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An Evaluation of the Logical Framework Approach in a Small-scale Aid Project

A Case Study on Infrastructure Improvements at Mkula Hospital in Tanzania

Master's thesis in the Master Program Infrastructure and Environmental Engineering

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Cover: A collage with pictures of the hospital, the Hospital Management Team and the Healthy Hospital Project Group. Photo by Rebecca Axelsson

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Abstract

The purpose of this master thesis is to evaluate the Logical Framework Approach (LFA). The LFA was applied in a case study at Mkula Hospital in Tanzania in order to investigate if the LFA can help create sustainable implementations in a small-scale foreign aid project.

The small-scale foreign aid project was performed at the Mkula Hospital during seven weeks. The aim of the project was to investigate the infrastructure at the hospital, find the most crucial problem and implement a measure to solve it. During the execution of this aid project a collaboration has been between the Hospital Management Team, several local actors, two NGOs: Engineers Without Borders and Architects Without Borders as well as the initiators to the project - the Healthy Hospital Project Group.

The LFA method was used in the planning phase of the project. The method consist of several steps that were carried out through meetings, workshops and inspections at the hospital area, together with the hospital management team. Using the LFA method in this aid project entailed that the planning phase was structured and that important parts were included. However, the method was time demanding and would benefit from having more participation from the stakeholders than was possible in this project.

The main conclusion of this study is that the LFA is a suitable method for implementing sustainable solutions in a small-scale foreign aid project. However, the main challenge with the method is that it is very time demanding. Therefore, it is important to take the time aspect into consideration when planning the time frame of the project - two months to perform the LFA was too short to be able to conduct it in the most correct way.

Keywords: Logical Framework Approach, foreign aid, Tanzania, sustainable implementations, collaboration

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Sammanfattning

Syftet med detta examensarbete är att utvärdera the Logical Framework Approach (LFA). LFA användes i en fallstudie på Mkula sjukhus i Tanzania för att undersöka om metoden kan underlätta att skapa hållbara implementeringar i ett småskaligt biståndsprojekt.

Det småskaliga biståndprojektet genomfördes på Mkula sjukhus under sju veckor. Syftet med projektet var att undersöka infrastrukturen på sjukhuset, hitta det mest kritiska problemet och åtgärda detta. Under projektets gång har ett samarbete skett mellan ledningsgruppen på sjukhuset, flera lokala aktörer, två icke-statliga organisationer: Ingenjörer utan gränser och Arkitekter utan gränser samt initiativtagarna till projektet - Healthy Hospitals Project Group.

LFA metoden användes i projektets planeringsfas. Metoden består av flera steg som utfördes genom möten, workshops och inspektioner på sjukhusområdet, tillsammans med ledningsgruppen på sjukhuset. Genom att använda LFA i detta projektet strukturerades planeringsfasen upp, metoden säkertällde även att viktiga delar inkluderades. Det var emellertid en tidskrävande metod att utföra. Dessutom hade metoden dragit nytta av att ha ett större deltagande från intressenterna än vad som var möjligt i detta projekt.

Den huvudsakliga slutsatsen i denna studie är att LFA är en lämplig metod att använda för att genomföra hållbara lösningar i ett småskaligt biståndsprojekt. Den största utmaningen med metoden är dock att den är mycket tidskrävande. Det är därför viktigt att se till att projektet har tillräckligt med tid för att kunna utföra metoden - två månader upplevdes vara för kort tid för att kunna genomföra LFA metoden på ett så korrekt vis som möjligt.

Nyckelord: Logical Framework Approach, utländskt bistånd, Tanzania, hållbara implementeringar, collaboration

Acknowledgements

In this master thesis, the Logical Framework Approach is evaluated. A small-scale foreign aid project in Tanzania was used as a case study, in which the Logical Framework Approach was applied. The case study, initiated by the Healthy Hospital Project Group, was performed between February to March, 2019, at the Mkula Hospital in Tanzania. The main organizations that supported this project were: Engineers Without Borders, Architects Without Borders, WSP, RISE and ARQ.

We would like to thank Sebastien Rauch, our supervisor at Chalmers University of Technology, for the support you have given us throughout this master thesis. We would also like to thank Henrik Nilsson, our supervisor at Skanska, for all the help and insights you have given us.

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Contents

List of Figures	xi
List of Tables	xiii
Abbreviations	xv
1 Introduction	1
1.1 Purpose	2
1.2 Research questions	2
1.3 Limitations	2
2 Background	4
2.1 Aid and poverty	4
2.2 Tanzania	4
2.2.1 Health care in Tanzania	5
2.3 Background to the LFA method	6
2.3.1 Step 1 Context analysis	6
2.3.2 Step 2 Stakeholder analysis	6
2.3.3 Step 3 Problem analysis	7
2.3.4 Step 4 Objective analysis	9
2.3.5 Step 5 Activity plan	10
2.3.6 Step 6 Resources	11
2.3.7 Step 7 Measurement of the result	12
2.3.8 Step 8 Risk analysis	12
2.3.9 Step 9 Assumptions	13
2.4 Different views on the LFA method	13
2.5 Knoster's model	14
3 Case study: The Mkula Hospital Project	16
3.1 Initiation and project structure	16
3.2 Mkula village	17
3.3 The Mkula Hospital	18
3.3.1 Situation at the Mkula Hospital today	19
4 Method	20
4.1 First week	20
4.2 Execution of the LFA	21

4.2.1	Step 1 Context analysis	21
4.2.2	Step 2 Stakeholder analysis	21
4.2.3	Step 3 Problem analysis	22
4.2.4	Step 4 Objective analysis	23
4.2.5	Step 5 Activity plan	23
4.2.6	Step 6 Resources	24
4.2.7	Step 7 Measurement of the result	24
4.2.8	Step 8 Risk analysis	25
4.3	Case Study	25
4.3.0.1	Documentation	25
4.3.0.2	Direct observation	25
4.3.0.3	Participant observation	26
4.3.0.4	Interviews	26
5	Outcome of the LFA	27
5.1	Step 1 Context analysis	27
5.2	Step 2 Stakeholder analysis	28
5.3	Step 3 Problem analysis	30
5.4	Step 4 Objective analysis	31
5.5	Step 5 Activity plan	33
5.6	Step 6 Resources	34
5.7	Step 7 Measurements of the result	36
5.8	Step 8 Risk analysis	39
6	Analysis of each steps in the LFA	42
6.1	The first week	42
6.2	Step 1 Context analysis	42
6.3	Step 2 Stakeholder analysis	43
6.4	Step 3 Problem analysis	45
6.5	Step 4 Objective analysis	46
6.6	Step 5 Activity plan	47
6.7	Step 6 Resources	47
6.8	Step 7 Measurements of the result	49
6.9	Step 8 Risk analysis	50
6.10	The project plan	50
6.11	How the LFA helped create sustainable implementations in the MHP	50
6.12	Summary of the analysis	51
7	Discussion	53
7.1	What is a sustainable solution?	53
7.2	Challenges in the MHP	55
7.2.1	Challenges with the LFA method	55
7.2.2	Challenges with dependency	56
7.3	The project group in relation to Knoster's model	57
7.4	Recommendations	58

8 Conclusion	60
Bibliography	61
A Appendix - Memorandum of Understanding	I
B Appendix - Project Plan	IV
C Appendix - Contract Agreement	XIX
D Appendix - First problem tree	XXXVII

List of Figures

2.1	A template over a problem tree. The main problem is in the red square. The main causes in the yellow ovals with their underlying sub-causes in the yellow squares. The effects are in the green squares. Adapted from Örtengren (2015)	8
2.2	The connection between the problem analysis and the objective analysis. Adapted from Örtengren (2015)	9
2.3	A template that describes how the different objectives in the objective analysis are connected to each other and how they relate to the expected outputs and activities. Adapted from Örtengren (2015) . . .	10
2.4	Knoster's model for managing complex change. Including the elements and the change in attitude amongst the members if one element is missing. Adapted from Teclehaimanot (2006)	15
3.1	A timeline over the 12 weeks the MHP was active in Mkula. Showing the duration on site for the HHPG and the two groups of students. .	17
3.2	A map over Tanzania and the location of Mkula. The yellow part shows the Simiyu region while the red part shows the district of Busega. Mkula is marked with a white dot in the district of Busega. (Kullberg, 2018)	18
5.1	A schematic overview of the collaboration structure in the MHP. The figure depicts how different stakeholders have collaborated with each other.	28
5.2	The project timeline. The orange filled bars represent the presence of the stakeholders on site, the orange striped bars represent the involvement in the MHP without being on site. The blue filled bar represents the construction phase and the striped blue bar represents the delay of the project.	30
5.3	The final problem tree. The red rectangle contains the main problem and the green rectangles contain the effects. The causes are divided into main causes and sub-causes. The main causes are in the yellow ellipses while the sub-causes are in the yellow rectangles.	31

5.4	A visualization of how the different objectives in the objective analysis are connected with each other and with the activities. Parties in the blue squares contain the activities, the black squares contain the expected outcome, the yellow squares contain the intermediate objectives, the red square contains the project purpose, and the parties in the green squares contain overall objectives.	33
5.5	The activity plans for each intermediate objective.	34
5.6	Time schedule over the execution of the implementations conducted by the contractor. Presenting the start and duration of each activity.	35

List of Tables

2.1	Example of project monitoring. Adapted from Örtengren (2015) . . .	12
5.1	The budget of the MHP	36
5.2	The main objective and its monitoring indicators and verification sources	36
5.3	One of the intermediate objectives connected to its activities, ex- pected outcomes, budget/activity, indicators and verification sources .	37
5.4	One of the intermediate objectives connected to its activities, ex- pected outcomes, budget/activity, indicators and verification sources .	38
5.5	One of the intermediate objectives connected to its activities, ex- pected outcomes, budget/activity, indicators and verification sources .	39
6.1	A summary of the analysis, including all steps in the LFA that has been performed during the MHP	52

Abbreviations

AICT	Africa Inland Church of Tanzania
AWB	Architects Without Borders
EWB	Engineers Without Borders
HHPG	Healthy Hospital Project Group
HMT	Hospital Management Team
LFA	Logical Framework Approach
MoU	Memorandum of Understanding
MHP	Mkula Hospital Project phase two
NGO	Non-governmental Organization
RBM	Result-Based Management
RCH	Reproductive Child Health
SIDA	Swedish International Development Cooperation Agency
UPS	Uninterrupted Power Supply

1

Introduction

The definition of sustainability has no agreed universal meaning. It can be viewed in many different ways, both regarding what it is and how it can be achieved (Humanities Education Center, n.d.). In the context of aid projects and programs, sustainability is defined as “[...] the continuation of benefits after major assistance from a donor has been completed” (AusAID, 2000). AusAID (2000) further states that achieving sustainable outcomes is an aim in most projects. Prerequisites for creating sustainable projects are, according to Sida (2018), ensuring that assistance is provided on the recipients’ terms and that the recipient owns the project. This can be achieved by using Result-Based Management (RBM) Sida (2018).

RBM aims to achieve as good and sustainable results as possible. RBM is a "mind-set" (UN Habitat, n.d.) that supplies general guidelines over what should be included in the process. It does not include exactly how the project should be performed to achieve good planning, monitoring, evaluation and governance. Therefore, another method needs to be applied to understand exactly how a project plan is produced and how the result can be followed up. There are several methods and tool that can be applied, where one of them is the Logical Framework Approach (LFA). (Örtengren, 2015)

The core in the LFA method is to give guidance regarding how to proceed when producing a project plan and how to follow up the result. With the aim to facilitate the planning, monitoring and management of a change processes to create good and sustainable results. What distinguishes the LFA method from other methods is that it is a comprehensive planning model, i.e. it covers all the steps in the planning process until the project is completed - a plan that also can be followed up. (Örtengren, 2015)

As a part of this master thesis, a case study was conducted to analyze the LFA method in a small-scale foreign aid project. The project, also referred to as the Mkula Hospital Project phase two (MHP), has been performed at the Mkula Hospital, which is located in a small village in Tanzania. The overall objective of the MHP was to assist Mkula Hospital to address their most important infrastructural challenges, to provide a good base for safe health care.

The students managing the MHP on site was two engineer students and one architect student. The engineer students are henceforth referred to as we. During seven weeks did we, together with the architect student, live in the Mkula village, where

we worked in close contact with the Hospital Management Team (HMT) and had virtual support from the Healthy Hospital Project Group (HHPG). Furthermore, several financiers have been involved in the MHP, as well as two non-governmental organization (NGO): Engineers Without Borders (EWB) and Architects Without Borders (AWB).

1.1 Purpose

The purpose of this master thesis is to critically evaluate the LFA in a case study at Mkula Hospital, Tanzania, where an infrastructural development of the hospital will be performed. The LFA method will be used during the planning phase of the MHP. Each step will be analyzed, with the aim to understand if the LFA is a suitable method to creating sustainable implementations in a small-scale foreign aid project.

1.2 Research questions

RQ 1 - How can the LFA method help create sustainable implementations at Mkula Hospital?

RQ 2 - What are the challenges with using the LFA method in a small-scale foreign aid project?

1.3 Limitations

- The LFA was performed by using only one guideline over how to conduct a LFA. This entails that the LFA method is presented in a narrow view.
- We had no expertise in the role of facilitation, which the LFA method advocates. This could have affected the outcome of the workshops.
- The case study has only been performed in the MHP. The result is, therefore, limited and can only be applicable to small-scale foreign aid projects similar to this one.
- There was no interpreter available during the case study, entailing that the communication barriers might have lead to misunderstandings.
- Lack of knowledge regarding the cultural differences can lead to own interpretations of the situation, entailing that misunderstandings can occur.
- The main focus during our time on site was to perform and succeed with the MHP. Therefore important procedures and information for the master thesis

might have been insufficiently performed and documented.

- The outcome of the LFA method is partly built upon our interpretations, hence it might be one-sided.
- We possess a large influence on the donations, hence the interviews with the HMT might be biased since they do not want to criticize us.

2

Background

This chapter provides a brief background to aid and poverty, Tanzania and the health care system in Tanzania. Furthermore, a description of the nine steps in the LFA, experiences of using the LFA, and Knoster’s model are presented.

2.1 Aid and poverty

Ending poverty is a global concern and one of the reasons why richer countries provide aid to other countries (Sida, 2018). Aid can be divided into humanitarian aid and development aid. Humanitarian aid is provided for suffering people in catastrophic scenarios. Development aid is provided directly to the receiving country, organizations, authorities or to companies, and is aiming at reducing poverty and promote democracy in a long-term perspective (SIDA, 2015).

Aid is a large industry globally and the majority of all aid is funded from the Development Assistance Committee (DAC) (Fengler & Kharas, 2011). DAC is a committee consisting of thirty countries (OECD, 2019b). Their aim is to “[...] promote policies that will improve the economic and social well-being of people around the world.” (OECD, 2019a).

One country that is a member of DAC is Sweden. According to Sida (2018), the aim of Swedish aid is to create better conditions for people living in poverty and oppression. The number of people living in extreme poverty is still unacceptably high, despite the progress made over the last decades of reducing poverty. The most recent estimates, in 2015, shows that still 10 % of the world’s population lives on less than US \$ 1.90 a day (The World Bank, 2019). The majority of the poorest people live in Sub-Saharan Africa, where 413 million people in 2015 lived in poverty. Furthermore, the poverty rate in this region is increasing, unlike worldwide where it is decreasing. (The World Bank, 2019)

2.2 Tanzania

Tanzania is located in Sub-Saharan Africa, bordering the Indian Ocean, Kenya and Mozambique. The country has a youthful population, about two-thirds of the population is under 25 years old. Their government is a presidential republic, and the largest religion is Christianity, however, approximately a third of the population are

Muslims. (CIA, 2019)

Tanzania has over the last decade had a stable economy with an average annual economic growth of 6-7 % and the poverty rate in the country has decreased. The poverty rate is, however, still high. In 2011, 49.1 % of the population were living on less than US \$ 1.90 a day (The World Bank, n.d.). The persistent poverty in the country is due to the population growth of 2.9 %, lack of productivity growth in agriculture, difficulties in generating jobs, increasing soil degradation and climate change (SIDA, 2019). Furthermore, the majority of the population in Tanzania does not have access to improved sanitation, and close to half of the population does not have access to clean drinking water (UNICEF, nd).

