APPENDICES

// Healthy Start Lamu //

Designing interventions for a healthy and equal starting position in life

Wessel Veenkamp

Msc. IPD Graduation Thesis

TU Delft

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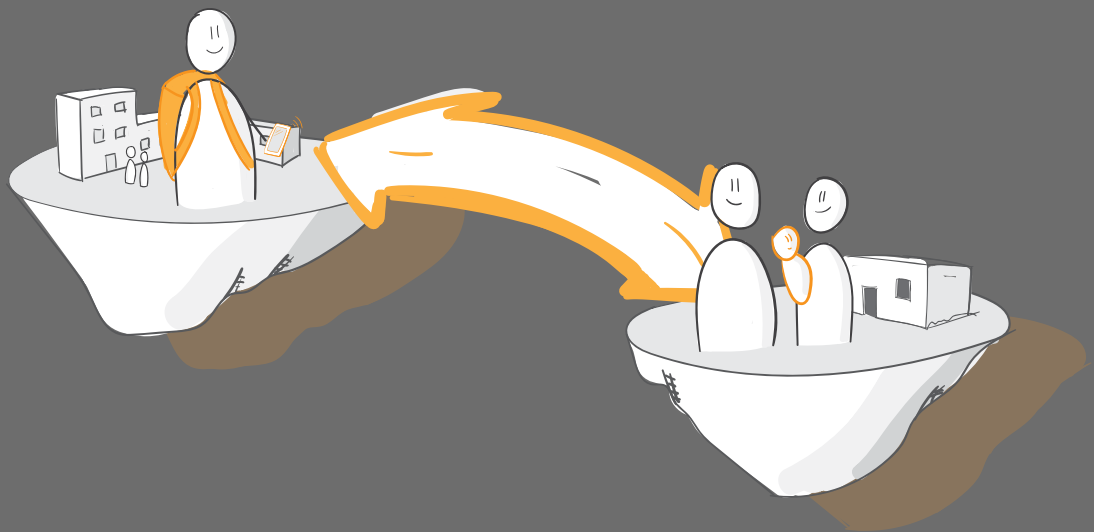

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Appendices Contents

Appendix A: Field-work

A.1 Fieldwork preparation

An important part in answering the formulated research questions was four and a half weeks of fieldwork in Lamu. The goal was to understand Lamu from a cultural, healthcare and technological perspective. This greatly informed the design phase of the intervention.

A.1.1 Fieldwork Research Questions:

To prepare for the fieldwork, research questions were formulated:

What are the nutrition practices in the first 1000 days in communities in Lamu?

What is the typical diet in the first 1000 days in Lamu?

What are the problems concerning nutrition practices in the first 1000 days in Lamu

What is the current state of nutrition related healthcare in the first 1000 days?

What are the contact points with health care facilities and/or health care workers in the first 1000 days?

What are the problems and needs around the accessibility of healthcare for undernutrition in the first 1000 days?

What are the problems and needs along the healthcare seeking pathway for undernutrition in the first 1000 days?

Who are the stakeholders involved in the undernutrition in the first 1000 days in Lamu and how do they interact?

What are the characteristics of the various diagnostic settings (health care facilities, CHV, and caretaker)?

What are the characteristics of the various groups throughout the healthcare service delivery structure (caregivers, CHVs, health care workers, nutritionists, NGO workers etc.)?

What are relevant environmental factors for each diagnostic setting?

Which diagnostic technologies are suitable for the different diagnostic settings?

What are cultural factors in Lamu that influence the context around healthcare and nutrition?

Which technologies could be useful in the context of (un)healthy nutrition in Lamu?

A.1.2 Fieldwork detail

To form a comprehensive perspective of the current context, we conducted a range of activities to gain a deep understanding of the context and needs of the project. We engaged in interviews and observations with a broad variety of stakeholders, for four and a half weeks. KRCS, with their expertise in the context, played a key role in helping decide who to interview for the project.

Semi-structured interviews were conducted with 17 stakeholders in total: 11 experts (from NGOs, hospitals and facilities, and the public health office), 2 CHVs and 4 with caregivers who had recently had a child. Prior to each session, we asked participants to sign a consent form and whether they would be comfortable with audio recording, although most preferred note-taking instead.

Meanwhile, observations were done at the three healthcare facilities and two communities that were visited. Figure A1 and A2 provides an overview of the locations observed and the stakeholders interviewed.

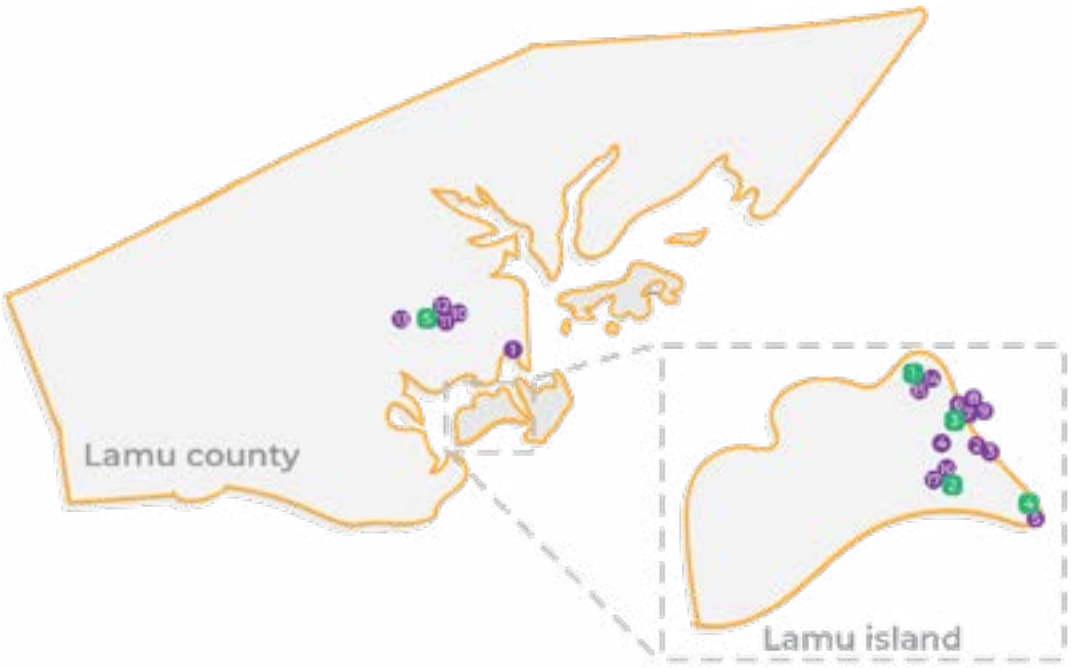


Figure A1: overview of the locations visited during the fieldwork to conduct interviews (purple circles) and observations (green circles)

Interview overview

	Role	Organisation type	Location
1	Doctor	NGO	KRCS Innovation Lab & Rehabilitation Center
2	Chief Nutritionist Officer	Facility	King Fahad Regional Hospital
3	Nutritionist	Facility	King Fahad Regional Hospital
4	Director	Other	Early Childhood Development Centre
5	Doctor	NGO	Safari Doctors Office
6	County Community Health Officer	Governance	County Public Health Office
7	County Public Health Promotion Officer	Governance	County Public Health Office
8	Community Health Volunteer #1	Community	County Public Health Office
9	Community Health Volunteer #2	Community	County Public Health Office
10	Community Health Extension Worker	Facility	Hindi Dispensary & Maternal Child Health Center
11	Sub-county nutritionist	Facility	Hindi Dispensary & Maternal Child Health Center
12	MCH Doctor	Facility	Hindi Dispensary & Maternal Child Health Center
13	Coordinator	NGO	Wildvision office
14	Caregiver #1	Community	Wiyoni Community
15	Caregiver #2	Community	Wiyoni Community
16	Caregiver #3	Community	Kashmir Community
17	Caregiver #4	Community	Kashmir Community

Table A2: overview of stakeholders that were interviewed

Observations overview

	Location	Type
1	Wiyoni Community	Community
2	Kashmir Community	Community
3	King Fahad Regional Hospital	Facility
4	Safari Doctors Office	Facility
5	Hindi Dispensary & Maternal Child Health Center	Facility

Table A2: overview of facilities and communities that were observed

A.1.3 Interview guides

The interviews were divided up in two parts. The first part was in the form of a semi-structured interview to explore the first research question. The second part was a generative discussion about preferences when it comes to diagnostics and healthcare settings.

To prepare the first part, a list of questions to ask was compiled based on the main research questions and the literature research in the previous chapter. In preparation for each interview, the questions were selected beforehand that were most appropriate for the person being interviewed:

The second part of the interview was facilitated by bringing a sheet of paper, post-its and two different types of tools for the three main anthropometric measurements that are needed to diagnose undernutrition to the interview; circumference, weight, and length measuring. An example can be seen in figure A3.

Figure A3: bringing a sheet, post-its and the diagnostic tools to understand the local preferences

A.1.4 Interview guiding document and total list of questions

Date:	
Participant:	
Role:	
Location:	

Introduction

Make general chit-chat, establish a bond and base of trust before starting the interview more formally.

Introduce yourself and the project

Hello, thank you so much for your time today. I will first quickly introduce myself. My name is Wessel Veenkamp and I am a Msc. student from the Netherlands. I am working together with the Kenya Red Cross Society on a project called Healthy Start.

The aim of the project is to, together with the red cross, find out how every child in Lamu could have an equal and healthy start to life through all having healthy nutrition. The focus for this research is on the first 1000 days of life, from pregnancy up until 2 years, as research has shown that this time period in life is crucial, as any health related issues in the first 1000 days of life will likely develop in health problems later in life. This is especially true for nutrition, where the outcomes of unhealthy nutrition in the first 1000 days can be largely irreversible. Together with the Kenya Red Cross Society we are aiming to understand how innovation and technology could contribute to the healthy nutrition for young children in Lamu.

