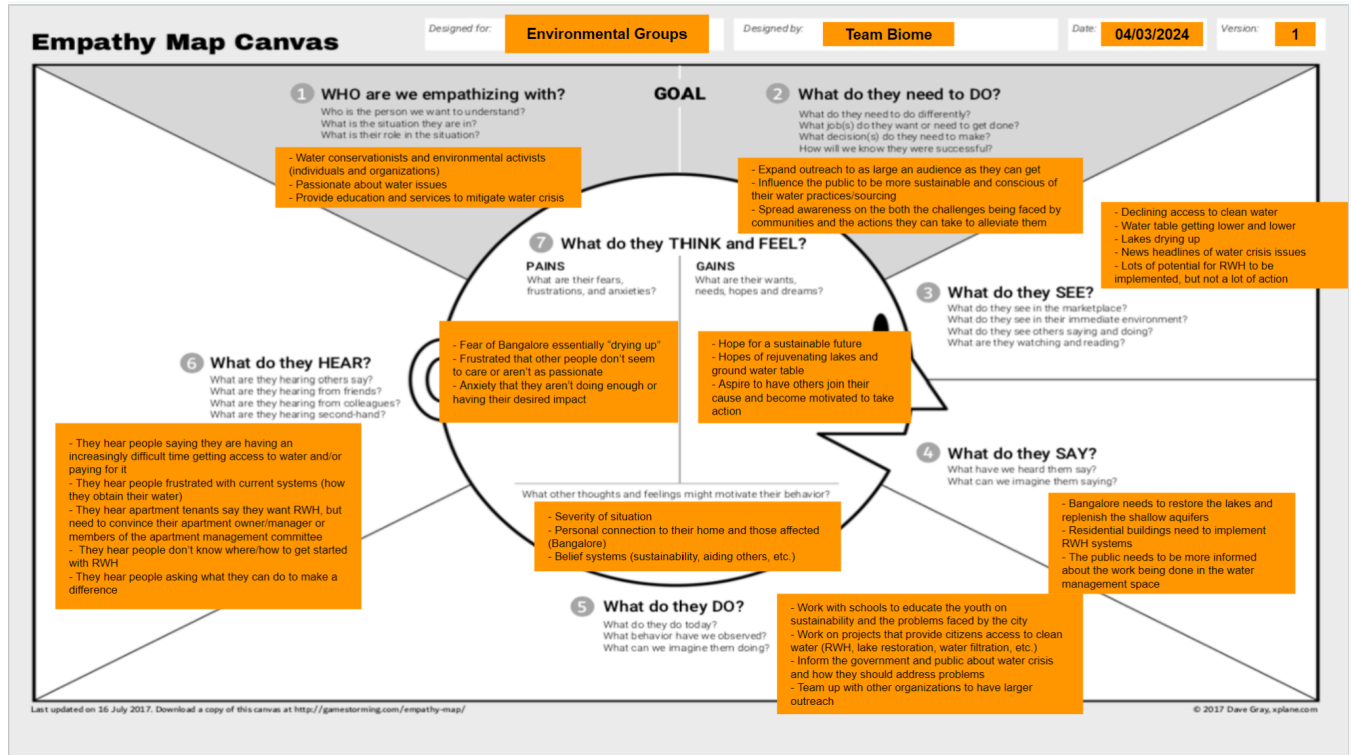


¹ We chose a sample size of 30,000 residences to ensure statistical prominence in results. We anticipate the intervention of the RainRuler will have a 30% increase in RWH installations from the 'control' group and a 15% increase from the 'current resources' group. Because the RCT is only taking place over the course of one year, a large sample size is required to detect any effect from the interventions. Therefore, we chose a sample size big enough to represent a difference between groups.

