

“Raani wants a clean and hygienic surrounding with more opportunities for social interaction and wish to have affordable electricity”

“OUR SOLUTION SHOULD PROVIDE RAANI WITH AFFORDABLE ELECTRICITY WHICH ALSO FACILITIATES IMPROVED SOCIAL INTERACTIONS AND CLEAN, HYGIENIC SURROUNDINGS”



Raani used to live in an informal settlement (slum).  
Picture Source: dnaindia.com



Raani moved to the Pragati Apartments built by L&T 2,5 years ago.  
Picture: Ms. Sachie Yoshizumi (22.08.2019)



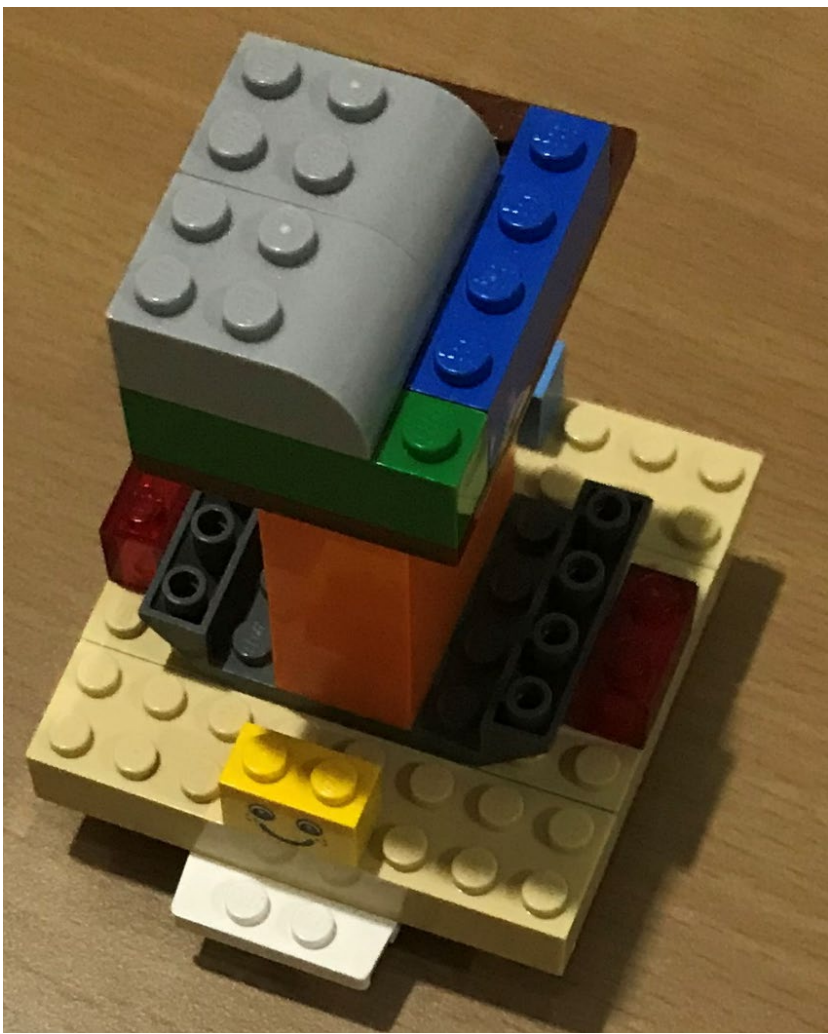
Will Raani's building be properly maintained or end up as a vertical slum in ten years?  
Picture: Ms. Sachie Yoshizumi (27.08.2019)

**PERSONAS**

**Raani**  
→ 35 Yrs old, Hindu  
→ Living in V. settlement for nearly 2 years  
→ 5 members, 2 sons, 1 daughter  
→ she is from outside Mumbai  
→ not working, husband → autoriksha driver  
→ Family salary = 6000/month  
→ Education: - High School  
→ Maintenance cost: - 500/month  
→ What she likes  
→ Happy with the house/renovated in their own  
→ Enough water supply facilities  
→ Good waste management system (collaboration)  
→ Community group & is functional  
→ More space in balcony

