

Jivan Jar

A device that provides pure water during Survival Situations

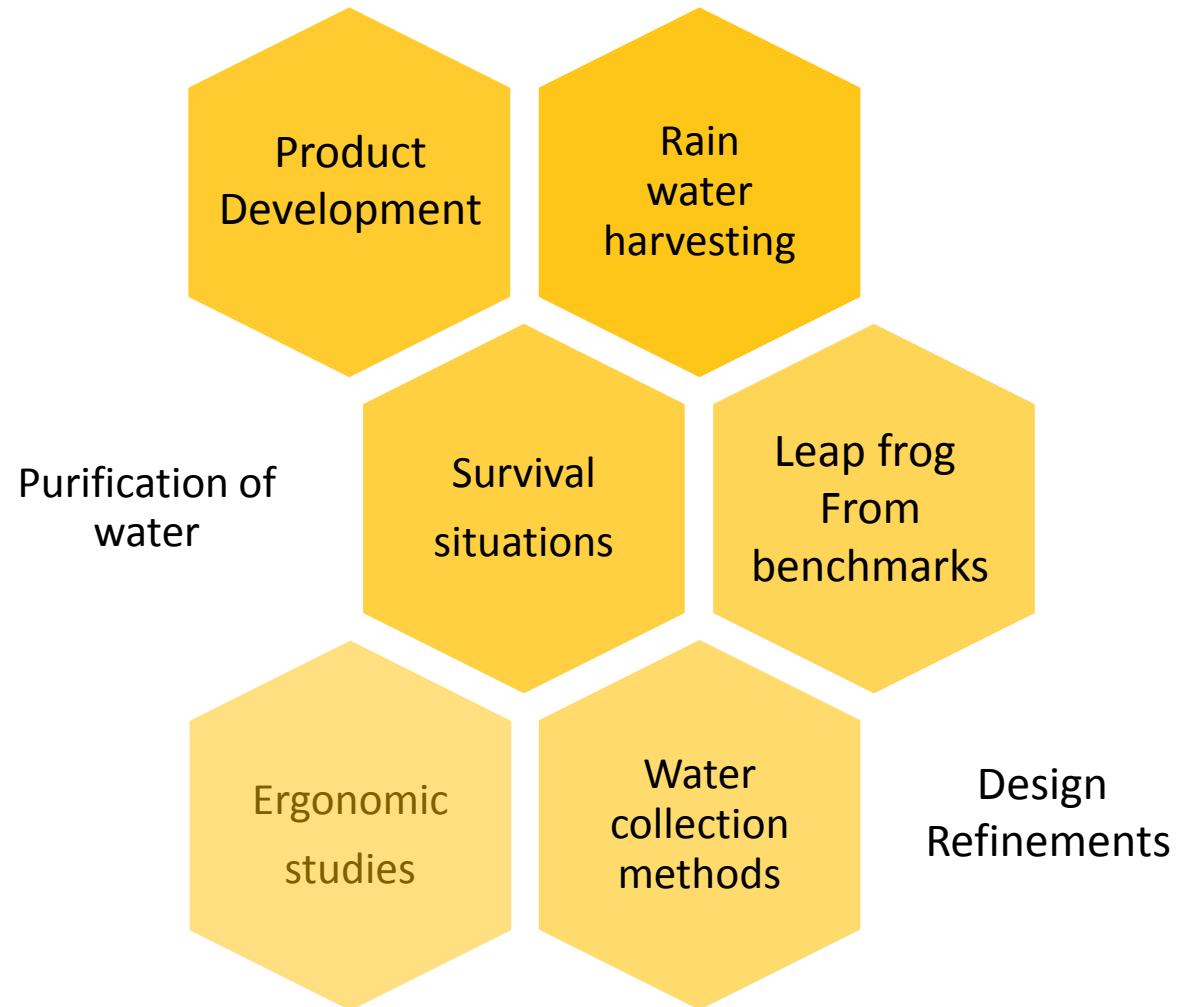
GUIDE : Prof. Sandesh

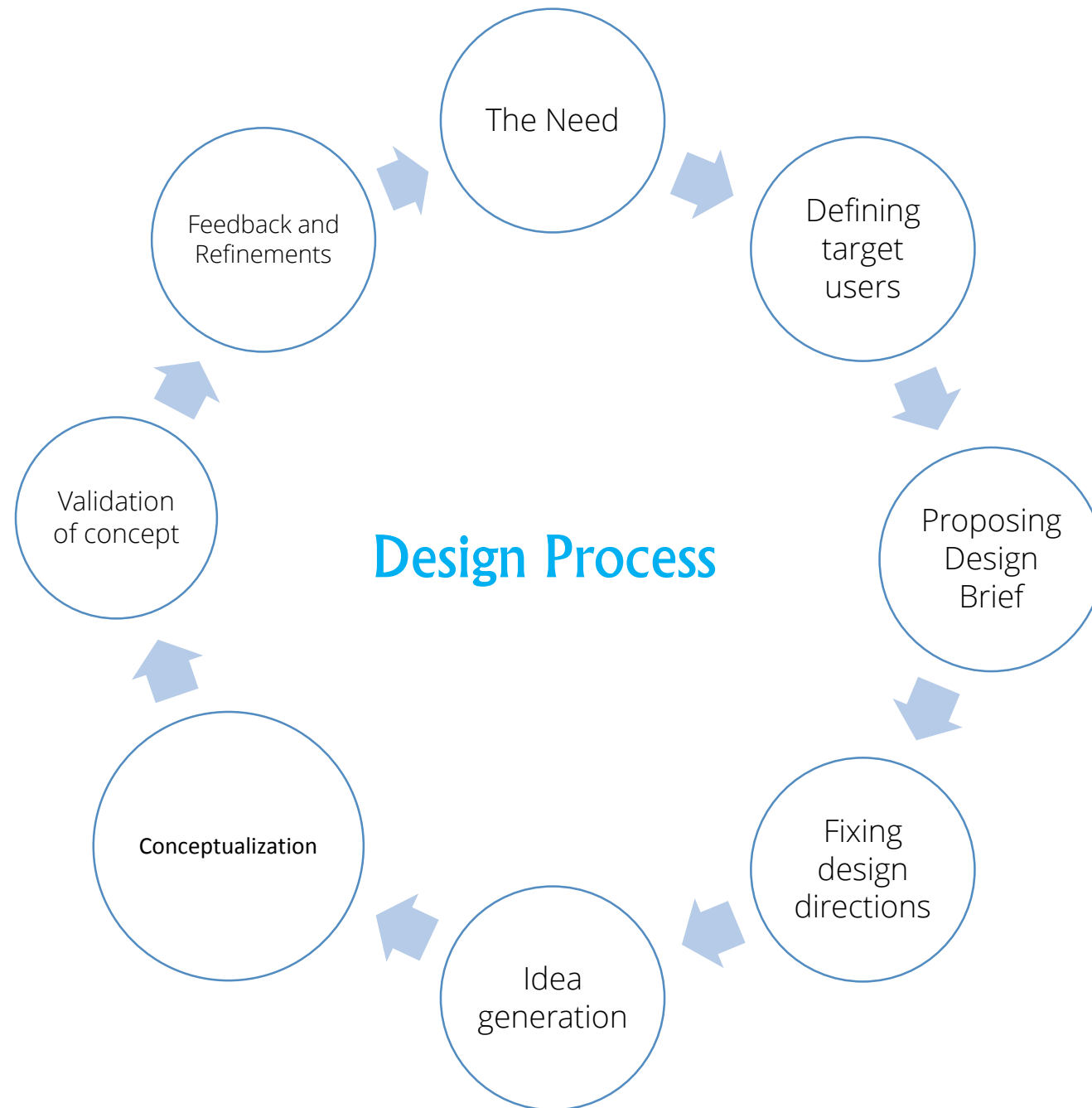
TRIVIKRAM | 136130013

‘Survival can be summed up in 3 words – **Never Give Up**, that’s the heart of it. Believe and try – you will triumph’

- Bear Grylls

Overview

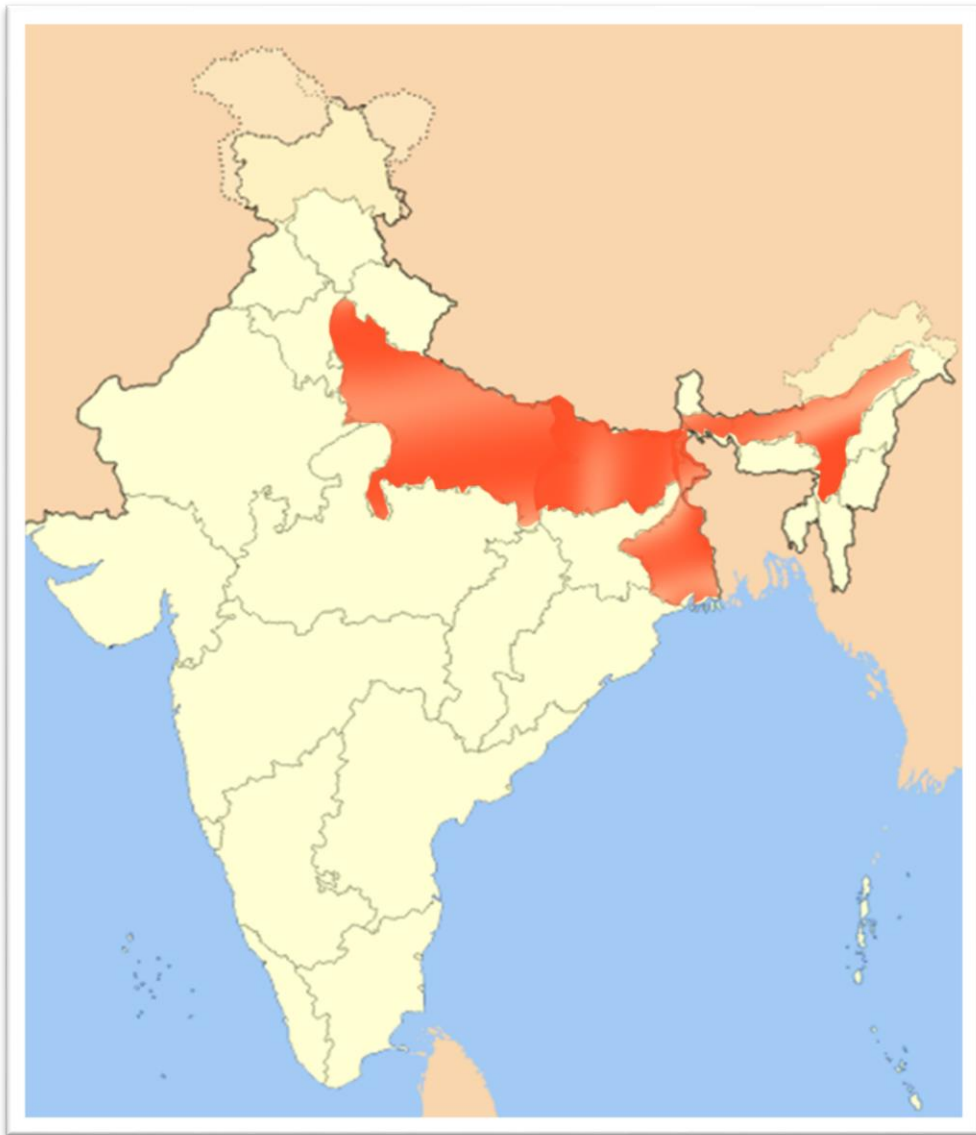




Product Development Timeline

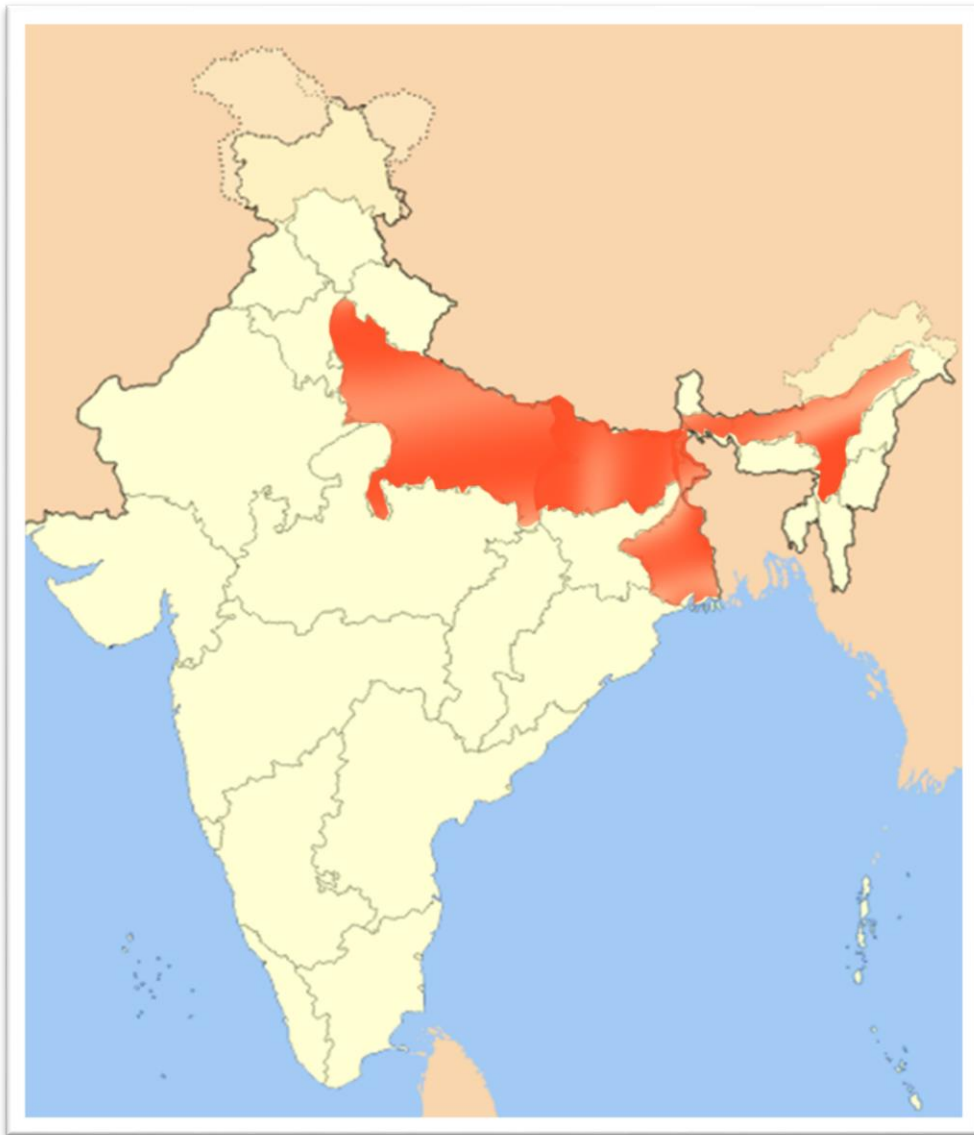


THE NEED



Most flood prone states of India

Uttar Pradesh , Bihar , West Bengal & Assam



Most flood prone states of India

Uttar Pradesh , Bihar , West Bengal & Assam

17.4

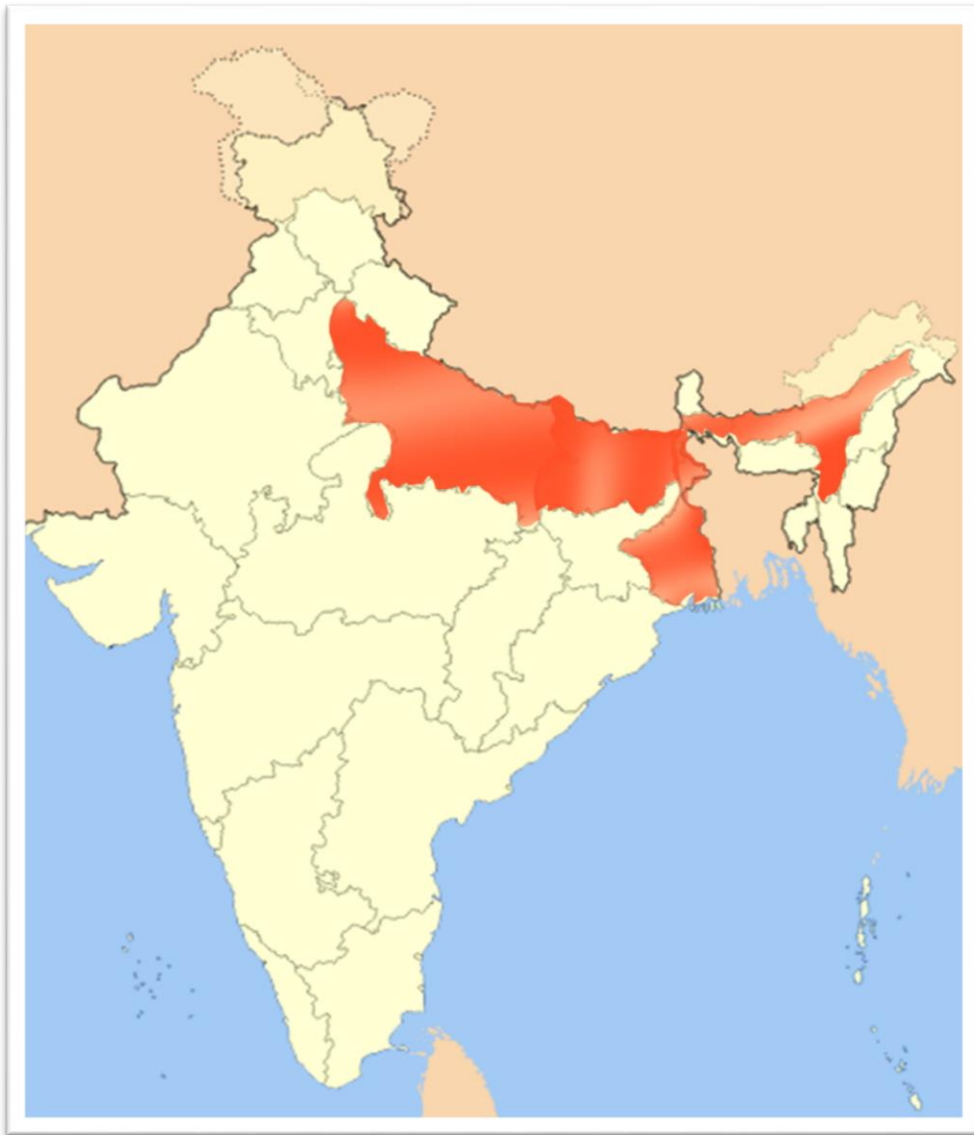
Million hectares liable to floods

4

Lakh people affected in Assam Floods, 2014

242

Villages affected in Assam



Most flood prone states of India

Uttar Pradesh , Bihar , West Bengal & Assam

17.4

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The river delta in Bengal can flood every year,
some years worse than others