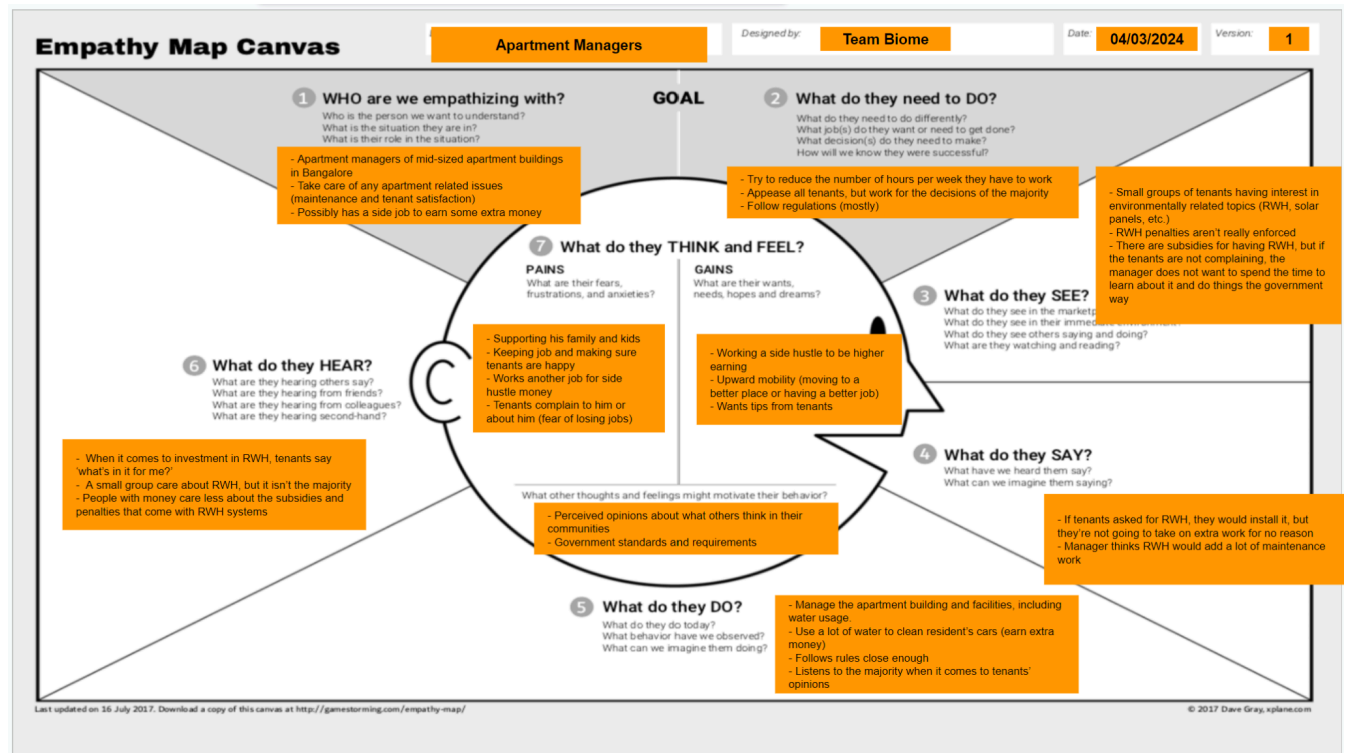


Appendix 4: Empathy Maps

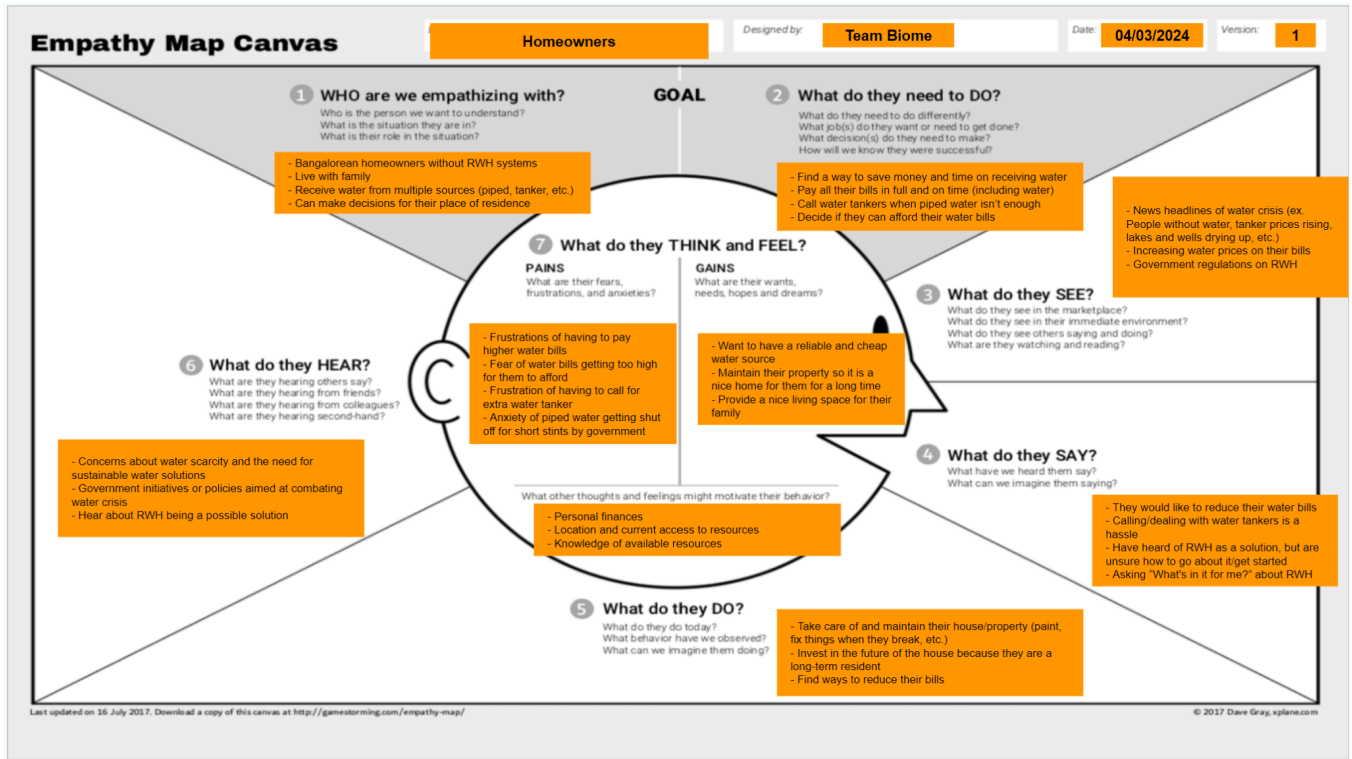
Environmental Groups



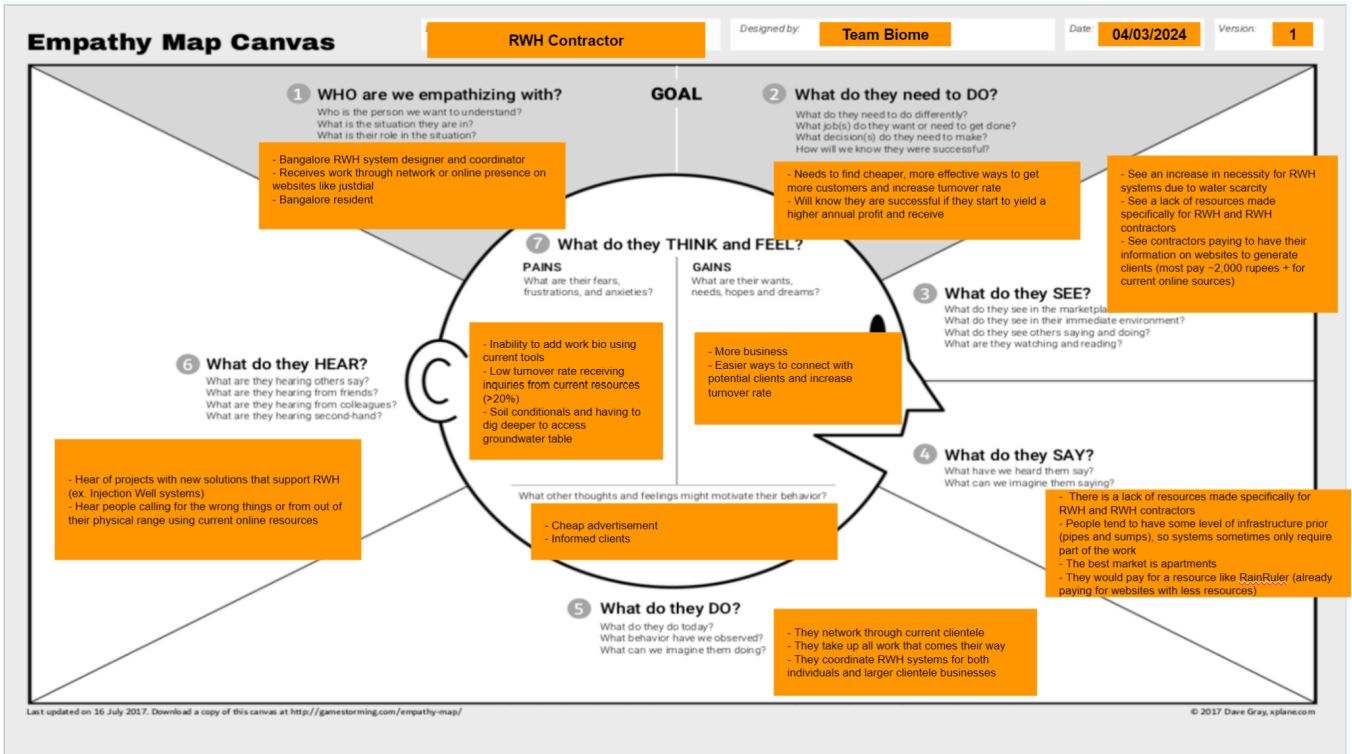
Apartment Managers



Home Owners



RWH Contractors



Appendix 5: Prototype

Main Page



How RainRuler works

Estimate the rainwater harvesting potential of your roof today



1 Find Your Roof

Using your location and roof area, we can calculate the expected annual rainfall and harvesting potential of your roof.



2 Personalize Analysis

Adjust your water bill information to get a more accurate estimate of your savings



3 Put it in Perspective

Get individualized information on the financial viability and sustainability benefits of your system



4 Find contractors

Use our search tool to easily find contractors near you that specialize in installing rainwater harvesting systems.





Be part of a sustainable solution



Energy