**Amalina (Muslim)**  
→ 25 years old, Muslim  
→ Has lived in house for 3 years  
→ Living on rent: 4000/month  
→ 3 kids, 1 husband  
→ She's from UP  
→ Not working, husband is autoriksha driver  
→ What do they like?  
→ Affordable rent  
→ Living with family?  
→ What does she not like?  
→ Congested, small space  
→ No social life  
→ Waste management → garbage thrown out next building  
→ Violence & other safety issues  
→ Hygiene & dirty environment  
→ Very dark (not enough sunlight)  
→ No common area for recreational purpose

### Solution: Integrated Solar Energy and Rain Water Harvesting Systems

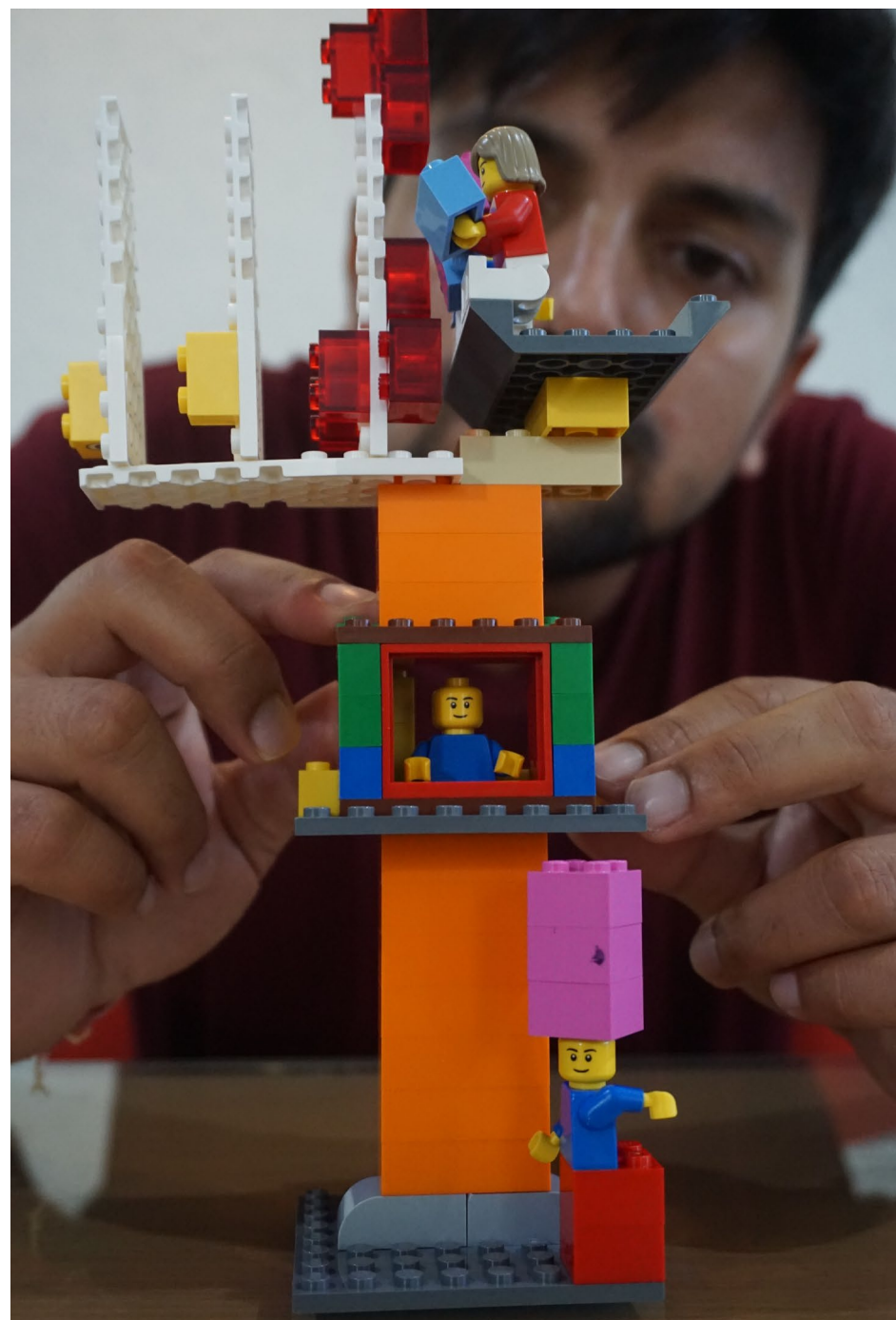


The first solution was a self sustaining SRA building which can generate its own electricity and harvest rain water for maintaining the building.