MAJOR PROBLEMS OF FLOOD HIT AREAS



Electricity



Drinking Water



Food

EXISTING SOLUTIONS



Drinking water bottles and water purification units are deployed



Rescue aids often take days to reach the needy



Children, pregnant women and old people cannot easily relocate and do not have easy access to rescue operation



Consumption of dirty water leads to health issues



Most often sewage water gets mixed with the flood waters





Enormous usage of plastic bottles -
Environmental hazard

MOTIVATION



There is water **Everywhere** – but no water to **Drink**

DESIGN BRIEF

A water purifying device to be used in survival situations, with the following features-

- Gives clean potable water
- Is small and portable
- Easy to use
- Possible for large scale manufacturing
- For people in survival conditions, with difficult access to drinking water

SCOPE OF THE PROJECT

- The device will cater to the need of providing clean drinking water to people stuck in survival situations
- The device is meant for a small group of people (around 20 persons)

FEATURES NOT ADDRESSED ARE :

- Device is not meant for a **large community system** (population in excess of 100, during a worst case scenario)

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- As the device is meant for **Mass use**, instances of toxic wastes mixed in water are less than 1%

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- As it would involve a **system level** approach, which would be difficult to address in the given time frame
- As the device is meant for **Mass use**, instances of toxic wastes mixed in water are less than 1%
- As purification would need **scientific backing** and **technological intervention**



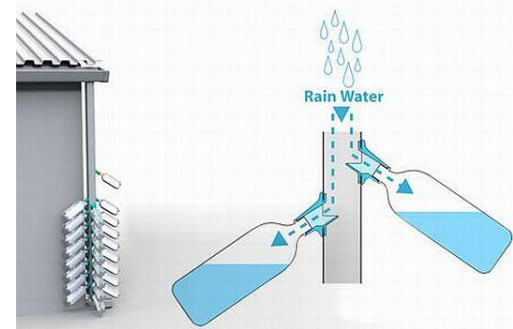
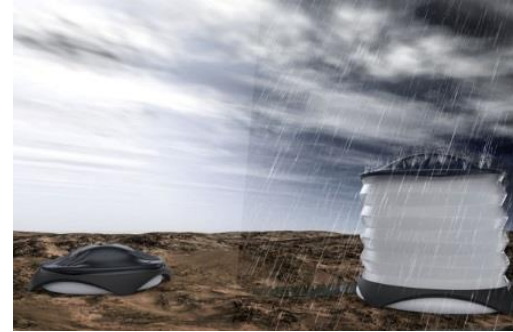
TARGET USERS

As a short term relief for the **people stranded during floods** without access to drinking water

PARALLEL PRODUCT STUDY

Inferences :

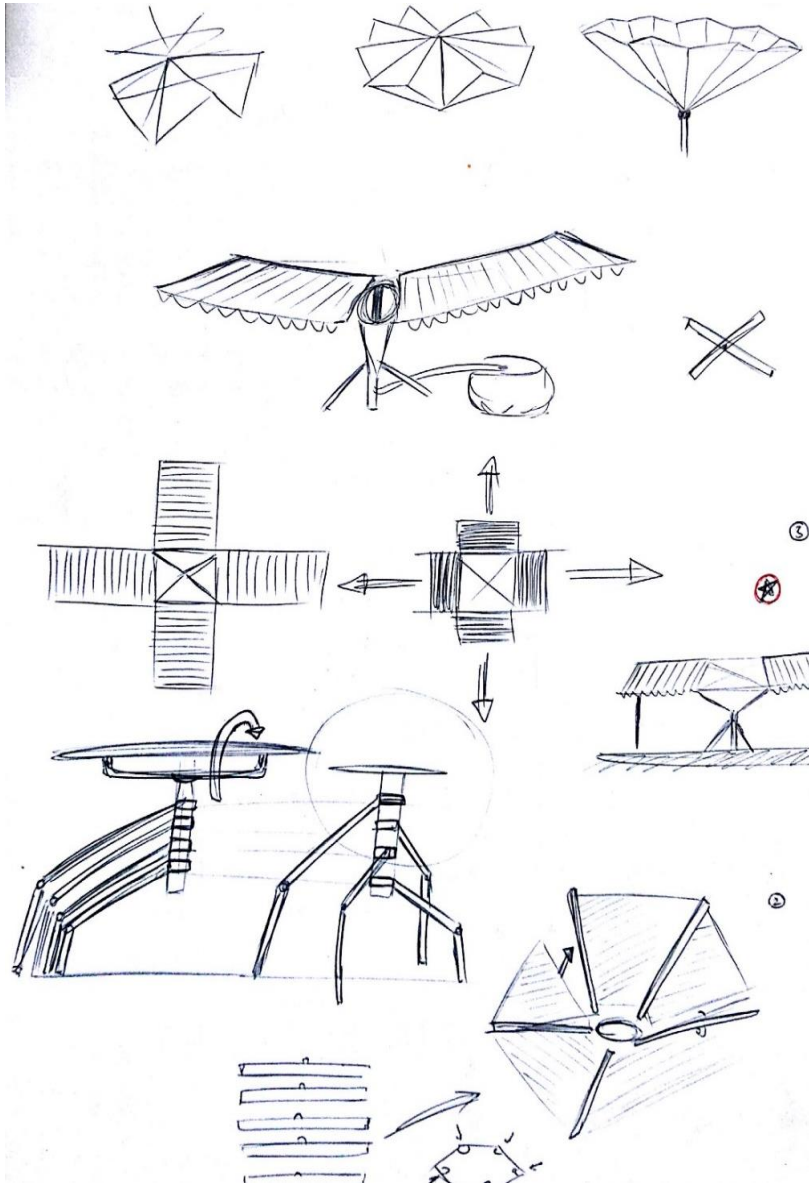
- Overview of existing technologies
- Usage of Simplistic methods to obtain a solution
- Form explorations to convey the usage method of the product



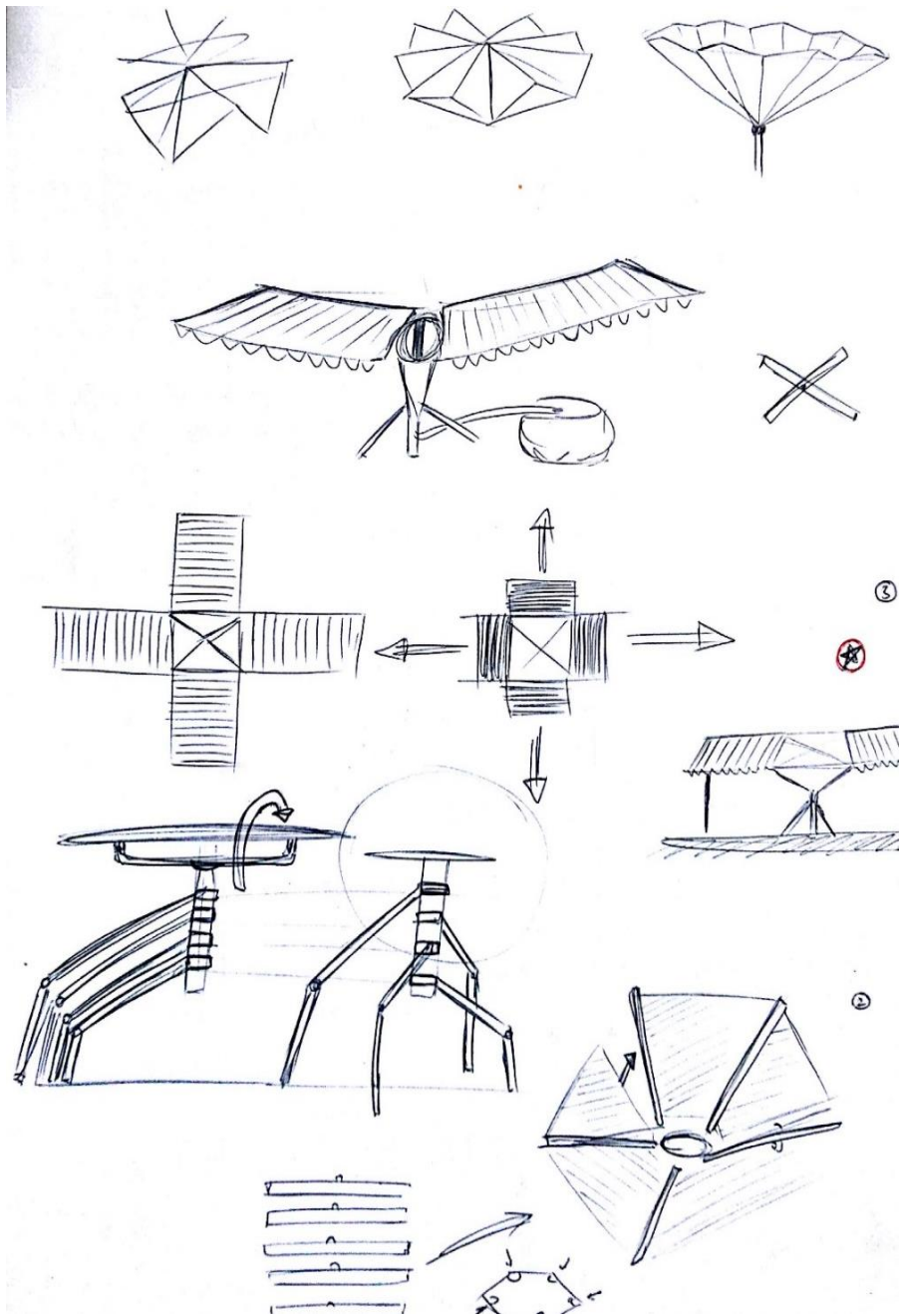
When the concentrated solution runs out, more solution can be prepared and poured into the empty solution container.

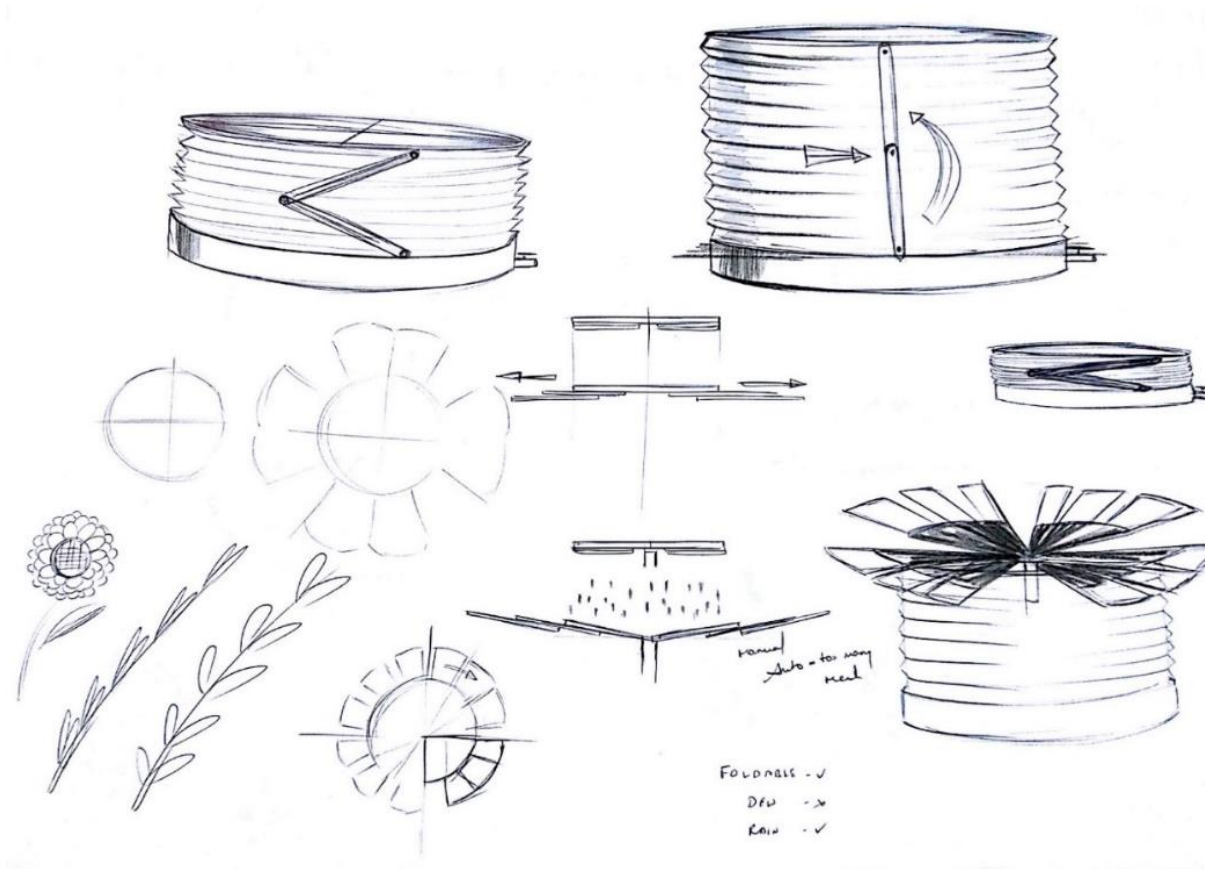


IDEATIONS

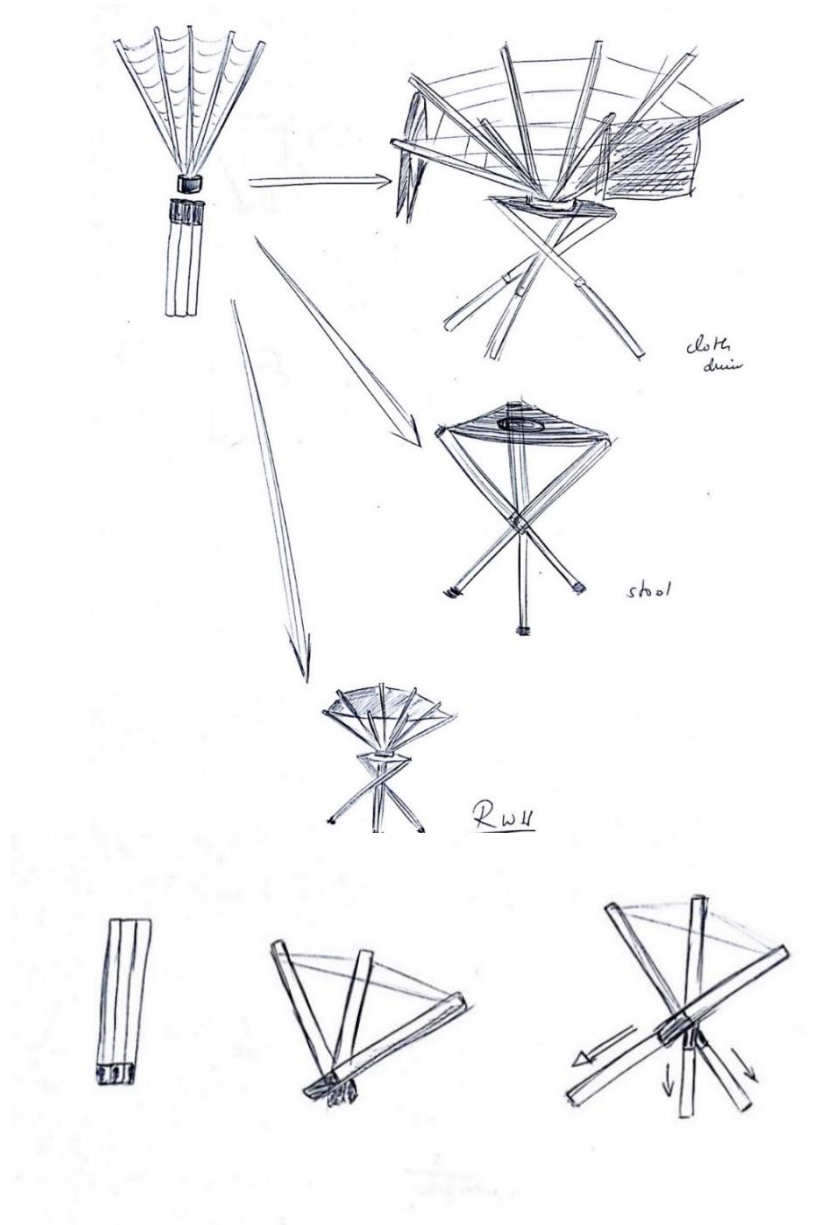


- Explorations of off-beat water harvesting techniques, like- Dew water harvesting
- Discarded as Indian climatic conditions don't provide necessary sustenance
- Collapsible mechanisms