In this interview I would love to learn from your expertise when it comes to nutrition in the Lamu area. The insights from these and various other interviews with other health experts, community health volunteers and workers and communities will be collected and lead to a better understanding of the context that surrounds healthy nutrition in the area. From here, the red cross and I, will explore how innovation could potentially be used to make sure that every young child has healthy nutrition. I will be making notes during this interview if that's okay, your name will be anonymized in the results for privacy concerns. Is all of this okay with you?

Choose from total list of Questions:

On awareness and social factors:

How do people view nutrition (and mal/undernutrition)?

Is there a taboo when it comes to recognizing under/malnutrition in young children in communities?

Are people aware of the importance of healthy nutrition, especially for young children?

Are the causes of undernutrition understood within communities?

Is there an awareness of the detrimental effects of mal/undernutrition for young children?

On the causes, risk factors and symptoms of undernutrition:

What are the leading causes of under/malnutrition for young children in the Lamu area:

Are caregivers aware of the importance of exclusive breastfeeding in the first period?

Is a general lack of food an issue?

Is a lack of variety in available food an issue?

Is a lack of knowledge on the importance of enough food and food variety an issue?

Are infections common for malnutrition?

How quick do the symptoms of stunting and wasting present themselves?

Are the symptoms more common for a certain gender?

What are the risk factors for under/malnutrition in young children in the Lamu area?

Does socioeconomic status (wealth/poverty play a role)?

Are some communities more at risk than others? If so, why?

Is the growth of children tracked and measured throughout childhood?

How do the effects of mal/undernutrition present themselves at first?

Do caregivers understand the symptoms for what it is?

How do caregivers feel when they notice undernourishment?

When does a caretaker decide to take action and seek help?

After how long?

After which symptoms?

What factors influence the timing or deciding of health seeking behaviour of caretakers?

Is money an issue?

Is work or other commitments an issue?

Cultural factors of influence?

Others?

How do caretakers feel when they go and seek help?

Are other people involved or consulted before going to see health providers?

What are the actions a caregiver takes once he/she has decided to seek help?

Where do people go to get a diagnosis?

Do they know where to go? How are they informed?

How far do they have to travel?

How do they travel?

What does it cost to get a diagnosis?

How does it affect their day-to-day activities such as work?

Where are young children being diagnosed if they are wasting/stunted?`

What happens when an undernourished young child comes to be diagnosed?

How is the diagnosis being done?

Which tests/technologies are used?

What data is documented from the patient?

How is the data entered?

Where does the data go to?

Who is doing the diagnosis?

What kind of expertise is needed to do the diagnosing?

What is the skill level with regards to literacy and digital skills of those that diagnose?

How long does the diagnosis procedure take?

What are the challenges in the diagnosis of stunting/wasting?

What are the advantages/disadvantages of diagnosis at community level compared to health facility level?

How long does it take before the caretakers get the results?

How are the results given?

How do the caretakers feel when they get the result?

How are results documented?

What is the response of caretakers in case of a good result, what in a case of a bad result?

What are the next steps that are taken/adviced to caregivers in case their child is diagnosed with mal/un-ernutrition?

What steps are taken by caretakers to get treatment?

Do caretakers often get treatment/is it underdiagnosed?

How do caretakers feel to get treatment? How is it for the one who does the diagnosing?

Who decides if treatment is necessary?

Where is the treatment given?

What is the treatment like?

Is there enough treatment/facilities available in the area?

For how long do they need treatment?

How much does it cost?

How do caretakers feel to get treatment?

How is the healthcare system financed?

Are people insured?

What is the price difference between private and public health centers?

How much do people have to pay for transport to get to health clinics?

For which groups are financial factors a barrier to accessing healthcare? Is it different for certain communities?

What are the challenges in completing treatment?

How much does it cost?

Is it widely available?

Is it easy to do?

Can caretakers do it at home or do they have to return to the facilities?

How often does the treatment get successfully completed?

How do caregivers feel during continuation of treatment?

When is the treatment considered to be successful?

Are caretakers more aware of the importance of healthy nutrition after going through it?

How do caregivers and CHV/CHW and/or health providers feel when treatment is successful?

Template for generative discussion:

A.1.5 Consent form

CONSENT FORM FOR RESEARCH HEALTHY NUTRITION LAMU

You are being invited to participate in a research study titled "Improving the accessibility of health services for young children in Lamu". This study is being done by Wessel Veenkamp from the TU Delft and is in collaboration with the Kenya Red Cross Society.

The purpose of this research study is to understand how innovation and technology could contribute to the healthy nutrition for young children in Lamu, and this interview will take you approximately 60 minutes to complete. The data will be used for gaining insights that will be included in a design report. We will be asking you to respond to questions concerning the problems and needs concerning nutrition in Lamu.

As with any research activity the risk of a breach is always possible. To the best of our ability your answers in this study will remain confidential. We will minimize any risks by anonymizing quotes used in reporting, storing the data securely, and deleting any voice recordings (if applicable) after the completion of the study (in maximum 6 months).

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any questions.

Participant name: _____

Date: _____

Location: _____

☐ I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.

☐ I understand that personal information collected about me that can identify me, such as my name, will not be shared beyond the study team.

☐ I understand that after the research study the de-identified information I provide will be used for a design report

☐ I agree that my responses, views or other input can be quoted anonymously in research outputs

☐ I agree that pictures and/or video materials can be taken during the research upon agreement that might be used in the report and/or resulting video outputs

Participant signature: _____

Researcher name and signature: Wessel Veenkamp

A.1.6 Observation framework

Two types of observations were done during the fieldwork; observation of facilities and communities, and of the context in general.

Observations in facilities and communities were done to understand the capabilities (such as level of expertise of the healthcare workers and tools and technologies used) and environmental factors (such as if there was electricity, the build quality of the facility etc.) of the facilities. These were noted down after each visit of a facility or community in a facility in a notebook, the results are collected in appendix A.2.2 fieldwork data: diagnostic settings

Observations of the context were done throughout the stay in Lamu and were done to gain an understanding of the society. Things that were of note were written down along various domains, such as sociological, economical and cultural. The insights were mapped in a society observation framework.

A.1.7 Data documentation and structuring

The interviews were typed out by either transcribing the audio recordings or expanding on the notes taken during the interview. Photos were taken of the sheets and post-its of the second part of the interview and were converted to a MIRO board.

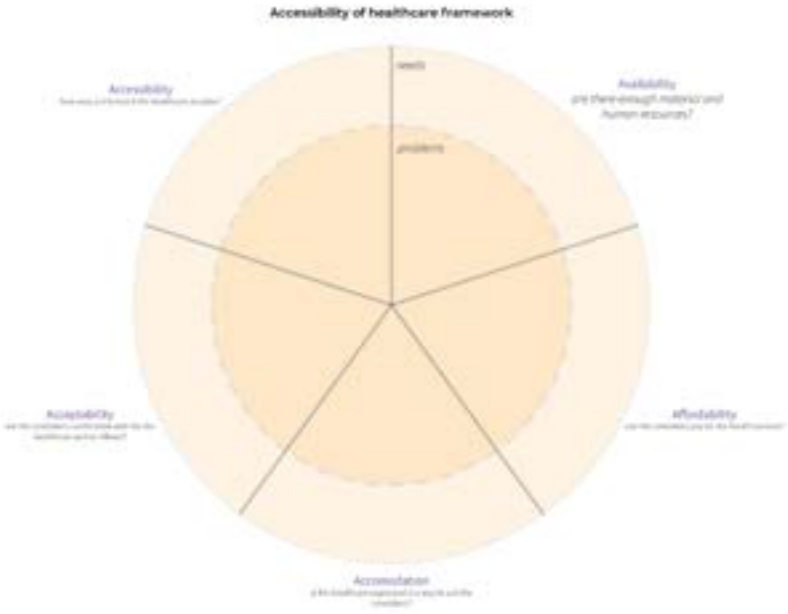
To make sense of all the data that was collected, each interview was converted into post-its and put in a framework that collected insights per research question, which can be found below. Finally, all interview post-its were put together on one board. This allowed for clustering and synthesis of insights, see figure x.

RQ1: What are the nutrition practices in the first 1000 days in communities in Lamu?
sq1.1: What is the typical diet in the first 1000 days in Lamu?
sq1.2 What are the problems concerning practices in the first 1000 days in Lamu

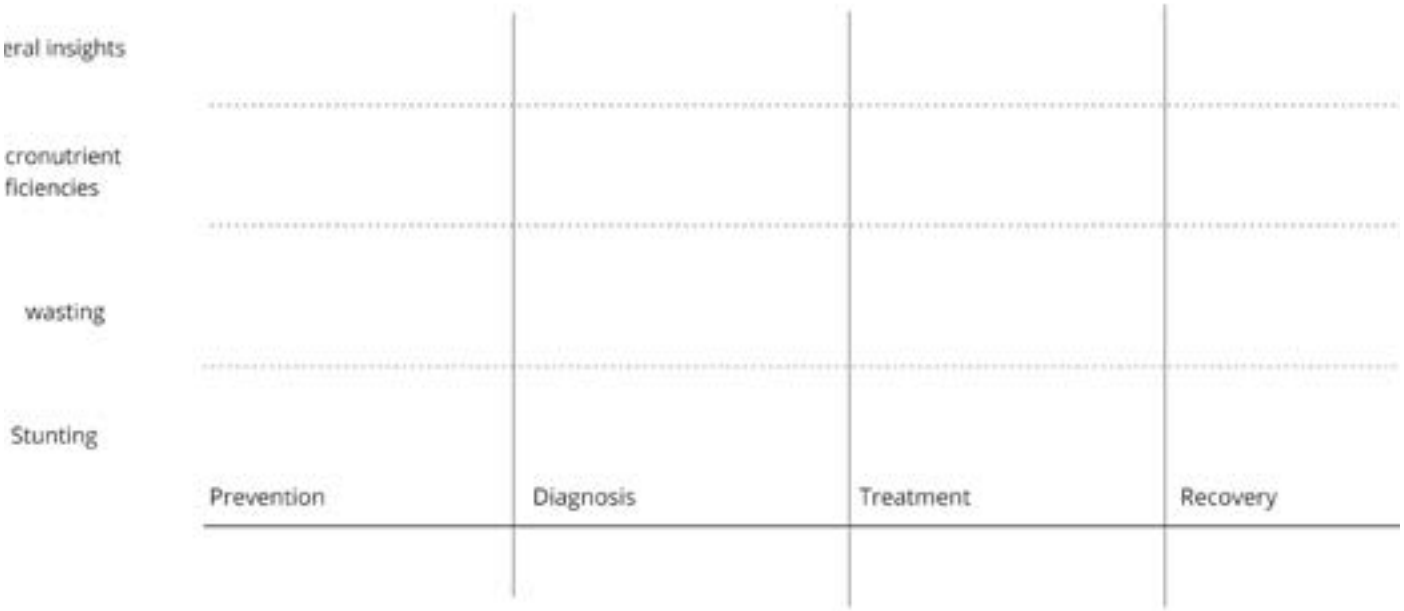
Typical diet during pregancy and for young children?	Problems concerning nutrition practices during pregnancy and for young children

RQ2: What are the current state of healthcare for nutrition in the first 1000 days
sqr2.1: What are the contact points with health care facilities and/or health care workers in the first 1000 days?

