

IDEATION PHASE

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The idea focuses on the fact that in the future there will be more contaminated than clean water and we need to find a way to reuse wastewater and monitor water usage (Fig. 3, 4,5).

The existing solar panel system was a source of inspiration.

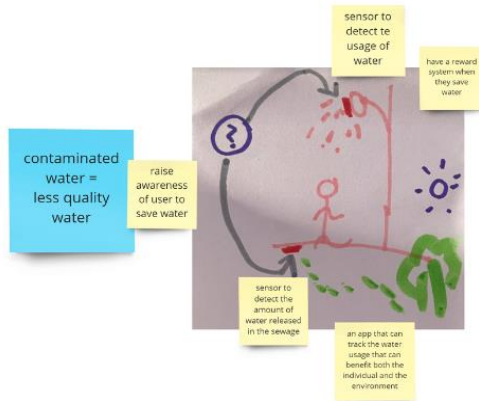
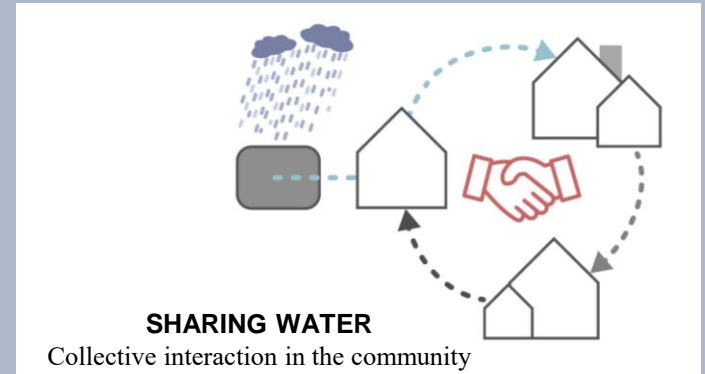


Figure 3: First sketch of idea

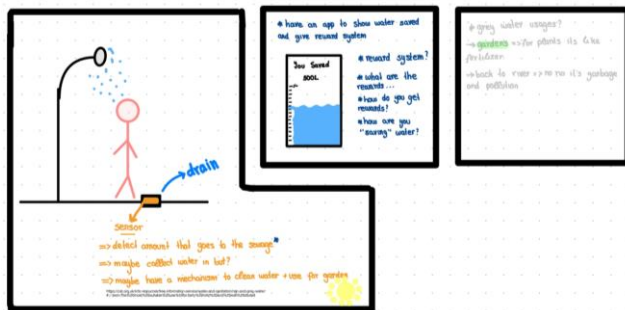


Figure 4: First idea writing

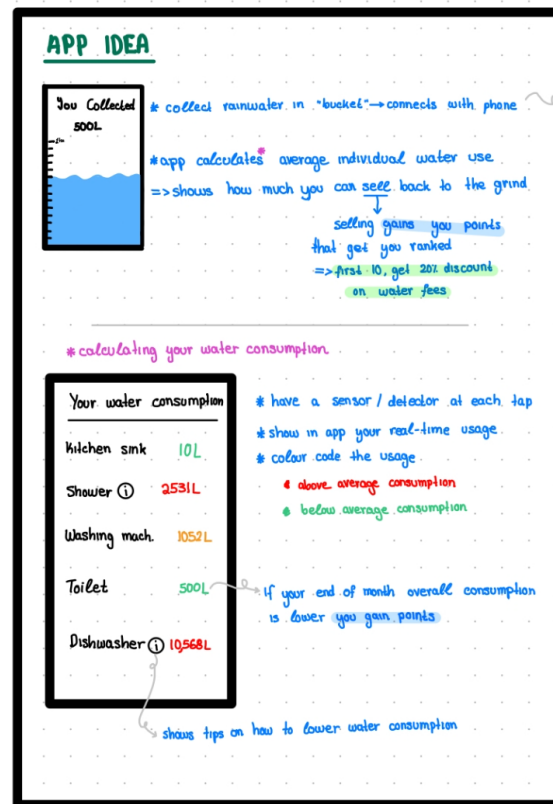
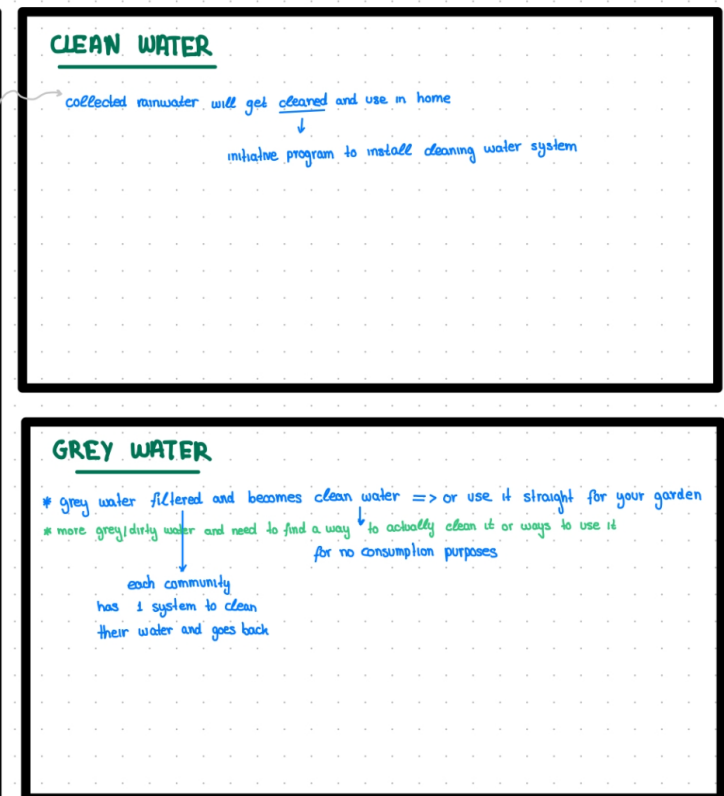


Figure 5: Expanding our idea



BACKGROUND RESEARCH

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Our focus was to find out what the water demand could be in three to five years. The graph in Figure 7 shows that the available supply will be much lower than the actual demand, so rainwater collection and filtration will be necessary.