- Ideas inspired from Nature
- Open able bellow units
- Space saving device



Explorations of **value added features**, based on the needs of people living in rural areas

Features addressed in the idea:

- Rain water harvesting
- Cloth drier
- Stool

CONCEPTS

CONCEPT 1

To **Collect** rain water during survival situations

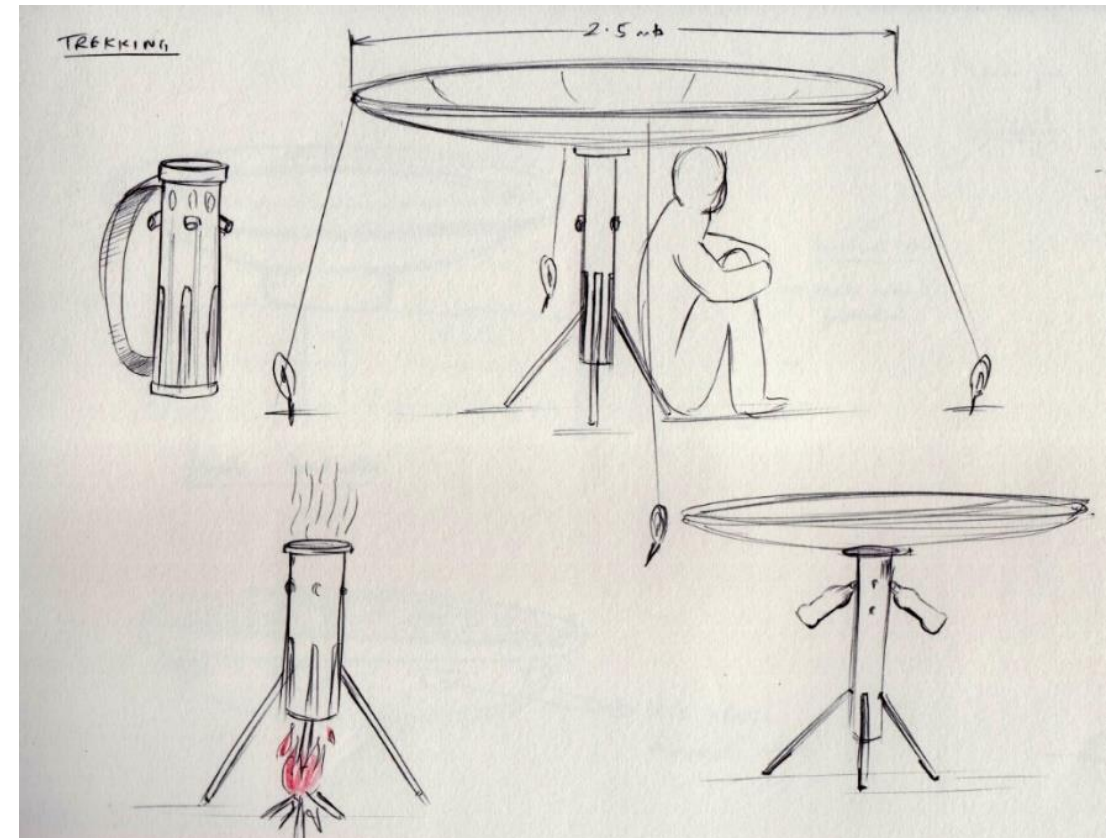


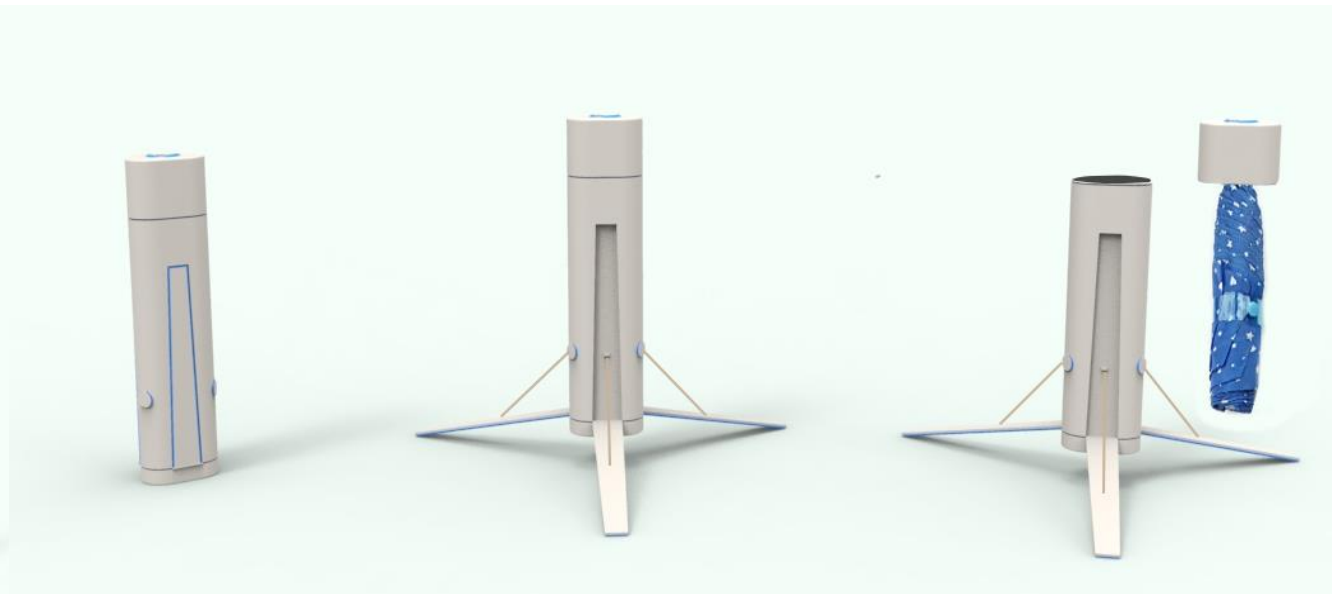


Water Storage and portability issues

CONCEPT 2

To collect and store rain water during survival situations





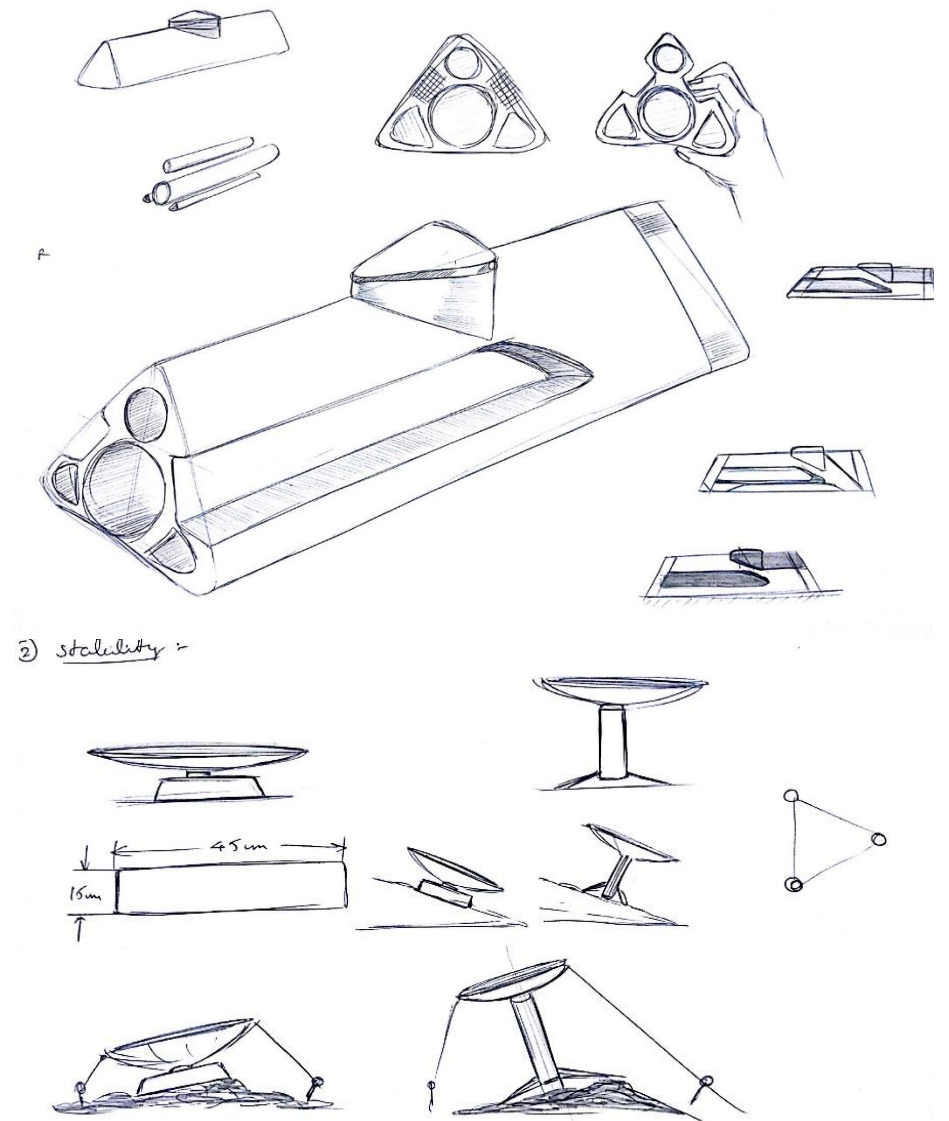


Too complex – many moving parts

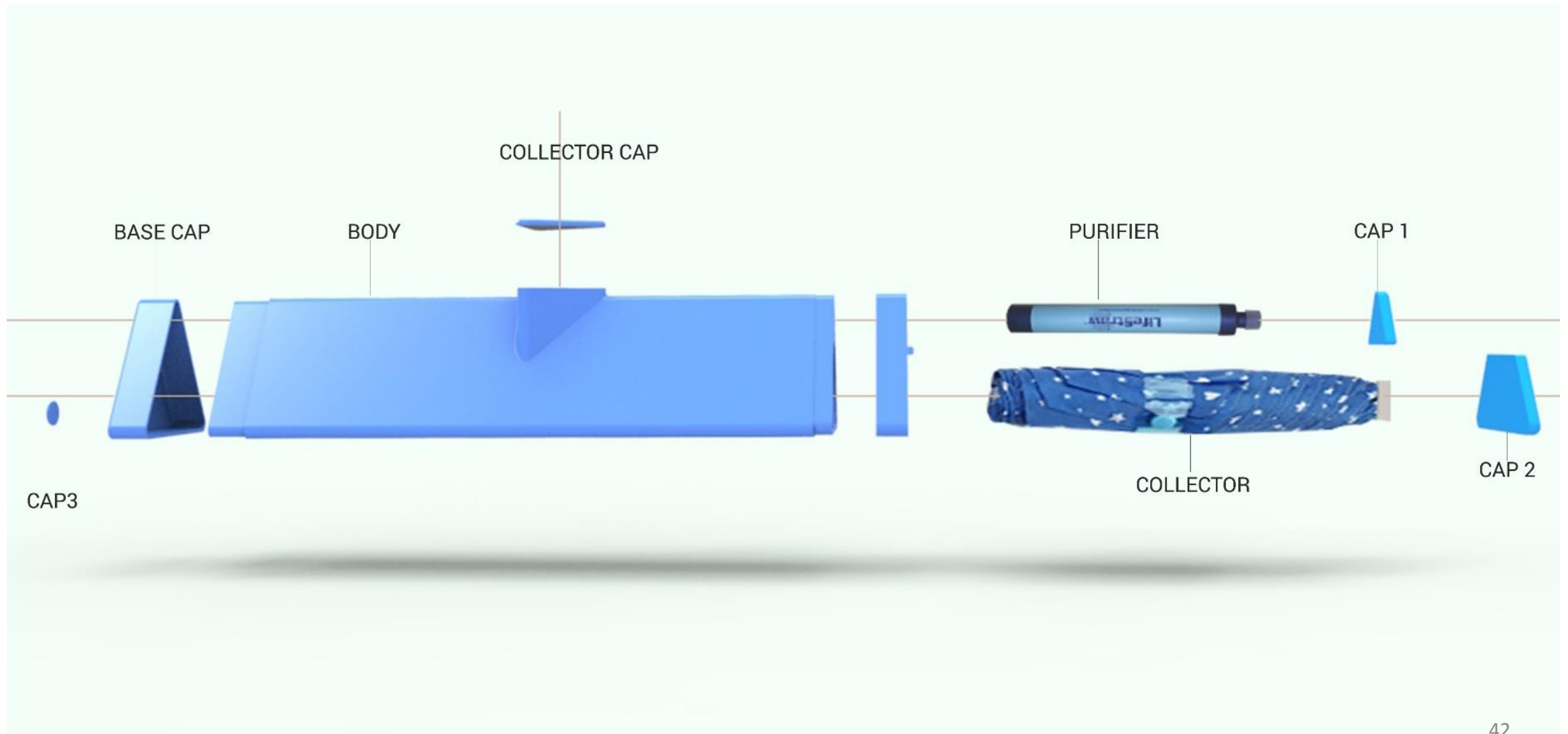
CONCEPT 3

To **collect and store** rain water and **purify** flood waters during survival situations