Tanzania is heavily dependent on foreign aid. However, according to DPG - Development Partners Group Tanzania (n.d.), dependency has decreased. Between 2004-2005 44 % of the governmental expenditures were based on donor finances, while in 2013-2014 it had decreased to 19 % (DPG - Development Partners Group Tanzania, n.d.). One of the reasons why aid dependency has decreased is because the government has reduced the share of aid in the budget by trying to increase the tax collection (Landguiden, 2016). This was due to that several donor countries, in 2014, stopped their aid to Tanzania, after a large corruption network was discovered in a state company (DPG - Development Partners Group Tanzania, n.d.). Measures like increasing the transparency and reliability of the aid flow data have been taken to decrease the corruption since then (DPG - Development Partners Group Tanzania, n.d.).

2.2.1 Health care in Tanzania

The health care system in Tanzania is separated between the mainland and Zanzibar. The health care system at the mainland is divided into three levels: nation, region and district. (World Health Organisation, n.d.)

There are three national hospitals in Tanzania which also are university hospitals, that provide teaching. Regional hospitals are located in each region and provide service to approximately 1 million people each, while the district hospitals have approximately 1 bed per 1000 inhabitants, 2-4 doctors and serves a population of 100,000-200,000 inhabitants. (Missionshilfe, n.d.)

One of the major issues at the hospitals in Tanzania is shortages of human resources for health service delivery. The world average of health workers is 9.3 per 1000 inhabitants, while in Africa the average is 2.3 per 1000 inhabitants (World Health Organization, 2006). This can be confirmed in a study conducted by Manzi et al. (2012), in which nurses in Tanzania were asked what could be improved at the hospitals. The answer was that the number of employees at the hospitals was too low. The nurses also stated that the maintenance of the buildings needed to be improved, that the hospitals needed more equipment and that the availability of drugs needed to be improved.

2.3 Background to the LFA method

The source used for this section is *En vägledning till resultatstyrd projektplanering med hjälp av LFA metoden* written by Örtengren (2015), which is a guidance to the LFA method.

LFA is a planning method that originated from the USA and was developed in the 1960s. Since then the method has been widely spread and today it is used as a project planning and evaluation tool amongst aid agencies as well as companies and authorities. The aim of the LFA method is to facilitate the planning, monitoring and management of a change processes to create good and sustainable results.

The LFA method is based on the idea that the service and the products the project delivers should respond to the needs of the target group. Meaning that it is not the resources and activities themselves that are important. It is the achievements, the results of the activities at different levels, the outcomes and impacts, that are the important factors.

The LFA method follows a process that includes nine steps. They are used to ensure relevance, feasibility and sustainability to the project or program. The different steps in the LFA method do not always have to follow the same order, neither need all of them have to be included in the process. Which steps that are included and how they are executed can vary from project to project, depending on the conditions and information that exist when the project starts. The outcome of each step is documented in a project plan. Below follows a description of each step in the LFA method.

2.3.1 Step 1 Context analysis

All change processes are a part of a larger context. The project is constantly affected by different economic, social and politic processes that occur in the society. The project group, therefore, needs to be well aware of the culture in which the project is conducted and what occurs in society. To gain this knowledge the project group needs to conduct an overall pilot study about the environment. Where information should be gathered regarding inter alia the country and the region, in which the project will take place, as well as information about the target group.

2.3.2 Step 2 Stakeholder analysis

Stakeholder involvement in planning and project implementation are highly important in the LFA method. Step two in the LFA method, therefore, aims to answer the following questions:

- Who affect and who is affected by the project?
- Who should be a part of the planning process?

- Who should be involved and informed during the project implementation?

Örtengren (2015) describe stakeholders as individuals or organizations that indirect or direct affect and/or will be affected by the project. They are very important actors in the change process and their support both before, during and after the project time, are often crucial for accomplish sustainable results. The stakeholders can be divided into five main groups, stated below. It is important for the project group to make sure that at least one from each group is a part of the planning process. However, one specific stakeholder can be a part of several groups.

1. Target group
2. Project owner and project group
3. Decisions makers
4. Experts in the subject/field of investigation
5. Financiers

After the stakeholders have been identified, it is time for the project group to plan how the information should be gathered from these different stakeholders. It could be done by workshops, seminars, interviews and/or surveys. According to Örtengren (2015) the most time efficient way to gather information is by doing a LFA-workshop.

During a LFA-workshop different important stakeholders gathers to openly discuss a draft over the project plan, to summarize why and what should be done within the frame of the project. A LFA-workshop, therefore, includes conducting a problem analysis (step 3), discussing the goals with the project (step 4) and creating a first proposal over the activities (step 5). If there is time, a risk analysis is also carried out (step 8).

After the LFA-workshop it is the project group responsibility to analyze the result and establish a final and more detailed project plan. Thereafter, the project group develops and specify in detail how the project should be conducted. It is the project group together with the project owner and the financiers that decide upon the final project plan, not all the stakeholders.

The project group should, however, after that the final project plan is compiled, give feedback to all the stakeholders that were present at the LFA-workshop. It could be done by sending reports from the LFA-workshop to them and tentatively, have a seminar where the final project plan is presented.

2.3.3 Step 3 Problem analysis

The problem analysis analyze situation before the project starts. The analysis should be performed by the stakeholders that have knowledge about the local situation and the current topic. If the project is carried out in a foreign country the stakeholders should be from the local population. The problem analysis is, as mentioned in

2. Background

Subsection 2.3.2, preferably discussed during a LFA-workshop. If it is not possible to conduct a workshop the project group could gather information by interviewing different stakeholders and then structure the stakeholders answer in a problem analysis. A problem analysis is divided into three parts: main problem, causes and effects.

The main problem is one problem which the project group will aim to solve during the project time frame, entailing that it has to be realistic. During the formulation of the main problem the target group, the final beneficiaries and the resource should be considered. The main problem often focuses on challenges that the beneficiaries have, for example, contaminated drinking water in village X. It is the project owner together with the project group that decides which main problem that should be solved during the project.

The causes are the underlying reasons for the main problem to occur. All main problems have their individual causes, which the project group needs to solve in order to solve the main problem.

The effects are the consequences the main problem leads to, both for individuals and society. For example, an increased number of infected people and/or increased cost for society. The effects are the arguments for the main problem to be solved.

To visualize the main problem, its causes and effects, and to understand how they relate to one another, a problem tree can be conducted, see Figure 2.1. The main problem is placed in the middle of the figure and symbolizes the trunk of the tree. The causes are placed at the bottom of the figure and represent the roots. The causes are divided into main causes and sub-causes. The main causes are at the top of the chain, with underlying sub-causes. The effects, at the top of the figure, represent the branches of the tree.

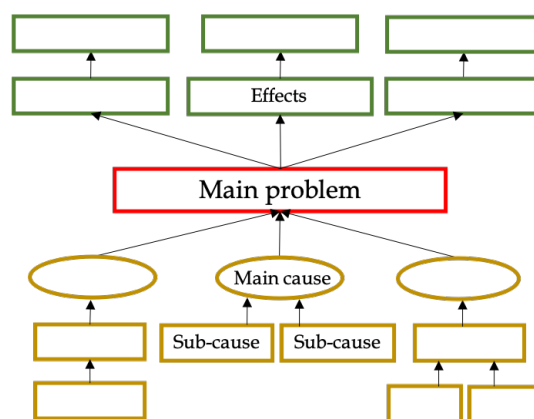


Figure 2.1: A template over a problem tree. The main problem is in the red square. The main causes in the yellow ovals with their underlying sub-causes in the yellow squares. The effects are in the green squares. Adapted from Örtengren (2015)

A problem tree is compiled during the LFA-workshop by letting the stakeholders write down what they think is the main problem. Then a discussion follows regarding the causes and the effects of this problem. During the LFA-workshop it is favorable to get help from a professional facilitator, a neutral person, in order to facilitate the process of conducting the problem analysis. The problem tree created will be the foundation for the next step in the LFA method, the objective analysis.

2.3.4 Step 4 Objective analysis

In the problem analysis the main problem, causes and effects have been identified, as mentioned in Subsection 2.3.3. The objective analysis is based on the outcome of the problem analysis. The analysis results in overall objectives, one project objective and intermediate objectives. These are connected to the main problem, causes and effects as shown in Figure 2.2. The objective analysis also includes expected outcomes which are connected to the activities, see Figure 2.3.

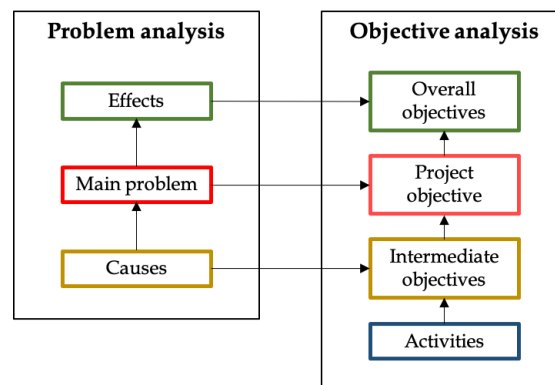


Figure 2.2: The connection between the problem analysis and the objective analysis. Adapted from Örtengren (2015)

The overall objectives are *long-term* goals indicating the direction of the project. However, they are not expected to be achieved until several years after the project is finished. The identification of the overall objectives are made by translating the effects into overall objectives, as can be seen in Figure 2.2.

The project objective is the reason behind the project and aims to solve the main problem, see Figure 2.2. A project should only have one project objective and it shall describe the ideal situation directly after the project is finished, i.e. the *medium-term* outcome. The project objective should create an improved situation for the target group. It is the project group responsibility to complete the project objective during the project time frame.

The intermediate objectives are the *short-term* goals. It is by analyzing the causes in the problem tree that the intermediate objectives are created, see Figure 2.2. A project has several intermediate objectives, however, it is important not to have too

many since it can be hard to conduct and control all of them. Furthermore, each intermediate objective needs to have a clear and specified plan with activities that explains how the goals should be reached.

The project objective and the intermediate objectives shall be **"SMART"** in order to facilitate the formulation of the objectives. Entailing that they need to be:

- **S**pecific (*distinct, clear*)
- **M**easurable (*should be able to connect indicators to the goals, see step 7*)
- **A**ccepted (*by the project group and the project owner*)
- **R**ealistisc (*based on conditions such as mandates and resources*)
- **T**ime limited (*achieved during the time frame*)

Expected outputs are the *direct* results after an activity has been performed. They differ from the other parts in the objective analysis since they are not a result of the problem tree. The expected outputs can only be made first after the activity plan has been made. Each activity in the activity plan has an expected output, see Figure 2.3. The expected outputs are highly important in order to calculate a detailed budget, distribute the responsibilities and to create a realistic time frame. However, it is important to remember that the expected outputs do not take into account the quality of the activities, only that they have been accomplished. It is first in step 7 that the results are evaluated.

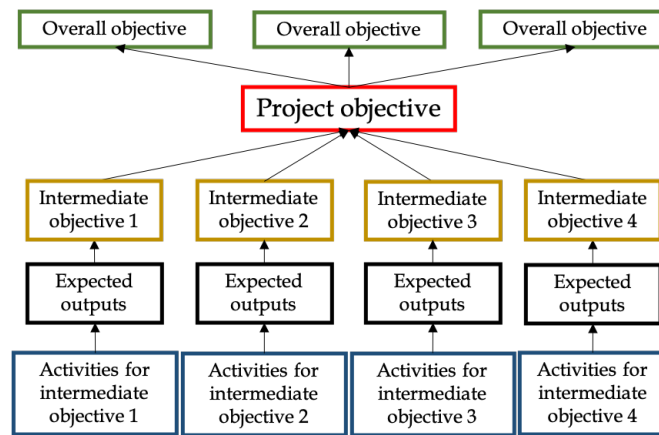


Figure 2.3: A template that describes how the different objectives in the objective analysis are connected to each other and how they relate to the expected outputs and activities. Adapted from Örtengren (2015)

2.3.5 Step 5 Activity plan

All of the intermediate objectives created in the previous step should have an activity plan. An activity plan is activities that answer how each of the intermediate objectives will be reached. The activities can be measures decided by the project

team, as well as the work performed by, for example, a construction company. The activities aim to solve the causes in the problem tree, which consequently solves the intermediate objectives, the project objectives and in the long-term also the overall objectives.

It is beneficial for the project to have several detailed activities connected to each objective since it will facilitate the resource planning and the risk analysis. In addition, if an activity is proven not to lead to good results, the activities should be changed.

2.3.6 Step 6 Resources

Step 6 in the LFA method analyzes the resources that are required in order to perform the activities. The resources are divided into the following categories:

- **Technical expertise/staff/competence:** An inventory of the staff and the decision regarding who is responsible for each activity should be performed. It should also be decided which competence needed for each activity.
- **Budget:** The budget should be detailed and divided into each activity.
- **Time frame:** The time frame should be connected to the activities.
- **Equipment:** An investigation of eventual equipment should be performed.

When assembling a project group it is important to include sufficient competence to the project, which includes persons with different experiences, age and gender. The administration is an important part of project management and a person responsible for the economy can be preferable. In a larger project, it can also be advantageously to have a control group.

In international aid projects the members in the project group are usually from the country of operation but also from other countries. This entails that the project group most likely is geographically dispersed in the world. Making the division of responsibilities within the project group very important, i.e. stating who is responsible for each activity.

Another important part of all projects is the economy. The budget, as well as a time schedule, should be performed in a way so it is easy to follow and monitor. One example of project monitoring can be seen in Table 2.1, however project monitoring will be further explained in Sub-Section 2.3.7.

Table 2.1: Example of project monitoring. Adapted from Örtengren (2015)

Intermediate objective				
Activity	Expected outcome	Responsible person	Time	Budget/activity
1.1				
1.2				
1.3				

Monitoring: Indicators	Source of verification

2.3.7 Step 7 Measurement of the result

Monitoring of the result is done by applying indicators and verification sources to each objective, to see if and when the objectives are met. The monitoring is facilitated if the objectives are stated as "SMART", as mentioned in Section 2.3.4, and if each of them is connected with 3-4 indicators and verification sources.

The indicators are measures for project success. There is no standard for how indicators should be stated, they are unique for each objective. However, the indicators should be neutral and objectively verifiable, for example, “% of primary care personnel who have been trained in infection tracing” or “number of primary health care personnel in the region who have undergone training”.

Besides the indicators connected to the objectives, it should be clearly stated where data could be found to measure the result, i.e. each indicator should be connected with a verification source. The verification sources could in larger projects be data from international organizations or ministries. However, the value of the indicator is normally gathered from interviews with the target group, inspections, exams, etc. Applying verification sources are a method to measure the completion of the objectives, a follow-up activity.

2.3.8 Step 8 Risk analysis

In order to assess the prerequisites for the project, an analysis of both external and internal critical risks that may occur has to be made. The external risks cannot be prevented by the project group, for example, corruption at a national level or natural disasters. They do however need to be considered before the project starts to make sure that they do not prevent the project to be completed. The internal risks, on the other hand, are risks that the project group can control. It could be practical issues like delays in deliveries or a limited amount of time. The project group can minimize the effects of these risks by creating a risk analysis and identify

how these risk should be managed.

Risk analysis is an iterative process that helps create sustainable results. It has to be made at the beginning of the process, but also continuously during the execution of the project. It is the persons responsible for the project that identifies, analyzes and estimates different factors that can affect the ability of the project to reach its goals.

Once a risk is identified, the causes, as well as the measures to that risk, needs to be identified. It is the measures that are included in the activity plan. To be able to assess which risk that may have the greatest negative impact on the project, the risk can be weighted. The probability for the risk to occur as well as the consequences if it occurs, are each given a number from 1-5. The numbers are then multiplied and the risks with the highest numbers are most crucial to solve.

2.3.9 Step 9 Assumptions

Assumptions can be described as problems that need to be solved in order to achieve the project goals. However, the assumptions are not something that the project group itself can solve, they are therefore assumed to be solved by someone else. An assumption can, for example, be: "On condition that law X on obligatory school attendance for all children is enacted by Parliament in country Y, an important foundation for supporting education in accordance with the model presented by the project of children and young people with disabilities is laid." The project group cannot affect the legislation, but they can assume whether or not it is realistic that the law will be implemented.