Additionally, the Newcastle 2028 map (fig.8) shows the areas that will flood, demonstrating the abundance of rainwater in the coming years. Based on this data our idea of collecting rainwater, filtering and reusing it seems very viable.

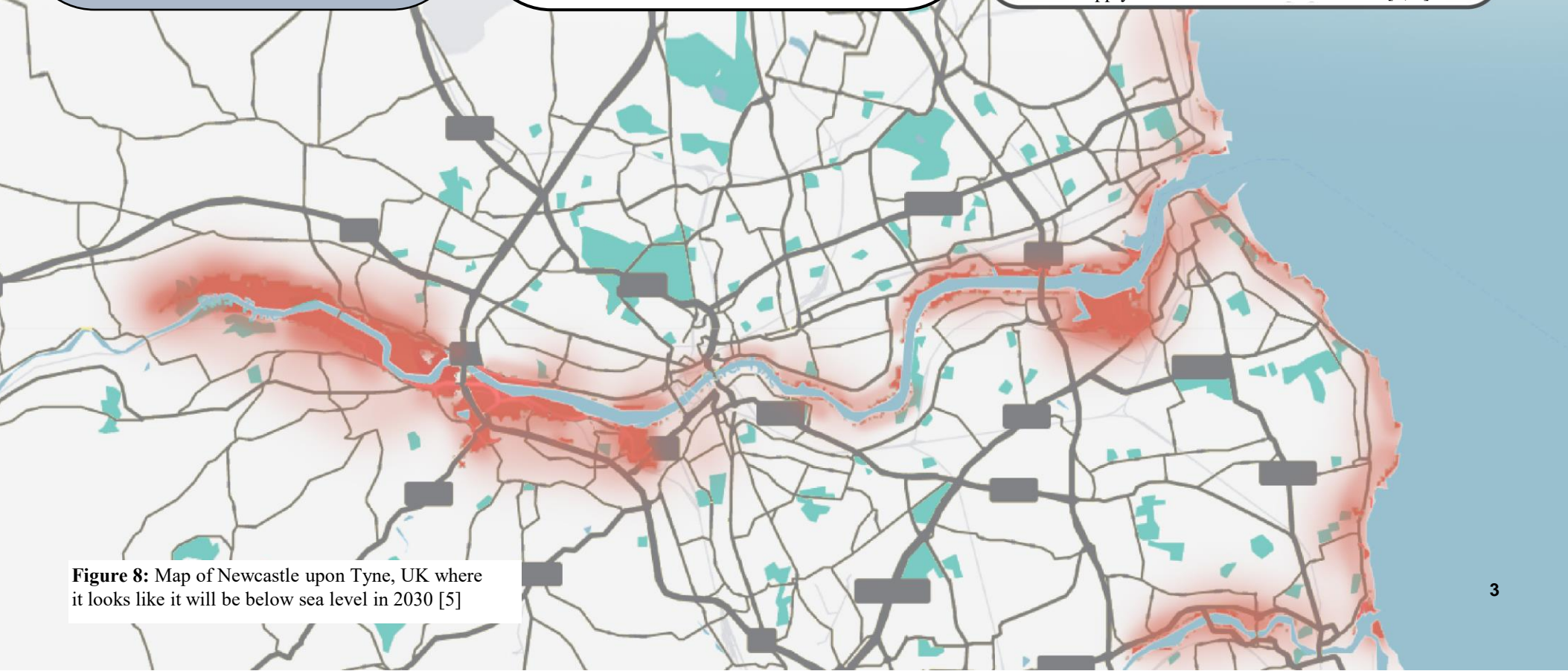
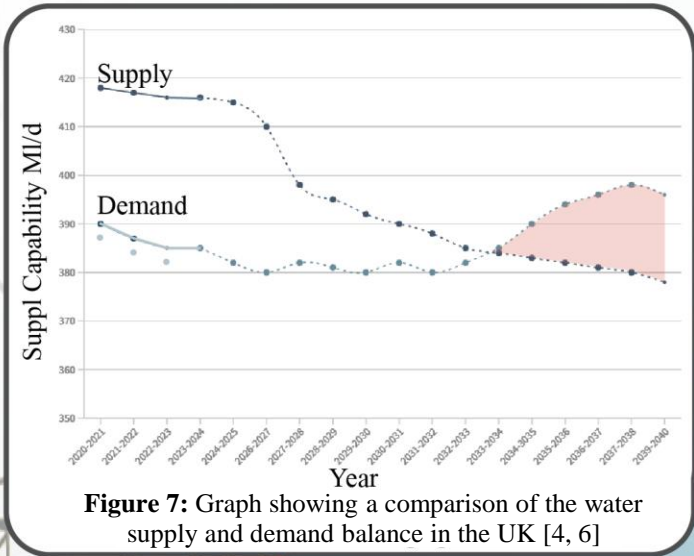
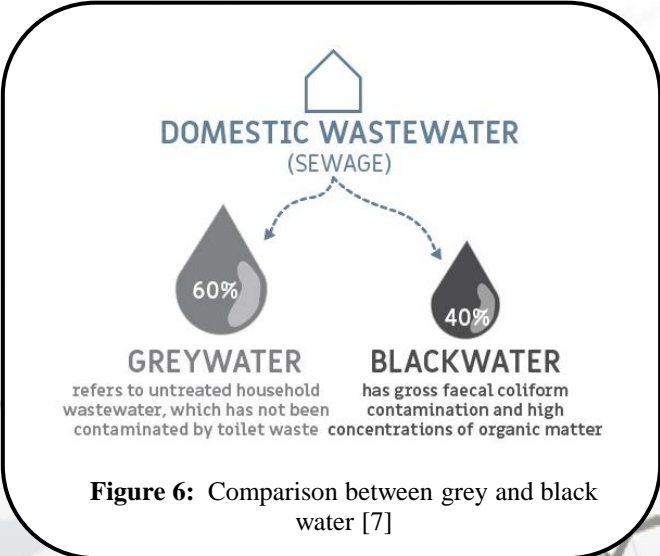
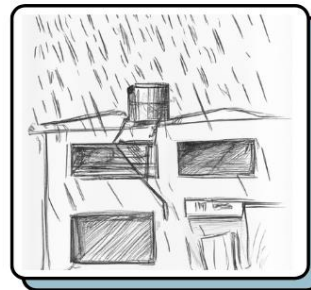