Saves energy normally required to pump Kaveri river water



Ease

Reduces reliance on municipal water sources



Economy

Save money on water bills



Environment

Decreases urban flooding and replenishes groundwater

Enter Street Address, Pin code, District

[Contact us](#) A Grand Challenges Impact Lab 2024 product



Calculation Page

RainRuler [Learn](#) [Calculate](#) [Connect](#)

Enter Street Address, Pin code, District [CHECK MY ROOF](#)

your roof area of:
682 m²

Can capture:
5,76,221 L
Of water per year

This results in a potential cost savings of:
₹ 40,000
per year

Customize Savings Information

Water Supply

Information about who supplies your water helps us better estimate the cost savings each year

Type of water supply

I pay fines for not installing a rainwater harvesting system

Provide us with your monthly bill

₹ Average monthly water bill

Cost Breakdown

₹ 2,50,000 - 2,75,000

Estimated Cost of System

₹ 40,000

Savings Per Year

7

Years to Pay for System

I would like to be sent this information

[Send](#)



You Save

View personalized information about the sustainability impacts of installing a system in your home

Enough water to



Fill **52** small tanker trucks
Each Year



Flush an average toilet
94,000 times
Each Year

By not having to pump in water from the Kaveri river you save,
Enough energy to



Charge your phone
1,68,600 times
Each Year



Power the average home for
30 days
Each Year

I would like to be sent this information

[Send](#)

Next Steps

Locate a contractor in your area who can install a system.
If you're still unsure learn more about rainwater
harvesting below.

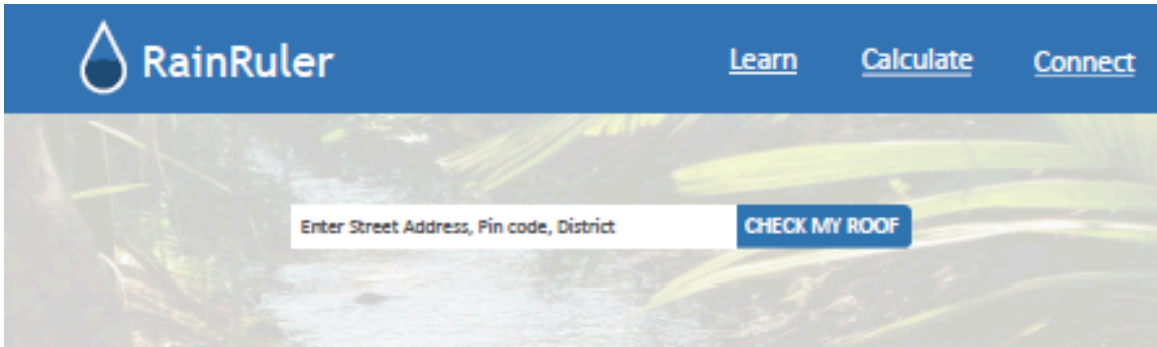
[Find Installation Professionals](#)

[Learn More](#)

[Contact us](#)

A Grand Challenges Impact Lab 2024 product





What is Rainwater Harvesting (RWH)?