The assumptions are preferably identified by analyzing the problem tree. The assumptions are the problems in the problem analysis that are important and relevant to solve, but not manageable by the project group. Hence they need to be solved by another actor.

2.4 Different views on the LFA method

The LFA method is globally used by a wide range of development organizations and is most frequently used in the projects planning phase (SIDA, 2006). One advantage of using LFA is that the method provides a clear framework, with a clear set of expectations, regarding what the work should achieve.

Moreover, it is a structured way of reporting progress as well as providing the possibility of producing visible and sustainable impact, as a result of development interventions. Furthermore, it challenges the performer of the LFA to think more deeply about the work and how it impacts people's lives. (Bakewell & Garbutt, 2005)

One of the driving forces behind the use of the LFA is due to a force from donors and that it is a prerequisite for receiving funding from several aid agencies (Crawford & Bryce, 2003). In a report by Bakewell and Garbutt (2005), several responses have

been collected from Swedish development NGOs, that receives support from SIDA, regarding their view of the LFA method. One of the respondents argues that the once in the top of the hierarchy, i.e. managers dealing with multiple projects, find the LFA a helpful tool. Since it provides a summary that simplifies the complexity of the project, which provides a good overview of the project for the managers. However, the lower in the hierarchy it gets, i.e. the closer to the reality of the development it gets, the more complains there are about the LFA method. (Bakewell & Garbutt, 2005)

There are reasons why the LFA has not been appreciated. Some experience that the method requires much time to learn (Bakewell & Garbutt, 2005) and that it is complicated, entailing that initiatives are suppressed. Furthermore, the method is described as linear, predictable and quantifiable. Even though this is advantageous during the planning process, it does not depict the complexity of the reality, hence it is argued that the method is not applicable to the reality (SIDA, 2006).

In addition, the LFA method has been experienced hard to communicate in a simplified way to local partners, so that the local partners easily can perform it. It has been argued that it was hard to communicate the idea of the LFA since it was hard to translate the concepts behind the method. Furthermore, some cultures had difficulties to understand the way of thinking in the LFA. (Bakewell & Garbutt, 2005)

Furthermore, as mentioned in Section 2.3, stakeholder participation in a project is a prerequisite for project success (Örtengren, 2015). However, it is found that NGOs experience the participatory approach being time and resources consuming. For example, a logical framework took two years to conduct for a water project (Bakewell & Garbutt, 2005).

2.5 Knoster's model

The LFA method is one method of how to succeed with a project - to create a change, however, there are several other methods and guidelines that can be followed in order to create a change. Teclehaimanot (2006) describe Knoster's model for managing complex change. The model depicts five main elements that are needed for a successful change to occur: *vision*, *incentives*, *skills*, *resources* and an *action plan*, shown in Figure 2.4.

According to De Graaff and Kolmos (2007) Knoster emphasizes that if one of these elements is missing, the attitude among the staff members will vary. Teclehaimanot (2006) describe that lack of *vision* can create confusion. When the *incentives* are missing, people can become resistant to change or that it becomes a gradual change. Anxiety can be a consequence when people feel that they lack the necessary skills needed to make a change. Frustration can be experienced if *resources* are missing, and finally, if there is no *action plan*, one oftentimes sees multiple false starts.

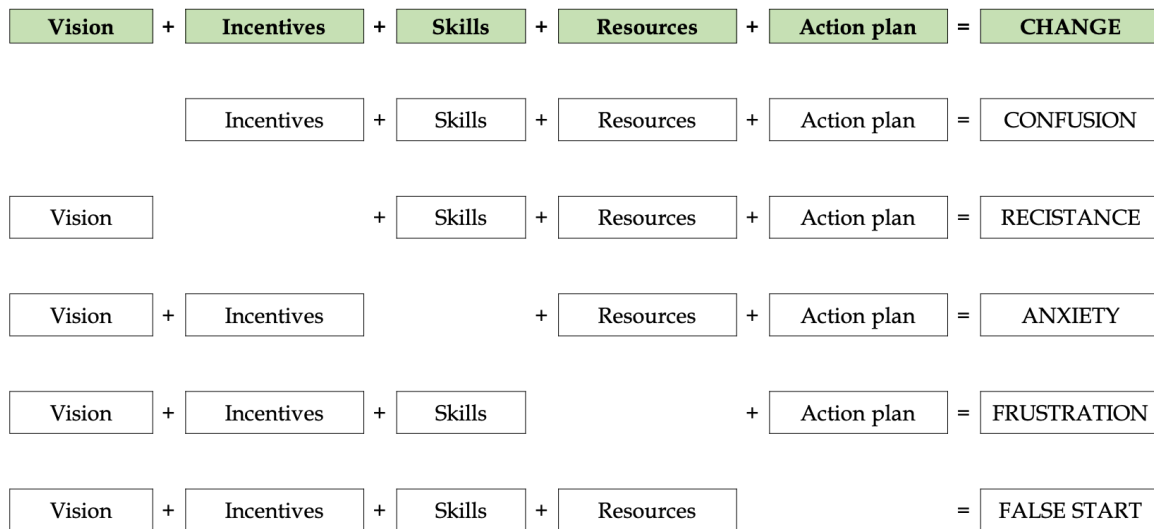


Figure 2.4: Knoster's model for managing complex change. Including the elements and the change in attitude amongst the members if one element is missing. Adapted from Teclehaimanot (2006)

Knowledge regarding the meaning of each step is a prerequisite to prevent that one or several of these elements become absent in a project (Astrakan, n.d.). Astrakan (n.d.) explains each step as follows:

The *vision* of the change has to be built upon the picture that the future will be better than the situation today. The *vision* should answer: in what way will the change improve the situation? The change should not be implemented if it is not possible to describe how the change creates improvements.

Incentives are achieved first after the *vision* is understood and accepted by all the involved parties. It is important to have enough insight into "what and why" that should be done, in order to take a position on the change. Meaning that the employees have to understand the purpose of the change in order to make a change.

If the right skills in a project are missing, a change can easily fail. The involved parties need to have the competence required, to successfully meet the new requirements that the change means.

It often happens that projects or businesses fall short on *resources* since most of the changes take more time and money than what is planned. It is, therefore, important not to underestimate the change and push too many change initiatives at the same time.

Planning the change, i.e create an *action plan*, is a prerequisite to prevent unexpected events to occur. It is hard to predict the effects of the change, therefore, an *action plan* can be hard to perform. However, if the change has not been planned, many unforeseen events will occur that can prevent the project or the organization to move forward.

3

Case study: The Mkula Hospital Project

As a part of this master thesis, a case study was conducted. In which a small-scale foreign aid project was performed, with the overall goal to assist Mkula Hospital to address their most important infrastructural challenges. This chapter is an overall pilot study which presents the background to the Mkula Hospital Project, information about Mkula and the hospital, as well as infrastructural challenges at the hospital today.

3.1 Initiation and project structure

The initiative for this master thesis came from the project group "Healthy Hospitals", which consists of three members. Two civil engineers, which are project managers, and one architect, who is in charge of the economy. The HHPG started working with the Mkula Hospital Project the spring 2018 and had previously worked together with a hospital in Kolandoto between 2015-2017 (Lexell & Cronemyr, 2018).

During the three years that the Kolandoto Hospital Project was carried out, eight master theses were conducted and fourteen students from Chalmers University of Technology were involved. The most extensive implementations that HHPG coordinated during this period were a new pump which increased the water supply, construction of a new emergency department and a solar driven electricity backup system. (Lexell & Cronemyr, 2018)

The Kolandoto Hospital Project was structured into three phases, each with a duration of seven weeks on site, including one introduction week with the HHPG on site. During phase one the hospital's infrastructural needs and challenges were identified together with the HMT. During phase two and three, measures were taken to solve the problems that were identified during the first year. (Lexell & Cronemyr, 2018)

The Mkula Hospital Project is planned to be structured almost in the same way. An introduction week with the HHPG present on site, and three phases. However, with a longer duration on site for phase 2 and 3. The first phase consisted of seven weeks and one group of students. The second phase, in which the MHP was performed, consisted of 12 weeks and two groups of students, which were present on site for seven weeks each, see Figure 5.6. The plan for phase three is to extend the phase

to at least 12 weeks as well, hopefully longer if possible.

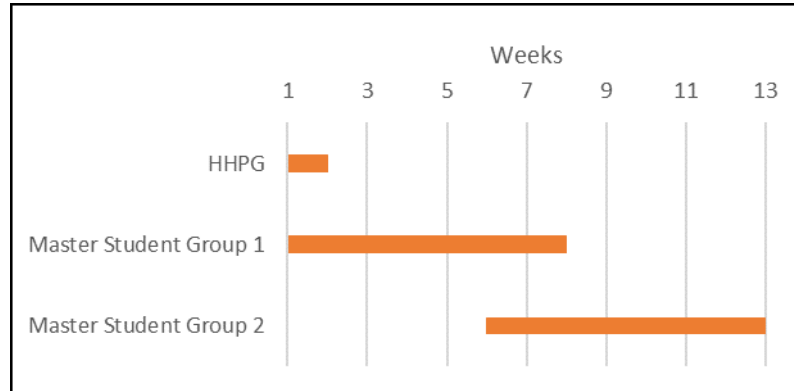


Figure 3.1: A timeline over the 12 weeks the MHP was active in Mkula. Showing the duration on site for the HHPG and the two groups of students.

A difference between the first and second phase in the Mkula Hospital Project was that HHPG visited Mkula Hospital for one week before phase one started, to decide what measures to take during the first year. It was then decided that a new groundwater pump needed to be installed to increase the water supply at the hospital. During phase one the students, therefore, focused on implementing this new groundwater pump. During phase 2 the HHPG did not visit the hospital before the project started. Therefore, we had to start by investigating the infrastructural needs at the hospital, before any decision could be made regarding the focus for this phase.

3.2 Mkula village

Mkula is a village located in the northern part of Tanzania. It belongs to the Busega district which is a part of the Simiyu region see Figure 3.2 (AICT, n.d.-a). The village has approximately 17 000 inhabitants and the hospital is the only one in the district, entailing that they have a catchment area of over 200 000 people. (National Bureau of Statistics & Office of Chief Government Statistician, 2013).



Figure 3.2: A map over Tanzania and the location of Mkula. The yellow part shows the Simiyu region while the red part shows the district of Busega. Mkula is marked with a white dot in the district of Busega. (Kullberg, 2018)

The climate in Mkula varies from tropical, in the rain season, to dry, in the dry period. During the rainy season, between November to April, it rains approximately 800-1000 mm. The people in Mkula is highly dependent on the rain since most of the villagers are farmers. A prosperous harvest of cotton, millet, rice or beans entails a better income. Some people in the village are also performing fishing activities and/or keeps cattle's, goats, sheep and chickens. (AICT, n.d.-a).

3.3 The Mkula Hospital

Mkula Hospital is a voluntary agency hospital, established in 1986, with a daily number of approximately 90 patients, 40 outpatients and 50 inpatients. The hospital is governed and operated by Africa Inland Church of Tanzania (AICT) and provides both preventive and curative services of various ranges. Some of the services are listed below: (AICT, n.d.-b)

- Outpatient departments
- Tuberculosis and leprosy service
- Dental care
- Surgery
- Care and treatment clinic for HIV/Aids
- Laboratory
- Reproductive child health (RCH)

- Inpatient departments, including;
 - Female ward (surgical & medical)
 - Maternity ward (including labour ward)
 - Pediatric ward (surgical & medical)
 - Male ward (surgical & medical)

3.3.1 Situation at the Mkula Hospital today

Mkula hospital faces several infrastructural challenges regarding inter alia, the sewage system, the restrooms, the electricity, lack of space for their operations and erosion of the buildings. Furthermore, the shortage of water is still a problem today, however, due to the water pump installed last year, the amount of water at the hospital has increased significantly. Therefore, they do not emphasize water shortage as such a vital problem that it needs to be solved this year. The information regarding the infrastructural challenges at the hospital has been gathered through informal meetings with the hospital staff, direct observations and participant observations.

The HMT stress the need for reparation of the existing sewage system since they have several problems with, for example, leakages of wastewater, back-flows, and clogging of pipes. Furthermore, the HMT points out the unsustainable condition of the toilets inside the wards. The majority of the toilets are broken and the concrete surface on the floors makes it hard to clean.

Besides this, the hospital needs an Uninterrupted Power Supply (UPS) system. This is an automatic switch for the generator which turns on the power automatically when the power breaks. Today they have to manually go to the generator and turn the power back on every time the power breaks, which happens several times a day. This becomes a major problem, especially when they have to perform surgery during the night.

Furthermore, the HMT wants to extend the laboratory to be able to analyze the samples at the hospital instead of having to send them away. Sending the samples to another laboratory entails more costs and longer waiting time for the patients before they get their test results back. The HMT have therefore expressed a wish of moving the RCH out from the laboratory and build a separate building for the RCH. This would entail more room for both the laboratory and the RCH.

Lastly, the hospital has several problems when it comes to rainwater. The heavy rainfalls during the rainy season have created erosion of the buildings. Additionally, water is unintentionally collected outside the surgery building, which has led to that water is leaking into one of the surgery rooms.

4

Method

This chapter describes the first week when we decided to choose the LFA as a planning method in the MHP. Furthermore, the chapter presents how we performed each step in the LFA as well as how we conducted the case study.

Knoster's model presented in Subsection 2.5 has not been used during the execution of the MHP. It has been used in order to present another view on how the project group managed to create a change at the Mkula Hospital, hence it will be discussed in Section 7.3.

4.1 First week

Before the arrival to Mkula, the HHPG sent a Memorandum of Understanding (MoU) and a project plan to the HMT. The purpose of the MoU was to clarify the responsibilities of the different partners as well as the decision-making structure within the collaboration, see Appendix A. The project plan was written by HHPG and based on observations from last year, including several issues regarding infrastructure and buildings.

During our first week in Mkula the HHPG was on site to help us get started with the MHP. The goal with that week was to decide together with the HMT the main focus for phase two. The first week included several meetings with the HMT and inspections of the hospital area, both with and without the HMT.

When the HHPG left Mkula we had agreed upon what to focus on for phase two. However the second week the focus shifted. Hence, the decision was made to use the LFA method for the continuing time on site. We felt that we needed a structure for the planning process, to facilitate the decision-making process regarding what to focus on during the MHP. Furthermore, we wanted to make sure that the implementations would be sustainable and could be agreed upon by both the HMT and the HHPG.

The reason why we specifically chose the LFA as a planning method for the MHP was because it is a widely used project planning and evaluation method amongst aid agencies around the world. Therefore we considered the LFA to be the most appropriate method for this project.

4.2 Execution of the LFA

The LFA method is an iterative process entailing that some of the steps were made several times. The outcome from each step was summarized in a project plan, see Appendix B. The project plan was a living document that changed as the MHP moved forward. Each time changes were made, it was read through and approved by the HMT.

Below follows a description of the steps from the LFA that were performed during the MHP. All steps except for step 9 *Assumptions* were executed. As stated in Section 2.3.9, assumptions can be described as *"[...] problems that need to be solved in order to achieve the project goals. However, the assumptions are nothing that the project group itself can solve and they are therefore assumed to be solved by someone else."*

We could not find problems that would prevent the MHP to reach its goals. Neither were we able to find problems that we were not able to solve but could be solved by another actor. For example, three problems identified in the problem tree, see Figure 5.3, were lack of staff, financial limitations and lack of knowledge. These problems could not be solved by the HMT, but they did not prevent us from reaching our goals. Therefore, we chose not to include the assumptions in our LFA method.

The LFA method was served as guidance throughout our time at Mkula. The steps in the LFA was carried out, adjusted in a way that was applicable to this case study, and continuously analyzed along the way.

4.2.1 Step 1 Context analysis

To gain knowledge about the environment, in which the MHP took place, an overall pilot study was performed. The information to the pilot study was gathered from several sources, including meetings with the HMT, observations on site as well as internet sources and previously written master theses.

4.2.2 Step 2 Stakeholder analysis

The stakeholder analysis includes identification and analysis of the different stakeholders as well as performing a LFA-workshop. The identification of the stakeholders was made by gathering information from the previous students that performed phase one, HHPG and HMT. Thereafter, the stakeholders were divided into the five groups mentioned in Subsection 2.3.2. The analysis was made by answering the questions stated in Subsection 2.3.2.