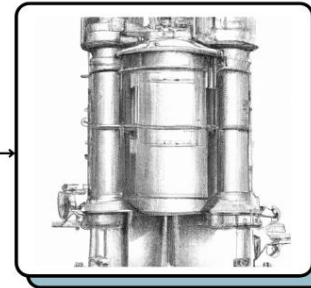
Figure 8: Map of Newcastle upon Tyne, UK where it looks like it will be below sea level in 2030 [5]



We have limited amount of water to use



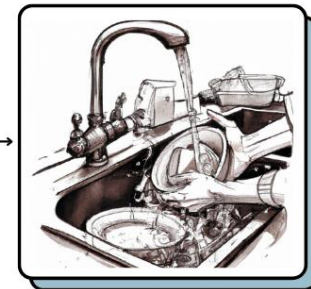
When it is raining, water can be collected into a tank



Water is then filtered and can be consumed. It can also be used for various activities such as -



Showering



Doing the dishes



The whole family can monitor and assess their water consumption



Excess water can be shared and traded



Gardening

HOUSEHOLD UNIT SCENARIO

First, we created some scenarios of what the future would be after the implementation of our idea in a household unit (fig.9).

Figure 9: Scenario of household unit

IMPLEMENTATION IN HOUSEHOLD UNIT

In the household level rainwater is collected and grey and black water is filtered for reuse as shown in figure 10. The water usage at each point is tracked using sensors and shown in the dashboard.