As a validation exercise, we visited various locations to observe the surroundings and interview residents. Based on their feedback, we refined our solution.

In the refined solution, residents export the solar energy to the grid and some advertisement spots are identified in the high rise part of the building. These bring the society a revenue that could cover the operations and maintenance of the building.

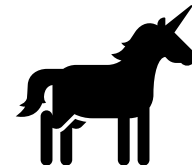


Additionally, as a recommendation for implementing the solution, the residents (especially women) are trained on the various conservation and health benefits, which indirectly increase community forming and social interaction. This would hopefully also lead to motivating residents to take ownership of maintaining their surroundings and building.

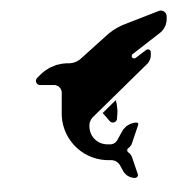
## BEHIND THE SCENES



Kul Prasad Sharma  
Mathematics faculty  
Jigme Namgyel Engineering College  
Royal University of Bhutan



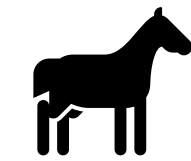
Joris Blok  
MSc student  
Strategic Product Design  
TU Delft (NL)



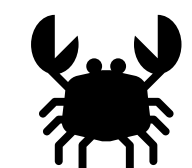
Sachie Yoshizumi  
MSc student  
Creative Sustainability  
Aalto University School of Business (FI)



Rabindra Raj Giri  
Civil engineering faculty  
Asian Institute of Technology and  
Management (Nepal)



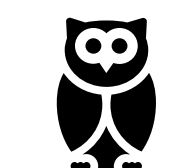
Prashanta Bagale  
Civil engineering faculty  
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Tribhuvan University (Nepal)



Siddharth Nair  
PhD student  
Collaborative Medical Device Designs  
Indian Institute of Science