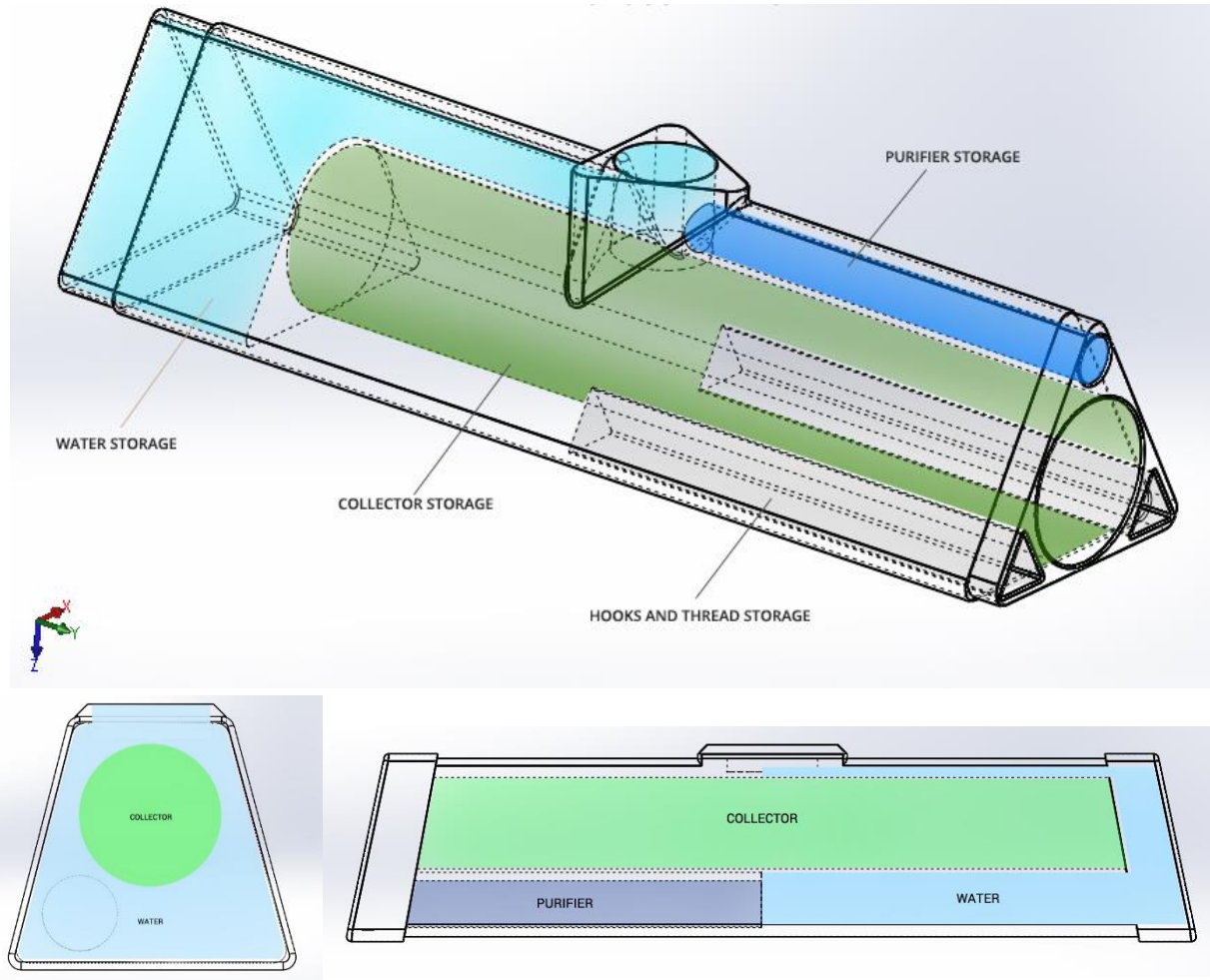
Issues addressed : **Terrain** of product usage



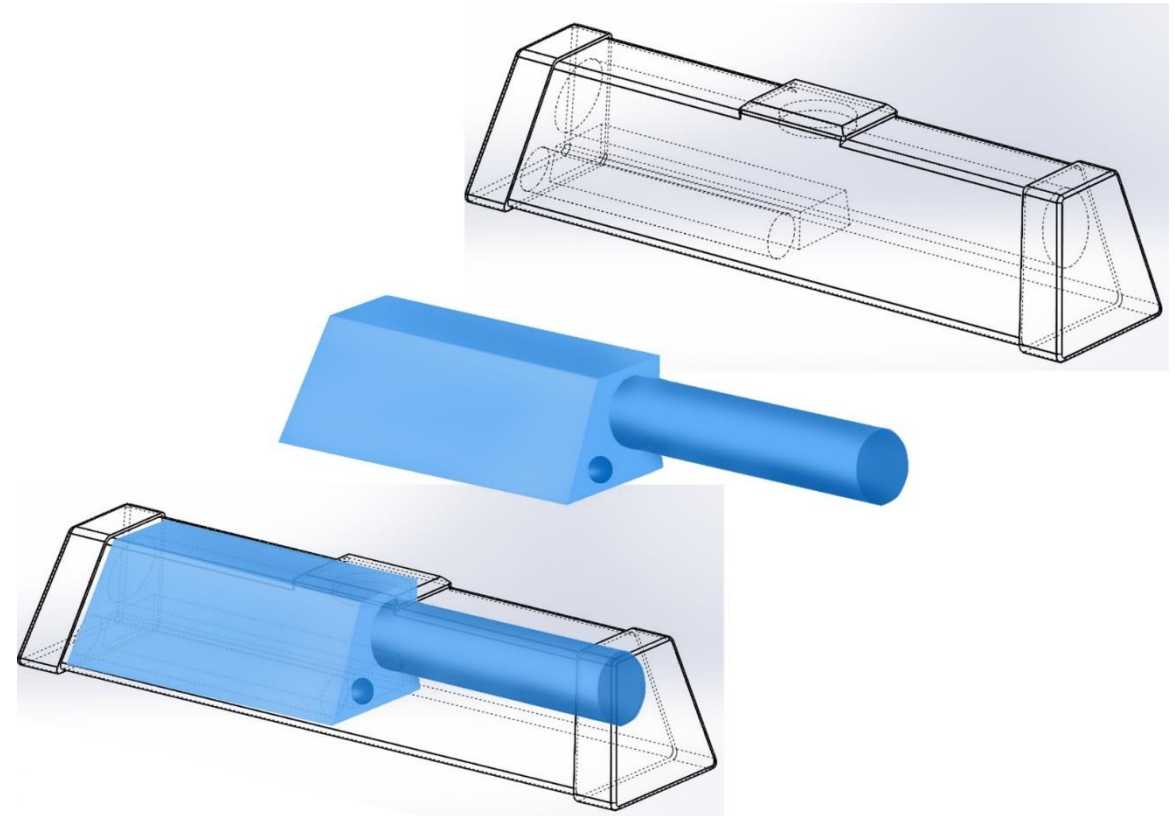
Exploded view of the concept



Internal Spaces of the Device



Internal component console



Ergonomic Study



95TH Percentile



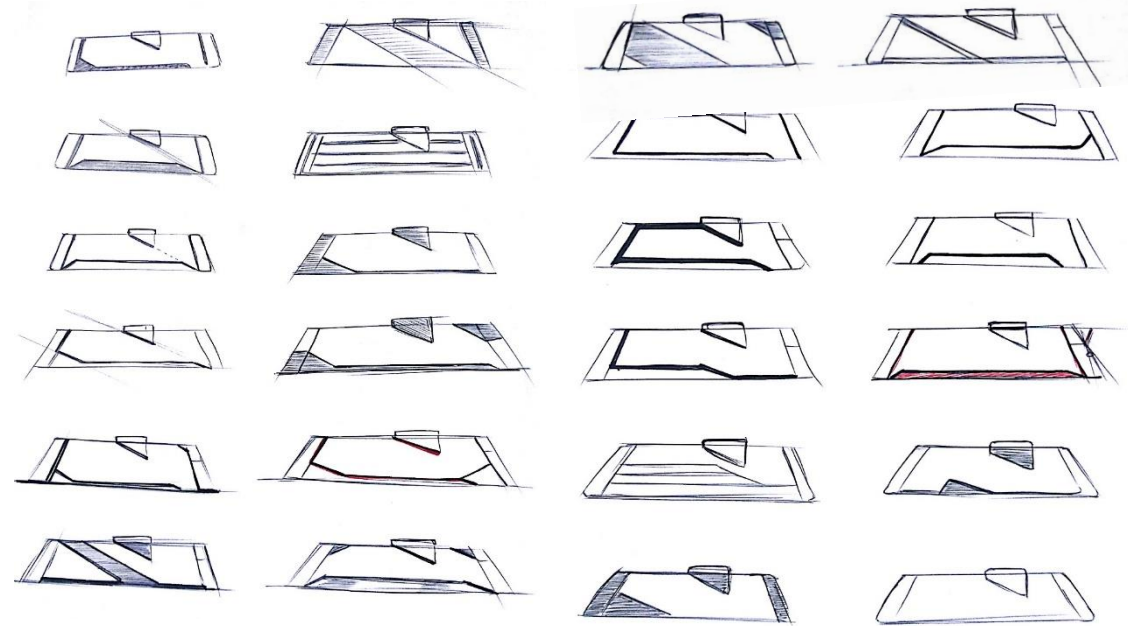
50TH Percentile



5TH Percentile

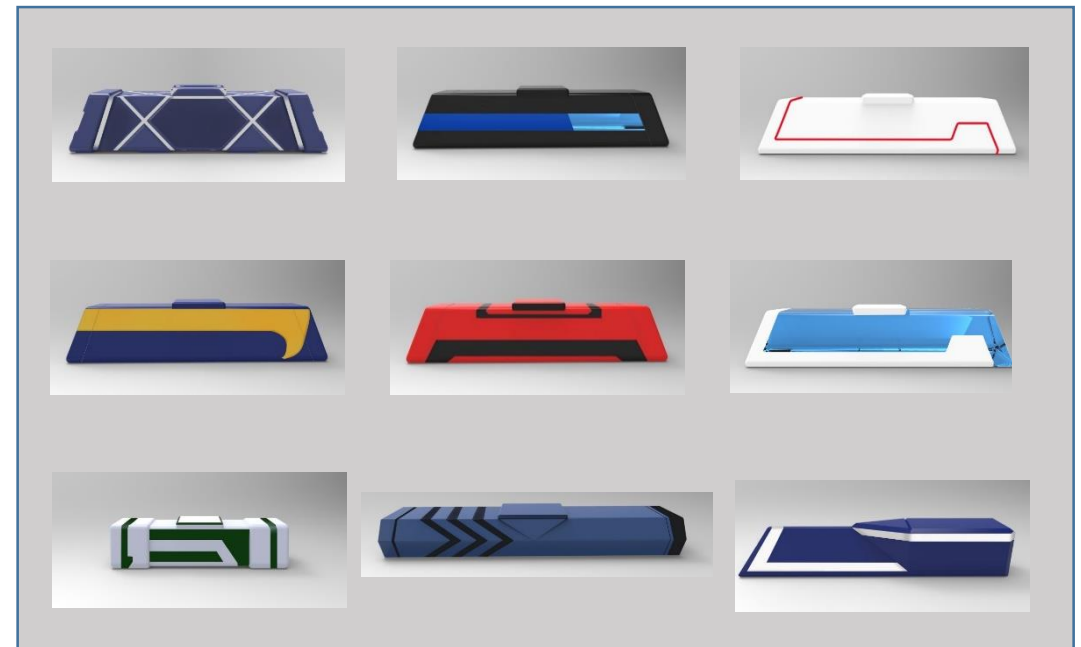


Form Explorations

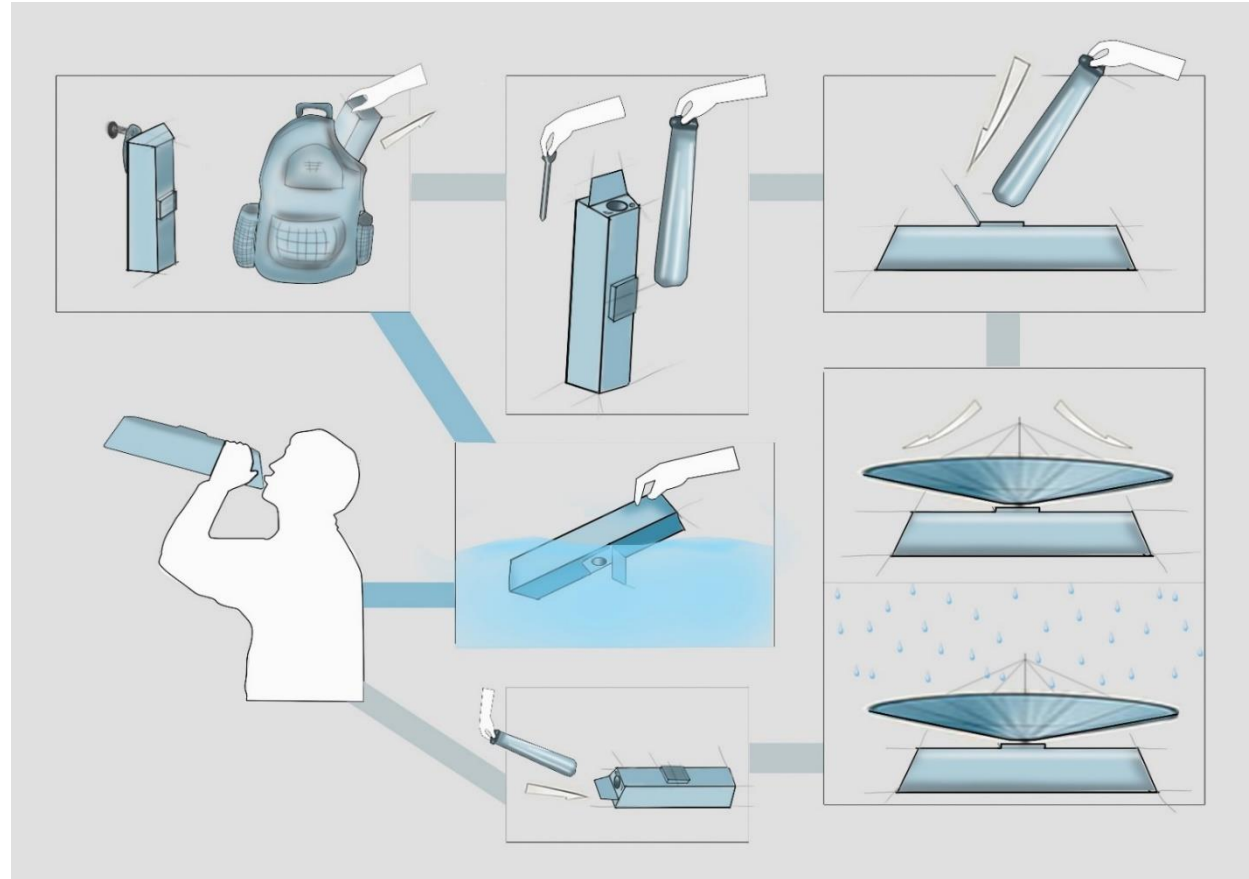
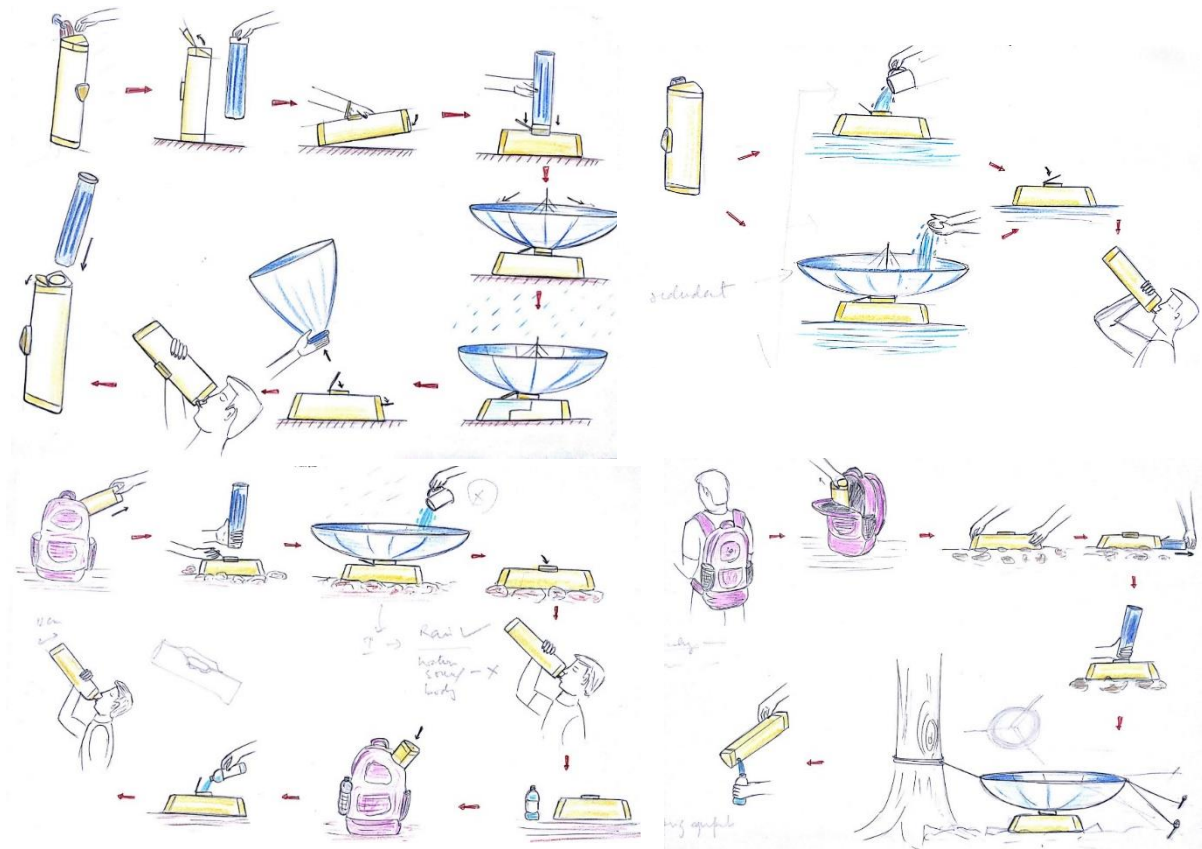