Rainwater harvesting is your gateway to sustainable water management. It is a simple yet powerful practice involving the collection, filtration, storage, and use of rainwater from rooftops. The harvested rainwater is repurposed for various needs, providing you with a self-sufficient and eco-friendly water source.

Why is it Important?

In the midst of Bangalore's water crisis, every liter matters. By harnessing rainwater for daily needs, you contribute to the collective effort of conserving water in Bangalore. This not only reduces your reliance on finite water sources but also translates to savings on your water bills. RWH is a solution that benefits you and your community.

Joining the Fight Against Bangalore's Water Crisis

Embrace a proactive role in overcoming Bangalore's water challenges. Utilize tools designed to calculate the potential harvestable rainwater in your area. By implementing RWH, you actively contribute to the community-driven effort to combat water scarcity. This collective approach enhances the city's resilience, making it more sustainable and better prepared to face the ongoing water crisis. Join the movement for a water-secure Bangalore and experience the rewards of sustainable living.





Frequently Asked Questions

Q: Will the harvested rainwater be safe to use?

A: Yes! Rainwater is considered one of the purest forms of water, but contact with the roof and downtake pipes will contaminate it. It will require an RO filter before consumption, such as cooking and drinking. Without an RO filter, it will be useful for all non-consumption purposes. This includes handwashing, toilets, plate washing, etc.

Q: What does maintenance look like for a rainwater harvesting system?

A: Maintenance for a rainwater harvesting system includes terrace sweeping, cleaning the filter, and diverting the first rainfall of the season. Terrace sweeping will prevent leaves and dirt from entering the pipes and water tank. Cleaning the filter is required due to excess material that goes through the filter, and must be removed to filter well. Lastly, every first rainfall of the season "cleans the pipes", and must be removed by turning the knob to direct the dirty water to the ground.

Q: Is rainwater harvesting required in Bangalore?

A: Yes, rainwater harvesting is mandatory in Bangalore under the BWSSB 2021 regulations. For properties over 40x60 sqft or houses over 30x40 sqft, a rainwater harvesting is a requirement. BWSSB fines households receiving Cauvery River water 50% for the first three months and 100% per month of the water bill until a system is installed.

Q: What are the benefits of rainwater harvesting?

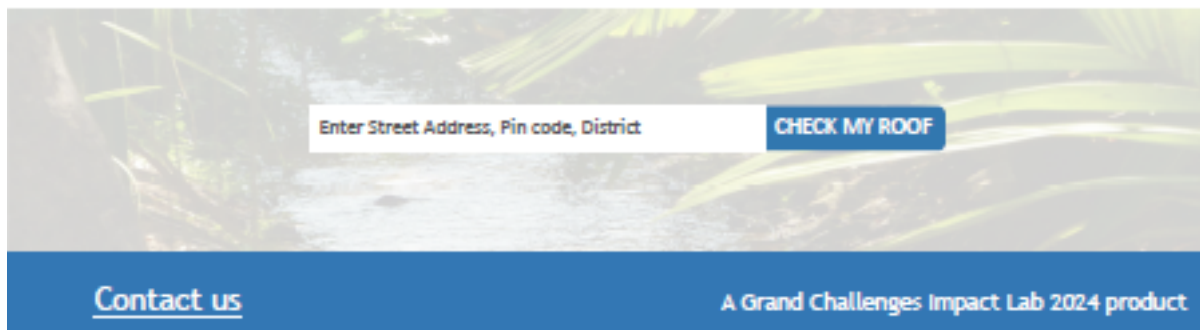
A: The benefits of rainwater harvesting are endless! It increases your water supply and reliance on other sources, decreases your water/electricity bill, is more sustainable, etc. Experts say that rainwater harvesting in Bangalore can account for up to 70% of the city's yearly water requirements. With Bangalore's water crisis worsening during the dry season, rainwater harvesting will be vital in slowing down the crisis.





About

RainRuler is a website concept created by a group of students from the University of Washington, as a response to the grand challenge posed by the water crisis in India. Our website serves as a centralized tool, simplifying the understanding of Rainwater Harvesting (RWH) benefits for every user. We provide quick, tangible numbers and connect individuals with reliable contractors, streamlining the process from awareness to implementation. RainRuler aims to empower households to capture and utilize water sustainably, reducing dependence on finite and energy-intensive public water sources.



Find Rainwater Consultants

Please note all contacts are independent and not employees of Urban Waters

City

- Bengaluru
- Chennai
- Hyderabad
- Pune

Are You a Contractor?