RQ2: What are the current state of healthcare for nutrition in the first 1000 days
sqr2.2: What are the problems and needs around the accessibility of healthcare for undernutrition?



RQ2: What are the current state of healthcare for nutrition in the first 1000 days
sqr2.2: What problems and needs are there along the healthcare seeking pathway for undernutrition?



RQ3: What are the characteristics of the various diagnostic settings?

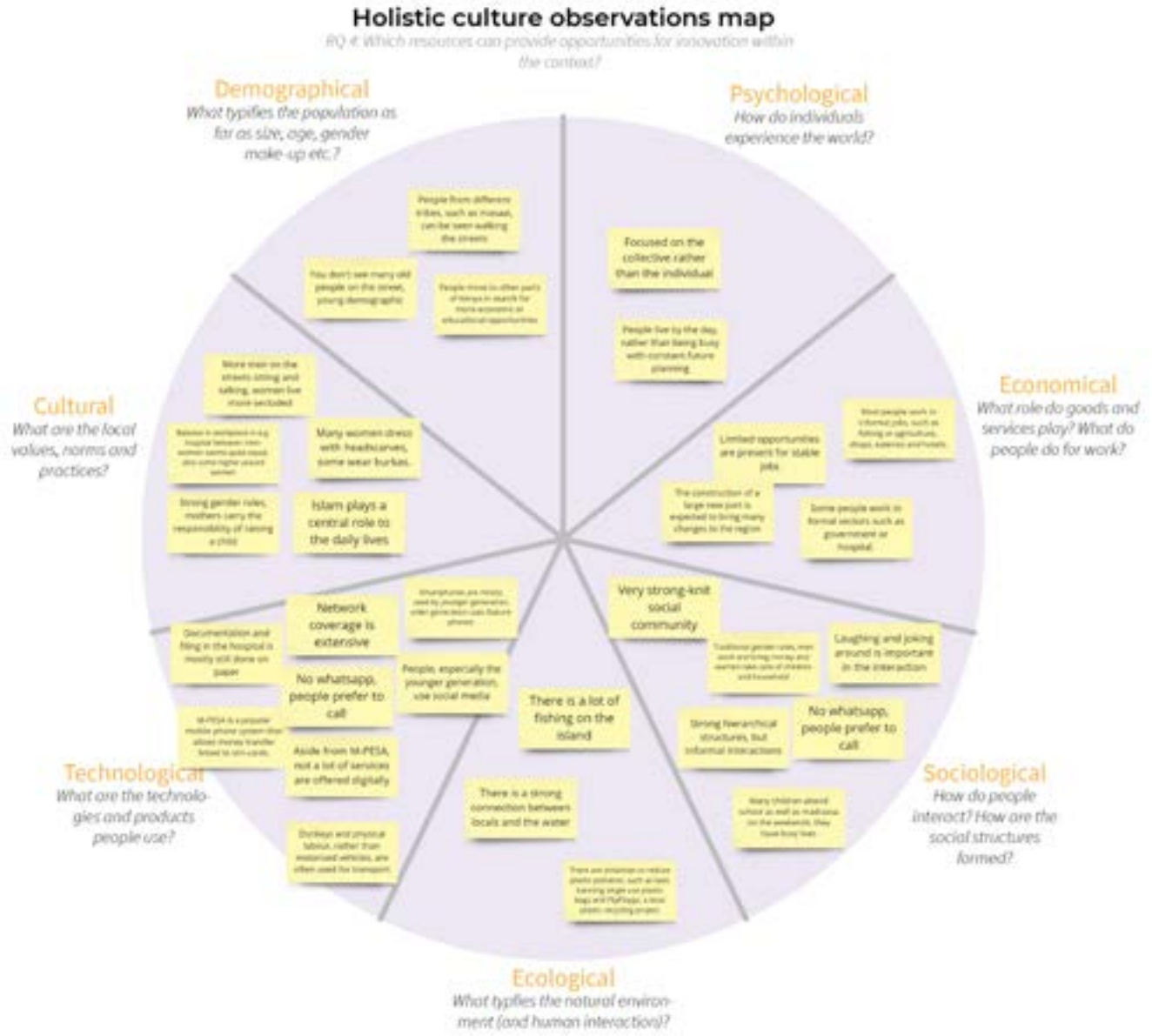
	Capabilities	environmental factors (electricity etc.	What do they measure/document?	How do they measure/document?
Facilities (NGO, nutritionist, MCH)				
Communities (CHV)				
Individuals (Families, caretakers)				

RQ4: Who are the stakeholders involved in the undernutrition in the first 1000 days in Lamu and how do they interact?

A.2 Fieldwork data

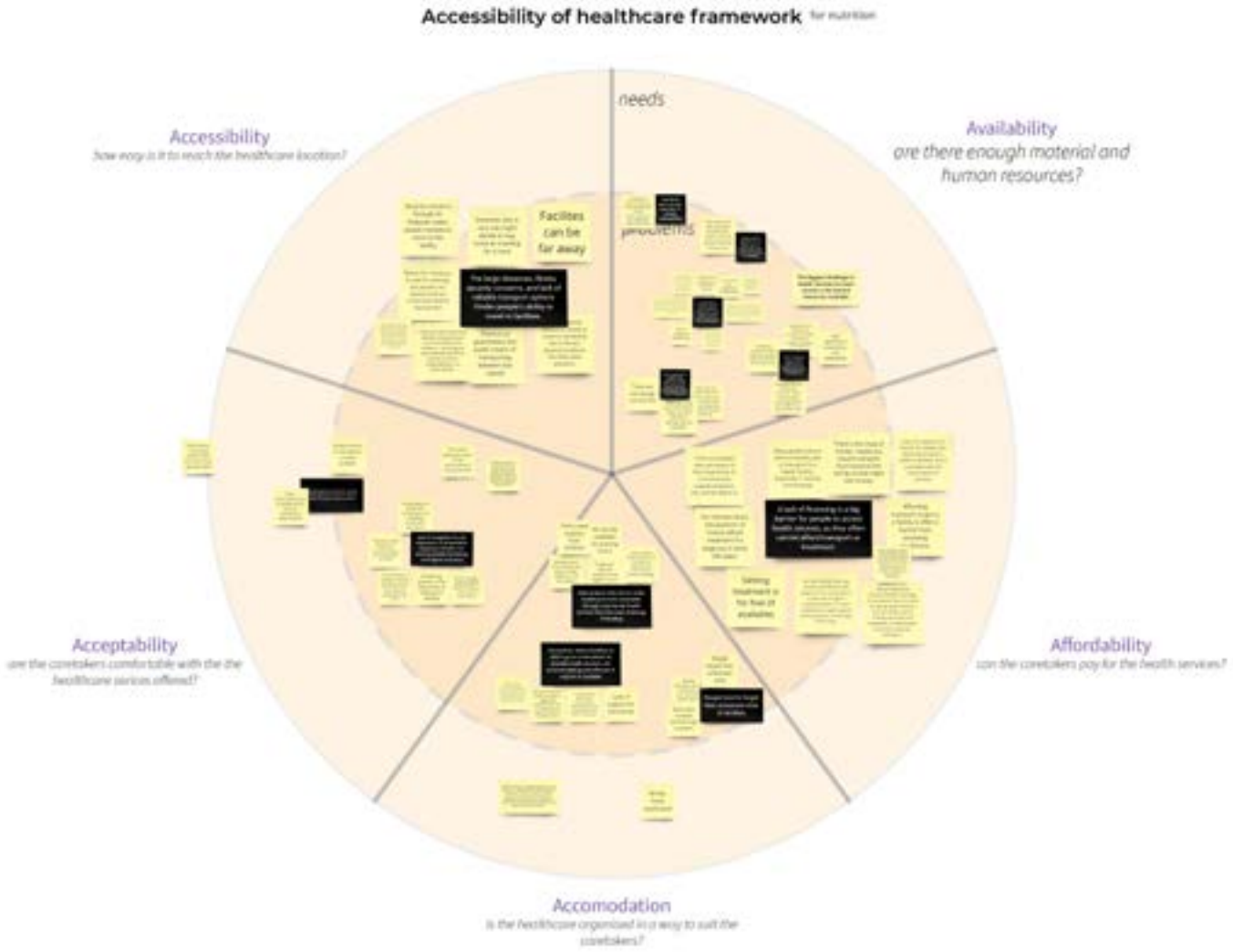
Yellow and orange post-its are direct quotes from interviews and anonymised. Black post-its are synthesis post-its describing the emerging insights. Zoom to read individual post-its.