The LFA suggests that the project group should organize a LFA-workshop where all the stakeholders gather to openly discuss a draft over the project plan, to summarize why and what should be done within the frame of the project. This was not an option for us since we were not able to gather all the stakeholders at the same time for one

meeting, neither could the HMT set aside one entire day for one workshop. Hence we divided the LFA-workshops into smaller workshops and meetings, in which we discussed one subject at a time. The outcomes from each meeting/workshop were compiled in the project plan, see Appendix B and confirmed by the HMT.

4.2.3 Step 3 Problem analysis

A workshop was held together with the HMT to understand how the situation was before the MHP started, in which a problem tree was created. The establishment of the problem tree was an iterative process, entailing that it was continuously updated as the project developed or when HMT's priorities changed.

The workshop was held with the HMT since they own the MHP and have the best knowledge regarding the problems at the hospital. The workshop started with us having an introduction of the problem tree, with examples and bullet points explaining each part of the problem tree. Followed by a presentation of the structure of the workshop. The workshop was planned to be divided into three parts, one discussion for each part of the problem tree, i.e. the main problem, causes, and effects. In order to include everyone's opinions, each discussion was planned to start by them individually thinking of each topic, one at the time, and then discuss together. We tried to have a facilitating role during the workshop, which entailed creating commitment and including the participants in the discussion without steering the discussion.

However, we noticed that the participants found it difficult to understand the definition of the main problem. Instead of discussing one main problem, they listed visual problems at the hospital area, i.e the causes. Entailing that we, that was supposed to be facilitators, had to break our role and help them find the main problem.

When the main problem as well as the main causes were set, the reason behind each main cause, i.e sub-causes were identified. This was done by asking the question: "why does this cause occur?". This entailed that the main causes were narrowed down until no more underlying sub-cause could be found. A similar procedure was performed when the effects were identified. However the question asked now was: "what does this lead to?", starting from the main problem leading to the final effect that could occur. In the end, the workshop was summarized by us and HMT approved it.

Besides the problem tree workshop, inspections of the hospital area were performed, to gain a deeper understanding regarding the problems at the hospital. The initial inspection was held by the HMT, where they informed us about the general issues at the hospital. Thereafter, more thorough inspections were held together with the hospital engineers, where the problems were discussed more in detail.

As mentioned at the beginning of this subsection, the problem tree was an iterative process. We had to update the problem tree continuously as new inputs were added. The final problem tree was conducted without the involvement of the HMT, however

in the same procedure as the workshop described above, and thereafter approved by the HMT.

4.2.4 Step 4 Objective analysis

This step aims to create objectives for the MHP, i.e. overall objectives, project objective and intermediate objectives. The problem tree was the foundation for the objective analysis, as described in Subsection 2.3.4.

Each part of the problem tree was discussed and relevant objectives were established. The process of creating objectives from the problem analysis was carried out as Figure 2.2 shows. This means that the effects were transferred into overall objectives, the main problem into a project objective and the causes were transferred into intermediate objectives. The expected outputs could be made first after the activities had been created. All the objectives, together with associated activities and expected output, were compiled into the template in Figure 2.3. The objective analysis was thereafter included in the project plan and confirmed by the HMT.

4.2.5 Step 5 Activity plan

Each intermediate objective was given an activity plan. The activity plan contained activities that aimed to solve the causes. The activities for each intermediate objective were identified together with the HMT through meetings and inspections of the hospital area. It was ensured that all of the identified activities were measures answering how the intermediate objectives should be reached. The activities, as well as drawings, clarifications and inventory lists, were sent to the contractors in order for them to calculate offers for each activity.

Continuous communication with the contractors was held to clarify our descriptions and to include their suggestions of how to improve the activities. They provided us with input regarding the execution of the activities and how the price could be decreased e.g. by choosing different materials.

When we received the final offers we realized that we could not afford all the activities that we sent to the contractors. A workshop was, therefore, held with the HMT to make them rank and prioritize the activities. Thereafter, the project tree was modified and narrowed down. This resulted in a new and more detailed activity plan, that only included reparation of the sewage system and rehabilitation of the restrooms. However, even though these activities were more detailed, they did not provide enough information for the contractor to calculate the correct price and to know exactly what was expected from them. Therefore, we created a drawing over the sewage system and made clarifications regarding both the sewage system and the restrooms.

4.2.6 Step 6 Resources

Before we arrived at the hospital, most of the resources i.e. technical expertise, budget, time frame and equipment were already set. We had only influence and control over parts of the technical expertise, budget, and time frame, which will be explained more thoroughly below.

The technical expertise was almost established when we arrived. The part missing was the contractor, entailing expertise in construction work at Tanzania, price, and equipment. HMT recommended two contractors they had worked with before, that had performed well and was familiar with the hospital area. It was our work to choose between them, however, in consideration with the HMT and HHPG. The contractor we chose to work with was then responsible for setting a time frame for the execution of the construction work. They were also in charge of the equipment and stood for expertise regarding how the work should be performed.

The budget consisted mainly of scholarships, which were applied for before the project started. However, additional scholarships were applied for on site, since several larger measures were found that were costly. The financial manager in HHPG received the donations and organized the transaction to the hospital. Our role on site was to document and compare the different offers to understand what we could afford, and then presented the affordable measures to the HMT. Thereafter, the HMT prioritized the different measures and decided what should be implemented. When the measures had been decided, we reported back to the HHPG and the right amount of money was transferred to the hospital. Finally, the person responsible for the economy at the hospital transferred the money to the construction company.

A brief time schedule was created together with the HHPG at the beginning of the MHP. Thereafter, a more detailed schedule for each week was created by us, which we continuously updated along the way. Furthermore, each day we documented the progress of the project and our observations. These documentations made it easier for the second group of students when they continued the work at Mkula Hospital, since they could understand what we had done and what was left to do.

4.2.7 Step 7 Measurement of the result

When the activities had been conducted, indicators and verification sources were applied. We started by identifying neutral and objectively verifiable indicators for the intermediate objectives and the main objective. Thereafter, verification sources were connected to each indicator. Three indicators and verification sources were identified and applied to each objective.

The measurements of the result were compiled in the project monitoring template, see Table 2.1, which also includes a summary of step 4, 5 and 6. Each intermediate objective is associated with activities, expected outputs and resources, as well as indicators and verification sources. The main objective has no activities, therefore, this table only includes indicators and verification sources.

4.2.8 Step 8 Risk analysis

Different scenarios that could occur at the MHP were discussed with the HHPG and risks within each scenario were identified. These risks were written down and included in the project plan for the HMT to read through and agree upon. Both external and internal risks were considered and the risk analysis was updated as new risks were identified. However, a more thorough risk analysis, where the risks were weighted, was not conducted during the MHP. This was not prioritized due to the limited amount of time on site.

The measures were dealt with in different ways, some were included in the activity plan while others were included in the way we operated. Measures that the contractor and/or HMT were responsible for were included in the activity plan, for example, put up signs inside the wards or empty the soak pits and the septic tanks slowly and carefully to prevent collapse. Measures that were included in the way we operated were, for example, that we made sure to have meetings regularly with open dialogues to prevent issues in the collaboration with the HMT, or that we were aware of the local currency and therefore had a buffer to prevent breaking the budget.

4.3 Case Study

The LFA method was performed in a single case study at Mkula Hospital in Tanzania. A case study should according to Yin (2009) be used when "how" and "why" question are asked, when the investigator has limited control over the event and when the focus is on a contemporary phenomenon in a real-life context.

Yin (2009), states that for the collection of data in a case study, the case study benefit of having multiple sources of evidence, creating a database for the case study and creating a chain of evidence. The most common sources of evidence for a case study is according to Yin (2009): documents, archival records, interviews, direct observations, participant observation, and physical artifacts. For our case study documents, interviews, direct observations and participant-observations were used as sources of evidence.

4.3.0.1 Documentation

According to Yin (2009), documents can be used in every case study and in different ways. The most important use of documents is to confirm and strengthen the evidence that is received from other sources (Yin, 2009). Useful documentation is e.g. letters, e-mail, agendas and news (Yin, 2009). In the MHP the documents were mostly used for confirming names and titles of persons involved in the project.

4.3.0.2 Direct observation

A case study takes place in a natural setting, entailing that direct observations are suitable in order to observe behaviors and conditions. The observation can be for-

mal or casual data collection. Formal observations can be done during meetings, sidewalk activities or in classrooms, etc. Casual observations can be performed e.g. during study visits or during an interview. It is good to have more than one person observing to increase the observational evidence. (Yin, 2009)

The direct observations in the MHP were performed during meetings, inspections of the hospital area and interviews. During the meetings, one person was actively participating while the other was observing. After the meetings, the observations were discussed and documented.

4.3.0.3 Participant observation

Participant observations are performed as the observer having an active role by, for example, participating in the events that are studied (Yin, 2009). It could be social interactions in a neighborhood or serving as a staff member in an organization (Yin, 2009). Participant observations were made continuously as we were a part of the MHP and performed the LFA.

4.3.0.4 Interviews

Two semi-structured interviews were performed with two of the members of the HMT. One was held with the medical director and one with the head of the nurses. Semi-structured interviews were chosen since they allow the interviewer to be flexible in how the questions are asked (Daymon & Holloway, 2011). The interviewer is also allowed to refocus the questions and ask more questions to get a deeper understanding if something interesting is said during the interview (Baskarada, 2014).

In order to perform the interviews, we followed the structure compiled by Kasunic (2010). The interviews started with an orientation, which, according to Kasunic (2010), is an introduction of the interview and the study. Secondly, clarification was made regarding expectations of non-attribution and sharing of data, etc. Thereafter, the information and gathering were made, entailing that the questions were asked and answers recorded. Finally, in the closing phase, we reviewed the key points and thanked the interviewee for the interview.

During the interviews both of us was participation, since Yin (2009) states that the interview benefits of having two persons present, one asking questions and one taking notes. Furthermore, Yin (2009) argues that it is beneficial to use probe questions, which starts with "how" and cannot be answered with "no" or "yes". Moreover, "why" questions should be avoided since these questions may create defensiveness from the interviewees (Yin, 2009). Therefore, when we formulated our interview questions, we took this into consideration, trying only to use probe question and avoid "why" questions.

5

Outcome of the LFA

In this chapter, the outcome of each step in the LFA is presented. Each step in the LFA is also compiled in the project plan, see Appendix B. The project plan was used as decision-support and continuously updated along the planning process.

5.1 Step 1 Context analysis

The overall pilot study, describing the environment in which the MHP took place, is presented in Chapter 3. Below follows a summary list of the most important findings from both Chapter 3 and Section 2.2.

- HHPG have previously worked with a hospital in Kolandoto, which included three phases
- The MHP started 2018 with phase one, followed by phase two this year
- About two-thirds of the population in Tanzania is under 25
- The government is a presidential republic
- The largest religion is Christianity
- The majority of the population in Tanzania does not have access to improved sanitation
- Close to half of the population does not have access to clean drinking water
- Mkula is located in the Busega district and has 17 000 inhabitants
- The climate in Mkula is tropical, with annual rainfall between 800-1000mm
- The rain season lasts for approximately six months (November-April)
- Most of the villagers in Mkula are farmers
- Mkula Hospital is a voluntary agency hospital, established in 1986
- The hospital is governed and operated by AICT
- The hospital provides both preventive and curative services of various ranges
- The daily number of patients at Mkula Hospital is around 40 outpatients and 50 inpatients
- Mkula Hospital faces several infrastructural challenges, the most crucial ones are listed below:
 - Broken sewage system
 - Unsanitary restrooms
 - Lack of a UPS system
 - Lack of space in the laboratory
 - Erosion of the buildings and leakage into the buildings, due to heavy rainfalls

5.2 Step 2 Stakeholder analysis

The stakeholders identified in the MHP are the HHPG, we, the HMT, local contractors, patients at the hospital and financiers. Before, during and after the project, continuous collaboration and dialogue were obtained between these different stakeholders. A schematic overview of the collaboration structure is presented in Figure 5.1. Thereafter, the identified stakeholders are divided into the five main groups, followed by answers on the three questions stated in Section 2.3.2, in order to analyze how the stakeholders relate to each other.

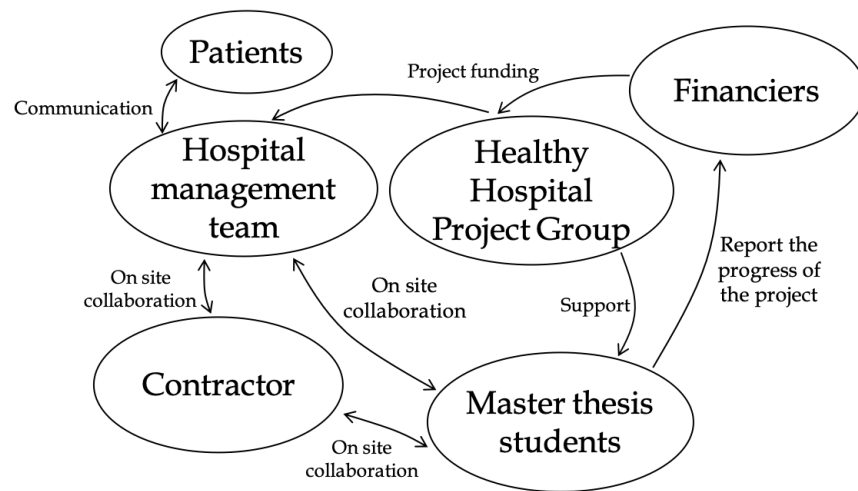


Figure 5.1: A schematic overview of the collaboration structure in the MHP. The figure depicts how different stakeholders have collaborated with each other.

1. **Target group:** Patients at the hospital
2. **Project owner and project group:**
Project owner: the HMT, which include members from the AICT, medical director, medical doctors, head nurses and head of hospital engineers.
Project group: the HMT, we and the HHPG.
3. **Decision makers:** The HMT, we, the HHPG and the local contractor.
4. **Experts in the subject/field of investigation:** The members in the HHPG have knowledge and experiences in the fields regarding geological techniques, hydrology, architecture and aid projects. Furthermore, they have close contact with persons in other fields and organizations, for example, the Red Cross. The contractor has knowledge about construction work in Tanzania and the HMT have knowledge about the hospital as well as health care.
5. **Financiers:** EWB, AWB, ARQ, Chalmers Mastercard, WSP and RISE. Every financier had requirements of how the finance should and should not be used.

Who affect and who is affected by the project?

Who affect the project: All of the stakeholders affect the project in different ways, which is explained below.

The patients at the hospital, i.e. the target group, affect the project indirect since the project is established for them. They are therefore affecting the project even though they are not in charge of the development of the project.

The HMT have the final decision-making power in all project related questions, which can be seen in the MoU, see Appendix A. Hence, they have a great influence when it comes to affecting the development of the project. Furthermore, the HMT affect the project with their knowledge in health care and thereby ensuring that the project results in improved health care for the patients at the hospital.

The HHPG, similar to the HMT, also affect the development of the project. Their knowledge in the subject and experience of similar projects have great importance during the development and execution of the project. Furthermore, they have the mandate to work and execute the activities stated in the project plan, see Appendix B, after it is approved by the HMT. We are the HHPG representatives on site, therefore, everything that pertains the HHPG pertains us as well.

The local contractor affect the project in the later stage. They present a price on the implementations and provide directions regarding the construction method. The price of the implementations steers the project in different directions as the budget regulates the extent of the implementations.

The financiers have an indirect influence on the project. The scholarships given to the project includes requirements which need to be catered during the process.

Who is affected by the project:

Both the patients and the HMT will be affected by the construction work during the project. The hospital will be open at the same time as the construction work is performed, therefore, the environment will be negatively affected due to, inter alia, noise and dust. Furthermore, the patients will have to go out of the wards to use other toilets during the construction work. However, the patients will benefit from the positive outcome of the project. For example, better and more hygiene restrooms at the ward, no odor and no clogging of the pipes.

Who should be a part of the planning process?

The stakeholders that should be involved in the planning process are the HMT, we, the HHPG, the contractor and the patients.

The HMT, we and the HHPG are the head of the project and therefore involved to a great extent in the planning process, with several meetings and updates during the process. The local contractor is involved in a later stage of the planning process, see Figure 5.2, with inputs regarding price and the construction method. They are also the project managers for the construction work. The patients are indirectly included in the planning process through the HMT since communication is performed between them on a daily basis. The financiers are also indirectly included through their

requirements of how the finance should be used. These requirements are considered throughout the process.