HOUSEHOLD UNIT

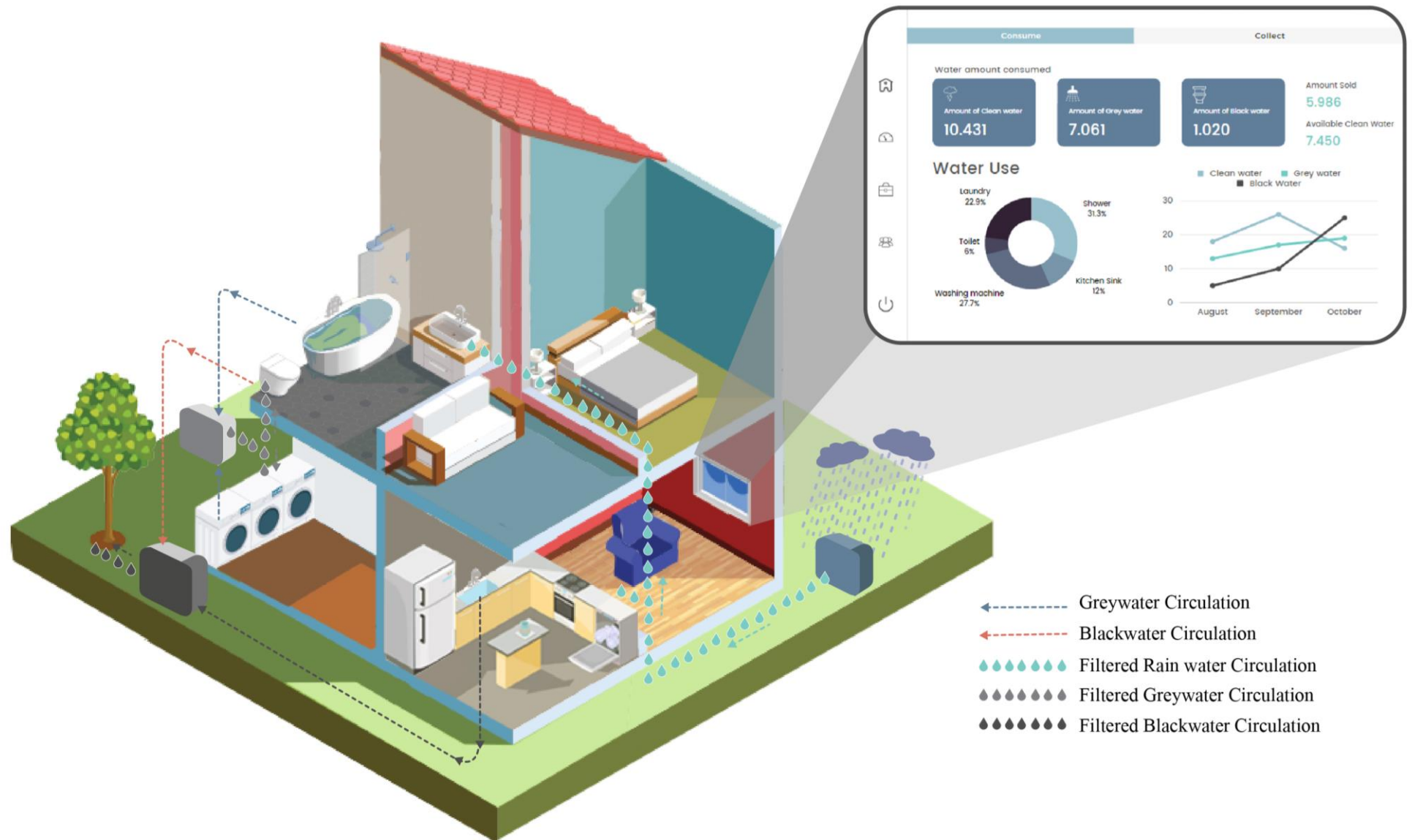


Figure 10. Image of the implementation of our idea in a household unit showing also the household dashboard (image source [1] before image processing)

DESIGNING A PROTOTYPE FOR HOUSEHOLD UNIT

The final step of our concept for the household unit is the design of an actual household prototype that shows individual home water usage and the available amount for each unit (fig..11).

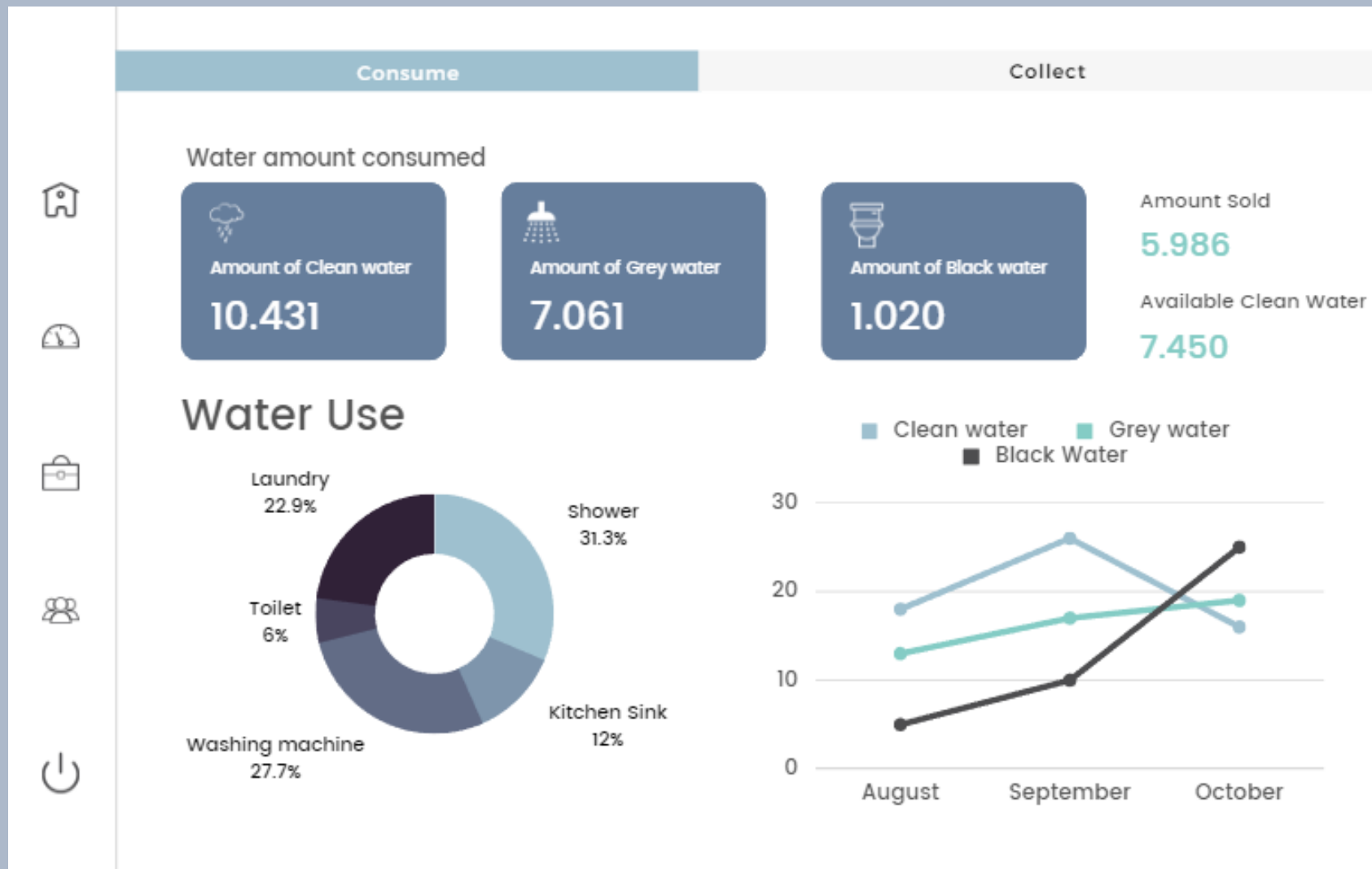
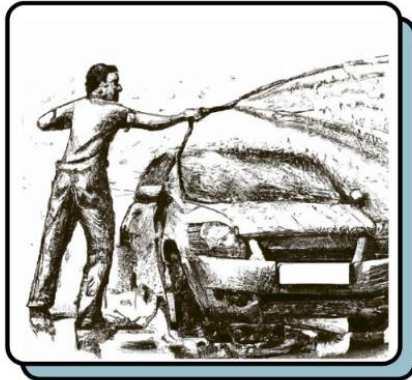