A.2.1 Cultural observations framework



A.2.2 Diagnostic settings

A.2.3 Accessibility framework



A.2.4 Patient stories data

A.2.5 Nutrition practice

A.2.6 Contact points

A.2.7 Stakeholders

A.2.8 Tools and technologies preferences

A.3 Specific described fieldwork results:

A.3.1 Local preferences for diagnostic tools and technology for measurements of infants in communities

Goal: Understand which tools and technologies are preferred for use in communities to measure the length, weight and MUAC for children in the community.

Participants: The preferences were asked at the end of each interview with all stakeholders, except for caregivers.

Preparation: Things that were brought to the session; an A1 sheet, two types of tools for each anthropometric measurement (analogue and digital weighing scale, length tape and drawing of height board, MUAC tape and length tape), and post-its with drawing on them (for data documentation on paper or on a phone) and post-its, see figure x. Stakeholders were asked for their preference between each of the two options and were asked why

Results:

The results from each interview were written digitally on post-its on MIRO and all interviews were combined.

Ease of use

A digital readout for diagnostic tools is strongly preferred due to the accuracy of results and ease of use, which will result in less time spent

Ease of use is important for tools, for example a weighing scale that needs to be hanged from somewhere is not ideal. Tools that are easier to read and to do the measurement are strongly preferred.

Cooperation from little children can be difficult, for tools it is therefore important that it is suitable for the age of the child.

Work should be done quickly and effectively, and ideally only require one person to do the work.

Power concerns

Diagnostic tools that use batteries are of concern. If the battery dies, the product is likely to be not used anymore. This is potentially less important if the user is an NGO rather than CHV's or community members, who might be able to easily acquire and afford new batteries.

Hygiene

Hygiene is important. Usage of fabrics to weight babies in is therefore not suitable

Familiarity

Which tools health workers are familiar with is important as training on new tools is inhibitively expensive.

People are generally familiar with smartphones and tablets, and previous projects using those were appreciated. Concerns over (digital) literacy exist, as not everyone can use a smartphone

Portability

Portability for outreaches and activities within communities is important, it should however not come at the expense of accuracy.

Affordability

Tools and technologies used should be inexpensive as costs are always a crucial inhibiting factor

Suitability

Different tools or ways of measuring are needed for different age groups.

Robustness

Tools should be (perceived as) robust

Unintended material use

Unintended use of materials should be considered for the introduction of tools and products in communities, mosquito nets have for example been misused for fishing.

Phones that are given in projects might be misused and taken by other (family/community) members

Data storage

Digital data storage is welcomed as there is less of a risk of the data getting lost.

Conclusion

There are local preferences to diagnostic tools and technologies for doing and documenting measurements on a community level. For the diagnostic

tools, the existing tools are suboptimal, as they are not designed to exist within communities. There is an opportunity to redesign the anthropometric measurement tools to optimally suit the measurement in the first years of life on a community level. Digital data storage would be welcomed, but comes with its challenges.

A.3.2 Why CHVs?

Interventions on a community level could be targeted to three groups, outreach health care workers from NGOs and facilities, CHVs and caregivers themselves. To all stakeholders it was asked which would be best suited for targeting community-based interventions. The insights on the advantages and disadvantages of each group are presented below.

	Health workers	CHVs	Caregivers
Advantages	Most health workers are well educated, have access to tools and smartphones.	Interventions on CHV level have better continuity, are more time and cost-effective in training compared to caregivers, they are open for new projects and generally have capabilities such as (digital) literacy.	Caregivers are intrinsically motivated to take care of their children and you could reach
Disadvantages	Health workers are not able to go to communities on a structural basis	CHVs do not currently receive compensation for their work	Caregivers can have low levels of education, would be much more expensive to train and due to, social problems it might be hard to reach families that are struggling

From these insights the CHVs are best suited to target interventions that focus on the community level. The main challenge to increasing the role of the CHV

A.3.3 Patient stories

Wasting 2 “Abdul”:

Because of an accident with Abdul his fishing boat, he suddenly finds himself unable to provide income and food for his family. As there is no alternative work for him to do, he goes to a more populous island in search for some work. This leaves his wife behind with his young daughters, who starts to experience a sudden lack of nutrition

Slowly but surely, the daughter starts to grow thinner. Because the slow and gradual onset of the symptoms it is easy to neglect the symptoms at first

The symptoms get worse, and out of fear of judgement from the community the child is hidden from public view.

After some weeks, the child has lost its appetite and is lethargic. Abdul comes back home after having generated some income on someone else’s fishing boat. He is alarmed by the situation and plans to go to a health facility as soon as possible

Because they live far away from the nearest hospital, he decides to go to the nearest dispensary. This is a 45 minute ride on the back of a “boda boda”, or motorcycle taxi. It costs him 8 dollars.

At the dispensary, the child is diagnosed as being severely malnutritioned through a MUAC-score.

The dispensary has a little RUTF and other supplements available. They do not have the facilities to treat his daughter in the facility so they give him the treatment and advice on how to treat his daughter at home and urge him to come back for a follow-up the next week

Abdul takes his daughter on the back of another the “boda boda” back to his house.

At home, he makes sure to follow the treatment. He cannot make it back to the dispensary however, as he cannot afford another return ride on the motorcycle.

Stunting 1 “Esha”:

Esha lives in a remote community in a hut that they fashioned themselves of materials that were available. It does not shield her much from the elements. Throughout the pregnancy it was tough for her, as there was always a struggle to eat enough. On top of that, she experienced sickness a lot, so that even when there was food it was tough for her to eat enough.

After giving birth, the lack of food and living environment resulted in chronic diarrhea and not enough nutrients for her newborn.

The child seemed to do fine in the first months. After a while though, the growth of the child was less than it probably should be. She did go to her nearby dispensary for vaccinations, but as there was not enough staff available they didn’t check for growth monitoring.

At the child’s second birthday, the chronic undernutrition resulted in both physical and cognitive development issues.

Micronutrient deficiencies 2 “Fatma (2)”

Fatma forms a family with her husband, Abud, and two young children. They usually eat once or twice a day, and most meals consist of chapati with beans, due to unawareness of the importance of a varied diet and the lack of money available to afford it even if they had been aware.

These non-varied eating habits lead to his family suffering from various forms of micronutrient deficiencies. Especially the youngest, who is just 9 months old, is affected.

Abud takes his youngest to the hospital for the measles vaccination, which is a 30 minute walk. He also wants to ask at the hospital about the fatigue his youngest is experiencing.

The nutritionist in the public health facility notices that the child is showing signs of weakness and fatigue. The nutritionist checks for some clinical signs and diagnoses anaemia. She prescribes iron supplements that have recently become available again.

Abud walks home again for 30 minutes.

He follows the instructions from the nutritionist on how to administer the treatment, slowly his child starts to show more signs of energy.

A.3.4 Evaluation + co-creation

Goal of the session: The goal of this session was twofold. The first was to evaluate the basics of combining anthropometric measurements tools with (smart)phones, CHVs to do measurements of infants in their community. The second was to learn how the products could be used together, what the basics of the interaction between phone measurement documentation and tools would be and where the measurements could be done.

Participants, time and location: A one hour session with two CHVs from different communities on Lamu island, Kashmir and Wiyoni, the session was held in the public health office, on Lamu island.

Preparation: A cardboard cutout of both a smartphone and a feature phone was made. Several screens were drawn on paper to prototype the basics of what it could be like to document the measurements.

Results:

CHVs are willing and enthusiastic to use the tools to do the measurements with infants in their community.

CHVs have an understanding on how they should use the diagnostic tools, and would be able to document the results on a phone.

They prefer going to caregivers their house rather than let caregivers come to their house, as they doubt that caregivers would come

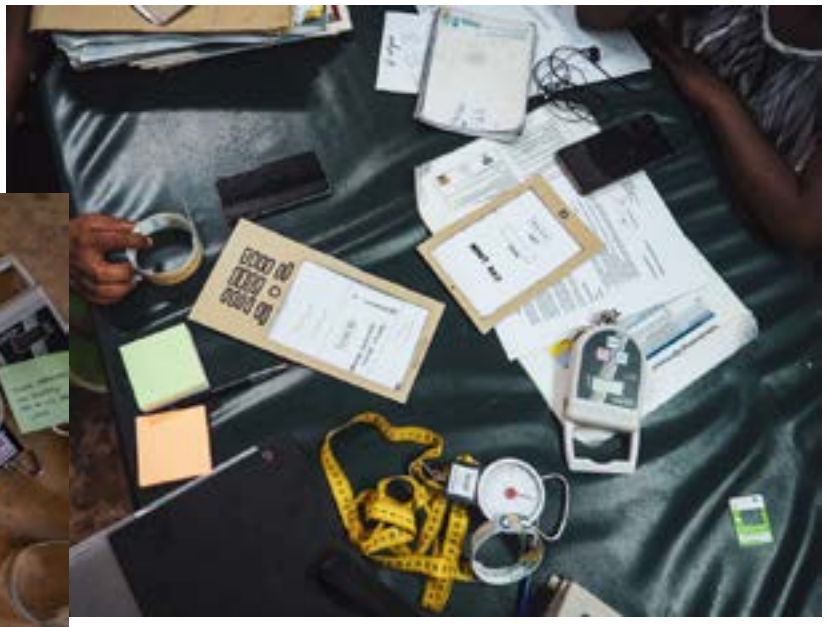
Most CHVs have a phone, either smartphone or feature phone

Infants do not have an ID number, so identification of an infant can be done on a personal description (such as community, household, child name).

Results of measurements should be communicated in a simple and clear manner, e.g. via colours (e.g. show the numbers in red if the weight or length measurement signals a problem) or via simple visuals (such as showing an illustration of the height of a child compared to a reference child)

Conclusion:

CHVs are suitable to carry out the measurements in their communities. Using the measurement tools and documenting the data on phones is feasible. Interaction with the phone interface should be simple and visual. Identification of infants is done via personal description or another solution has to be found.