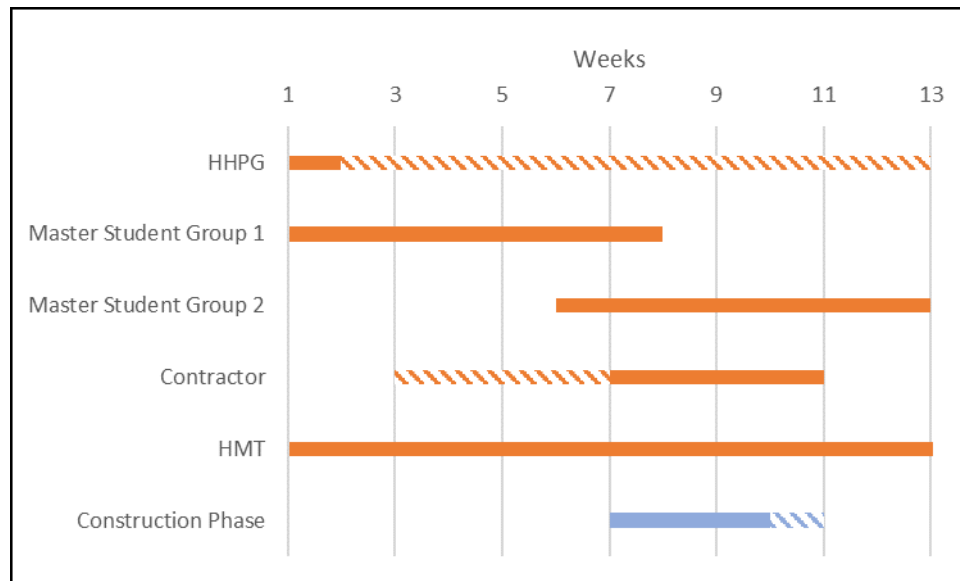


Figure 5.2: The project timeline. The orange filled bars represent the presence of the stakeholders on site, the orange striped bars represent the involvement in the MHP without being on site. The blue filled bar represents the construction phase and the striped blue bar represents the delay of the project.

Who should be involved and informed during the project implementation?

During the implementations, the contractor, HMT, we and HHPG should be involved. It is the contractor that will perform the implementations and the HMT that will receive the implementations. Consequently, it is important that the communication between the contractor and the HMT proceed well. We should follow the project progress on site, making sure that the implementations are performed correctly and according to the contract. The HHPG should be continuously updated regarding the project progress throughout the entire process. The implementation is performed while the hospital is open, therefore, to avoid accidents and prevent confusion, the patients at the hospital should be informed during the construction phase.

5.3 Step 3 Problem analysis

The initial problem tree conducted in a workshop with the HMT, see Appendix D, included a wide range of causes, i.e problems at the hospital. These causes were not realistic since they could not be solved within our time frame or within our budget, entailing that "SMART" objectives could not be connected to them. Therefore, a new problem tree needed to be performed. Information from the problem tree workshop, investigation of the hospital area, meetings with the HMT and finalization of the costs resulted in an iterated and optimized problem tree that could be connected

to "SMART" objectives.

The final problem tree depicts how the situation was at the hospital before the project started. The main problem at the hospital area was stated to be: *unsanitary condition for the patients at Mkula Hospital*, as can be seen in Figure 5.3. Unsanitary conditions mean, in this case, that the patients are not able to wash their hands properly after using the toilets, the toilets and floors inside the restrooms are black due to dirt, and the toilets are so broken that there is hardly any porcelain left. Furthermore, the leakage and backflows of wastewater create a bad odor, making it even more unpleasant to use the restrooms.

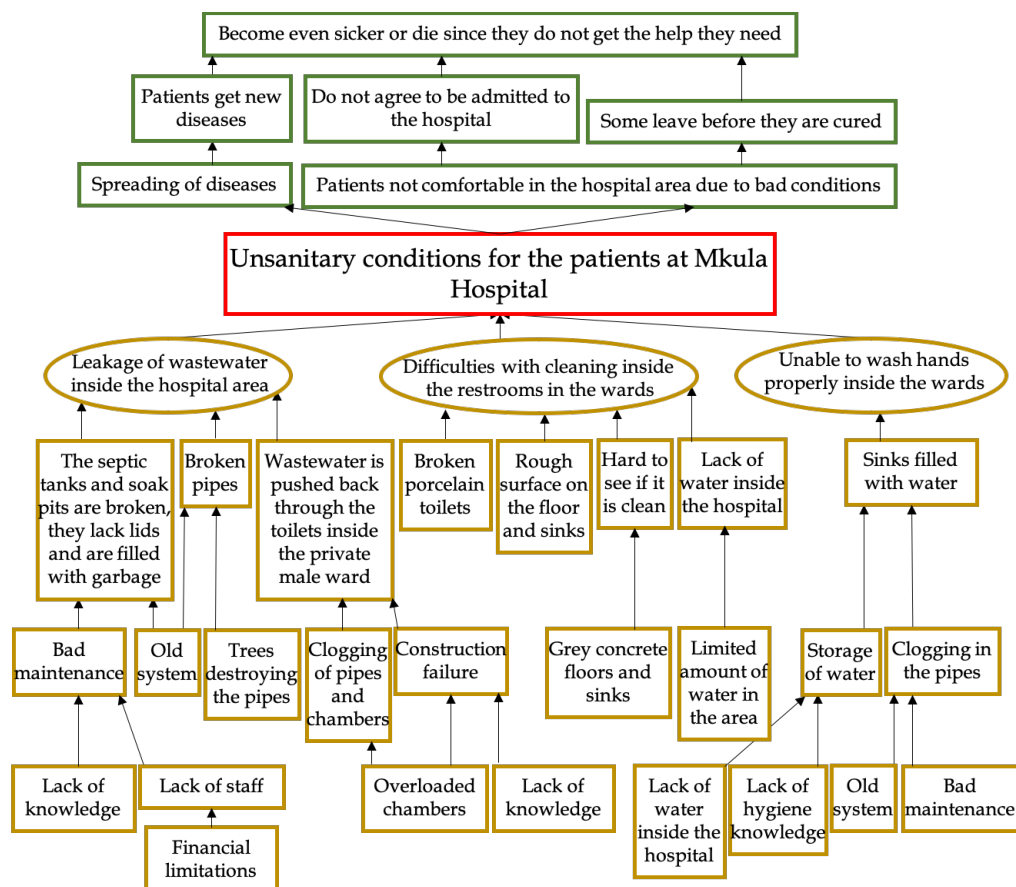


Figure 5.3: The final problem tree. The red rectangle contains the main problem and the green rectangles contain the effects. The causes are divided into main causes and sub-causes. The main causes are in the yellow ellipses while the sub-causes are in the yellow rectangles.

5.4 Step 4 Objective analysis

The optimized problem tree was the foundation for the objective analysis. This problem tree was well formulated, which made it easy to formulate "SMART" objectives.

The main problem resulted in the project objective, *improve the quality of the hospital premises to increase the sanitary conditions*. The main causes were transferred into the intermediate objectives, *no leakage of wastewater inside the hospital area*, *the restrooms in the wards are easy to clean with no broken toilets* and *the patients should be able to wash their hands properly inside the restrooms*. All the effects combined, resulted in two overall objectives, *Mkula hospital is a hospital with high standards that provides safe and high-quality health care* and *Mkula hospital is a hospital where the patients feel comfortable to stay and where there is no spreading of new diseases*.

The outcome of the objective analysis, i.e. the above-mentioned objectives as well as the expected outcomes, are presented in Figure 5.4. It should be noticed that the figure also includes the activities for each intermediate objective, which is a part of step 5. However, to be able to conduct the expected outputs the activities were needed and are therefore included in the figure as well.

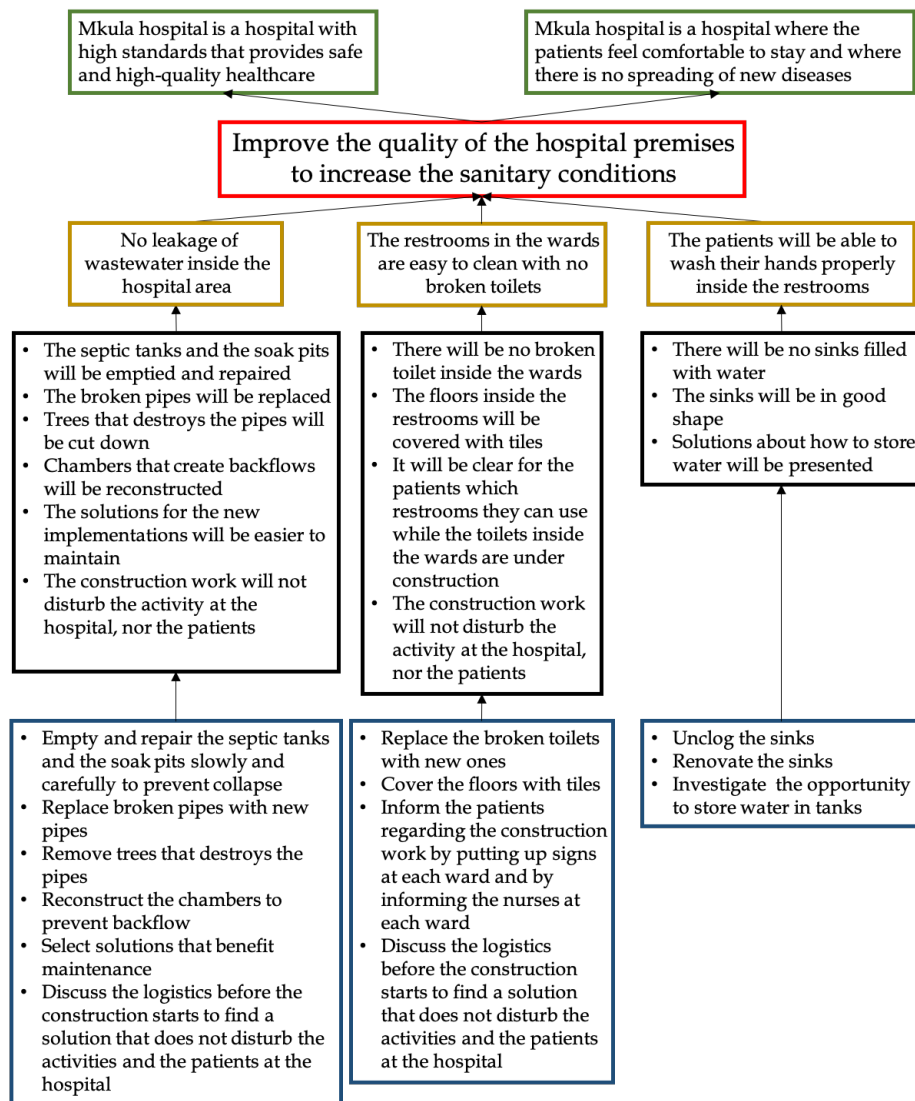


Figure 5.4: A visualization of how the different objectives in the objective analysis are connected with each other and with the activities. Parties in the blue squares contain the activities, the black squares contain the expected outcome, the yellow squares contain the intermediate objectives, the red square contains the project purpose, and the parties in the green squares contain overall objectives.

5.5 Step 5 Activity plan

The activities were created to solve the causes and thereby solving the intermediate objectives. The main causes include several sub-causes, as can be seen in Figure 5.3. All of them could not be solved, for example, financial limitations and lack of staff, hence they are not included in the activity plans. However, these causes did not prevent us from solving the intermediate objectives and thereby also solving the project objective. The final activity plans, i.e the activities for each of the intermediate objectives, are presented in Figure 5.5, the same activities can also be found in Figure 5.4.

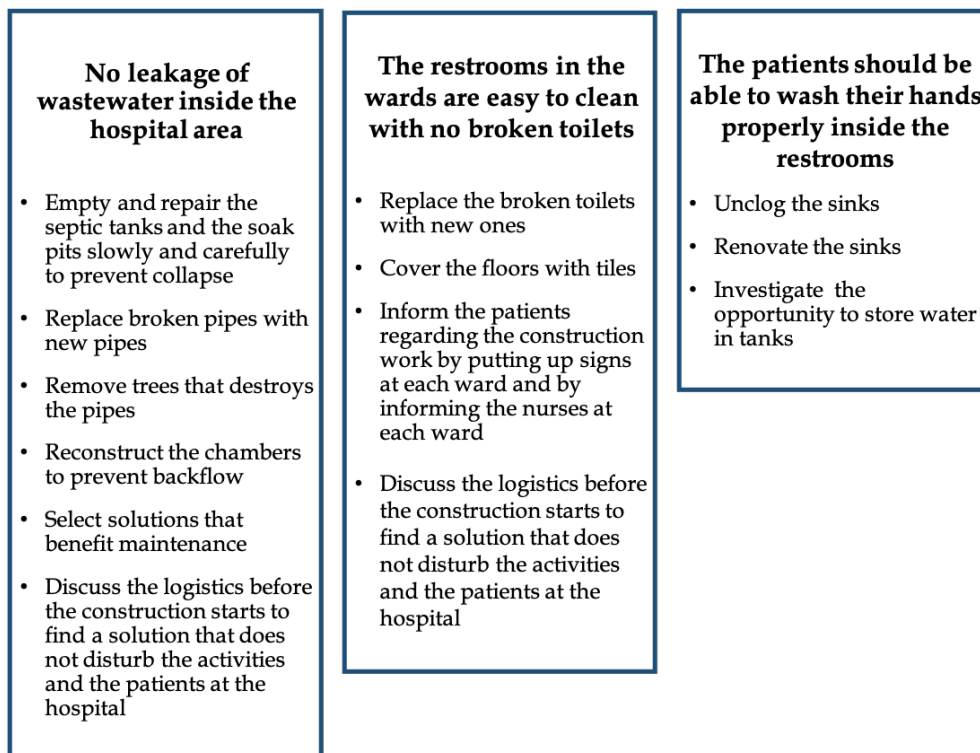


Figure 5.5: The activity plans for each intermediate objective.

The drawing over the sewage system and the clarifications regarding both the sewage system and the restrooms, given to the contractor together with the activities, can be seen in Appendix C. See page 8 in the contract *Rehabilitation of restrooms inside wards* for the clarifications regarding the restrooms. See page 8 and 9 in the contract *Emptying and repairing the sewage system at Mkula Hospital* for the drawing and clarifications of the sewage system.

5.6 Step 6 Resources

In this section, the budget and time frame is presented. The responsible persons for each activity and the budget/activity are presented in Section 5.7.

After we received offers from the two contractors, we chose to continue with the contractor that presented the best offer, and whom we felt would be easiest to co-operate with. The contractor was in charge of compiling a time schedule over the construction phase, which can be seen in Figure 5.6. The contracts were signed in the end of week six, entailing that the contractor started working with the construction work out last week on site, i.e. week seven.

CONTRACTOR'S WORK PROGRAMME FOR: EMPTYING AND REPAIRING OF THE SEWAGE SYSTEM AT AIC MKULA HOSPITAL.

EMPLOYER
 ICT MKULA HOSPITAL
 P.O.BOX 213
 MAGU
 MWANZA TANZANIA

CONTRACTOR
 LASSIWA INVESTMENTS LIMITED.
 P.O.BOX 798
 SHINYANGA

Duration: 4 Weeks					
S/NO	DESCRIPTIONS	DURATION/WEEKS			
		1	2	3	4
1	Site mobilization, Emptying of Septics and Soak away Pits and Demolition of WCs				
2	Repairing of Septics, Soak away Pits and fixing of WCs				
3	Tiling work to toilets and shower rooms				
4	Demobilization and site handing over				

Figure 5.6: Time schedule over the execution of the implementations conducted by the contractor. Presenting the start and duration of each activity.

The budget was updated continuously during the planning process. Initially, the total budget in the MHP was 232 500 SEK, as can be seen in Figure 5.1. The majority of the budget remained after the implementations, as can be seen in Table 5.1. This was due to one of the analyzed risks, that the septic tanks and soak pits could collapse when they were emptied. A collapse of the soak pits and septic tanks would result in a construction of new septic tanks and soak pits, which would cost 130 000 SEK. Furthermore, the table includes the installation of an UPS system. This was a measure that was easy to fix, therefore we only financially contributed.