Figure 11: Prototype for Household Dashboard

COMMUNITY SCENARIO

In the second part of our idea we implemented another scenario about sharing water in a community level (fig.12)



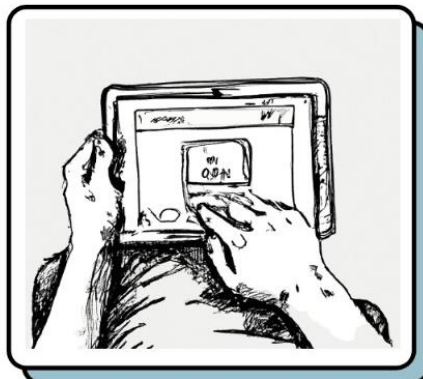
User is washing his car



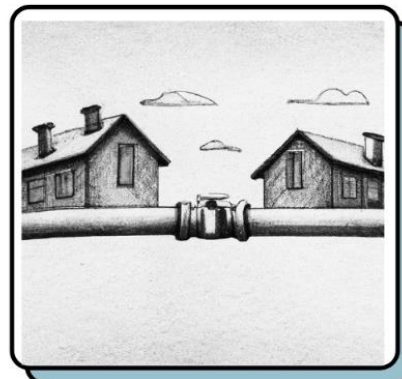
The flow of the water slows down and they realise that the water reserve is empty



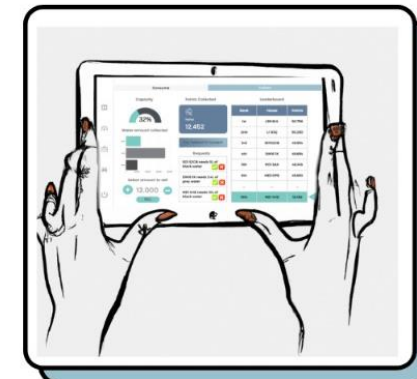
The user opens the dashboard to ask their neighbour to send the water



The neighbour gets the notification and she accepts the request



Once approved the water is transferred and can be utilised by the user



The neighbour receives the extra points and moves up on the leaderboard

Figure 12: Scenario about community sharing

IMPLEMENTATION IN COMMUNITY

Sharing grey and black water in a community as shown in figure 13 can be very helpful in saving water in the community level.

Households can exchange water here using our proposed dashboard.

