Mikono Misafi
Handwashing Station for rural Kenya
Various sizes and shapes of **plastic jerrycans** (5lt - 10lt - 20lt - round - square), and **plastic/metal taps** were purchased for reference (price, size, function). Some of them were also used for prototyping.

Prototyping facility and the tap used in Mrembo prototype were supplied by Kentainers.
Two main prototypes were built in Kentainers factory. With the help of their employees, we built a functional Mrembo and a variation of Twiga.
The prototype developed was quite rudimentary, using industrial cutting blades to slice 3-5 mm thick plastic sheets free handedly, and heat guns with strips of plastic for joining these pieces.

Whilst there was no precision, it was still very impressive that the prototypes were functioning properly.
GUIDANCE

Product designer was physically building when possible, though most of the time he was guiding for proper placement, proportion and function.

He was not allowed to use their cutting blades due to fear of injury.
Initial Mrembo Concept

Functional Mrembo Concept After Feedback

- Mirror moved higher
- Added water catchment
- Added gray water outlet
- Added soap dish
- Existing parts caused larger footprint*
- Existing tap is used for quick production

Prototype Dimensions

- **Height**: 740 mm
- **Width**: 400 mm
- **Depth**: 170 mm

*Final product is expected to have 10%–15% smaller footprint.*
**Initial Twiga Concept**

**Functional Twiga Concept After Feedback**

10lt capacity instead of 20lt

Existing 10lt jerrycan is utilized

Legs are discarded to cut the cost

Wall mounted or hanging

A modified cap with an existing tap

**Prototype Dimensions**

- **Height**: 310 mm
- **Diameter**: 220 mm
User Testing
GOALS

Get people to react immediately to the functional prototypes and efficient evaluation of these concepts. Observation of their reactions can also help fine tune the design direction during finalization.

These prototypes have been produced with only functional representation in mind. Their size and form will be refined for production.
User testing of the prototypes took place in two different locations, **Githunguri & Machakos.** These two locations have **different levels of water access** and were relatively close to Nairobi for a rapid evaluation.

**Three households** were visited in each location and we asked for minimum of **one household from our initial research and one new household** for this session. Local health officers identified them according to their **income level and location** in the district.
Ms. Peris & Mr. John

Pit latrine with corrugated iron sheet shelter (3 years old)

Karai + Bar soap

Lower class with aspirations to get economically better.

Ms. Margaret, widow

Pit latrine with corrugated iron sheet shelter (1 year old)

Karai + Bar soap

Lower class with tough life conditions & 9 children

Ms. Ruth

Pit latrine with brick & mortar shelter

Leaky tin + Bar soap

Middle class
A POSITIVE FAMILY

Ms. Peris & Mr. John

The first family in Githunguri had 4 children. They had a pit latrine (3 years old) for sanitation and a karai for handwashing. The fact that they didn’t have a functioning tippy tap meant that we could at least get an objective preference between our prototypes.

When we visited, there was plenty of water, however, water in the Karai was quite cloudy.

Even though we had our concerns, I believe we got their attention and they expressed their opinions clearly because their existing conditions were already poor in terms of handwashing.
“If my chickens can sleep outside, Mrembo can sleep outside too.”

Mr. John
“This is beautiful!”

Mr. John
Ms. Margaret, widow

This household was more centrally placed and it was the poorest of the three. Not surprisingly, its living conditions were worse compared to our first household.

She had 9 children including a disabled child and an infant.
Their sanitary conditions were questionable.
Since she was not in our field research, it was her first time with the HW proposals.
FIRST IMPRESSION

Like the first family visited, she also preferred Mrembo.

She would have it by the kitchen door because it is near the toilet and she can also wash her hands before preparing food.

She said the price can be around 1000 Bob, however young man beside her proposed 500 Bob.
VILLAGE ELDER

Ms. Ruth

Ruth was one of our initial interviewees and she was one of the most outspoken of her group.

She is a village elder and she is doing better economically compared to the first 2 families.

Her toilet was placed outside her house in the compound. It was well built brick and mortar pit latrine.

The leaky tin beside the toilet seemed to be used regularly.
Ruth had the only properly built leaky tin in 6 households of our field research.

Improvised soap dish.
Even though Mrembo was conceptually more advanced, a better tap was placed on wall mounted Twiga for comparison.

In Ruth’s case, she specifically asked for a better tap like the one on Twiga.

Her idea changed about the mirror (initially she was not opposed to removing it to reduce costs) and decided we should keep it.
“If God has placed you high, why would you want to lower yourself down.”

Ms. Ruth
FINAL TWEAKS

Ruth asked for a foot operated option or an elbow lever (after explaining the technical difficulties of a foot operated product) even though there was no foot operated tippy tap in the household.

• She would like to have the soap by the side instead of bottom of the sink and her price range remained 500 Bob.

• She would like to have it availed either at the local market or a hardware store.