During the time when the second group of students was on site, the MHP received additional donations. These donations were used to build a new RCH building, and the surplus was saved for future implementation.

Table 5.1: The budget of the MHP

Budget		
Income		
Financier	Amount	
Engineers without borders		
ARQ		
WSP		
Savings from last year		
Total income [SEK]	232500	
Expenditure	Amount	With 30 % in buffer
UPS system [SEK]	6 800	8 840
Reparation of sewage system [SEK]	38 912	50 586
Rehabilitation of restrooms [SEK]	33 772	43 903
Total expenditure [SEK]	79484	103329
Balance [SEK]	153 016	129 171
Balance [TZS]	38 254 100	32 292 830

5.7 Step 7 Measurements of the result

In this section, the outcome from step 4, 5 and 6 are compiled in the template shown in Figure 2.1, together with indicators and verification sources for each intermediate objective, see Table 5.3, 5.4, 5.5. The main objective only includes indicators and verification sources, since it does not have an activity plan, see Table 5.2.

In Table 5.3, 5.4, 5.5 are therefore activities (step 5), expected outputs (step 4), responsible persons and budget/activity (step 6), as well as indicators and verification sources (step 7), included for each intermediate objective. However, it should be noticed that the time column in the tables is empty. This is due to that the schedule was compiled by the contractor, hence it is separate and presented in Figure 5.6.

Table 5.2: The main objective and its monitoring indicators and verification sources

Improve the quality of the hospital premises to increase the sanitary conditions	
Monitoring: Indicators	Source of verification
Satisfied patients and hospital staff	Interviews
Easier to clean the restrooms	Interview
More frequent use of the indoor restrooms	Inspection

Table 5.3: One of the intermediate objectives connected to its activities, expected outcomes, budget/activity, indicators and verification sources

Intermediate objective: No leakage of waste water inside the hospital area				
Activity	Expected outcome	Responsible person	Time	Budget/activity [SEK]
Empty and repair the septic tanks and the soak pits, slowly and carefully to prevent collapse	The septic tanks and the soak pits will be emptied and repaired	The contractor		32 000
Replace broken pipes with new	The broken pipes will be replaced	The contractor		6 300
Remove trees that destroys the pipes	Trees that destroys the pipes will be cut down	The contractor		*
Reconstruct the chambers to prevent backflow	Chambers that create backflows will be reconstructed	The contractor		*
Select solutions that benefit maintenance	The solutions for the new implementations will be easier to maintain	The contractor, we and HMT		-
Discuss the logistics before the construction starts and find a solution that will not disturb the activities and the patients at the hospital	The construction work will not disturb the activities at the hospital, nor the patients	We		-

Monitoring: Indicators	Source of verification
Clean surfaces inside the hospital area	Inspection
Odorless hospital	Inspection
Blockage per year	Inspection

5. Outcome of the LFA

Table 5.4: One of the intermediate objectives connected to its activities, expected outcomes, budget/activity, indicators and verification sources

Intermediate objective: The restrooms in the ward is easy to clean with no broken toilets				
Activity	Expected outcome	Responsible person	Time	Budget/activity [SEK]
Replace the broken toilets with new ones	There will be no broken toilet inside the wards	The contractor		15 400
Cover the floors with tiles	The floors inside the restrooms will be covered with tiles	The contractor		13 800
Inform the patients regarding the construction work by putting up signs at each ward and by informing the nurses at each ward	It will be clear for the patients which restrooms they can use while the toilets inside the wards are under construction	HMT		-
Discuss the logistics before the construction starts and find a solution that will not disturb the activities and the patients at the hospital	The construction work will not disturb the activities at the hospital, nor the patients	We		-
Monitoring: Indicators		Source of verification		
New porcelain toilets installed		Inspection of the restrooms		
Satisfied cleaning staff		Interviews		
More frequent use of the toilets by the patients		Inspection		

Table 5.5: One of the intermediate objectives connected to its activities, expected outcomes, budget/activity, indicators and verification sources

Intermediate objective: The patients should be able to wash hands properly inside the restrooms				
Activity	Expected outcome	Responsible person	Time	Budget/activity [SEK]
Unclog the sinks	There will be no sinks filled with water	The contractor		1450
Renovate the sinks	The sinks will be in good shape	The contractor		*
Investigate the opportunity to store water in tanks	Solutions about how to store water will be presented	We		-

Monitoring: Indicators	Source of verification
Prerequisites for the patients in the ward to wash their hands	Inspection of the wards
Pleased patients at the wards	Interviews
Stationary water in the sinks during a year	Inspection

* These activities were identified after the contract was signed. The contractor executed the measure without extra cost.

5.8 Step 8 Risk analysis

The identified risks at the MHP are presented below, together with measures to prevent the risks to occur. The risks are divided into overall risks and risks that could occur during construction, including both internal and external risks.

Overall risks

Risk: The implemented buildings and infrastructure solutions are actually not needed at the hospital.

Measures: Make sure that all suggestions from the HMT are carefully considered and that it is the HMT that have the final say in the decision making.

Risk: Losing money and possibly breaking the budget because of big changes in local currency.

Measures: Be aware of the local currency when making the budget and have a buffer.

Risk: Not granted building permits or problems with other permissions.

Measures: Be prepared and informed. Find out early what permissions are needed for the tasks that are planned and make sure to apply in good time. Be ready to be flexible.

Risk: Issues in collaboration with Mkula Hospital Management Team.

Measures: Have meetings regularly with open dialogues.

Risk: Master students not able to complete the task due to sickness or other personal events.

Measures: None, but the probability is low that all of us become sick so that none of us can continue.

Risk: Master thesis students become short of time to finish the project.

Measures: Be prepared to scale down the project if signs would indicate this.

Risk: The rain could lead to flooding that prevents the project to move forward.

Measures: None, but the probability is low.

Risks during construction

Risk: Collapse of the septic tanks and soak pits while emptying.

Measures: Be careful when emptying, do not empty too fast.

Risk: Further breakage of the sewage system is found, which leads to additional costs.

Measures: The inspection of the area should be thorough and everybody should be fully aware of what measures to take before the construction starts. It should clearly be stated in the contract what happens if additional measures, and therefore an increased cost, would be needed.

Risk: The information regarding the rehabilitation of the restrooms does not reach the patients in the wards, entailing confusion for the patients when the restrooms are locked.

Measures: Put up signs at each ward and inform the nurses that they have to talk to the patients regarding which toilets they can use.

Risk: The construction work is performed so it affects the patients (logistics, noise and dirt) .

Measures: Discuss the logistics before the construction starts, to find a solution that will have the least impact on the patients.

Risk: The contract is not followed.

Measures: Clearly state in the contract the consequences if something deviates from the contract.

Risk: Master students leave Mkula before the project is finished entailing that it is no one that monitors the project on site.

Measures: Extend the time on site by handing over the project to another responsible person.

Risk: The contractor can not proceed with the work due to problems at the company.

Measures: Ensure that the company is reliable and that they can present documents on previous works that prove their credibility.

6

Analysis of each steps in the LFA

This chapter presents an analysis of the first week and each step in the LFA. At the end of each step a summary is conducted, pointing out the importance of that step. Lastly, the importance of a project plan is discussed and the first research question is answered.

6.1 The first week

During the first meeting on site with the HMT, all participants read the MoU and the project plan. However, it turned out that the majority of the problems written in the project plan had been solved, hence it had to be updated. The HMT was therefore asked to state the current issues at the hospital. Thereafter, the HHPG added some additional issues that had been identified during the inspections of the hospital area.

When the HHPG left Mkula we had all agreed upon what the main focus this year should be. However, it became clear during week two, that their major problems had not been discussed during the first week. We believe that the reason for this was because the issues at the hospital had not been thought through by the HMT before we arrived. As mentioned in Section 4.1, the HHPG had sent the MoU and the project plan to the HMT before our arrival. This was done in order to start preparing them for our arrival and to facilitate the decision-making the first week. However, it was clear during the first meeting that they had not read the documents that were sent to them. One other reason why new issues were brought up the second week, we believe, was due to that not all members in the HMT could participate in the meetings the first week. Entailing that important views were missing.

6.2 Step 1 Context analysis

The context analysis is an important part of the LFA. Every project is unique in its kind and so is the MHP. We believe it is even more important to have knowledge about the context when it is not familiar for the performer of the LFA. Not having knowledge about the context can have large consequences for the outcome of the project e.g. if the project group are not aware of when the rain season is, it can result in a negative effect on the implementation, even prevent it from being finished on time.

The context analysis in the LFA is flexible and easy to customize for each specific project. However, we felt it was difficult to ensure that we had not forgotten crucial parts. The context analysis was conducted at the beginning of the MHP, when we were not certain about what would have importance to the project. In a later stage of the process, we realized that important parts of our context analysis were missing e.g. cultural differences and knowledge of how construction work is performed in Tanzania.

One example of this was when we had left Mkula and the second group of students started the next implementation. The HMT then told them they preferred another form of project delivery method. The master students asked them why they had not said anything before and they responded that they thought we preferred the other form of project delivery method. However, we were not aware that this other method even existed. Consequently, if we had made a better context analysis, where we had studied project delivery methods in Tanzania, we would have realized that there were several different ways to perform the work. Resulting in that we could have asked the HMT which of the methods that were most preferable for them.

The project delivery method that we used was, however, according to us, suitable for our implementations, since our implementations were not as extensive as the next implementation. Additionally, during the next implementation would no one from the HHPG be present on site, which therefore required another project delivery method.

Summarily, the context analysis is an important part of the LFA to achieve sustainable implementations since it contributes to a deeper knowledge of the area. A well-performed context analysis prevents the project to get stuck in issues that are due to the context and it can prevent misunderstandings. Furthermore, it increases the chance for the project to fit the environment.

6.3 Step 2 Stakeholder analysis

The LFA method stresses the importance of stakeholder involvement, that it is a prerequisite for implementing sustainable solutions, which we agree upon. Having meetings and workshops continuously with the HMT entailed that we, in the end, got optimized and sustainable solutions to the problems identified. The HHPG, through support regarding aid projects and technical expertise, also contributed to an optimization of the implementations. Furthermore, due to the contractor's inputs and knowledge regarding the construction work could implementations be made that were beneficial for the hospital.

One example of when the solution became optimized was when the HMT stated in the beginning that all the pipes in the sewage system needed to be replaced, and that new septic tanks and soak pits needed to be installed. However, after several discussions with the HHPG, the HMT and the contractor, as well as inspections of the sewage system, it could be agreed that reparation of the system was enough.

Instead of building a new system, with new pipes, septic tanks and soak pits, it was decided only to replace the broken pipes, as well as empty and repair the septic tanks and soak pits. Consequently, the solution was optimized. This, in turn, resulted in less costs, entailing that we could afford to renovate the restrooms as well.

Furthermore, due to the involvement of the HMT in the process, the risk of implementing a measure that would not benefit the hospital was minimized. The HMT had the final say in the decision-making, entailing that they would not have agreed upon something that they did not think would benefit the hospital.

Stakeholder participation has been important for the project, as mentioned above. However, not all of the stakeholders identified have been directly included in the process. However, the patients at the hospital, i.e. the target group, was not present during the meetings. It was the HMT that represented the patients' wishes, but without actually having interviewed them. If the patients had been allowed to attend the meetings and contribute with their opinions directly, the outcome might have been different. Assumably, they would have thought of things we had not thought of, which could have lead to a solution that benefited them more. Therefore, since they were the target group and the solution aimed to fit them, it would have been good to involve them in the meetings as well.

In Subsection 2.3.2, it is stated that it is preferable to perform the LFA-workshop, in which step 3, 4, 5 and 8, should be discussed. However, this was not an option for us since we could not gather all the stakeholders involved in the MHP at the same time, neither occupy the HMT for so long time. The HMT consisted of, inter alia, doctors and nurses working at the hospital, entailing that they often were busy with patients. Hence we were not able to have such a long meeting that a LFA-workshop would entail. This resulted in that we had to divide the LFA-workshop into several smaller workshops.

To divide the LFA-workshop into separate meetings was, however, nothing that we considered as a bad procedure. Each part could be discussed more thoroughly and the meetings did not take to much time. Furthermore, it can be confirmed by one of the nurses that even though we had to divide the workshop into separate meetings and that all members could not be present in each meeting, it did not affect how she experienced the planning process. When we asked how she had perceived the planning process her answer was:

“The planning process has been going very well since we make all decisions together, we agree together and we change together, which have made me feel included in all decisions”

Summarily, the participation of the stakeholder entails that it is easier to create an optimized and more sustainable solution to the problem identified. When several people are involved in the process, more knowledge and inputs are included. Additionally, the risk of implementing a measure that would not be beneficial for the

target group is minimized since the project owner has the final say in the decision-making.

6.4 Step 3 Problem analysis

We decided to conduct a problem tree for the problem analysis. The problem tree was a good tool for analyzing the problems since it became clear how they were connected and how the problems should be solved. However, the creation of the problem tree was a long iterative process that required much time, consequently, the HMT could not participate in all the iterations.

It is stated in Subsection 2.3.3, that the problem tree workshop should have a facilitator, a neutral person, that should lead the workshop. We tried to take that role even though we were not neutral to the MHP or to the HMT. Hence, our plan was not to participate in the discussions, except by just steering them in the right direction.

This was however hard to accomplish, both since it was hard to get a flow in the discussion, but also since we realized that they could not really understand the concept of the main problem. Therefore, we had to break our role as facilitators. The reason why these problems occurred, we believe, was due to the language barriers and their lack of knowledge regarding the LFA method. Because later in the workshop an additional doctor participated. He was familiar with the LFA and understood English better than the others, hence he took a leading role in the discussion and could explain for the others, in their own language. This entailed that the discussions between the others became better and, even though, we had to break our role as facilitators some times and help them find the main problem, we could, in the end, conduct a problem tree that everybody agreed upon.

The insight we got from this was that it would have been good to have an interpreter breaking the language barriers. Moreover, it would have been beneficial to have knowledge about the LFA, as well as the problem tree, in order to perform the workshop in a successful way. Therefore, it would have been advantageous to have a facilitator that is familiar with the LFA method and neutral to the MHP. This person would assumably lead the discussion better and steer the discussions in the right direction. Furthermore, a facilitator would have a better knowledge of where to place all ideas and create a problem tree that is more optimized from the beginning.

It would also have been beneficial to involve several different stakeholders, in addition to the HMT. The HMT represent different roles of the hospital i.e. doctors, nurses and a social secretary, entailing a contribution of different viewpoints regarding the issues at the hospital. However, by including stakeholders that do not work at the hospital, e.g. the contractor and the patients, more point of views would have been included in the discussions. This would assumably have benefited the outcome of the project tree and created a more robust result.

The initial problem tree workshop resulted in a broad main problem, which included several different causes and effects. The main problem had too many underlying causes to be able to be solved within our budget and time frame. However, even though we had to create a new problem tree, the first problem tree was not considered unnecessary for the project. The workshop included several opinions from the HMT and their views on the issues at the hospital. Therefore, the first problem tree workshop resulted in new perspectives regarding the issues at the hospital and why they were important for the HMT.

As mentioned, this workshop did not lead to the final problem tree, however, it was used as a base while conducting the second one. During the creation of the second problem tree, we realized that it was hard to know when to limit the causes and effects since they have no specific end. Each one of the main causes and effects has several sub-causes and sub-effects, which creates a chain of causes and effects, that each impact one another. At the end of some of the chains in the problem tree there are causes and effect so broad that they are beyond the scope for the MHP. The question is then if they should be included in the problem tree at all. For example, financial limitations was not a cause that we could translate into an objective and solve with an activity. It does not contribute to the completion of the project, neither does it prevent us from moving forward. Consequently, this cause could assumably have been removed from the problem tree.

Summarily, we believe that conducting a problem tree in the problem analysis is a good way to identify and analyze the problems. Furthermore, the problem tree facilitates to keep the focus on the target group and hence deliver a result that responds to the needs of the target group. Which is the main idea with the LFA, as mentioned in Subsection 2.3. The workshop as a method for decision making is to prefer before ordinary meetings, especially in the problem analysis phase, since it creates a better involvement from all participants. However, the workshop should include an interpreter, a facilitator and several different stakeholders to get as good result as possible.