Form explorations on the basis of keywords :

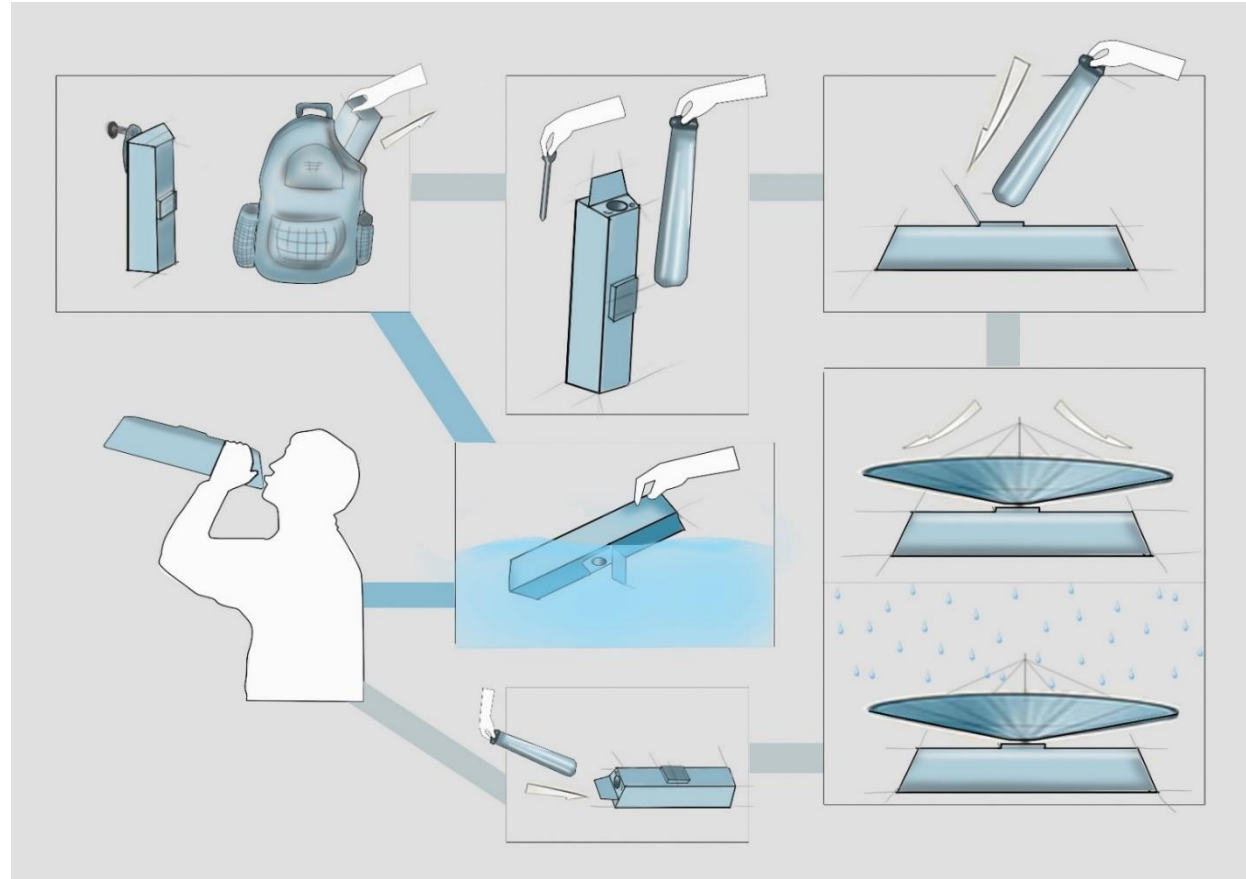
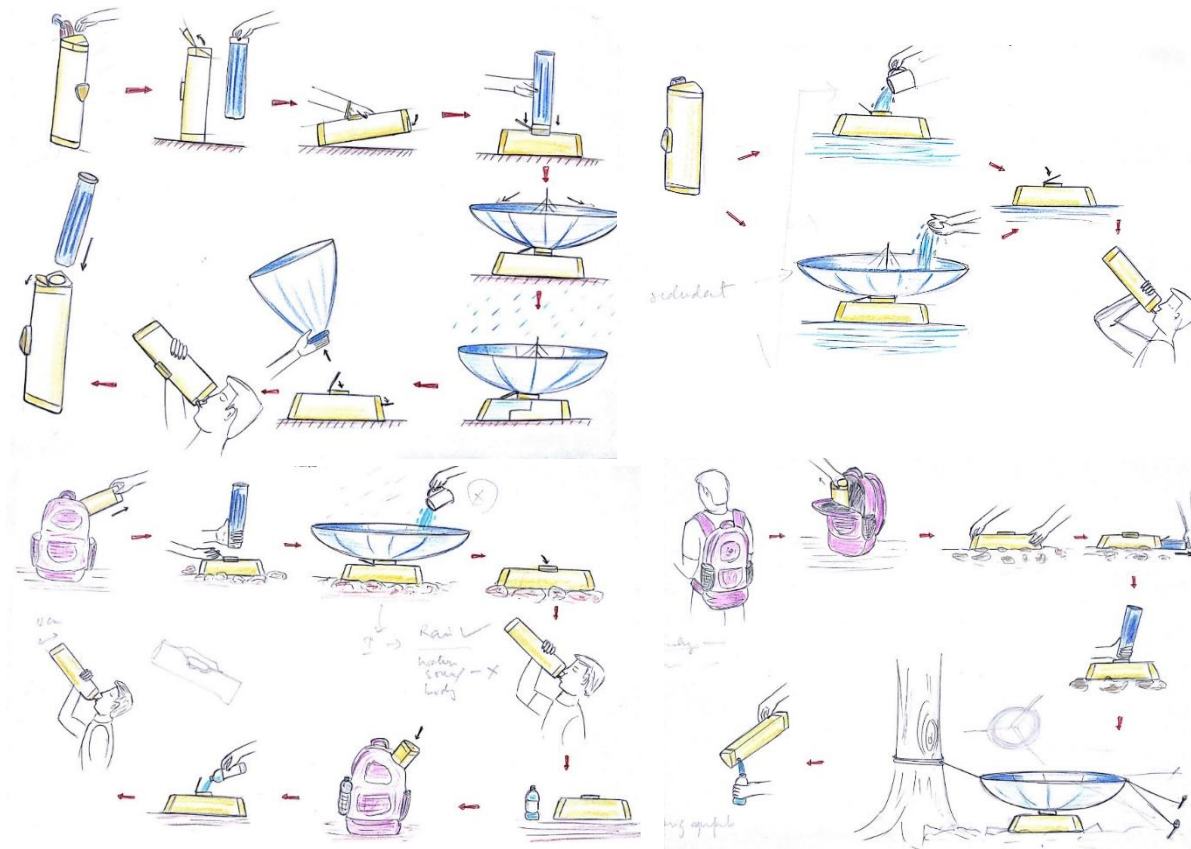
Rugged and Strong



Activity Analysis



Activity Analysis



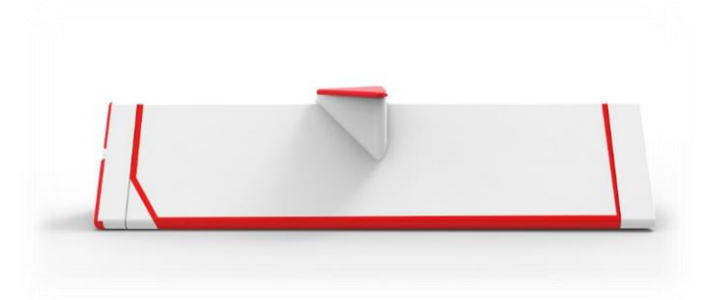
High usability issues and lacked the value proposition



To **collect and store** rain water during survival situations



To **collect** rain water during survival situations



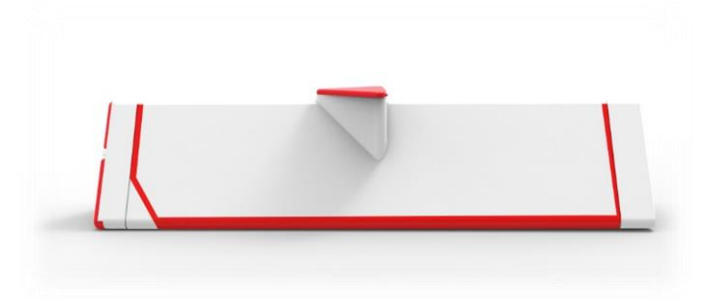
To **collect** rain water and **purify** flood water during survival situations



To **collect and store** rain water during survival situations



To **collect** rain water during survival situations



To **collect** rain water and **purify** flood water during survival situations

WHAT IF THERE IS NO RAINFALL ????



1

Undependable source

2

Less quantity of water collected

3

Simple methods of harvesting
available



1

Omnipresent source

2

Abundant quantity of water

3

Purify the water

WATER PURIFICATION

- Ceramic Filters
- Purification Tablets
- Synthetic water purifier
- Aeration techniques
- Solar Still
- Boiling water

WATER PURIFICATION

- Ceramic Filters
- Purification Tablets
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- Aeration techniques
- Solar Still
- Boiling water
- Not effective against all kinds of viruses
- Needs frequent cleaning
- Needs external energy source for working
- Robustness of the filter – easy breakage
- Tablets give pungent odour and taste
- Pregnant women are not advised to consume water purification tablets
- High purification time
- High cost

SALIENT FEATURES



- Filters upto 1000 liters of untreated water
- No chemicals used
- 99.99% of waterborne bacteria removed
- Pore size of 0.2 microns
- Uses hollow-fiber membrane
- Low cost
- Easy maintenance

CONCEPT VALIDATION

- Test rig was used, with a container, piston and filter
- Dirty mud water was poured and pure potable water was pumped out



BENEFITS OF THE PRODUCT

Purification capacity of the filter = 1000 Litres

Number of people using it = 30 people

Considering 1 person needs 3 litres per day,

30 people can drink water from the device for 11 days

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Considering 1 person needs 3 litres per day,

30 people can drink water from the device for 11 days

Cost of the product – 900 Rs, **1 litre = 1.1 Re**

MATERIALS AND MANUFACTURING

Body and Components

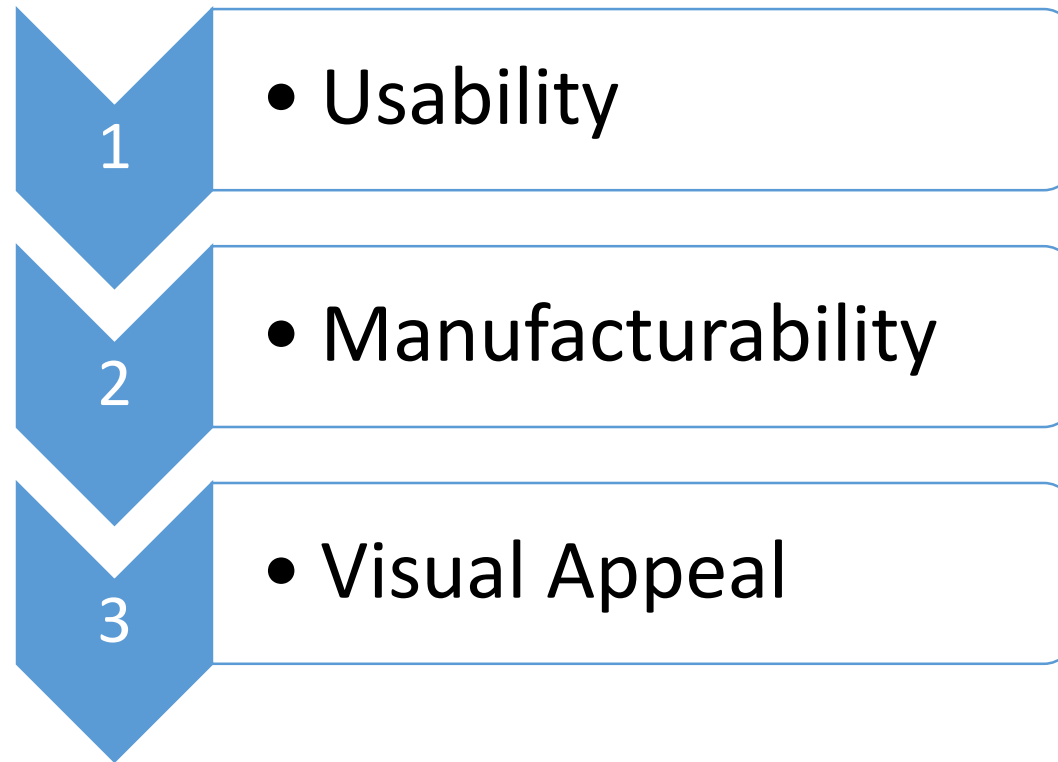
ABS -acrylonitrile butadiene styrene

- High impact strength
- With UV stabilizers, it's suitable for outdoor applications
- Non-Toxic –food safe – [User Safety](#)

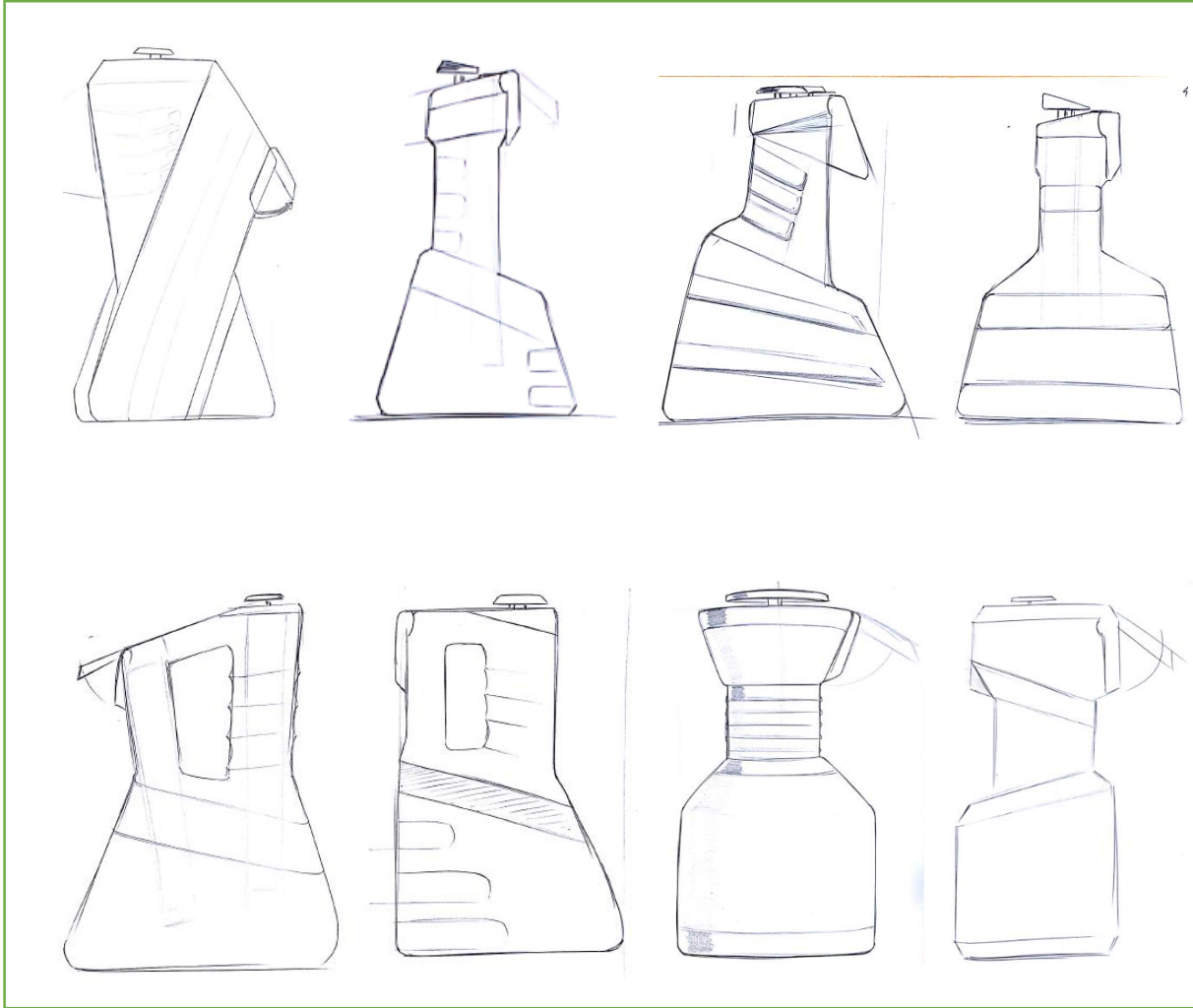
Body is manufactured using [Blow molding technique](#)