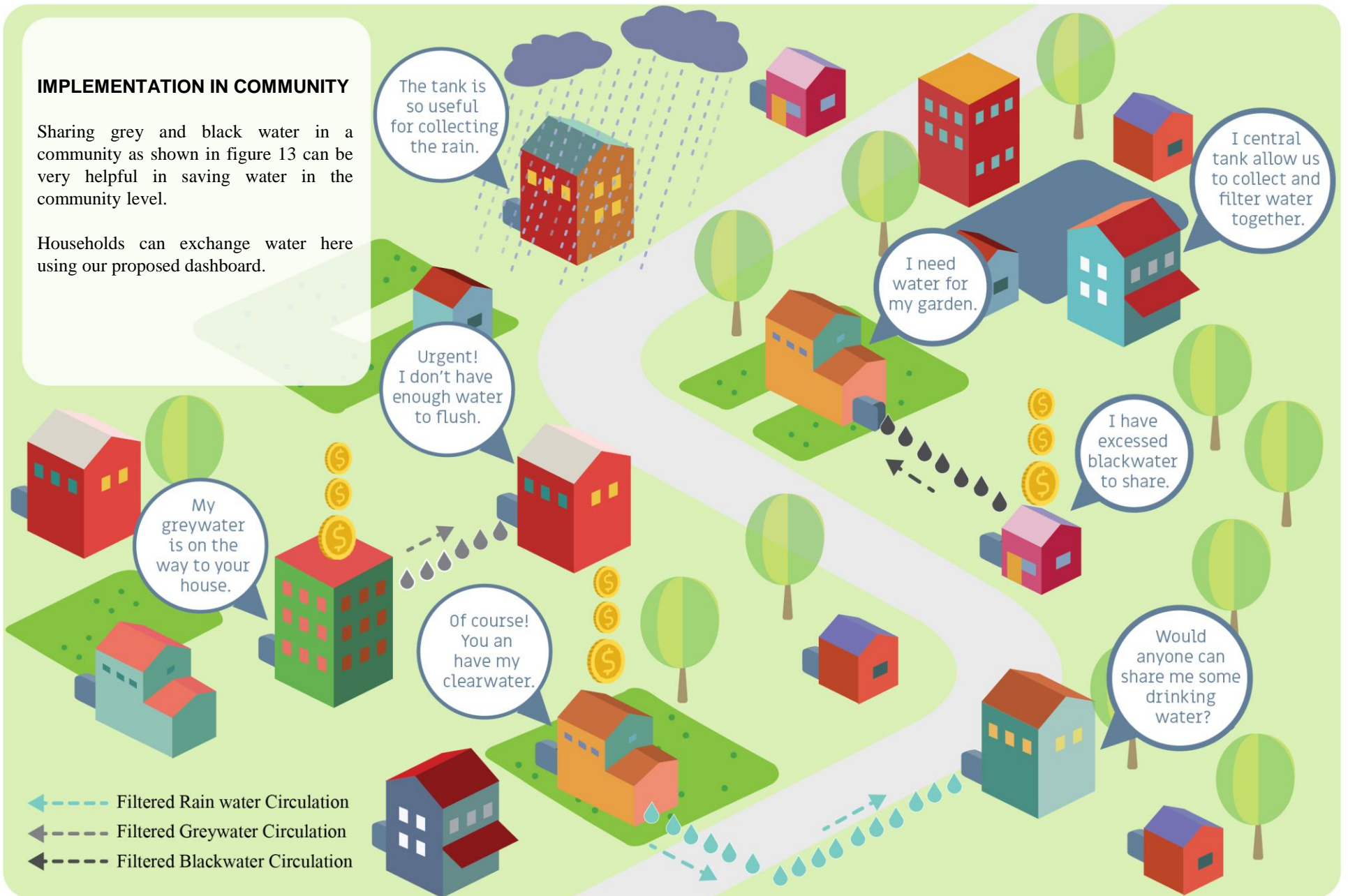


Figure 13: Implementation of Community Sharing

DESIGNING A PROTOTYPE FOR THE COMMUNITY

The prototype we created for the community is a single dashboard (Leaderboard) that includes all types of water (the amount stored and the amount consumed), manages requests for grey and clean water from the community and monitors the progress of each house in the community (fig.15).