Publish your contact info



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Rain Builders

Phone #: +91 9517586289

Rain Builders is a local Bangalorian construction firm specializing in rain-water harvesting with experience building a variety of different types of systems.



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Water consulting is a rainwater harvesting consulting company determined to work towards a more sustainable future.





Ramesh Kumar

Ramesh@RB.net

Rain Builders

Phone #: +91 9517586289

Rain Builders is a local Bangalorian construction firm specializing in rain-water harvesting with experience building a variety of different types of systems.

Previous Projects



Appendix 6: Prototype Feedback

We received feedback on our prototype from two main groups: (1) Bangaloreans (2) Contractors .

1. To gather public input on our prototype, we started by creating a straightforward Google Forms survey. This helped us gauge public opinions on rainwater harvesting and identify key preferences for our website. In this phase, we gathered insights from 45+ responses through street interviews and online forms, offering respondents the chance to share their contact details for further input. After multiple iterations and internal feedback from our prototype, we sent it back out to those initial respondents. From the 10+ responses we obtained, 100% found the website to be intuitive and believed it would be useful to those who are not sure about installing a rainwater harvesting system. Notably, 82% expressed that the site content would motivate them to consider a rainwater harvesting system. An excel spreadsheet with the information collected from our various surveys can be found [here](#). Note additional information may have been obtained from respondents verbally and recorded in notebooks.
2. To connect with contractors, we utilized Biome to arrange an interview with a contractor. In this session, we gathered background information about the contractor before introducing our website. Initially, we sought his spontaneous first-response feedback without any guiding information. We received positive feedback on the interface aesthetics as well the features our website offered like the opportunity for contractors to post bios about his work. Following this, we shared details about our planned financial model, explaining our subscription-based approach. Once more, the feedback was positive, with the contractor expressing satisfaction that our prototype would offer additional tools at a competitive price compared to other online advertising spaces contractors commonly use. Notably, he highlighted the drawbacks of current platforms like Justdial, citing a lack of information leading to unnecessary calls and a low turnover rate. He expressed a genuine interest in using a website with our offerings and believed that fellow contractors in his network would share the same sentiment.



Appendix 7: Business Model Canvas

Business Model Canvas				Date:
RAINRULER				05/03/2024
Key Partners - Investors (Urban Waters and partner orgs) - RWH contractors - RWH experts	Key Activities - Initiation and maintenance of relationships with contractors - Data acquisition and upkeep	Value Proposition - New, user-friendly source of personalised RWH information - Easy connection to RWH contractors - Convenient source of serious clients for contractors	Customer Relationships - Self-service - Three month free trial - Continued clients for contractors	Customer Segments - Multi-sided platform: - Customers: RWH contractors - Beneficiaries: Residents in Bangalore who do not have RWH systems but could install one - The decision maker of the residential building
	Key Resources - Network of contractors - Calculations (including Rainfall data, Mapping information, and the expertise to output accurate values)		Channels CUSTOMER - Word of mouth - Web search - Cold-call BENEFICIARY - Word of mouth - Web search - Reference from partner organizations	
Cost Structure - Website creation, maintenance, and updates - Data collection - Fixed cost			Revenue Streams - Investor covering start up cost (Rs 4,00,000) - Web maintenance (Rs 8,000/month) - Contractors paying small monthly fee for contact displayed on website (Rs 1,500) -Automatic deduction from bank account	



Appendix 8: Terms of Reference

Terms of Reference

RainRuler web tool developer

1. Purpose

Develop a user friendly Rainwater Harvesting (RWH) calculator designed to empower users with quick and compelling estimates on the benefits of implementing a RWH system. Utilizing both established data, such as local annual rainfall averages and current water costs, and user-provided inputs, including estimated roof area, location, current water sources, monthly costs, and designation, the calculator will generate figures like annual cost savings, annual water savings, installation costs, time until break-even, and more. Additionally, it will provide the user with contact information of possible RWH designers and developers.

This intuitive application aims to streamline the decision-making process by eliminating the need for extensive research and presenting users with clear, actionable information. To further enhance accessibility, the tool will be available in multiple languages, feature minimal input requirements, and integrate tools like Google Earth's area measurement for easy roof area estimation.

The ultimate goal is to not only demonstrate the advantages of RWH but also connect users with relevant businesses and NGOs based on their location and designation, thereby facilitating the adoption of sustainable water practices.