Appendix B: Intervention concepting

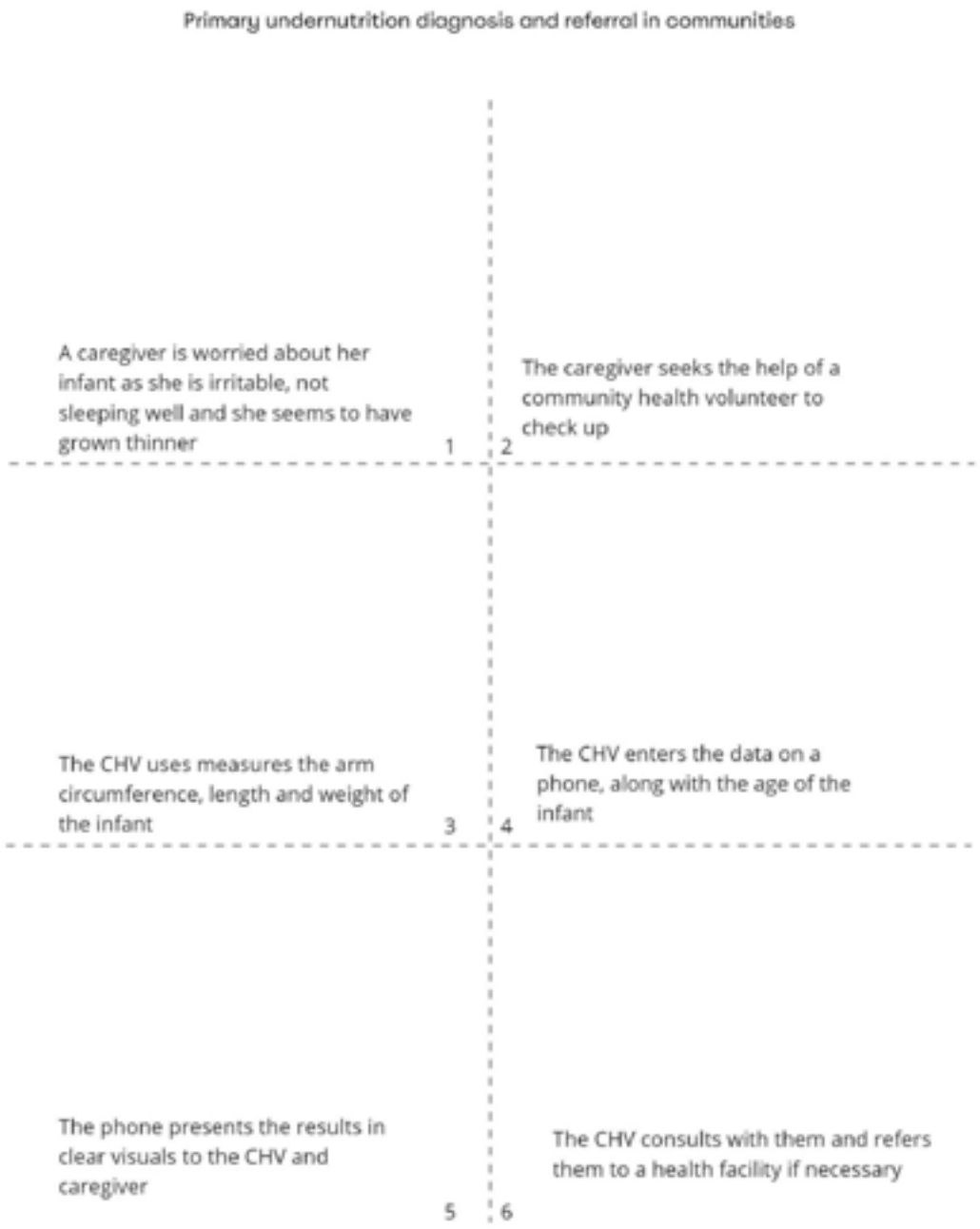
B.1 Three unselected scenarios

B.1.1. Early signalling

Currently, caregivers have to travel to facilities in case they want to get an initial checkup and diagnosis of their infant, which results in some caregivers putting off the trip, resulting in late diagnosis and worse outcomes. In this scenario, initial diagnosis is done by CHVs on a community level, which would signal any problems regarding wasting and stunting early, as it is more accessible for caregivers.

Reason for not selecting

Currently, public health is rolling out MUAC-tape to CHVs so they can do initial diagnosis on a community level for wasting. Even though stunting is not addressed, this scenario was deemed not innovative enough to be taken to the next step.

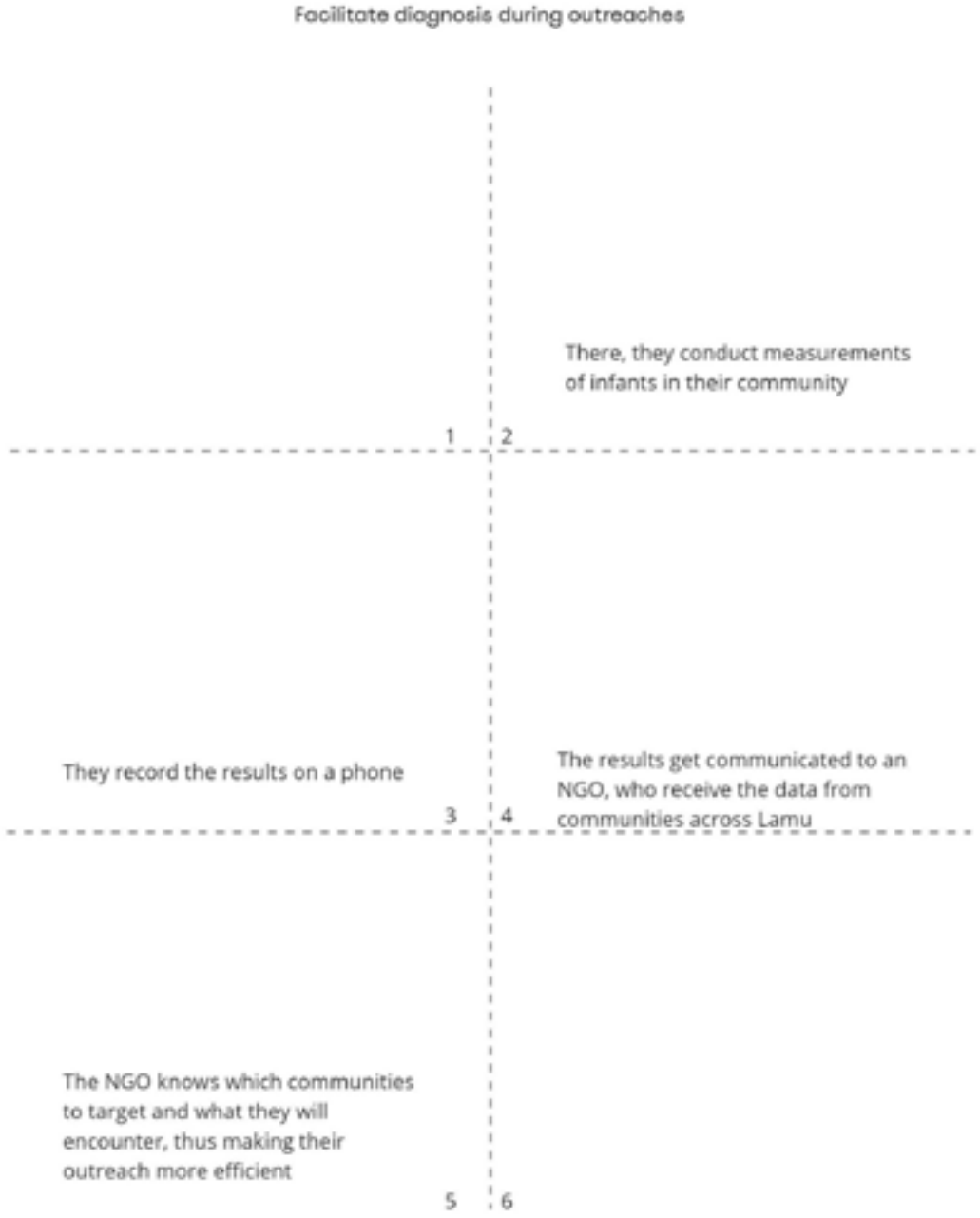


B.1.1. Efficient outreaches

Currently, NGOs and health facilities alike conduct outreaches, where they go out to communities to provide health services, such as immunization, monitoring and diagnosis. Before going to communities however, they do not know which children in the community might need help and what they might need. In this scenario, CHVs communicate results that report on the state of the children's health within their community to NGOs, so that the NGOs know which communities to target and what to bring.

Reason for not selecting

In a talk with KRCS, they revealed that they currently already have quite a good idea of which communities might need most help, as they have contacts in many communities who can signal any problems, thus the first advantage of this scenario might not be as impactful. Furthermore, the amount of treatment that NGOs bring to communities could already be sufficient. This scenario therefore, while it could be helpful, does not have as high an impact as other scenarios.