Components are manufactured using [Injection molding technique](#)

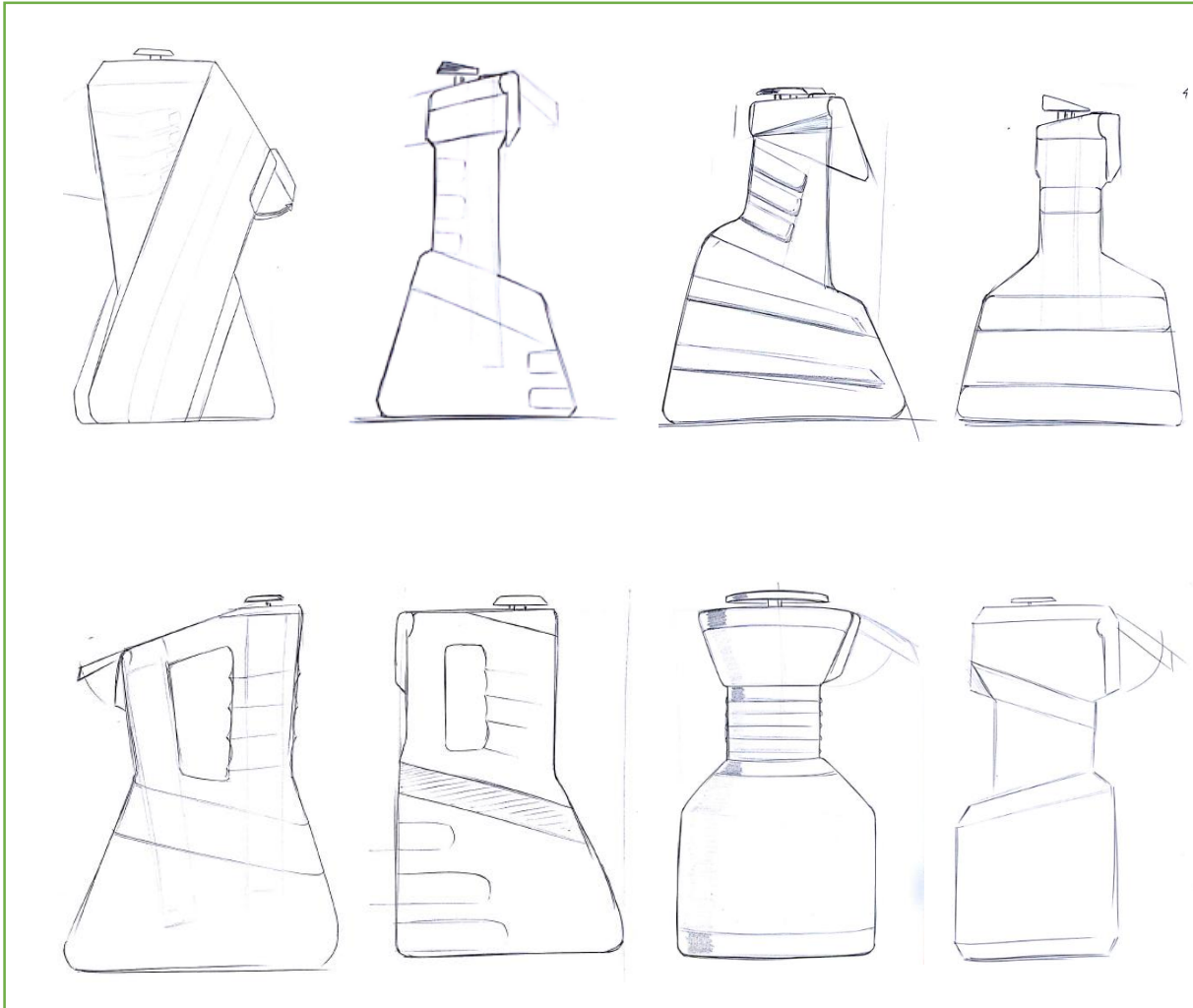
HIERARCHY OF PARAMETERS FOR FORM EXPLORATIONS



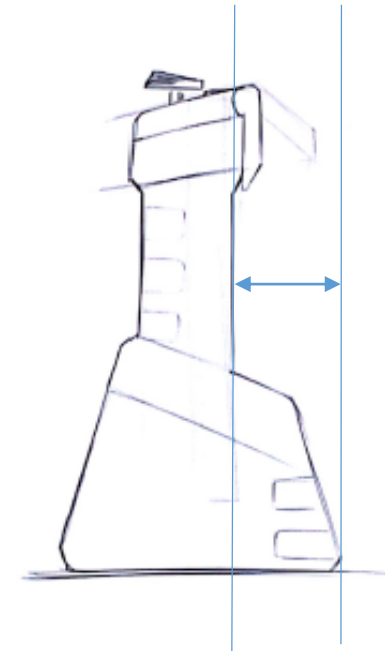
FORM EXPLORATIONS



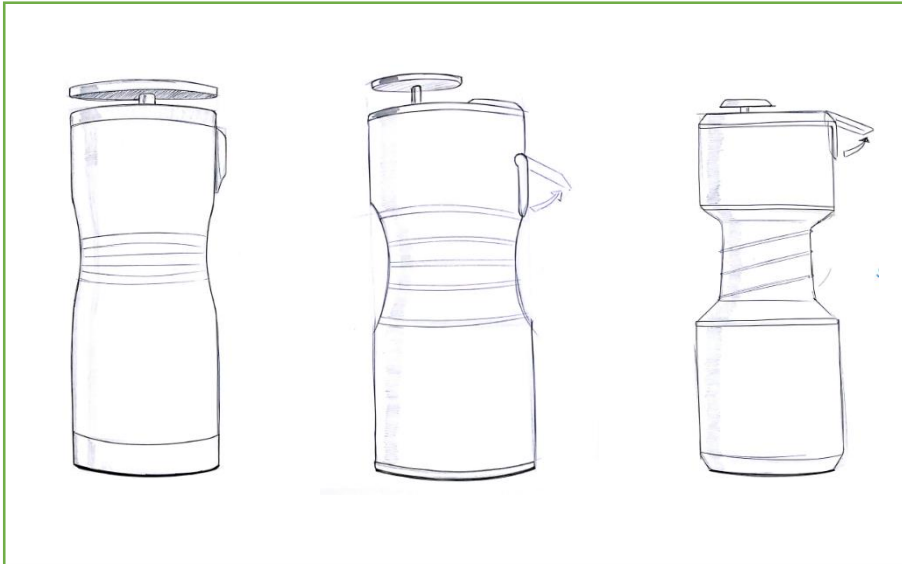
- Have a broader base for **stability**
- Have **enough diameter** to house the piston and purifier



CHUNK 1

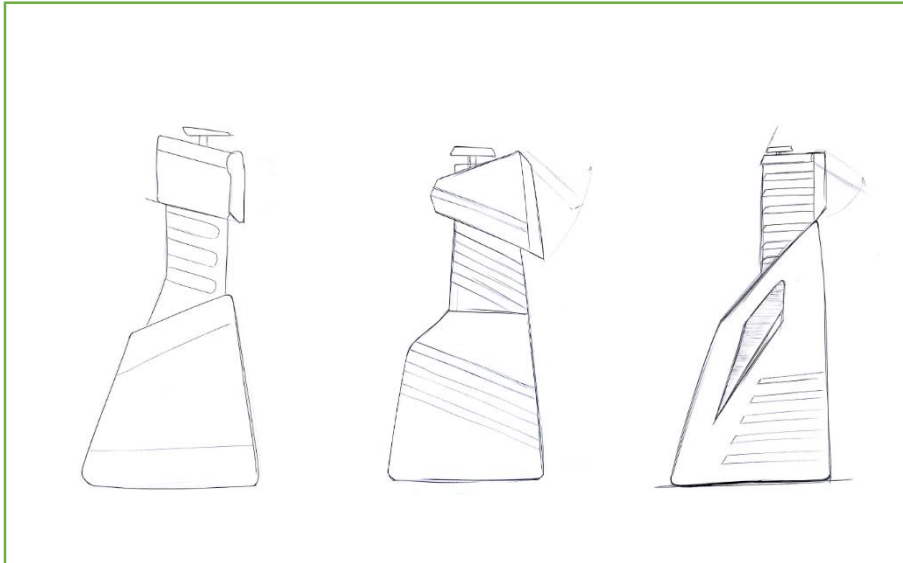


Spout side hinders with water collection



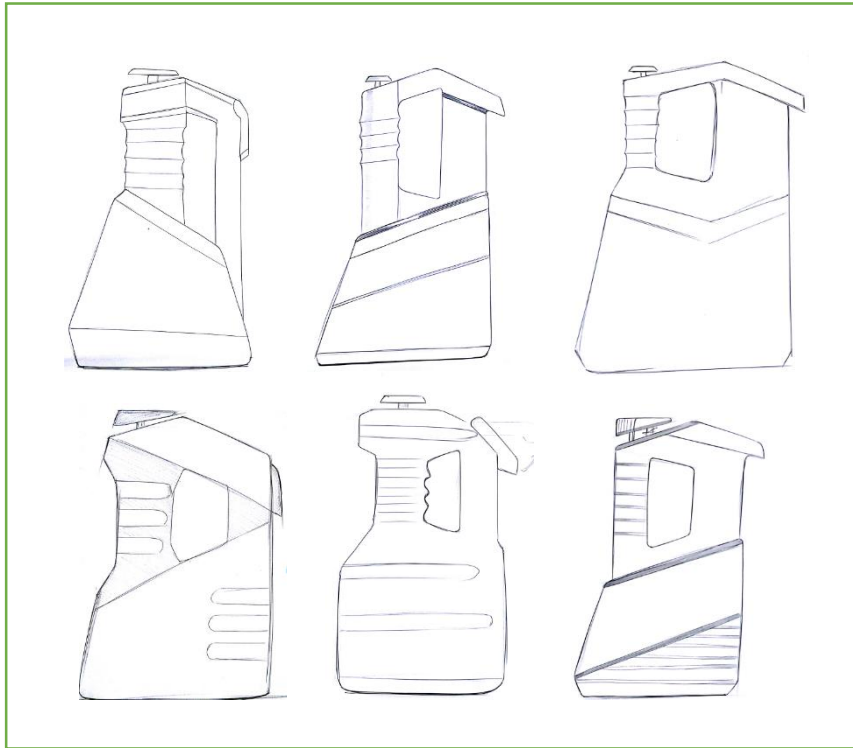
CHUNK 2

- Minimalistic approach – provision to hold the body for grip
- Have **enough diameter** to house the piston and purifier



CHUNK 3

- Evolved forms with **broader base** and **flat spout side**
- Problem persisted with **holding/gripping** of the product

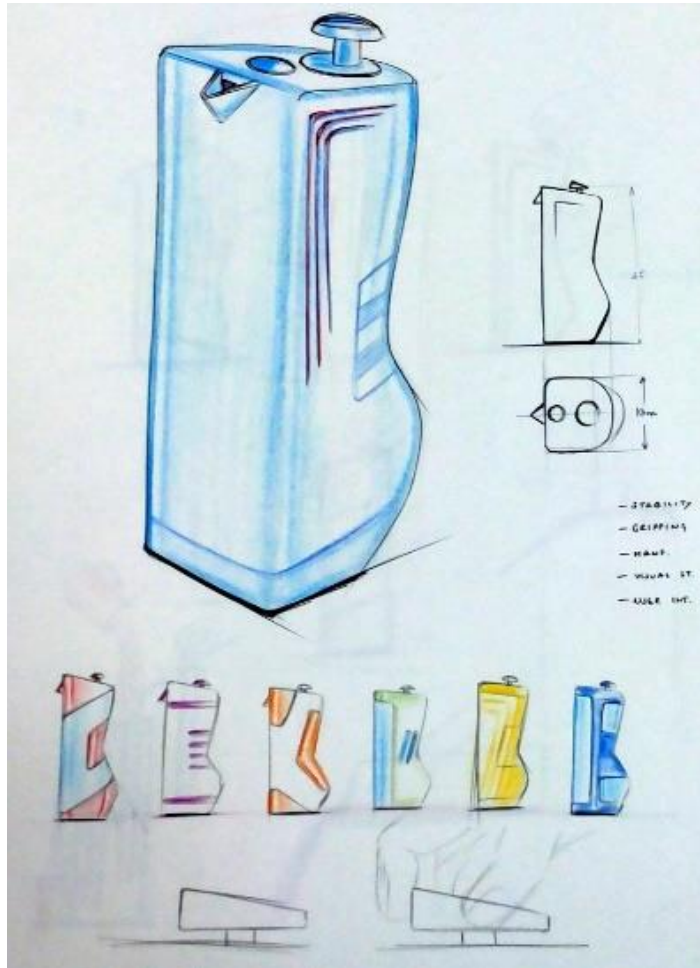


CHUNK 4

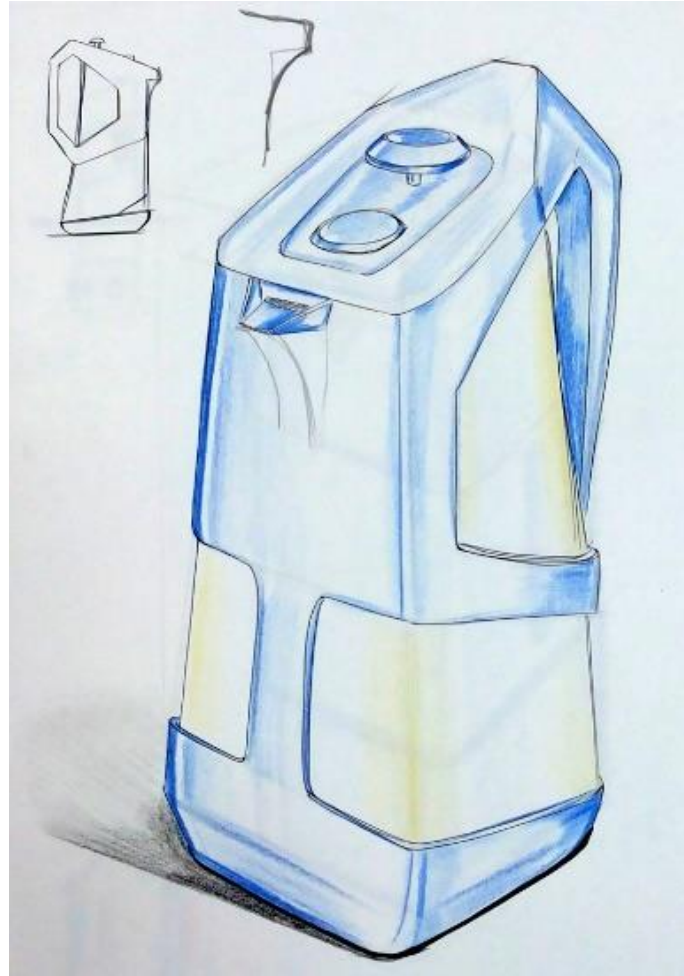
- Spout side is flat- for **easy collection** of water
- Have a broader base for **stability**
- Have **enough** diameter to house the piston and purifier
- Has a **handle** for better gripping during product usage