2. Background

The digital estimation tool strives to collaborate with established organizations, serving as a catalyst for public awareness about the significant advantages of Rainwater Harvesting (RWH). Our research and interviews underscore a common trend – while there is a general awareness of RWH among the public, there exists a notable information gap regarding the specific benefits it holds for individuals. Furthermore, people often don't know where to start even if they do decide to install a RWH system. Our tool seeks to address this challenge by not only disseminating crucial information through established channels but also by facilitating a smooth linkage between potential customers and businesses, thereby promoting the widespread adoption of RWH systems.

Once developed, this tool will be able to provide fast, accurate cost savings estimates and simplified relevant information directly to users. Utilizing user specific inputs in combination with known local data and assumptions (i.e. annual rainfall, cost of water, fines, etc.) users will



get curated information that will help guide them in their searches on RWH. The information we provide to the website users will answer their question of “What’s in it for me?”, and encourage them to look into implementing a RWH system for their own home or business.

3. Specific deliverable

The following deliverables are foreseen:

Deliverable 1: Calculator tool conception and design:

Output 1.1: Wireframe of design, features and functionality (admin and user)

Output 1.2: Deployment in prototype onto browser for user testing and feedback

1.2.1 admin testing and feedback

1.2.2 user testing and feedback

Output 1.3 Iteration #2 incorporating above feedback published open source

Output 1.4 Move to production environment on central website

Output 1.5: Documentation covering development process

Deliverable 2: Maintenance and bug fixes:

Output 2.1: Routine data updates and maintenance

Output 2.2: Log and organize data collected

4. Process of work

The person hired for developing the RWH calculator will report directly to RainRuler. The reporting structure will involve regular communication through weekly meetings and emails, ensuring continuous feedback and updates. The development process will be supported by regular feedback from key stakeholders, such as contractors, potential users, and experts within the field, to align the tool with the wants and needs of the community. Regular check-ins with RainRuler will be crucial for feedback and insights, ensuring that the tool aligns with our vision and seamlessly integrates within the current digital environment. Following the tool's completion, the focus will shift to monthly data updates and maintenance, guaranteeing the tool's longevity, relevance, and effectiveness in providing valuable rainwater harvesting information to the public.

5. Timeframe and volume of work:



March - May 2024: Deliverable 1

Once a month after completion: Deliverable 2

6. Budget and payment

Description	Nb of days*	Daily Rate (INR₹)	Total (INR₹)
Deliverable 1: Dates are distributed starting on the March 12th, 2024 to May 17th, 2024	~50	8,000	4,00,000
Deliverable 2: Fixed-Term Maintenance Contract (may be renegotiated after end of each term)	1 per month	8,000	8,000 per month
TOTAL	40 + 1 day per month		4,00,000 + 8,000 per month

* Standard 8hr work day

Note: Values have been determined based on general online research of developer salaries in Bangalore as well as research into work that would need to be done to create a website of this type.

Payments to be made on receipt of a progress or work based on the different outputs described in the Terms of Reference, as follows:

Deliverable 1	Due date	Percentage
On satisfactory delivery of progress on outputs 1.1	22/03/2024	25 %
On satisfactory delivery of progress on outputs 1.2	12/04/2024	30 %
On satisfactory delivery of progress on outputs 1.3 & 1.4	10/05/2024	40 %
On satisfactory delivery of progress on outputs 1.5	17/05/2024	5 %
Deliverable 2		
On satisfactory delivery of progress on outputs 2.1 & 2.2	Last Monday of each month	Paid in full

8. Characteristics of the contractor

Specific skills required:



- The contractor has a working knowledge of rainwater harvesting systems and its components with proven expertise in development of software, collaboration and rolling out of digital tools in the mentioned or related field .
- The contractor has experience of development and deployment of digital applications based on NodeJS, HTML+CSS, Apache Cordova (app), React (web app), Google Firebase (back-end) technologies and other platforms used worldwide.
- The contractor has demonstrated timely delivery of products and professional approach in deployment of similar applications and or services. Contractor has expertise and capacity to ensure timely delivery of products planned through this contract.

9. Use of language skills

Essential: Expert knowledge of English as is required as the working language in the field, local languages will be an asset. Website will be designed to be accessible to multiple languages, but fluency is not required. Translators may be sourced as needed.

10. Place of assignment

No travel is expected. The execution of the work will be conducted by the selected contractor remotely.