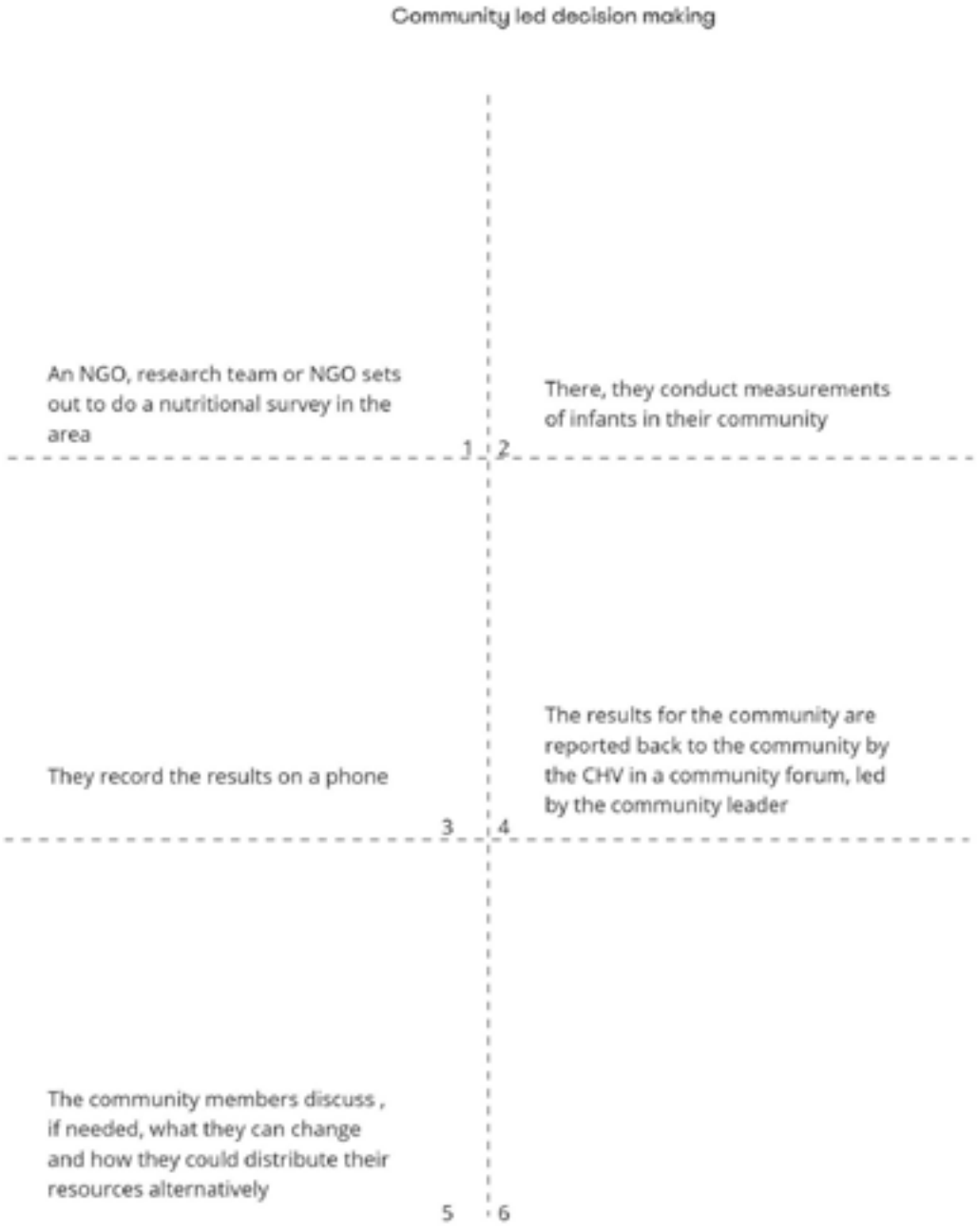


B.1.2. Community-led decision making

The other described scenarios either give the data insights back to facilities/NGOs or to the caregivers themselves. In this scenario, the idea was to give the data back to the community themselves, so that they could decide in community meetings what action needed to be taken with regards to any nutritional health problems that might exist within their community.

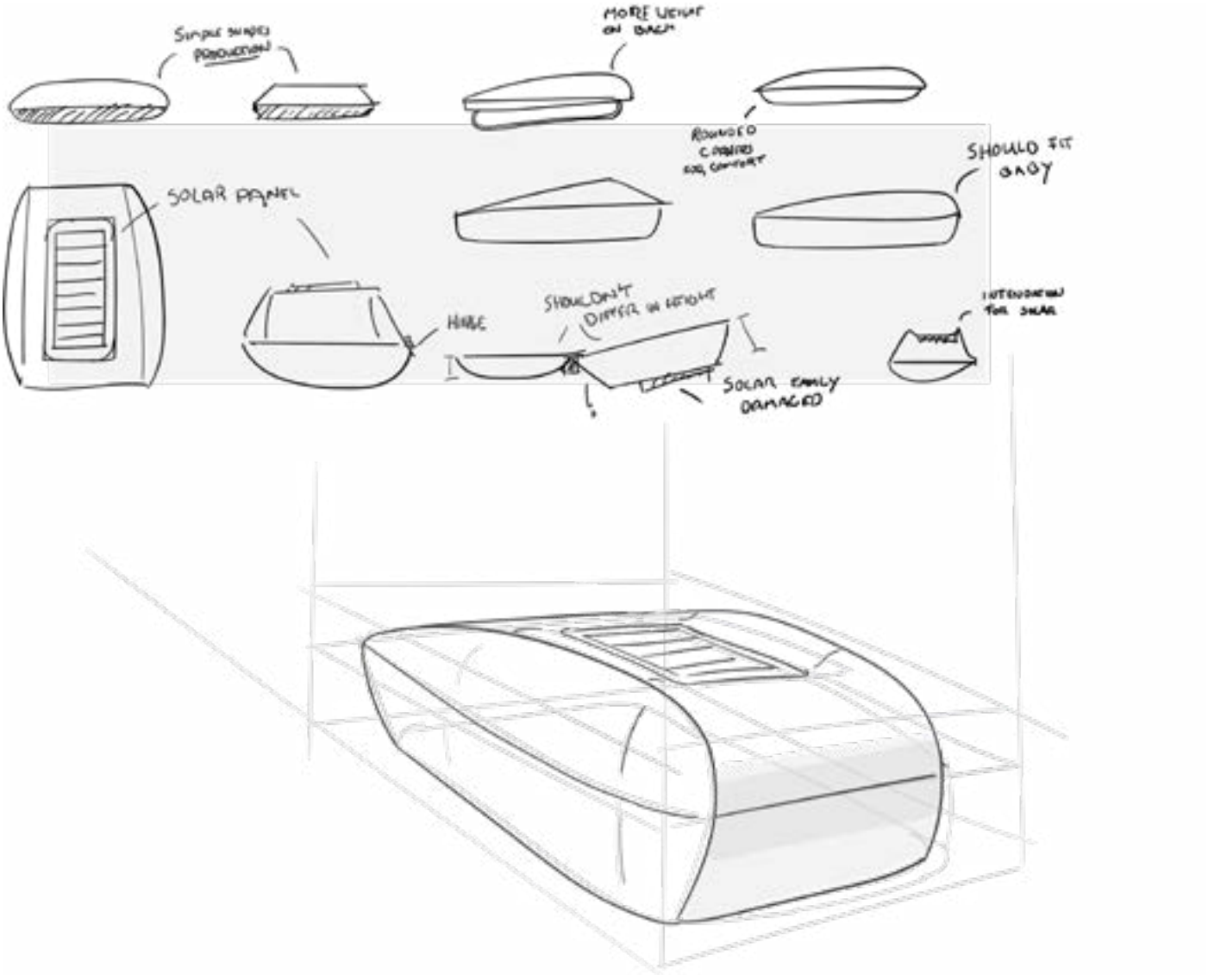
Reason for not selecting

While this scenario leverages heavily on the informal structures and strong social cohesion of the communities, its implementation and obvious potential for impact is the least certain from all the scenarios. Who would make sure that the meetings are held? Would the setup be sustainable? Are we sure that the communities would react positively to such an intervention? So while interesting, this scenario contained too many uncertainties to be further explored for now.



B.2 Redesigned anthropometric measurement device sketches

INSERT SKETCH



Appendix C: Evaluation

C.1 Evaluation form

To start, thank you for filling out this evaluation form. Your input is essential in understanding how we can make a positive impact in Lamu.

For the project, we are **exploring how basic anthropometric measurement tools, combined with (smart)phones, could enable community level nutritional health services.**

This form contains three scenario's that explore how these tools could be used in different ways to contribute to some needs caregivers experience within communities in Lamu. The scenarios are concept, and serve as a discussion tool of which your input will be of impoortance.

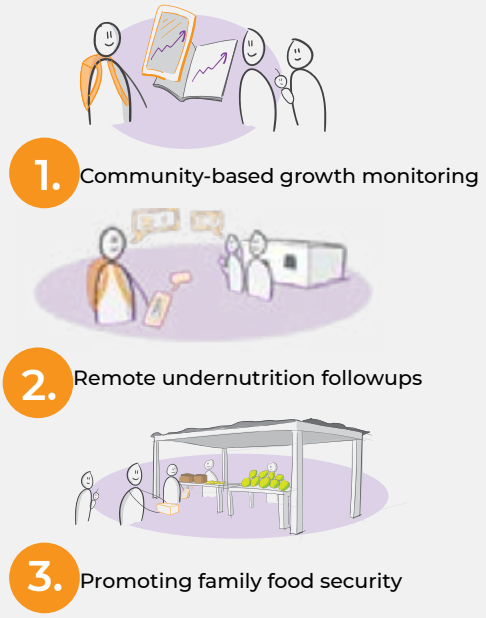
The scenario's will be explained on a seperate page. It would be great if you could give some feedback on each scenario and at the end rate which scenario you think is most feasible to implement in the short term and which scenario you think could have most impact.

Thanks again for your participation. You can type your answers directly in this document and save it. Could you send the saved document back to me when it is finished? (to c.w.veenkamp@student.tudelft.nl).

If you have any questions or concerns, please feel free to reach out to me on c.w.veenkamp@student.tudelft.nl.

Kind regards,

Wessel Veenkamp



What?

There is an opportunity to do growth monitoring by CHVs on a community level using the measurement tools and documenting the data on (smartphones. The results could be documented in a handbook or in a smartphone app.

Impact

The impact that is in increasing awareness and preventing problems. First, by giving the results back to the caregivers, they will become more aware of the importance of healthy nutrition on the growth of their infant. Second, it will catch any growth development problems at an early stage.

YOUR FEEDBACK

What feedback do you have on this scenario?

What are your initial thoughts?

What do you think the pros and cons are for this scenario?

PROS

CONS

What?