FINALIZED 3 FORMS

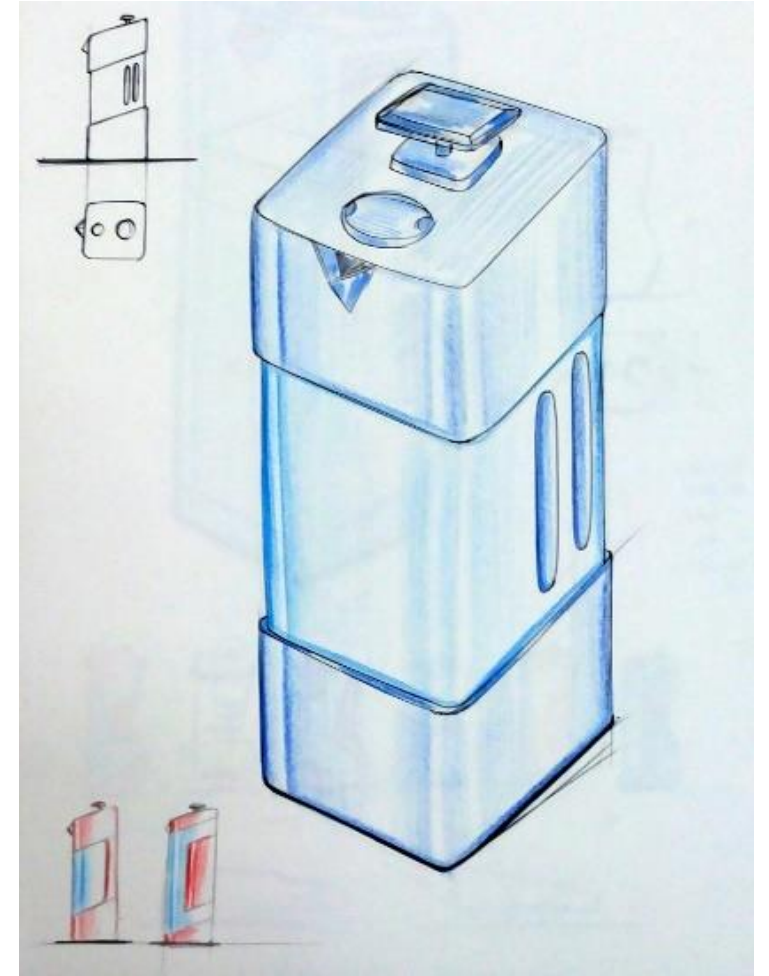
FORM 1



FORM 2



FORM 3





‘Looks like an alien form’

‘I don’t know were to hold it’

‘Should I hold the device’

‘how many times I would have to
refill the device’



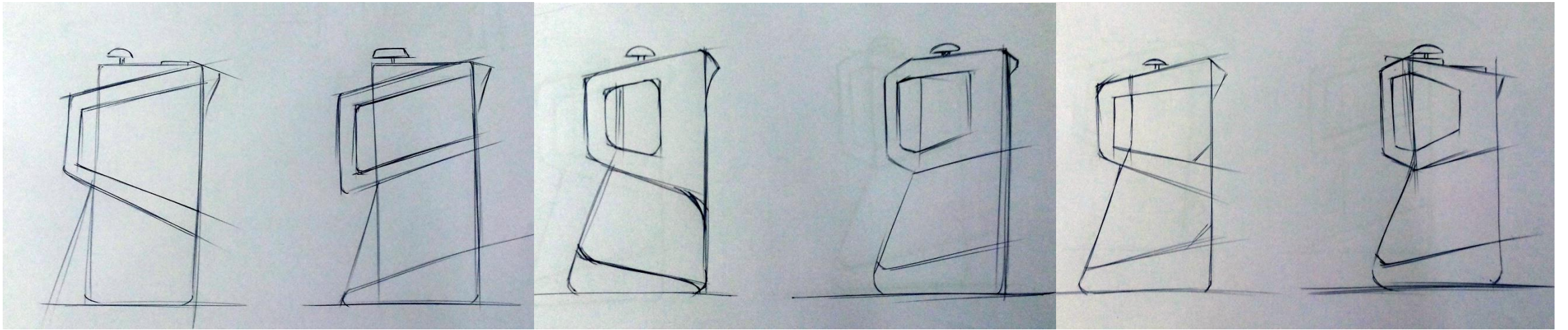
User perception

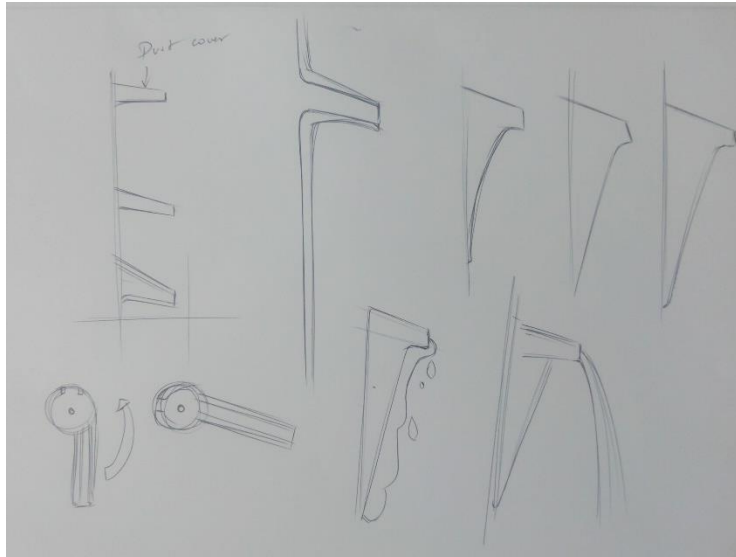
‘Looks like a Water storing jar’

‘Handle helps me hold it better’

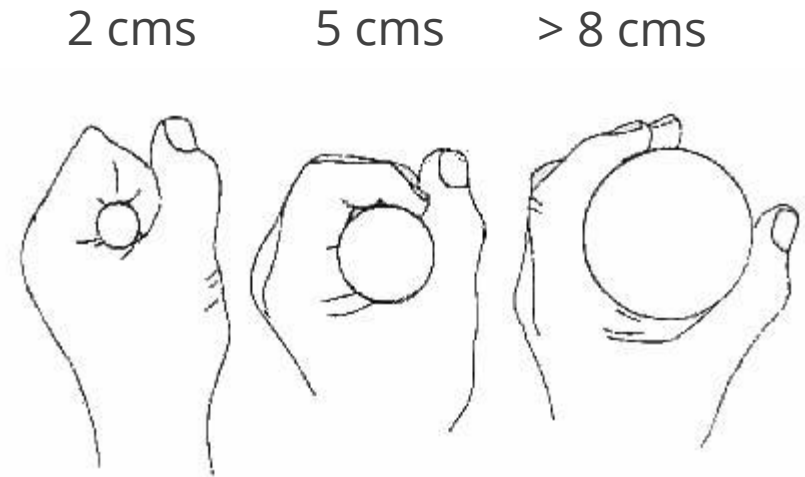
‘looks solid and strong’

REFINEMENT OF FINAL FORM

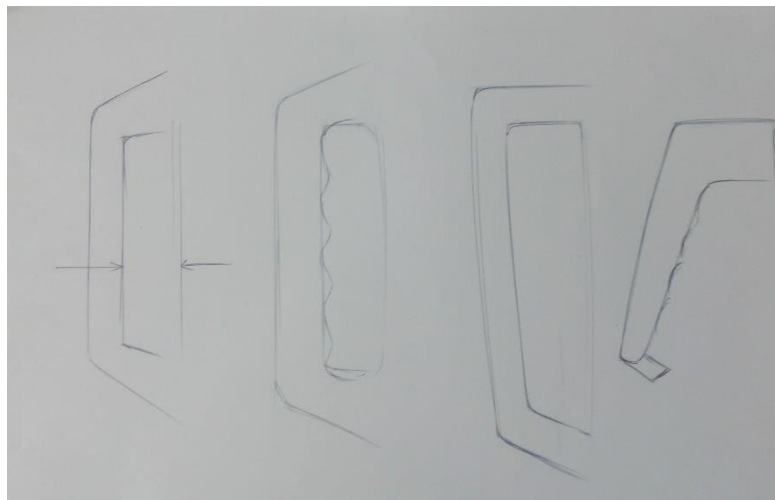




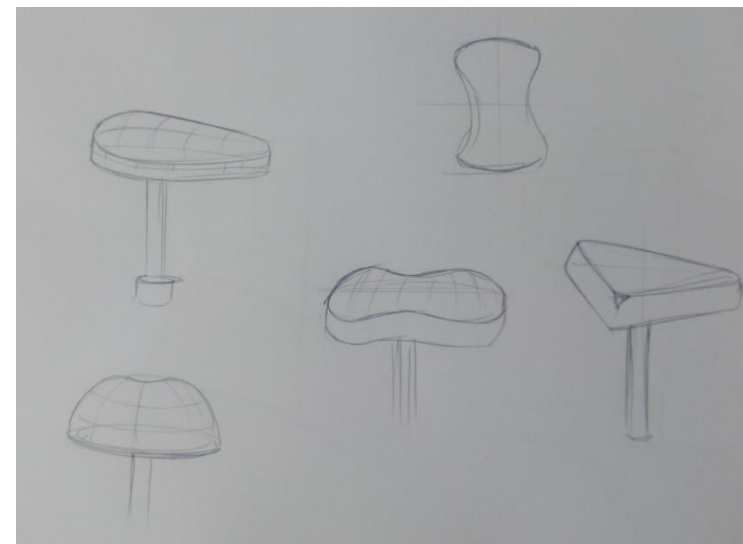
Spout refinement



Ergonomic Considerations



Handle Size refinement



Piston cap shapes

FINAL CONCEPT



FINAL CONCEPT



Jivan Jar

PROTOTYPE



RELOOK AT THE DESIGN BRIEF

Gives clean potable water

Is small and portable



Easy to use - learning curve

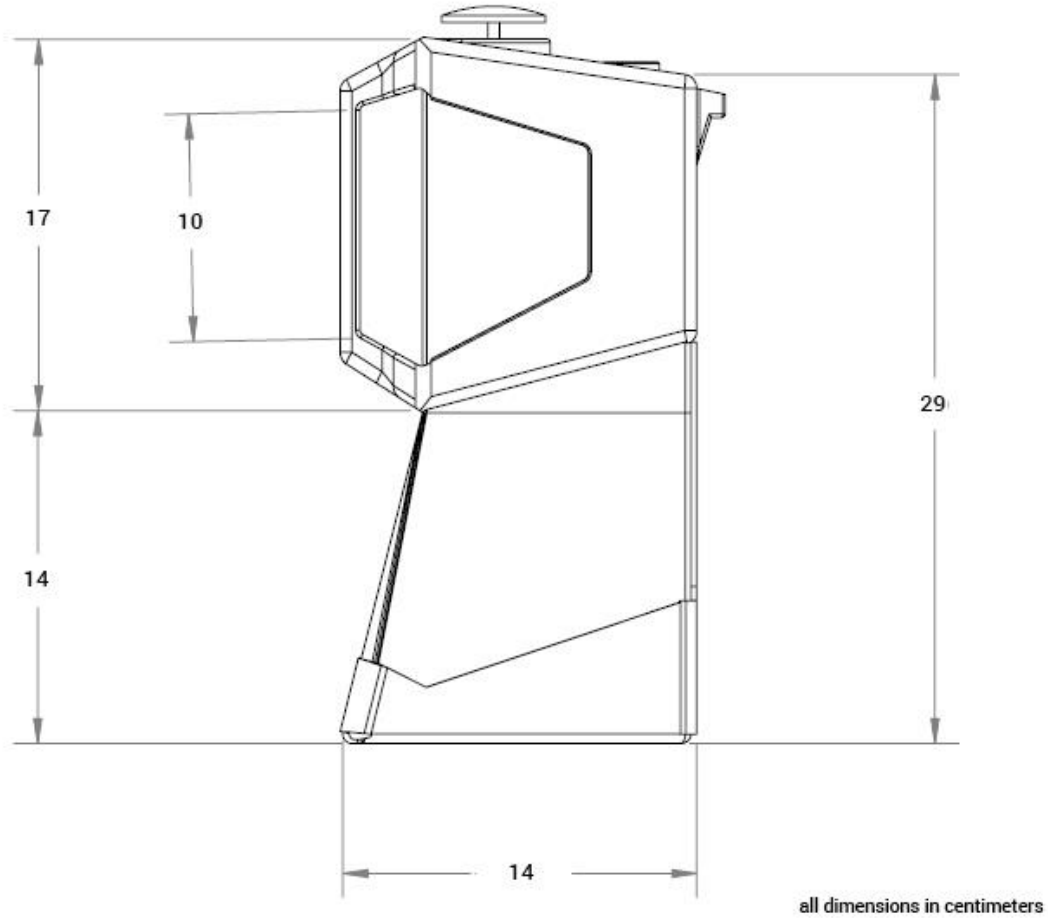
Possible for large scale manufacturing

COLOUR EXPLORATIONS

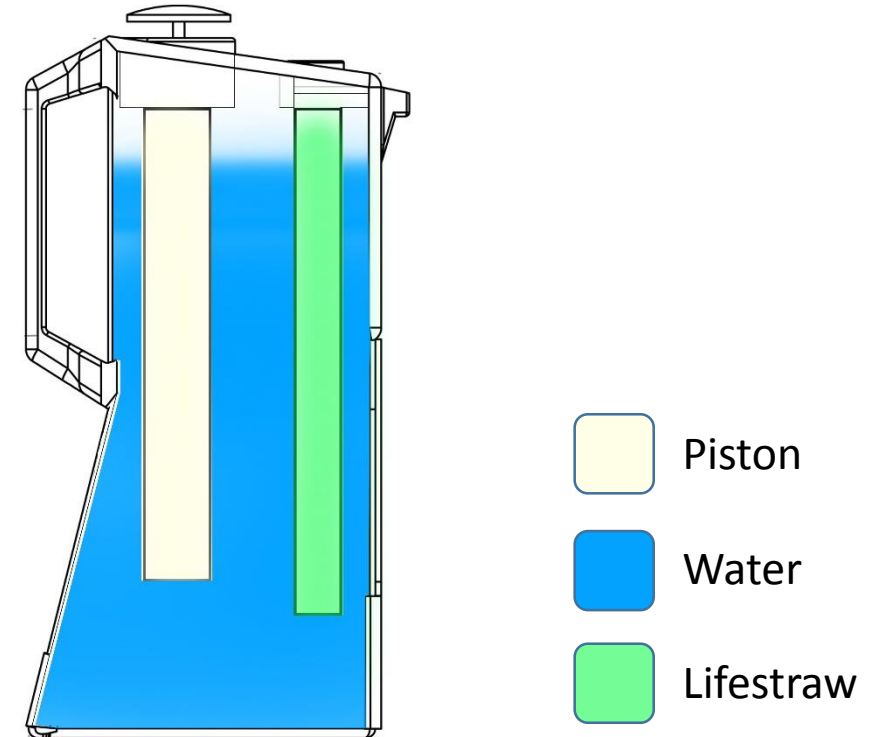


Bright colours used for better visibility of the product – usage in the dark

Dimensions of the device

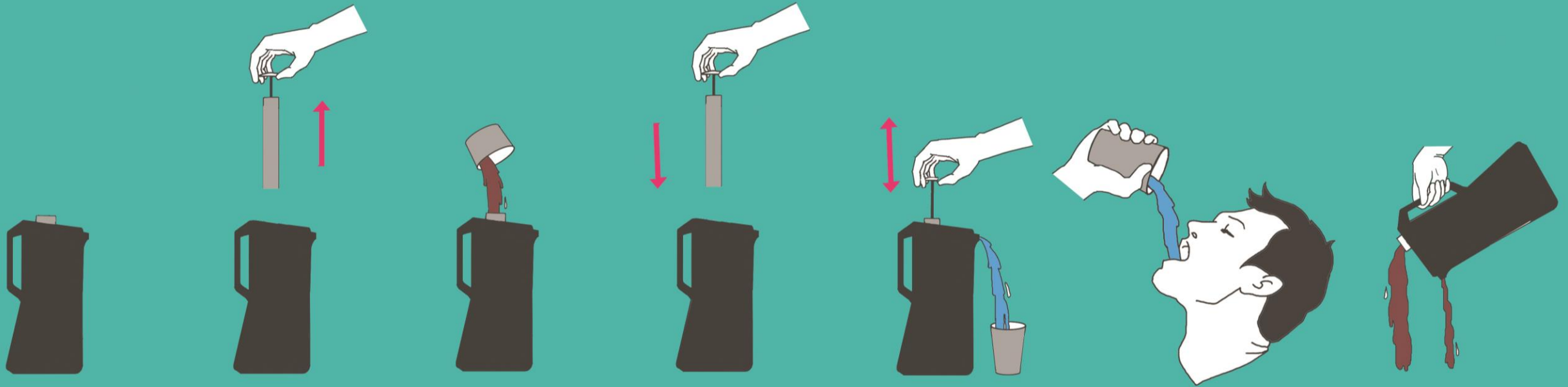


Internal spaces of the device



Capacity of device : 2 litres

ACTIVITY ANALYSIS



USER FEEDBACK

User :