6.5 Step 4 Objective analysis

The objective analysis is an important part of a project since it makes everyone strives towards the same goal. To continuously check if the objectives could be "SMART" facilitated the process of conducting the final problem tree since it helped us find causes that we were able to solve within our time frame.

The limited amount of time that the HMT could set aside for us during the weeks, entailed that we had to compile the objectives ourselves. If we had included the HMT in the compilation of the objectives it could have resulted in another outcome. However, the final problem tree was concise and optimized, which entailed that the translation from problems into objectives was easy and could not have been made in many other ways. Therefore, we decided it was better we compiled the ob-

jectives and the HMT confirmed them afterward.

Summarily, in order to succeed with a project, it is important that everybody strive in the same direction. This step is therefore highly important to include in a project. Furthermore, creating objectives that are "SMART" entails that the final causes are manageable to solve within the time frame.

6.6 Step 5 Activity plan

We believe that creating an activity plan was a structured and effective way to compile what was needed to be done in order to reach our goals and succeed with the MHP. However, we did not have knowledge regarding how the construction work should be carried out. Hence, we wrote overall activities and let the contractor compile a more detailed activity plan of how each implementation should be executed.

The decision of not being involved in the compilation of a more detailed activity plan led to some complications. Firstly, it was hard to do a correct risk analysis since we were not aware of exactly how they planned to perform the work. For example, one risk we had included at first was the risk of collapse of the septic tanks and soak pits, due to the heavy suction trucks that would empty the pits. It was later noticed that they did not use suction trucks, instead they emptied manually with buckets.

Secondly, since we had not stated clearly enough exactly how everything had to be performed, the contractor created their own solution when replacing a broken pipe. They chose to merge the grey water pipe (water from sinks and showers) with the black water pipe (water from the toilets) into one joint pipe, which then led all the water to one septic tank. The grey water should not be in the septic tanks, it has its own system. Entailing that when the grey water, which includes a large amount of soap, came into the septic tank, the system failed. The contractor had to correct this by separating the pipes again, resulting in that the wanted outcome was reached in the end anyway. However, all this extra work might have been prevented if we had created a detailed activity plan together with the contractor before the construction work started.

Summarily, creating an activity plan is a structured and effective way to compile what needs to be done in order to reach the goals and succeed with the project. However, it is important to include the contractor when compiling the activities, since it helps create an understanding of how the work should be carried out and what is needed in order to succeed.

6.7 Step 6 Resources

Structured recourse management has been an important part of the MHP. The resources set the boundaries for the project, entailing that they steered the extent of

the implementations. The four categories, described in Subsection 2.3.6, have been included in the MHP, however in different ways and with different persons responsible for each activity.

Since the Mkula Hospital project is an ongoing project, the involved parties were clear from the beginning as well as each stakeholder's responsibility. However, it was not clear which contractor that should perform the construction work. The HMT chose two contractors that they had worked with before and were satisfied with. Thereafter we chose who we wanted to continue with. This facilitated the process of finding good reliable contractors, which entailed that we could start much faster with collecting offers from them.

Regarding the budget, we believe that it was convenient to have one person responsible for the economy and that this person was not on site in Mkula. This made it easier for us to only focus on gathering offers and calculating how much all the implementations would cost.

The currency did however changed a lot which created some problems in the transaction. It was a cost for transferring money from Sweden to Tanzania entailing that we wanted to transfer all of the money at the same time. Hence we calculated with the right currency at that time and transferred the money. The problem was that it took two weeks to transfer the money to the hospital, entailing that when they finally got the money the currency had changed. This resulted in that money were missing to be able to pay for all the wanted measures. Consequently, one of the measures needed to be postponed.

The risk for the currency to change was nothing that we could have prevented since we could not control it, neither did we have knowledge about how and when the currency would change. This was, however, a risk that we had thought of hence we were prepared for it, i.e we had a buffer allowing us to transfer more money in a later stage.

The time frame for the MHP was decided from the beginning and therefore nothing that we could affect. Seven weeks on site was too short to be able to investigate the problems on site, decide what to prioritize as well as implement the measures. The construction work started our last week on site entailing that if the second student group had not been there to take over, no one from HHPG had been on site to follow the construction work. It was therefore advantageously that the time on site was extended with five more weeks in phase two.

The schedule we created on site, where we wrote down what had to be done each week, helped us understand how much time each activity was allowed to take in order to manage the MHP on time. Since this was a small-scale project we felt it was enough to write in a document and update it along the way, however for a larger project it could be good to create, for example, a Gantt schedule to see more easily how the work develops.

The equipment was not something that we had control over, it was the contractors responsibility to bring the correct equipment on site. We decided it was the most efficient way since they should perform the construction work and therefore knew what was needed.

Summarily, having structured management of the resources in a project is crucial, especially regarding the budget. It is important to continuously update the budget when changes occur and make sure that the project has a buffer for unexpected events. Otherwise, it is a risk that the project can not be completed. Furthermore, a structured time frame as well as knowing who is responsible for what, facilitates the process and prevents unnecessary misunderstandings.

6.8 Step 7 Measurements of the result

In order to measure if a project has been successful indicators and verification sources are needed. If indicators are missing, it will be difficult to analyze the project's results at a later stage, more than in general terms SIDA (2006). When creating the measurements of the results we realized that the indicators were relatively easy to find since they were so closely related to the objectives. The verification sources were also quite easy to identify, e.g. interview the target group or investigate the area.

The problem was that in order to verify the result someone needed to be present on site, which was not an option for us since we left Mkula before the implementations were completed. Hence, we could not verify our indicators ourselves. However, the second student group told us that the HMT, as well as the patients, were very satisfied with the outcome of the project. The students also performed inspections after the construction work was finished, ensuring that the goals were met. Therefore, our conclusion is that the project was successful even though we could not measure the result ourselves.

Summarily, the measurement of the result is a way to follow up the result to see if the project has been successful or not. However, when the project is conducted in another country the measurement of the result can be hard to perform, hence it is to prefer to have contact with someone on site that can perform interviews with the target groups or in other ways follow up the result and confirm that the project has been successful.

6.9 Step 8 Risk analysis

The LFA method describes that a risk analysis is a process that helps create sustainable results. We argue that by identifying risks that can occur and how they can be mitigated, the risk of failure is limited. The more risks that are acknowledged and hence prevented before they occur, the fewer problems will the project face, which consequently lead to a more sustainable result.

The risk analysis we created for the MHP was however quite one-sided since it was only we, together with the HHPG that identified the risks and the measures. The HMT read through the risks and agreed upon them, however, they did not contribute with any additional risks. It would have been good to involve the contractors when conducting the risk analysis, in order to recognize more risks and prevent misunderstandings. The local contractor had more knowledge of the construction procedures in Tanzania and thereby also more knowledge about risks that could have occurred.

Summarily, conducting a risk analysis is highly important. Being aware of the risks in an early stage entails that measures can be found to prevent them from happening. The more risks that are acknowledged and prevented before they occur, the fewer problems will the project face, which consequently lead to a more sustainable result. However, make sure to involve several different stakeholders in order to identify as many risks as possible.

6.10 The project plan

The final important part in the LFA, that was very helpful during the execution of the MHP, was the project plan. Conducting a project plan was an easy and efficient way of compiling the outcome from each step and ensure that both we, the HHPG and the HMT was continuously updated on what had been discussed and/or decided. We believe that this is even more important when the involved parties do not speak the same language since misunderstandings more easily can arise. When the decisions are written down it is easier to go through everything and sort out the confusions that may have occurred.

6.11 How the LFA helped create sustainable implementations in the MHP

The answer to **RQ 1** - *How can the LFA method help create sustainable implementations at Mkula Hospital?* is that the LFA method has helped create sustainable solutions in Mkula since the method facilitates the projects planning process. However, the method does not create sustainable solutions by itself. It is the performer of the LFA that needs to initiate a sustainable perspective on the project. If that is done, the LFA method provides a structured way to accomplish a sustainable solution, since the method ensures that important parts in a planning process are

not missing. Furthermore, we believe that the structure of the method, with different steps, entails that the solution has been properly processed. Meaning that the iterative process that the method provides entails that the solution has been dealt with so thoroughly that no hasty decisions have been made.

The LFA method also stresses the importance of stakeholder participation and that the recipients, in our case the HMT, are the project owner. That this is a prerequisite for creating sustainable solutions. This is an aspect provided from the LFA method that we agree helped create sustainable solutions at Mkula Hospital. The stakeholder participation ensured that the project could continue when we were no longer on site. Furthermore, the stakeholders' opinions get heard, entailing that we did not implement something that was not needed.

6.12 Summary of the analysis

A summary of our experiences from each step in the LFA is presented in Table 6.1. In the table, each step is given a short presentation and the advantages and challenges for each step are stated.

The main advantage of the LFA method is that it is a structured method that contributes to a deeper knowledge of each step and of the project. Furthermore, it facilitates the monitoring of the project. The main experience regarding the challenges with the LFA method is that the method requires stakeholder participation, which was time demanding and therefore not always an option in this project.

6. Analysis of each steps in the LFA

Table 6.1: A summary of the analysis, including all steps in the LFA that has been performed during the MHP

Summary of the analysis			
Step	Short summary	Advantageous	Challenges
1 - Context analysis	Explains the context in which the project is performed	Contributes to a deeper knowledge of the area Prevents the project to get stuck in issues that are due to the context	Hard to know in forehand what to include in the context
2 - Stakeholder analysis	Identification and analysis of the different stakeholders involved in the project. The LFA stresses stakeholder participation	The analysis clarifies • Who affects and who is affected by the project • who should be a part of the planning process • Who should be involved and be informed during the project implementation	Hard to gather all stakeholders in meetings and workshops
3 - Problem analysis	Identification of the problems in the project, including both causes and effects. The identification was made by conducting a problem tree	The problem tree gives a clear picture of how the problems are connected and how they should be solved Focus on the target group	The problem identification is a long iterative process that requires much time, consequently, the HMT did not participate in all the iterations The problem tree is difficult to understand
4 - Objective analysis	Translates the problems into goals, on short, medium and long terms	Make everyone strives towards the same goal The "SMART" objectives facilitate the process of conducting an optimized problem tree	No negative aspects can be found in this step. It benefits from stakeholder involvement, however, if step 3 is carried out accordingly, step 4 is easy to perform without other stakeholders
5 - Activity plan	Each intermediate objective are given a activity plan which describes how the objective should be met	A structured way to know how to reach the goals	Requires that the contractor participate in the performance of the activity plan, since they are the ones carrying out the construction work
6 - Resources	Resources as staff, budget, time frame and equipment are managed	Well-structured resource management, ensures that the project is continuously within the budget and time frame, and has sufficient amount of staff and equipment	The Tanzanian currency constantly changes over time, which affects the budget
7 - Measurement of the result	Indicators and verification sources are connected to each objective, in order to monitor project success	An efficient and structured way to measure if a project has been successful	Demands representatives on site to measure the result
8 - Risk analysis	Risks are identified and a plan is set up for how to manage them	Prevent risks to occur	Hard to identify all risks that can occur

7

Discussion

In this chapter the sustainability aspect, in relation to the outcome of the MHP, is discussed. Followed by the main challenges identified with the LFA method as well as with the MHP. Lastly, the change that the project group was able to succeed with, is analyzed with the Knoster's change model.

7.1 What is a sustainable solution?

Our aim with this thesis was to investigate if the LFA method was a suitable method to help create sustainable implementations in a small-scale foreign aid project. However, if the solutions actually are sustainable is hard to know for sure, because what is sustainability exactly?

As mentioned in Chapter 1, there is no agreed universal meaning regarding the definition of sustainability. The definition of sustainability in the context of aid projects and programs, that there will be a continuation of benefits after the project is completed, is a relatively diffuse definition. The definition can be interpreted as when the aid organization leave the site, the project should be able to continue. However, the definition does not specifically imply that the solution should be sustainable for a longer perspective.

Our implementations have improved the situation at Mkula hospital, i.e. the solutions have been beneficial for the hospital since there are inter alia, no longer clogging of the pipes, the toilets are no longer broken and it is easier to keep the restrooms clean due to the tiles on the floors. However, for how long will these solutions last? Are they sustainable in the long-term? And in what way have the solutions met the economic, environmental and social aspects? In the overall objectives, we created long-term goals for the project, however, they are not measurable until several years from now. Therefore, only speculations can be made at this point.

Our measures of emptying the septic tanks and soak pits, repairing the pipes that were broken, and replacing the porcelain in the toilets, might not be sustainable in the long-term. The system is old, entailing that there is a risk that another pipe will break soon, or that the septic tanks and soak pits will be filled again, due to that the HMT do not prioritize maintenance that well. The question is then, would it have been better to install a completely new system instead?

Below a comparison is made between the new system and the implemented solution. The different solutions are discussed from the three sustainability aspects: economic, environmental and social, to find out if our implemented solution can be considered sustainable from the three aspects and therefore also can be considered to be sustainable in a long term.

A new system would entail that all the pipes were replaced with new ones and that flush toilets were installed. Furthermore, the septic tanks and soak pits would have to be replaced with new ones, to handle the increased flow and amount of water that flush toilets would bring. Consequently, a new system would entail additional resource use, regarding both construction material as well as water use. Furthermore, flush toilets break more easily than toilets with pour flush, entailing that a new system would be more resource demanding also in the long-term. The pour flush system that they have today is, therefore, more environmentally sustainable than installing a new system.

That the flush toilets break more easily was mentioned by the HMT. We noticed during our time on site that some of the toilets at the hospital had broken flush cisterns connected to the toilets. When we asked if they wished us to replace the cisterns with new ones they said no. The reason for this was because they break easily and the hospital has no money to repair them with, neither staff that can fix them, hence it was better to continue with the pour flush system.

A new system, only including flush toilets would, therefore, not only demand more water and resources, it would also entail extra costs, time and staff for maintenance. This is nothing that the hospital can solve at this point and assumably not in the next few years to come either. Consequently, a new system would not be economically sustainable for the HMT since they would not be able to afford the additional costs that a new system assumably would entail. Therefore, with all this in mind, the solution of renovating instead of building a new system, is more sustainable both for the environment and economically for the hospital.

Regarding the social aspect of sustainability, both of the solutions increase the sanitary conditions at the hospital, hence create a better environment for the patients. The improved sanitary condition that these implementations entail led to a better health care situation at the hospital since the risk of spreading of new diseases is decreased. Hence both the options meet the social aspect of sustainability.

Summarily, the solution of rehabilitate the restrooms and repair the sewage system, meet all the aspect of sustainability. Hence, we believe, that the solution will be sustainable also in the long-term for the hospital.

7.2 Challenges in the MHP

Several challenges have been identified during the MHP while implementing the LFA method, which can be seen in Table 6.1. This section presents the main challenges with the LFA method as well as the challenge with aid dependency.

7.2.1 Challenges with the LFA method

During the performance of the LFA method, challenges have been identified and analyzed in order to answer **RQ 2** - *What are the challenges with using the LFA method in a small-scale foreign aid project?*

The main challenge of using the LFA method in the MHP has been the limited amount of time on site. We found the LFA time demanding, which entailed that the method could not be performed as we would have preferred. The method stresses the importance of stakeholder involvement in all steps, however, that was not manageable for us. Both due to our limited amount of time on site but also due to that the HMT had the MHP as their secondary work. The HMT had difficulties setting aside a large amount of time for the workshops and to gather all of the members in the meetings since some of them had to work. The HMT could in best ways have 1-2 meetings per week, 1-2 hours each, but some weeks they could not have meetings at all.

These sporadic meetings and that not all members from the HMT could be present at each meeting, resulted in that the problem identification took a very long time. All problems were not dealt with at the beginning of the project and more inputs were added when new members participated. This led to that new problems were brought up along the way.

Due to the many issues at the hospital, the HMT had difficulties only choosing one or two problems that they wanted us to focus on, which entailed continuous changes in their prioritization. An example of this was when we met the HMT to sign the contracts for the restrooms. It was agreed that they needed new toilets, renovation of the sinks and tiles on the floors. However, during the meeting the HMT stated that they had a limited amount of water inside the restrooms, to be able to provide the patients with water for hand washing, cleaning and showering. Therefore, they could not renovate the restrooms without installing water tanks outside each ward. Consequently, the discussion shifted from renovating the restrooms to water scarcity and how we could install water tanks at the hospital, which delayed the process even more.