There is an opportunity to do follow-ups for undernutrition cases of young infants at a community level. This reduces the amount of times that caregivers have to travel to facilities, and could increase recovery rates.

Impact

The impact is in better recovery from undernutrition cases that are seen in facilities. Furthermore, the increased accessibility to healthcare services that the intervention brings could increase the amount of times that people seek help altogether.

2. Remote undernutrition followups

YOUR FEEDBACK

What feedback do you have on this scenario?

What are your initial thoughts?

What do you think the pros and cons are for this scenario?

PROS

CONS

What?

There is an opportunity to directly aid families with infants and young children who are in need for temporary support of food security, through communicating with responsible measurements to NGOs/facilities who in turn can provide food packages through associated market stalls. This is just a first exploration of how such a system could function, and it could be implemented in a variety of ways.

Impact

The impact is in improved food security on a family level, preventing vulnerable families with infants and young children from suffering advanced stages of undernutrition or stunting.

3. Promoting family food security

1. CHV brings the measurement tools to the local food market on a certain day of the week

2. Caregivers that have issues feeding children are informed they can go to see the CHV at the market

3. CHV measures and tracks the development of infants that caregivers bring

4. If there are any danger signs of undernutrition, the CHV puts it in the app, notifying the NGO. This gives the CHV a one-time code that can be used in an associated market stall for a food package

5. The CHV communicates the paid for code with the market stall, and the caregivers receive the food package directly from the stall, paid for in advance by the NGO

YOUR FEEDBACK

What feedback do you have on this scenario?

What are your initial thoughts?

What do you think the pros and cons are for this scenario?

PROS

CONS

Impact

Which scenario do you think could have the most impact?

1 = most impactful → 3 = least impactful

1
2
3

Why?

Feasibility

Which scenario do you think would be most feasible to implement

1 = most feasible → 3 = least feasible

1
2
3

Why?

YOUR FEEDBACK
the scenarios

1. Community-based growth monitoring

2. Remote undernutrition followups

3. Promoting family food security

C.2 Evaluation results

After getting the forms filled in in return, the responses were collected and put together:

C.2.1 Community-based growth monitoring

The community-based growth monitoring scenario was consistently ranked highly both for impact and feasibility. It was especially valued as it both improves acceptance and utilization of nutritional health services on a community level as well as generating knowledge and awareness.

The main pros for the scenario were that it could lead to better acceptance and utilization of nutritional care by community members, as the regular visits could improve trust towards nutritional health services. Furthermore, it could increase knowledge on nutrition among communication members. Also, it would lead to early detection of any nutrition related development milestones and smooth referrals if needed.

Some of the barriers that were expressed include the lack of or inadequate phones to use, the knowledge of CHVs in operating the phones, necessity of medical background for interpretation of the data. An unstable phone network should be accounted for, so that data would not be lost in case the connection drops out.

Initial thoughts:

This is great because interventions are community level help in early detection

Technology plays a vital role in primary health care.

Caregivers getting more understanding on importance of good nutrition

Pros:

Can contribute to primary healthcare through contribution by the CHVs at community level.

Better acceptance and utilization of nutritional care and management by community members since trust is improved through monthly visits

Enhancement of early detection of any nutrition related development milestones and appropriate intervention designed

Increased knowledge on nutrition among community members

fast communication process

smooth referrals

This will help notify the ministry of health on the number of newborns whose parents are not able to access health facilities for delivery or immunization due to various challenges. The data will be useful in justifying infrastructure development

Cons:

Lack of or inadequate gadgets/phones to use

Some CHVs might not have the best understanding of how to operate the phones(though I assume training on the usage will help address this challenge)

Interpretation of the data can be a challenge for some in case of the need of specialized care

in case of network or phone issues information can be lost or fail to reach in time

C.2.2 Remote undernutrition followups

The remote undernutrition follow-ups scenario was also found to be impactful and feasible, though there were some concerns expressed on putting CHVs in charge for handling potentially severe undernutrition cases.

The main pros for this scenario was that it would enhance the referral pathway, enable access to sustained help from healthcare workers for those who are not able to access facilities. It was also noted that this could improve the relations and coordination between health care workers in facilities and communities.

Some of the cons that were expressed for this scenario include concerns over whether cases would be handled with satisfaction, as it would shift responsibility to CHVs for potentially problematic cases without the training and medical background of a normal health worker.

Initial thoughts:

This helps in followups as instructed by health care workers in some facilities. Some community members because of different reasons are unable to come back to health facilities for such followups.

wide coverage of health services in hard to reach areas.

For some families due to low economic abilities, 'if it is not broken don't fix it'. The data will need to help generate illustrations that help convince parents that their child is experiencing malnutrition, what the long term effects could be and therefore the importance of getting to the hospital.

Pros:

The follow up processes enhances complete referral pathway technique.

It enables community members' children access the much needed care even when they cannot access it from the health facility due to reasons that made them unable to do so.

Improves the rate of access to nutritional care at community level through the local level health care providers (CHVs)

Better relations and coordination between the health care workers in the health facilities and the community health volunteers

early diagnosis and early intervention leading to better recovery.

This will work well where distance to health facility is a problem

Encourages the parents to seek medical interventions

Cons:

Some cases might not be handled with absolute satisfaction.

in case CHVs not not well trained there can be wrong results

C.2.3 Promoting family food security

The promoting family food security scenario was appreciated for its targeting of families in need. however, some concerns around unintentional consequences such as intentional neglect by families to get provisions and the cost of implementation were mentioned. It was therefore ranked lowest in both impact and feasibility.

Some of the pros that were mentioned include that it contributes to increasing awareness and participation of community members, and that it would allow for customized, targeted and efficient food interventions.

The cons for this scenario include that community members could start to rely too much on these rations, that there would be privacy concerns and concerns around the sustainability of the initiative, as it could prove costly and be difficult to implement. Furthermore, one respondent noted that, as an unintended consequence, families could start to intentionally neglect an infant to obtain the rations.

Initial thoughts:

For the sustainability of this initiative, the county government can partner with other NGOs especially through climate smart agriculture for households that are involved in agriculture as their key livelihood venture. This ensures there is adequate supply of the required food packages at the community markets.

zero hunger as per sustainable development goals.

The same could also be part of the data processing feature of scenario 2. Data collected over a certain period of time can help make predictions and identify specific households in need. That data is then given to the NGOs for planning and resource mobilization

Pros:

the provisions.

Contributes to an increase in awareness of the program among community members thus improved outcomes through more participation.

Significantly improves standards of living for the beneficiaries.

Improves market dynamics for the area through supplies hence better economic statuses for community members.

where community have enough food less malnutrition cases

customized and targeted food interventions

Cons:

Overdependence on the rations by some community members.

Sustainability of the program needs to be stated however much it helps the community members a lot.

Too much funds required

Privacy concerns

C.2.4 Ranking:

Most impactful:

Scenario 1

Scenario 1, simlply beacuse to me address the cornerstone of primary healthcare where the CHVs play a critical role. Most communuty members in Lamu, espoecailly the hard to reach areas rarely visit health facilties because of many factors that influence their access to such places. Through scenario 1, nutritional outcomes can be improved at the community level by the CHVs after proper training and knowedlege equiping.

1,2,3

Scenario 1 will help capture nutrition history early preventing malnutrition from happening. scenario 3 is less impactful cause it can create intentional neglect so as the caregivers can get free food.

Most feasible:

1

It can be implemented immediately through the already existing community health strategy structures of community health volunteers and their supervisors, community health assistants (CHAs). This will help improve on the outcomes since it will become a bottom up level of engagement and this ensures cases of malnutrition are noticed and addressed within the minimum period of time. Leveraging on the community health strategy approach, it is easy to train the CHVs and ensure the information is cascaded to to community members. The linkage to CHAs and health facilities is also existing therefore better management.

2,1,3

scenario 2 following up is easy cause diagnosis is already established. scenario 3 needs too much funds.

Appendix D: Design brief

DESIGN FOR our future

TU Delft

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT
Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

family name: Veenkamp
initials: C.W. given name: Wessel
student number: 4323041
street & no.: [redacted]
zipcode & city: [redacted]
country: [redacted]
phone: [redacted]
email: [redacted]

Your master programme (only select the options that apply to you):

IDE master(s): ★ IPD ☐ DfI ☐ SPD
2nd non-IDE master:
individual programme: - - (give date of approval)
honours programme: ☐ Honours Programme Master
specialisation / annotation: ☐ Medisign
☐ Tech. in Sustainable Design
☐ Entrepeneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair: JC Diehl dept. / section: SDE/DfS
** mentor: M. Guerreiro Gonçalves dept. / section: DOS/MOD
2nd mentor:
organisation:
city: country:

comments (optional)

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

Second mentor only applies in case the assignment is hosted by an external organisation.

Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair JC Diehl date 18 - 10 - 2022 signature Jan-Carel Diehl Digitally signed by Jan-Carel Diehl Date: 2022.10.19 11:20:28 +02'00'

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 42 EC

Of which, taking the conditional requirements into account, can be part of the exam programme 42 EC

List of electives obtained before the third semester without approval of the BoE

NB: 11EC behaald vóór de inschrijving (niet meegeteld hierboven

★ YES all 1st year master courses passed

NO missing 1st year master courses are:

name K. Veldman date 21 - 10 - 2022 signature

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: V APPROVED NOT APPROVED

Procedure: V APPROVED NOT APPROVED

comments

Monique von Morgen 1 / 11 / 2022

name JC Diehll date 18 - 10 - 2022 signature Jan-Carel Diehl Digitally signed by Jan-Carel Diehl Date: 2022.10.18 14:35:26 +02'00' MvM

Initials & Name C.W. Veenkamp Student number 4323041

Title of Project Improving the accessibility of health services for young children in Lamu

Improving the accessibility of health services for young children in Lamu — project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 03 - 10 - 2022 — 03 - 03 - 2023 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

Children's health around the world is unequal. This is the case in wealthy countries such as the Netherlands and in Low- and Middle Income countries such as Kenya. Wide disparities exist in the health of different socioeconomic groups due to economic, social and geographical barriers (Rebouças et al., 2022). Children specifically form a sensitive group with early life health problems having effects later in life. One of the regions in the world where this is obvious is in the Lamu archipelago, Kenya. Bordering on Somalia on the northern east coast of Kenya, the local population faces a variety of health risks such as (non-)communicable diseases, unsafe water and insecure food supply.There is a limited access to basic health services, and economic barriers further complicate the health situation. Furthermore, the geographical characteristics of the region have a significant influence on the accessibility of healthcare. The population is spread out on the mainland and on various islands, and there is limited infrastructure. To illustrate, there are only two doctors per ten thousand inhabitants, with a majority of the population having to travel for multiple hours by boat to reach the nearest small hospital. This, among other factors, results in Lamu having a higher infant and neonatal mortality rate compared to the Kenyan national average (The World Bank Data, n.d.) (Healthdata, 2020).