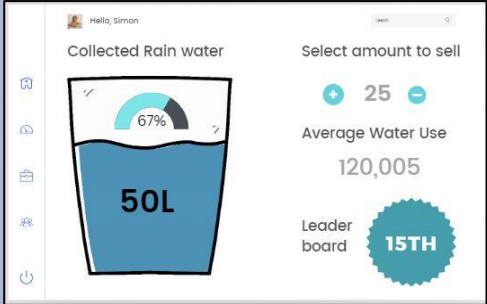


Figure 14. Prototype discarded because it did not involve all the required data

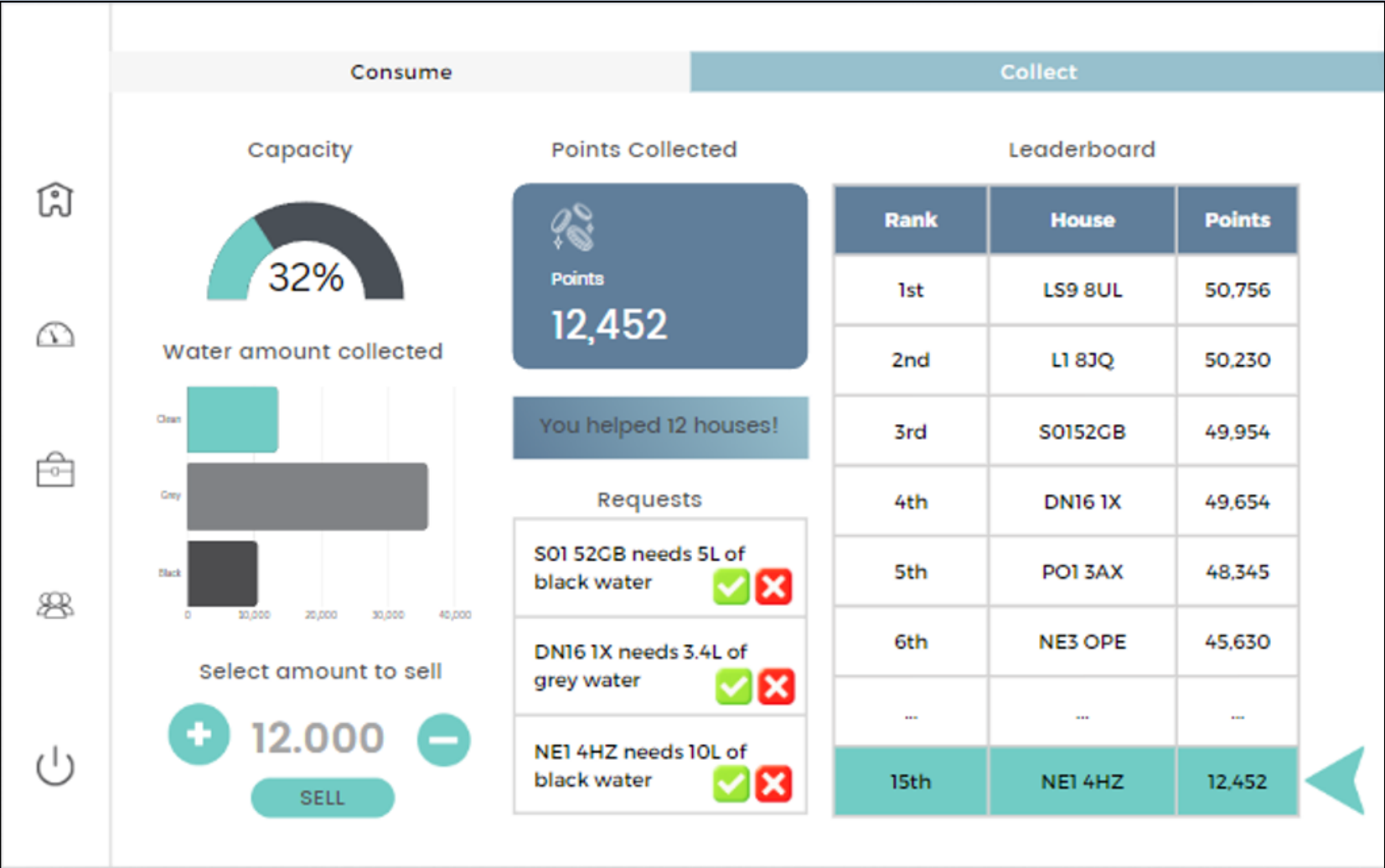


Figure 15: Prototype for Community Dashboard

USER JOURNEY MAP

HOUSEHOLD UNIT AND COMMUNITY LEVEL

The implementation of our idea is shown through a user journey map (fig.16) where the steps from both sides of the system are identified - that is, the user making the request for water and the user sharing its surplus water.

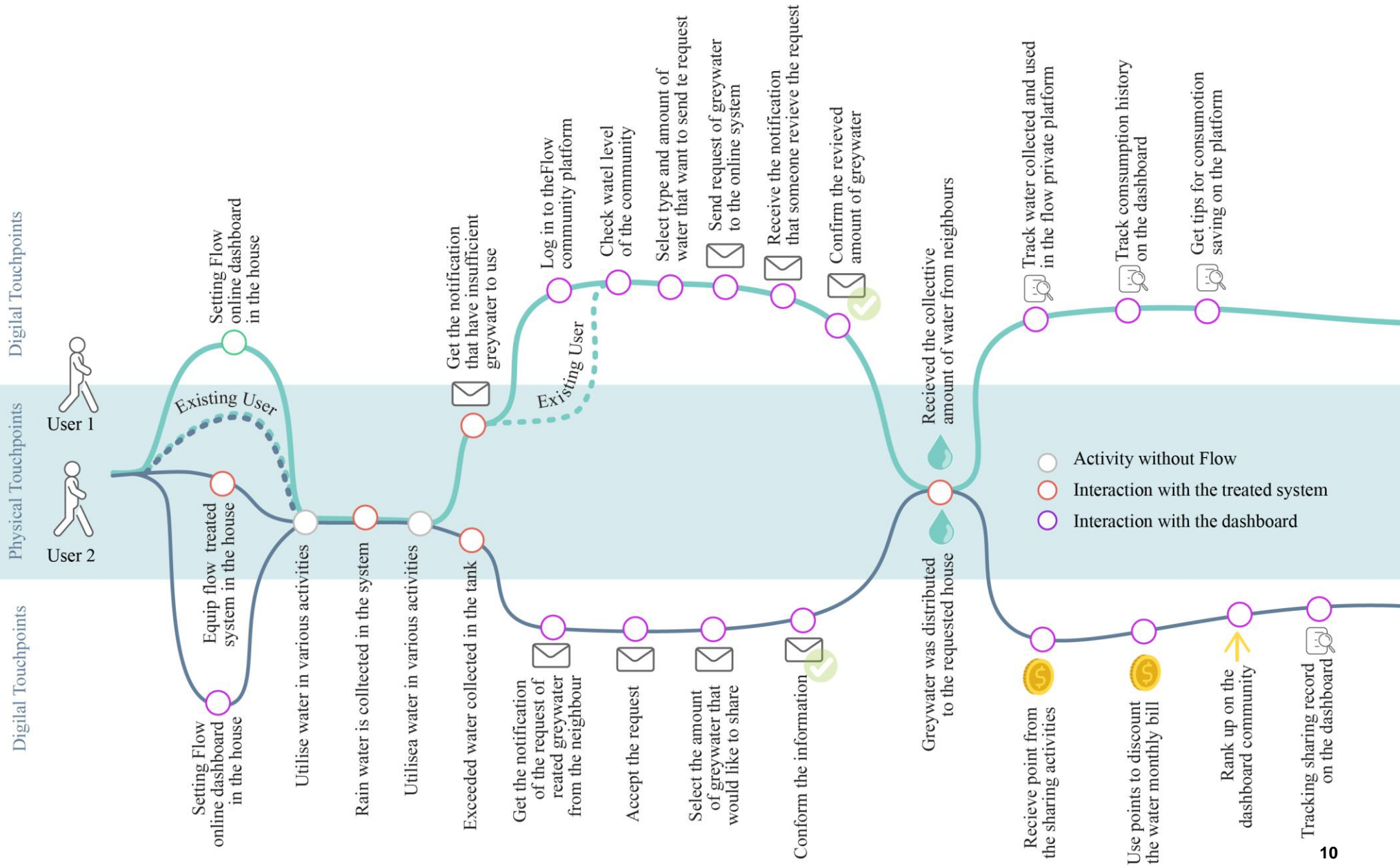


Figure 16. User journey map

HOUSEHOLD UNIT AND COMMUNITY LEVEL

WATER JOURNEY MAP

The various uses of each type of water as shown in the figure 17 make our proposal very beneficial for each household unit as well as for the whole community.