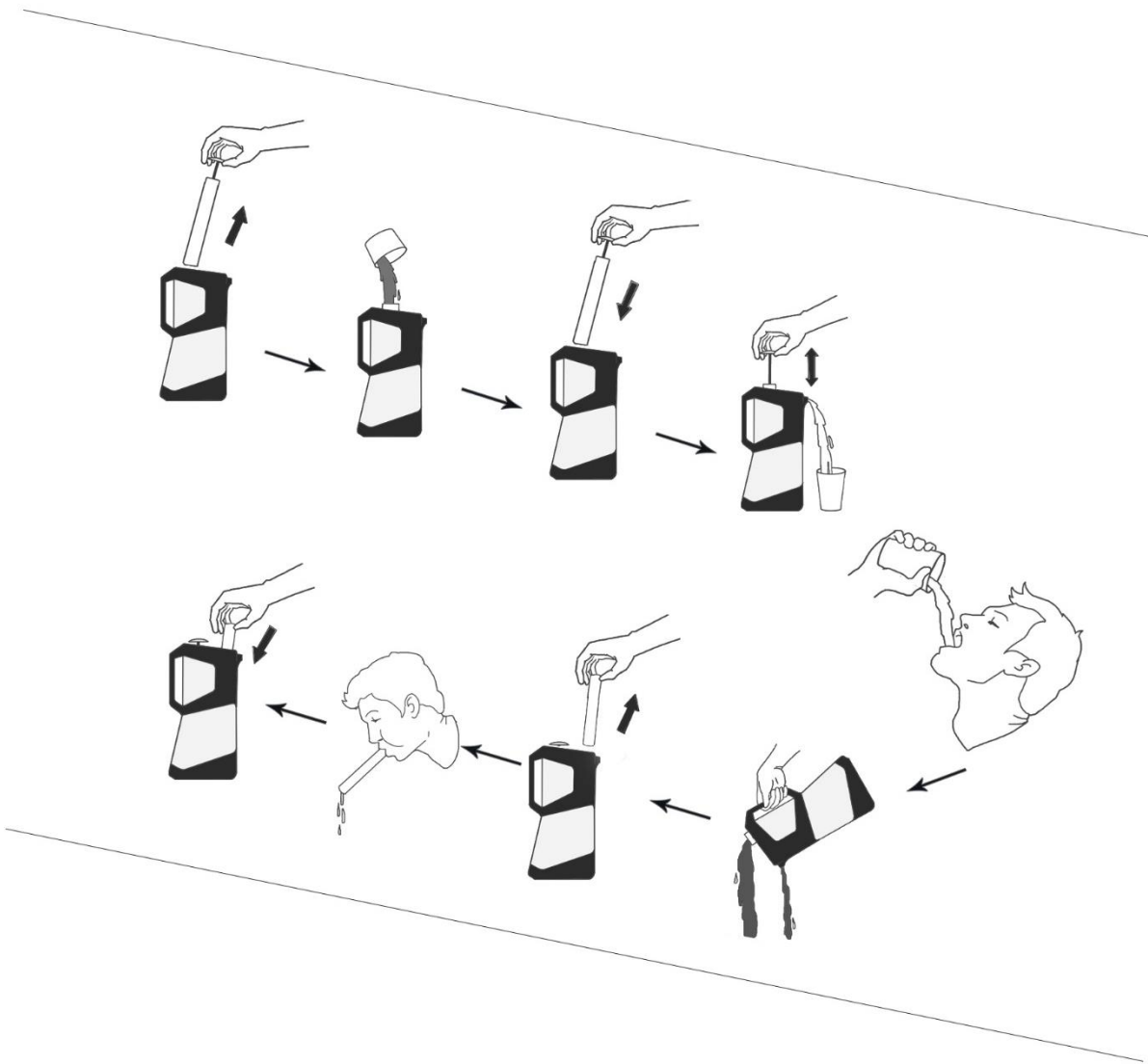
Non-Designer

No prior idea about the project

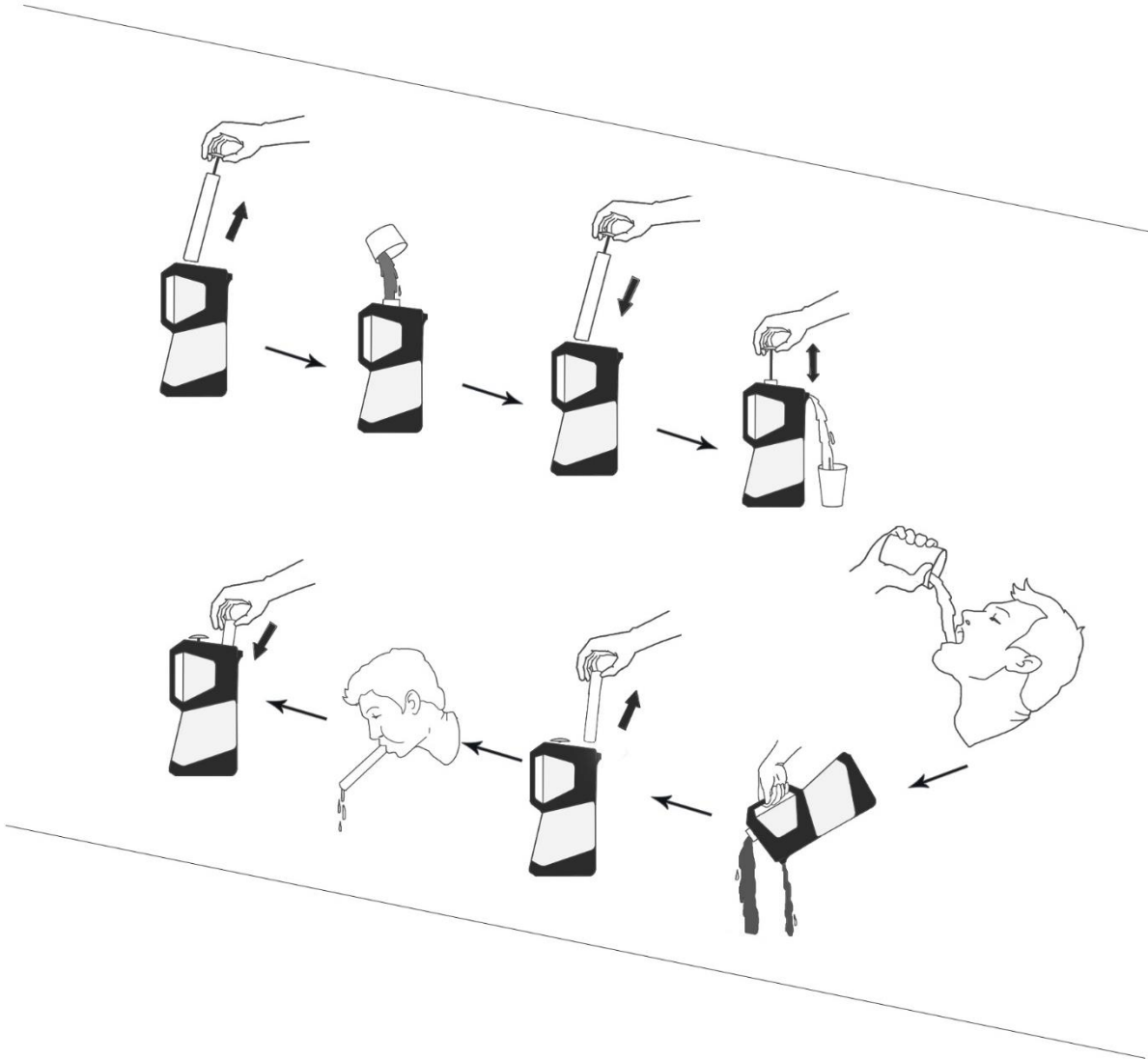
Semi literate



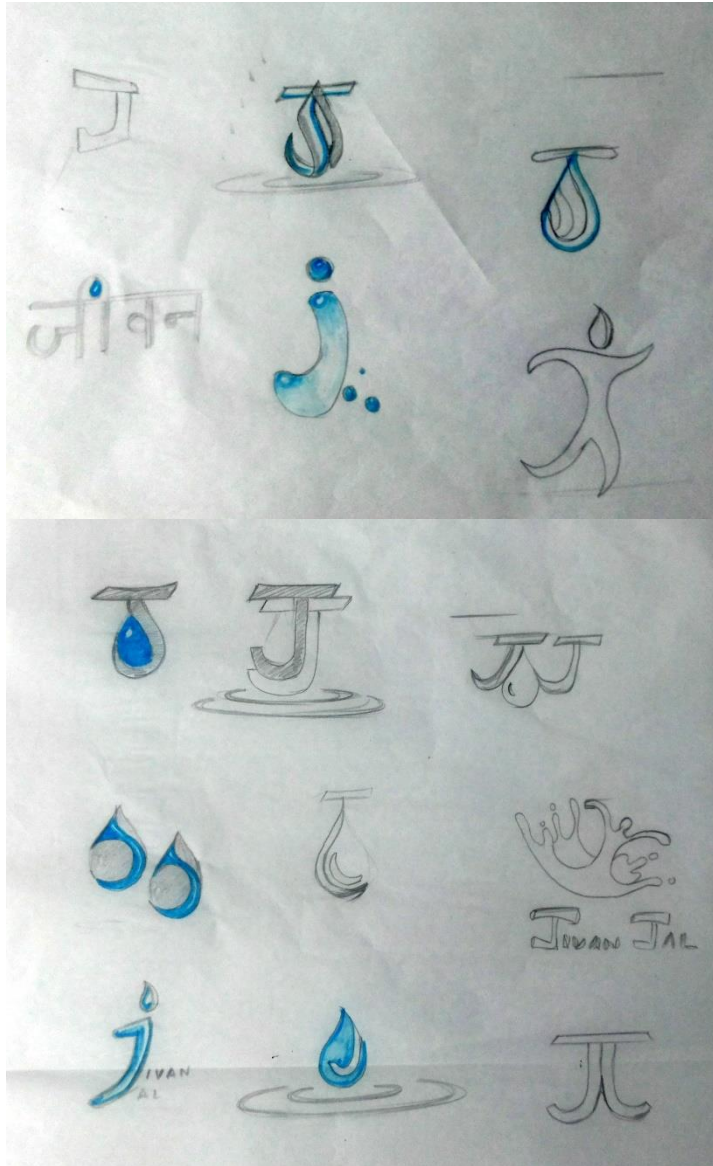
DIRECTIONS TO USE THE PRODUCT



DIRECTIONS TO USE THE PRODUCT



- Ikea manual inspired directions
- Effective usage by Illiterate user

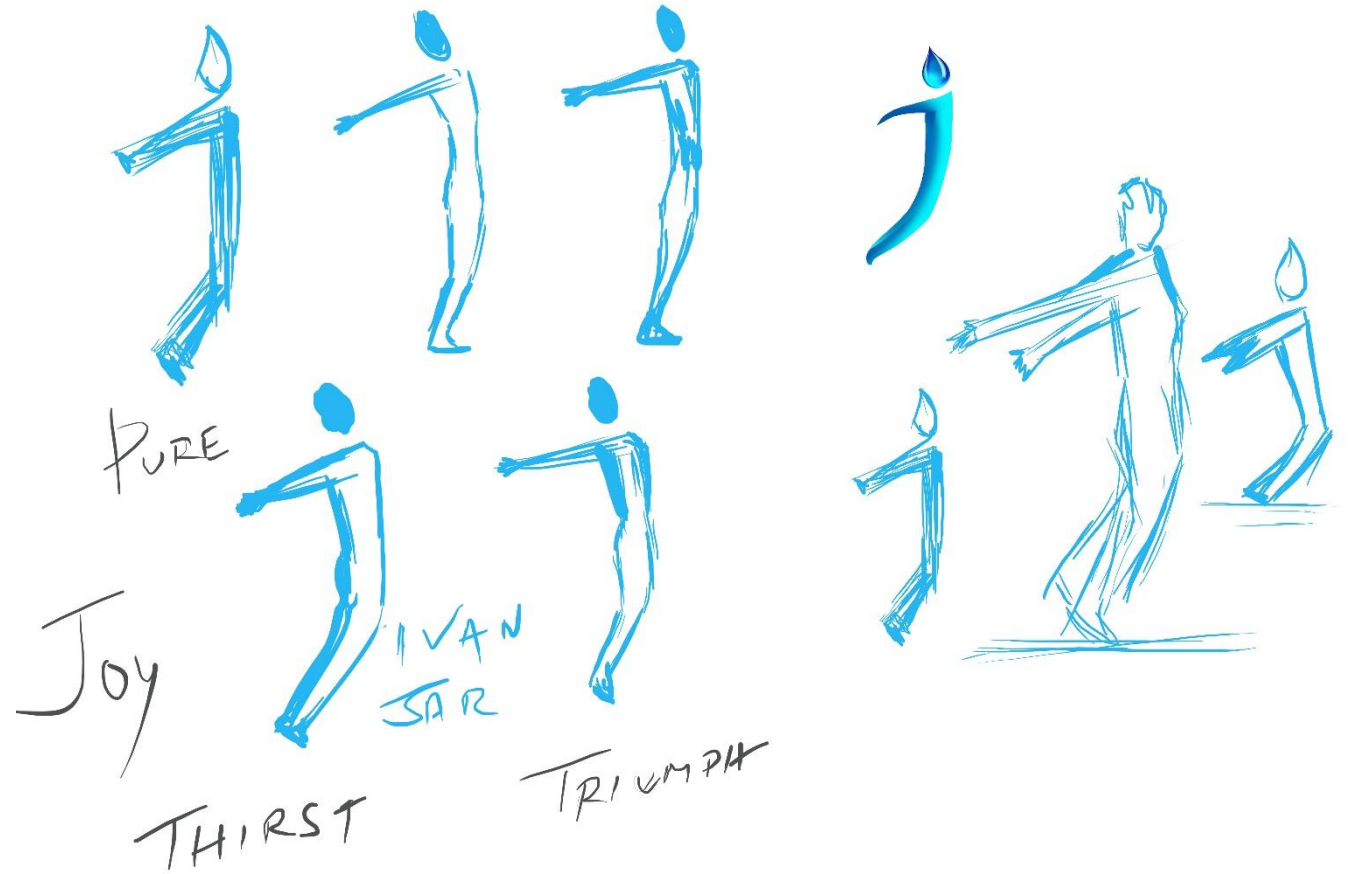


Logo Explorations

Need for a Complete Product

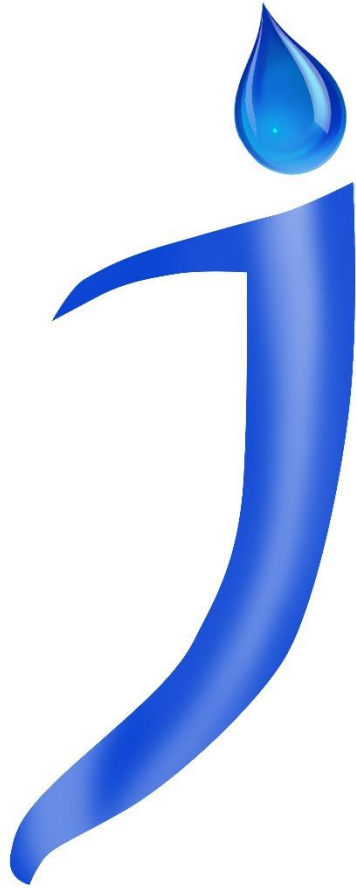
Importance of Product identity and Branding

BRANDING



‘The Joy of being Alive’

‘The Joy of being able to drink pure water when thirsty’



Final logo



LEARNINGS FROM THE PROJECT

- Importance of Learning from a concept lacunae and Moving ahead
- God is in Detailing – even a modest product needs substantial amount of detailing
- Making the product functional yet minimalistic is a challenge
- One must not shy away from modifying the project direction, if the new direction holds a better value to the user

FUTURE SCOPE

- Deploy ability of the product needs to be judiciously thought about
- Packaging of the product
- Further reduce the cost of the product
- Develop and Integrate an Indian made filter

REFERENCES

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- Handle Ergonomics
<http://mpatkin.org/ergonomics/handle_checklist.htm> as seen on 12/11/14
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<<http://science.howstuffworks.com/environmental/green-tech/remediation/lifestraw1.htm>> as seen on 10/11/14
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<<http://www.mapsofindia.com/top-ten/geography/india-flood.html>> as seen on 12/11/14
- Working of pressure pump
<www.hydopac.com/HTML/howpumps.html> as seen as 12/11/14