Healthy Start is an initiative between the Delft University of Technology, Erasmus MC and the Erasmus Universiteit Rotterdam, which has the mission of giving every child an equal starting position in life. Through collaboration between researchers, designers and organizations, it aims to tackle complex societal issues to improve the health of children around the world. The majority of the main players of the initiative are Dutch or based in the Netherlands, but there is an ambition to look across borders. By exploring the issue in several countries such as the Netherlands and Kenya, and therefore adopting both global and local perspectives, the initiative aims to learn how different contexts require different interventions to improve and can inform each other.

One of the collaborative partners of Healthy Start for the local perspective in Kenya is the Kenya Red Cross Society (KRCS). As an organization, they have the mission to alleviate human suffering through responding to humanitarian emergencies and implementing community driven programs to transform lives and enhance resilience. Their main activities are disaster management, health nutrition and social services, and organizational development, and they have an active presence in the Lamu region.

I.O.Me005 is a community-based makerspace in Lamu with a humanitarian focus. They have a strong collaboration with KRCS. They find opportunities to use their prototyping and innovation space to improve the region through sustainability, mitigating risks and improved humanitarian services.

Healthy Start is now looking to collaborate with KRCS and the I.O.Me005 makerspace to explore what problems and opportunities are present in Lamu to improve the health situation of children in their first 1000 days, with this graduation project being a part of that exploration.

space available for images / figures on next page

Initials & Name C.W. Veenkamp Student number 4323041

Title of Project Improving the accessibility of health services for young children in Lamu

introduction (continued): space for images

image / figure 1: The only ambulance boat in the Lamu region

image / figure 2: Hygiene advice poster inside a local school classroom

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

In general, the local population in the Lamu area experience a lack of accessible health services, due to the challenging geography of the archipelago, limited infrastructure, limited health services and economic barriers. At the same time, the locals are exposed to a variety of health risks; a high risk of both communicable and non-communicable diseases (dengue, pneumonia etc.) and are more likely to have poor or insufficient nutrition. Cultural factors also have an effect, such as being rooted in rituals (Gearhart, 2013) or some communities constantly moving around the region, making them hard to reach for health service providers.

Young children in the first 1000 days of their lives, from conception onwards, are a sensitive group with regards to health risks which have a significant effect on development later in life (Walker et al., 2007). With young children in Lamu forming a large part of the local population, one out of six people in the area is aged below five (Kenya Ministry of Health, 2015), their accessibility to health services is a growing problem. Telemedicine, or remote digital health, is promising to bridge the gap between underequipped health services and the local communities, and is increasingly prevalent throughout sub-Saharan Africa (Holst et al., 2020).

The main goal of this project is therefore to explore how technology could be used to make healthcare more accessible remotely, to improve the health of children in their first 1000 days in Lamu, Kenya. The research questions that this project aims to answer are:
- What is a health problem for young children in Lamu that is problematic, culturally relevant and has technological opportunities for remote healthcare?
- What are promising directions of innovation regarding the chosen health problem and what would a product/service concept look like that takes into account the relevant contextual, medical and technological domains?

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

This graduation project aims to improve the health of young children in the Lamu archipelago, Kenya. The main design challenge is to create a remote health product/service concept that could be accepted by the local community and that promotes an equal starting position for all children by improving their accessibility to health care.

This project will focus on generating insights through qualitative research, desk research and generative sessions to: find a specific important health problem that has a fit with an available technology, generate a deep understanding of the local culture and present opportunities. This then leads to a vision statement, after which a product/service concept will be ideated and evaluated with an emphasis on co-creation. Opportunities in the area present itself through the widespread use of mobile phones and strong social cohesion.

The expected result is a product/service concept for a remote healthcare service to improve the health of young children in the area. The proposed concept has to be sensitive to the local culture so that it could be adopted by the community. At the same time, the concept should be affordable for the context and be (partly) locally produced in the I.O.Me005 Makerspace.

The proposed concept has to be technically feasible, so it has to be affordable and make use of readily available technology. It has to be viable for the KRCS to implement the concept. And finally, the concept should be desirable for the community.

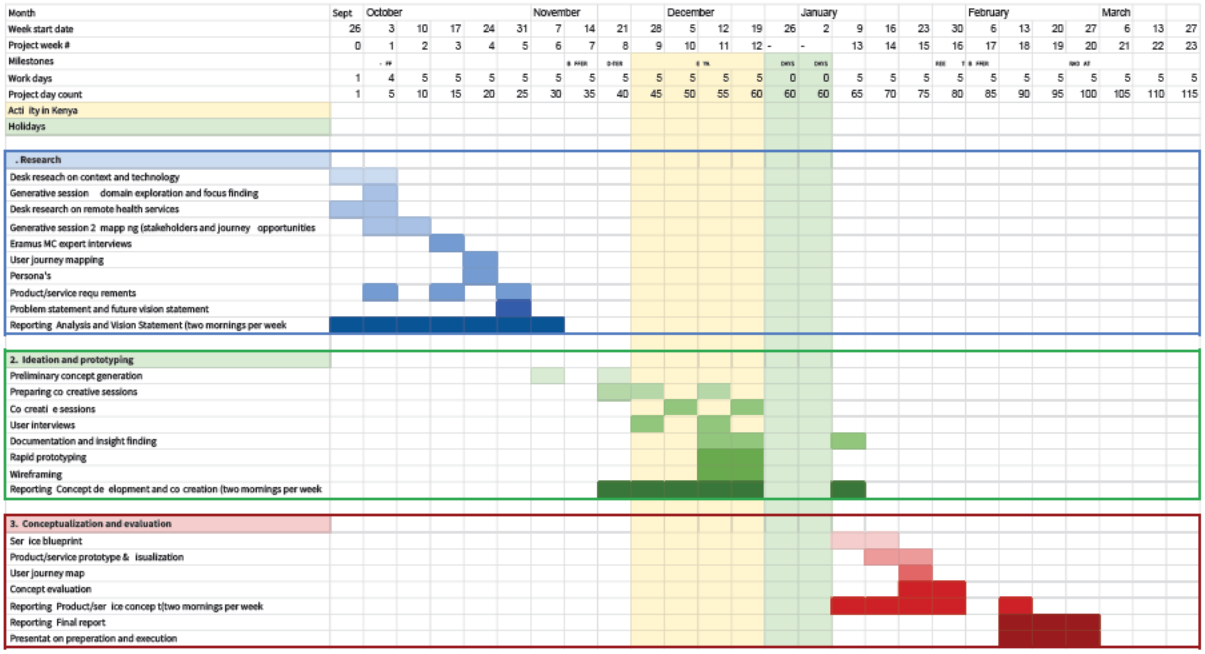
Initials & Name C.W. Veenkamp Student number 4323041

Title of Project Improving the accessibility of health services for young children in Lamu

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 3 - 10 - 2022 3 - 3 - 2023 end date



The project is split up in three major phases: 1) research; 2) ideation and prototyping, and 3) conceptualization and evaluation. Throughout the project, a combination of two approaches makes sure that the end result is desirable, feasible and viable. On the one hand, an empathic and co-creative approach through qualitative research, generative sessions and co-creation will make sure that there is a focus on a relevant health risk and lets the culture shape and inform the concept. On the other hand, a more pragmatic and technology led approach through desk-research will inform which health risks could be solved through affordable and available technology.

Early on in the project, together with local experts, a focus on a specific area in the Lamu archipelago and a specific health problem will be made to further focus the scope of the project. The availability of technologies to diagnose and/or solve health issues will inform this scoping. This phase concludes in the synthesis of the insights in the form of a user journey map, persona's, problem statement and future vision statement (Hekkert & van Dijk, 2011).

The second phase of ideation and prototyping will mainly be in the field in the Lamu region. Co-creative sessions and/or interviews with the target group to ideate, evaluate, prototype and improve preliminary concept ideas will be done to make sure that the design fits the community. In field user interviews and observations will further gain qualitative insights to inform the concept.

The final conceptualization and evaluation phase will see the insights from the previous phases come together in a final product/service concept. This will be visualized and delivered in the form of concept visualizations, service blueprints, user journey map, plan for implementation and an evaluation.

Initials & Name C.W. Veenkamp Student number 4323041

Title of Project Improving the accessibility of health services for young children in Lamu

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

Throughout the projects that I have done as an industrial design student it has always been the projects that explore complex societal issues that excite me. In past projects and in an internship I have touched upon the potential that social design, product/service design and design research holds to help transform societal issues in a meaningful way. The front end of design is for me the most interesting in this, as discovering new paths of innovation together with the relevant stakeholders is where I truly experience the beauty of design.

Throughout the project I am looking to learn how to use co-creation with the target group and generative sessions with various stakeholders to inform the design process. I want to understand how to let the local culture inform the concept. I am looking to learn how to ideate, prototype and evaluate service design concepts.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

Initials & Name C.W. Veenkamp Student number 4323041

Title of Project Improving the accessibility of health services for young children in Lamu