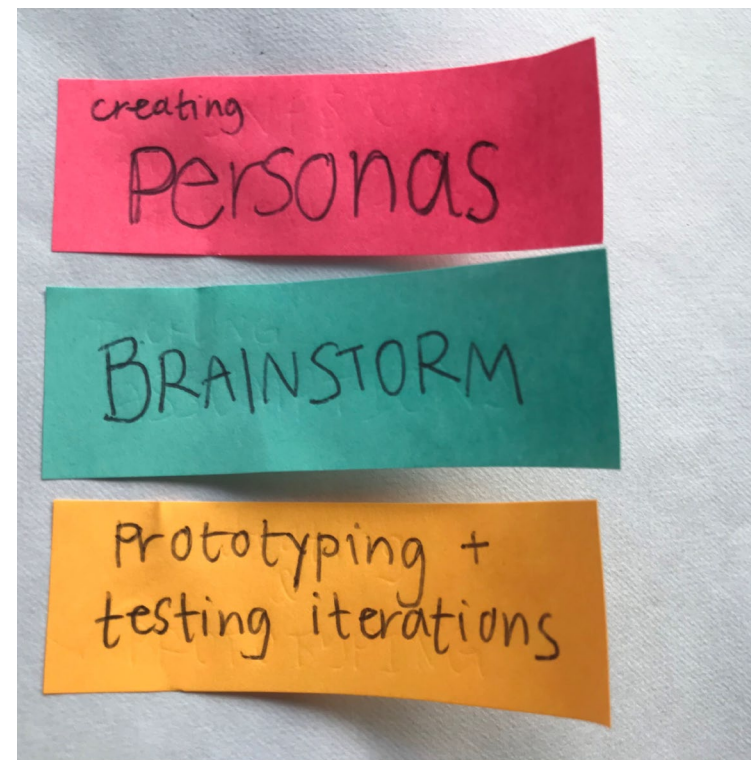
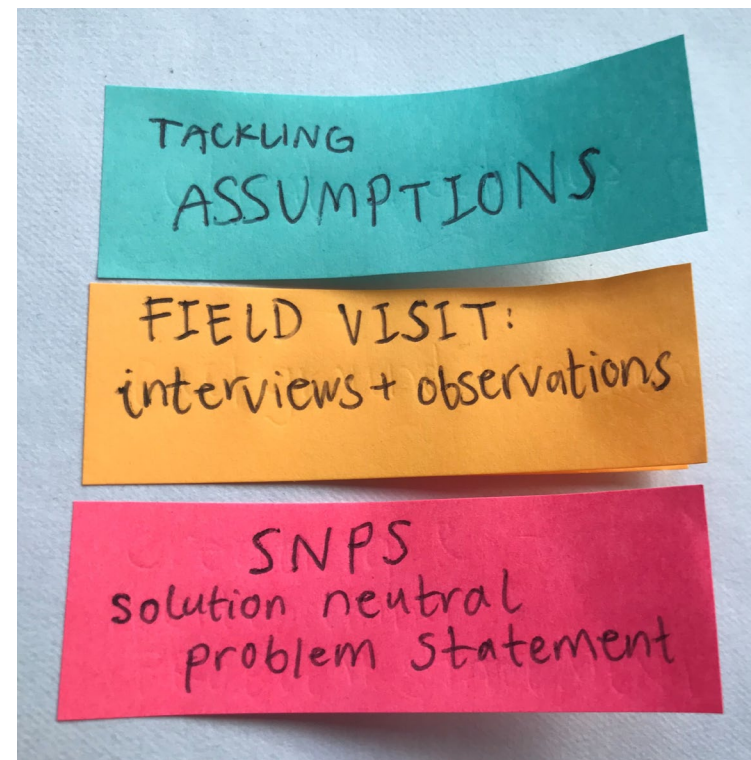
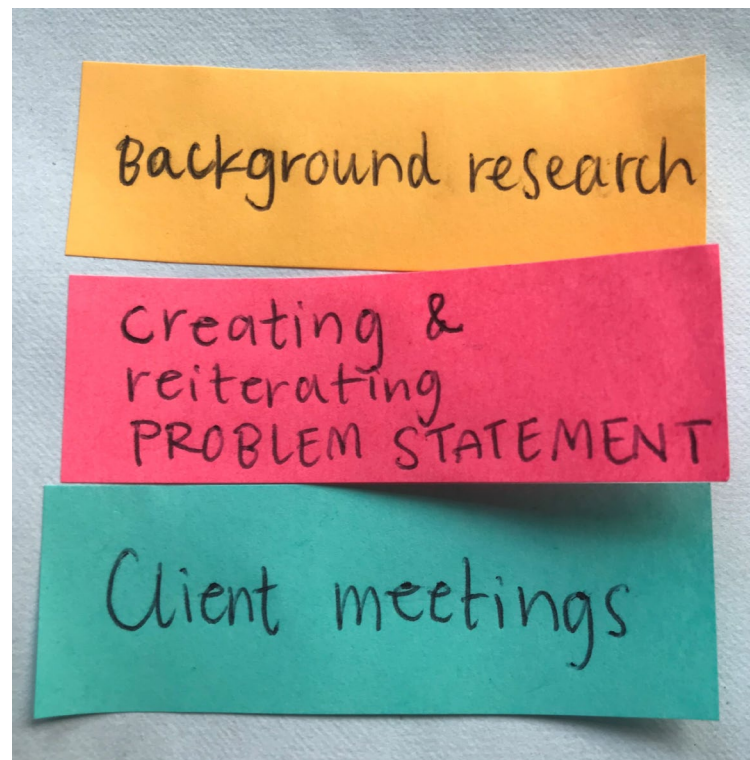


Yaman Dhakal  
Civil and rural engineering faculty  
Nepal Engineering College



Albert Thomas  
Construction Technology and  
Management Faculty  
Indian Institute of Technology Bombay

### OUR PBL PROCESS



### OUR LEARNING OUTCOMES



Way of identifying, defining and reiterating problems (and solutions)



Different PBL tools (e.g. personas, research process, interviews & brainstorming prototypes)



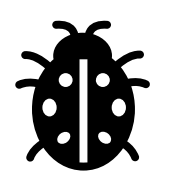
Difference between PBL and conventional learning



Designing curriculum in PBL style



Analysing the problem and solution from user's perspective



Challenging, because PBL is a non-conventional method



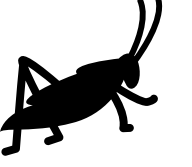
Time Constraints, Unfamiliar case and language barriers



No possibility to test solutions and problem statements with end users



Limited interaction with stakeholders



Lack of primary data and supporting information

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