• She would place it outside her toilet.
Two of these HWS were found at the community health center. They were donated but both of them had custom built stands to allow for proper use.

Metal legs cost an extra of 1000.- Ksh of this donated handwashing station.
We suddenly became 9 people when we left the local health office. We kindly requested to limit the number of people coming with us since it might have been intimidating for the household members to be visited.

We however, later acknowledged that we needed their blessing to be able to run an interview following our experience with our first interviewee, Ms. Josephine.
Ms. Josephine

- Pit latrine with corrugated iron sheet shelter
- Karai + Bar soap
  (although not observed)

   Middle Class

Mr. Justus & his family

- Pit latrine with brick & mortar shelter
- 6000lt rainwater tank
- Jerrycan + Bar soap

   Middle Class

Mr. Peter & his family

- Pit latrine with brick & mortar shelter
- Karai + Bar soap

   Upper-middle Class
QUIET BARRIER

Ms. Josephine,
Muumandu Location,
Kyanzimbi Village

She has been married for 6 years, and has 2 children. Her children are 6 and 2 years old. It was an unplanned visit since our initial household members were nowhere to be found.

Ms. Josephine, her children and her neighbor were extremely shy - almost scared - and we had difficulty getting clear answers.
PRIORITIES

The compound was not very well organized. She mentioned using rain water from a tank for drinking and river water, which is 30 minutes away, for other purposes. There was no sign of HW and she also told us that children wash their hands only once during their daily bath, though she mentioned 2 more critical junctures for adults as after toilet and before eating.

- She preferred Mrembo because of its soap holder and mirror.

- She would screw it to prevent theft and damage by children.

- Local market place would be the right place of purchase for her. It is more accessible and her husband has shop in there too.
There was no sign of a handwashing station.
RECEPTIVE FAMILY

Mr. Justus & his family,
Lumbwa Location

Since they installed a 6000lt tank in 2011, this household hasn’t had any water problems. Animals get their water from another location but water for cooking, drinking and washing is supplied from stored water.

They built their 20-ft deep, 2-door latrine (male/female) in 1998.

Mr. Justus and his family took time to understand the context of our project and tested our prototypes with ease.
Mr. Justus & his family wash their hands by using this container. It was fixed on a tree beside their latrine and only one hand can be washed at a time.

Improvised soap dish without a soap.
“I can have one in the house for guests and one by the latrine.”

Mr. Justus
“Mrembo is more advanced.”

Ms. Justus
DAWN OF MREMBO

Mrembo was again the first choice in Mr. Justus’ compound. They found it more advanced and user friendly.

Even though initially Mr Justus didn’t want to wash his hands because they were too dirty, after some encouragement, he and all other family members ended up actively washing their hands and enjoyed using the prototype.

- They would like to have two units. One for the latrine and one for the house, so guests can wash their hands after a “safari” and before meals.
- Local market place is accessible.
CURIOSITY

Mr. Peter & his family,

In this large and nice compound there were 2 latrines and 2 separate bathrooms. The family seemed well-off and the whole compound seemed properly maintained.

Peter & another elderly member of his family had taken part in our initial research. Following a small introduction of other family members, they wanted to cut to the chase and test the prototypes as soon as they could.
“Community Health Workers (CHWs) are more believable and have integrity.”

Mr. Peter
They loved Mrembo so much that they didn’t take much time with Twiga.

They took time to wash their hands and examine Mrembo.

• Mrembo should go for ~ Ksh 500.

• They don’t mind buying from Muumandu market or the local health center.

• They trust CHWs as promoters. They believe they are more believable and have integrity.
All of our testers on the field had a consensus on Mrembo. They liked its functions, they were aware of its added value and they also liked it from an aesthetic point of view even though it was a very rough functional prototype.

Wall mounted Twiga was basic and it didn’t differ much from the existing jerrycans in terms of use. It was viewed as not being aspirational enough.
**KEY INSIGHTS FOR MREMBO**

- Price range still soars around 500.-Ksh but there is a willingness to go up a little higher (~800.-Ksh) with a good built quality. **People appreciated the added value.**

- **Mirror, water catchment & proportions** were appreciated even though it was a rough sample. Using was immediately understood.

- Some of the testers recommended to change the soap dish placement.

- If security is an issue, they preferred to mount it on the wall. Other wall mounted objects have been observed in the households.

- Placement was considered outside of the latrine, outside of the kitchen, inside the house & sometimes multiple units around the household.
The prototypes were evaluated in 2 communities & 6 households.
We met with great people & enjoyed their hospitality.
We are looking forward to seeing an affordable Mrembo in action!
Next Steps
1 Prototyping:
• Mrembo with an added sink,
• A wall mounted & 10lt version of Twiga,
• And a jerrycan retrofitted with an existing tap, for user testing.

2 Refining Mrembo after user feedback. (April 12th)

3 Finalization of Mrembo. (April 26th)

4 Preparation of production database and technical guidance. (Until May 06th)

5 High resolution prototypes for marketing and long term user testing.