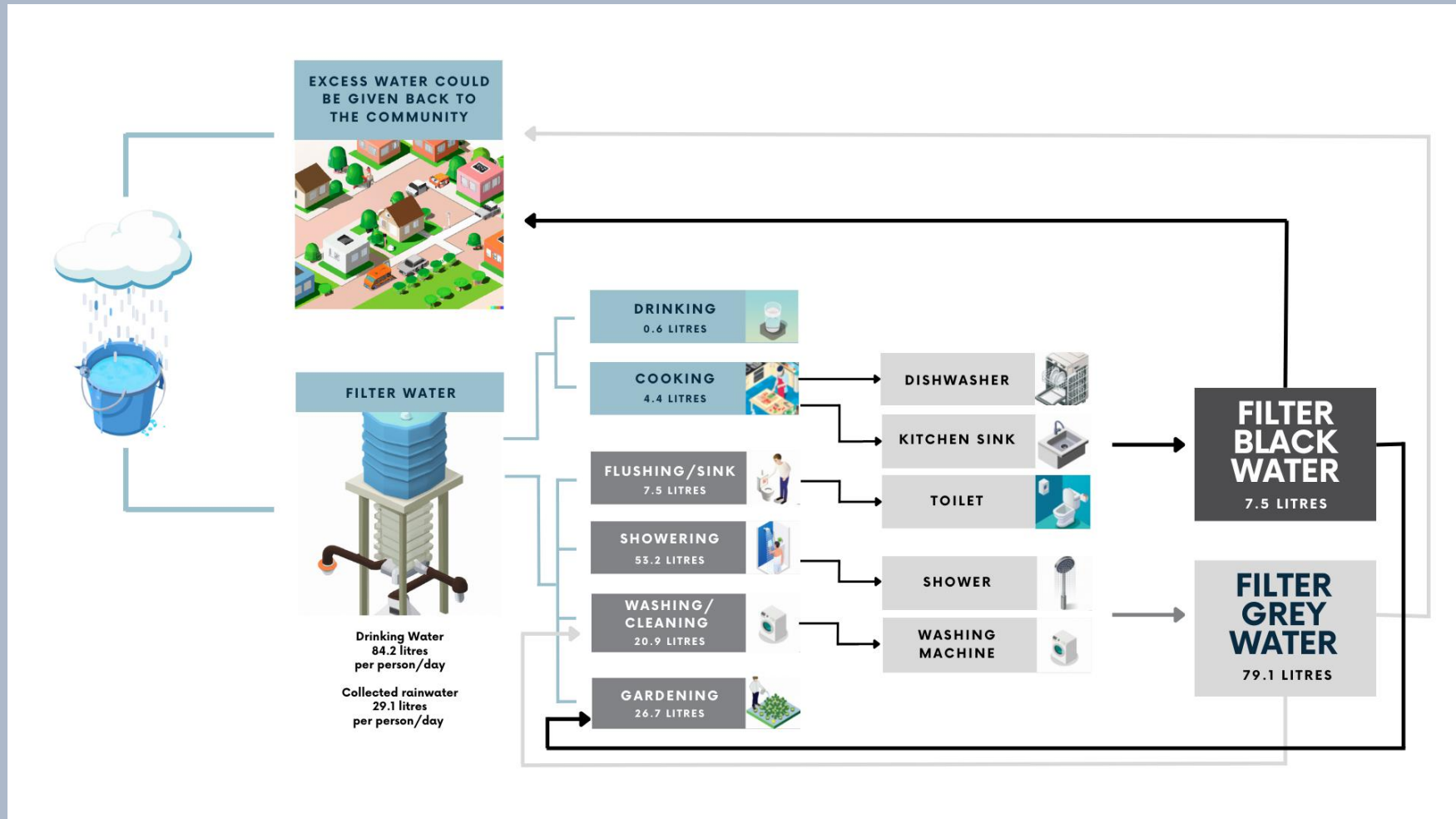


Figure 17: Water journey diagram [2, 3]

DISCUSSION, CONCLUSIONS, REFLECTION AND CONTRIBUTION

DISCUSSION

The idea we propose seems plausible to be implemented soon. Although our scenarios seem feasible, we recognize that many households will not be able to afford the required filters and monitors.

Furthermore, although in three to five years a large amount of filtered and grey water will be in daily use, a rather limited number of people will be able to make use of this procedure.

However, we believe that our idea will become necessary in the future since, as we mentioned, the demand for water is increasing but the water supply is decreasing.

CONCLUSION

Further improvement in low-cost sensor design, widespread adoption of digital meters, and improvement in filtering technology are some of the barriers to adopting this design in everyday household and community life. Community awareness in adopting the proposed application for the utilization of such a precious resource as water is very important and requires discussion and further study.

REFLECTION

During the process of this work we learned how important but also difficult is cooperation within a group work, because not everyone works at the same pace. Additionally, during our collaboration we learned the importance of feedback especially between people from different backgrounds.

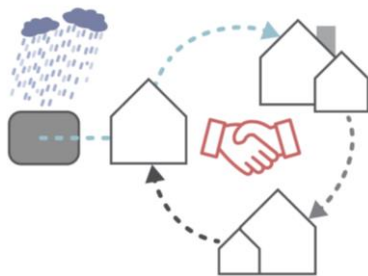
CONTRIBUTION

Loukia: Brainstorming, Ideation, Prototype, Text

Mohit: Water journey, Domestic scenario and Community scenario

Shakthi: Brainstorming, Ideation, Text

Sutakorn: Brainstorming, Ideation, Diagram of background research and User Journey and domestic and community unit, Text



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