A few days later, when we informed them that it would take a long time for us to investigate if we were able to install water tanks, they changed their minds again and the water tanks were no longer a prioritization. When the second group of students asked if the HMT wanted them to prioritize the water tanks instead of a new RCH building, it turned out the water tanks were not needed at all.

The HMT's inconsistency entailed that the problem analysis took longer time than expected. We wanted to ensure assistance was provided on the recipients' terms, i.e. the HMT terms, as mentioned in Chapter 1. Therefore, we had to investigate all the issues they pointed out and make them rank the problems each time new things came up.

As mentioned in Section 4.1, we chose the LFA method since HMT was inconsistent the first week and therefore needed a method that could help us structure the planning process as well as prevent that new issues were brought up. However, as described above, the HMT kept adding new issues during the whole planning process, even though, we performed the LFA. Consequently, the LFA method itself does not solve the problem of deciding upon issues. However, if more time would have been given to the problem analysis, the issues would have been dealt with more thoroughly, entailing that the inconsistency could have been limited.

Another challenge with the problem analysis was that we experienced that the problem tree was hard to communicate in a simplified way. The HMT had difficulties to understand the concept of the workshop which made it difficult to have a discussion regarding the main problem. The discussion was instead about the causes and how they affected the hospital. It was first when the doctor that was familiar with the LFA arrived at the meeting, as it was manageable to perform a discussion about the main problem. However, it can also be argued that language barriers could have caused the confusion. Therefore, it would have been advantageous to use an interpreter during the workshop.

7.2.2 Challenges with dependency

During the time on site, we conducted two interviews. One with the medical director and one with the head of the nurses. Our purpose with these meetings was to understand how the HMT had experienced our cooperation and to get feedback on what we could improve. However, we realized that they had difficulties with giving us constructive criticism.

It can be argued that this was due to aid dependency. Odén (2006) states that aid creates an imbalanced relation of power between the donor and the receiver since the receiver becomes dependent on the donor. The HMT is dependent on the donations from the HHPG and therefore want us to come back. Which could have been the reason why they had difficulties giving us criticism and honest answers.

It was problematic that they found it difficult to give us criticism. We are dependent on their feedback in order to learn and improve our work. Otherwise, the risk could be that the same issues occur every year. Furthermore, if they are not honest about how they feel during the planning process, it might affect the project outcome.

A prerequisite for creating sustainable projects is, as mentioned in Chapter 1, to

ensure that assistance is provided on the recipients' terms and that they own the project. If the HMT are not honest about how they feel and think, assistance will not be provided on the recipients' terms, it will only be based on our interpretations.

7.3 The project group in relation to Knoster's model

In this subsection Knoster's model, on how to manage a complex change, is applied on the project group, i.e we, the HMT and the HHPG, to discuss what could be behind the successful outcome of the MHP. Knoster's change model is divided into five components as described in Subsection 2.5, which all are a part of a complex change. The elements are *vision*, *incentives*, *skills*, *resources* and *action plan*.

The HHPG had a clear *vision*, to improve the conditions at hospitals in order to save lives. We adopted this *vision*, which united us as a group and decreased the risk of confusion. However, during the first week, the HMT had not the same *vision* as we and the HHPG had. Their *vision* was mainly to improve the conditions at the hospital in order to make the hospital more attractive. This created confusion within the project group since we had different goals. However, the LFA method helped us to commonly agree upon problems and objectives, which united us as a group and made us strive in the same direction.

The *incentives* for our work were clear. We had embraced the *vision* and were, therefore, clear over "why and what" that was going to be performed, hence we had the motivation to perform the work at Mkula hospital. However, before we had agreed upon common problems and objectives we experienced resistance toward the HMT wish to improve the mortuary. This was not in line with HHPG's *vision* to save lives, it would only create a more attractive hospital, hence nothing that we could support.

The HHPG ensured the representatives on site had the right *skills* for the project. Since mostly infrastructural changes were planned to be made at the hospital, the HHPG chose students that had knowledge in infrastructure and architecture. However, even though we had infrastructural knowledge we sometimes felt that we lacked sufficient technical skills, which made us feel anxious. When this feeling occurred we got support from the HHPG and the problems were solved together. On site, the HMT contributed with suitable solutions for their context and local contacts relevant for the MHP.

The *resources* mainly concerns the budget and time frame. The budget in the MHP consisted of donations and scholarship, which were applied for before we arrived at Mkula Hospital. During the time on site, the budget was monitored and a buffer was used to manage additional cost as e.g. transferring costs. Regarding the time frame, the HHPG wanted to expand the time on site for the HHPG representatives, i.e. the student. Phase two was therefore divided into two parts with two groups of student. The expansion of phase two, 12 weeks instead of 7, ensured that the

project was observed during the entire implementation. However, both the limited budget and the time frame created some frustration during the project for us. It was frustrating to realize that we could not afford everything we wished to do and that the limited amount of time prevented us from performing the LFA method as we would have preferred. However, even though we felt frustrations sometimes, this did not prevent us from continuing with the project and in the end manage to implement the measures on time.

The *action plan* that was used to manage the change was the LFA. The method, as mentioned, is a structured way to create a change. In Section 2.5, it is mentioned that the *action plan* is used to be able to prevent unforeseen event to occur. The LFA managed the unforeseen events with risk analysis as well as context analysis.

Summarily, the project group managed to perform a change at Mkula Hospital. It can be argued that the change was possible since all the elements in the Knoster's change model were fulfilled. During the process, we experienced setbacks, which also can be connected to the model. However, they did not prevent us from succeeding with the MHP.

7.4 Recommendations

We recommend using the LFA method as a planning method for small-scale foreign aid project. It is a structured method, which ensures that crucial parts of a project are included and well performed. There are however some aspects that need to be considered when the LFA is performed. These aspects, together with our recommendations are described below.

The LFA method is straightforward and simple in its entirety, however, there are steps that demand more time and knowledge to be able to perform them correctly, especially step 3, the problem analysis. We experienced step 3 as the most difficult step to perform but also the most crucial step for the project. Our recommendation is, therefore, to include a facilitator that has knowledge about the method and, therefore, can explain the procedure in a more pedagogical way. Furthermore, we recommend that the only focus during the first week on site should be on the problem analysis. The first week should include meetings and/or workshops every day to be able to solve the problem analysis, to avoid that new issues are brought up during the project. In addition, it would be beneficial to have an interpreter that can break the language barriers.

The LFA method is presented in the order step 1 to step 9. However, it is up to the performer of the LFA to decide in which order the step will be performed. We decided to start with step 1, 2 and 6, followed by step 3, 4, 5, 7 and 8. The reason why step 6 was carried out in the beginning, was since we knew the budget, the time frame and most of the staff before the project started. We believe that it is important to have this step in the beginning since it lowers the risk of project failure due to that the budget is not enough or that there is not enough time. Therefore,

we recommend performing step 6 before the project starts and, as LFA also states, adjust the order of the steps in a way that is appropriate for the specific project.

We decided to execute the LFA one week after we had arrived at Mkula. This entailed that we did not have much time to plan in detail how and when each of the steps should be performed. Furthermore, it was hard to learn the LFA method and at the same time perform it. Our recommendation is, therefore, to prepare the execution of the LFA before arriving on site. Each step could then be planned in detail and more time would be given for each step on site.

The list below summarizes our recommendations when using the LFA method in a small-scale foreign aid project.

- Use the LFA method to perform the project planning of the project
- Include a facilitator and an interpreter in the meetings/workshops
- The first week should have meetings every day that only focus on the problem analysis
- Perform step 6 together with step 1 and 2 before the project starts
- Customize the steps in the LFA to the specific project
- Ensure to be well prepared for the execution of the LFA

8

Conclusion

The purpose of this master thesis was to perform and critically evaluate the LFA, with the aim to understand if the LFA is a suitable method to help create sustainable implementations in a small-scale foreign aid project. Our conclusion is that the LFA is a suitable method to help create sustainable solutions since the method facilitates the projects planning process. However, the method does not create sustainable solutions by itself. It is the performer of the LFA that needs to initiate a sustainable perspective on the project. If that is done, the LFA method provides a structured way to accomplish a sustainable solution, since the method ensures that important parts in a planning process are not missing. We also believe that the structure of the method, with its different steps, entails that the solution has been properly processed. Meaning that the iterative process that the method provides entails that the solution has been dealt with so thoroughly that no hasty decisions have been made.

Furthermore, the method is designed to be flexible, i.e. easy to customize to each project, which we believe has been helpful when applying it on the MHP. The majority of the steps in the LFA were performed and adjusted to fit the MHP. For example, we divided the LFA-workshop into smaller workshops and meetings instead of performing one LFA-workshop.

The main challenge of using the LFA method in the MHP, we believe, has been the limited amount of time on site. We found the LFA time demanding, which entailed that the method could not be performed as we would have preferred. The method stresses the importance of stakeholder involvement in all steps, however, that was not manageable for us. Both due to our limited amount of time on site but also due to that the HMT had the MHP as their secondary work.

The main conclusion of this master thesis is that the LFA is a suitable method for implementing sustainable solutions in a small-scale foreign aid project. However, the main challenge with the method is that it is very time demanding. Entailing that if the time on site had not been extended with another group of students, we probably would not have come to the same conclusion. Therefore, it is important to take the time aspect into consideration when planning the time frame of the project - two months to perform the LFA method was too short, to be able to conduct it in the most correct way.

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A

Appendix - Memorandum of Understanding

The Memorandum of Understanding was established and sign before the project started. The contract was established between between Mkula Hospital Management Team, MHMT, and Architects Without Borders, ASF, and Engineers Without Borders, EWB. In the MoU, the students are a part of the HHPG, and the HHPG are representatives of ASF and EWB, unlike what is stated in the report.

Memorandum of Understanding

Between

Mkula Hospital Management Team (MHMT)

and

Architects Without Borders (ASF), Engineers Without Borders (EWB)

This Memorandum of Understanding (MoU) sets for the terms and understanding between MHMT and ASF and EWB for Healthy Hospital Phase 2 Mkula.

Background

The collaboration between the Swedish partners started in 2014 with Healthy Hospital phase 1 together with Kolandoto hospital that aimed to survey for water and electricity needs. That collaboration grew during 2015 and 2016 with an implementation of some of the recommendations. Phase 1 of Healthy Hospital Mkula took place 2018 and replicated phase 1 of Healthy Hospital Kolandoto, but with the new partner MHMT. During phase 1, a new water pump was installed and an investigation of the hospital's infrastructure was conducted.

The importance of a clear working agreement where ownership is clearly with MHMT is of utmost importance. MHMT is the initiator and the partner that has created the framework for the other partners to work within through the approved project plan Healthy Hospital Phase 2.

Purpose

This MOU will clarify responsibilities of the different partners in the collaboration with the aims and goals stated in the Healthy Hospitals Phase 2 project plan.

Further this MoU aims to clarify the decision making structure within the collaboration.

Decision making structure

MHMT has full ownership of the project and final decision-making power in all project related questions. To facilitate an effective cooperation the MoU consider that through the approved project plan Healthy Hospital Phase 2 Mkula, EWB and ASF has received a mandate to work and execute the activities within that framework bearing in mind continues updates to MHMT.

When a question arises that falls outside of the project plan EWB and ASF will discuss and make either a recommendation or more than one proposal for MHMT to take a decision on.

Reporting

All listed partners are responsible for evaluation of effectiveness and adherence to the agreement throughout the project period. Evaluation of each activity will happen after finalization of the activity by responsible partner. Input of overall cooperation will be gathered by the Healthy hospital project group and finalized in the final evaluation of phase 2 due 20191231.

Duration

This MoU is at-will and may be modified by mutual consent of authorized officials from (listed partners). This MoU shall become effective upon signature by the authorized officials from the (listed partners) and will remain in effect until modified or terminated by any one of the partners by mutual consent. In the absence of mutual agreement by the authorized officials from (listed partners) this MoU shall end on (20191231).

Contact Information

Partner name: Mkula Hospital

Partner representative: [REDACTED]

Position: Medical Officer in Charge

Telephone: [REDACTED]

E-mail: [REDACTED]

Partner name: Engineers Without Borders

Partner representative: [REDACTED]

Position: Project coordinator

Partner name: Architects Without Borders

Partner representative: [REDACTED]

Position: Architectural design

----- Date:
(Partner signature)

[REDACTED]

----- Date:
(Partner signature)

[REDACTED]

----- Date:
(Partner signature)

[REDACTED]

B

Appendix - Project Plan

The outcome of the LFA, summarized in a project plan

Mkula Healthy Hospitals Project Plan Phase 2

Updated version: 2019-03-06

Table of content

Purpose	3
Background	3
Project goals	4
Method and structure	4
Stakeholders	4
Problem Identification	5
Objectives and Activities.....	6
Recourses and indicators	7
<i>Time plan for the constitution work.....</i>	<i>9</i>
<i>Project funding</i>	<i>10</i>
Risk analysis and mitigation.....	10
Sign of agreement	12
Appendix 1: Guidelines.....	13
Appendix 2: Partners	14

Purpose

On a large scale, the ultimate purpose of the Healthy hospital projects series is, and has always been, to help and cooperate with the current hospital to decrease mortality and morbidity in the area. To do this, the main purpose of this phase, Healthy Hospitals Mkula Phase 2, is to assist Mkula Hospital to address their most important infrastructural challenges to provide a good base for safe healthcare. This will be done by helping with necessary investments, technical and architectural advice, and further planning and investigations.

Background

Healthy hospitals is an architectural and engineering aid project which started in 2015 as a collaboration between Kolandoto Hospital (Shinyanga region, Tanzania), and the Swedish NGO:s (Non Governmental Organisations) Architects Without Borders, Engineers Without Borders and Involve Aid (see Appendix 1). The project at Kolandoto Hospital was completed in 2017. The most important outcomes during the three years included:

- Total examination of the hospital infrastructural status
- Architectural masterplan for the hospital's development
- New groundwater pump and water treatment for increased and safer water supply
- Solar powered backup system
- Construction and equipment of a new casualty unit

During the latter stages of the project at Kolandoto Hospital, Mkula hospital made an enquiry regarding assistance with infrastructural issues. Since then, a new Healthy Hospital Project has been set up as a collaboration between Mkula Hospital, Architects Without Borders and Engineers Without Borders in similar way as the previous project at Kolandoto Hospital.

In 2018, the first phase of the Healthy Hospital Mkula took place. During the first phase, a new groundwater pump with new TANESCO power supply was installed and the work with a new architectural master plan for the hospital's development was initiated. Additionally, an examination of the current status of the hospital general infrastructure was produced from in-field examinations and interviews. The findings were summarized in a Survey Report. The report concluded the hospital's most important infrastructural areas in need of improvements and further investigation. The needed improvements and investigations are stated in this Project Plan.

Project goals

The overall project narrative is to find a strategic way for Mkula hospital to proceed providing healthcare in a safe and efficient way. The goal is to decrease mortality and morbidity in the hospitals catchment area by creating a clean, safe and healing environment for both staff and patients at the hospital.

Method and structure

The Healthy Hospitals Mkula project consists of the Survey Team and the Mkula Hospital Management Team. The Survey Team includes: management group (experienced architects and engineers) and students (architectural and engineering students). The Mkula Hospital Management Team consist of members from AICT (see Appendix 2), medical director, medical doctors, head nurses and the head of the hospital engineers.

The engineering students are divided into two sub-groups, the first with Rebecca and Hanna, and the second with Annika and Ellen. The first sub-group will arrive at the start of the field study together with the architect student, and the second sub-group will arrive 4-6 weeks after the start of the field study to prolong the field study and enable the project to achieve more during this phase.

Stakeholders

HMT = Hospital Management Team

HHPG = Healthy Hospital Project Group

1. **Target group:** Patients at the Hospital
2. **Project owner and Project group:** Project owner – HMT, Project group – The students, HTM and HHPG
3. **Decision maker:** HMT, the students and HHPG
4. **Experts in the subject/field of investigation:** HHPG, Contractor and HMT
5. **Financiers:** EWB, ARQ, Chalmers mastercard, WSP and RISE

Problem Identification

The figure below depicts the problem tree conducted together during the problem analysis workshop. It includes the main problem at the hospital, with the causes that create the main problem and the effects that the main problem lead to.

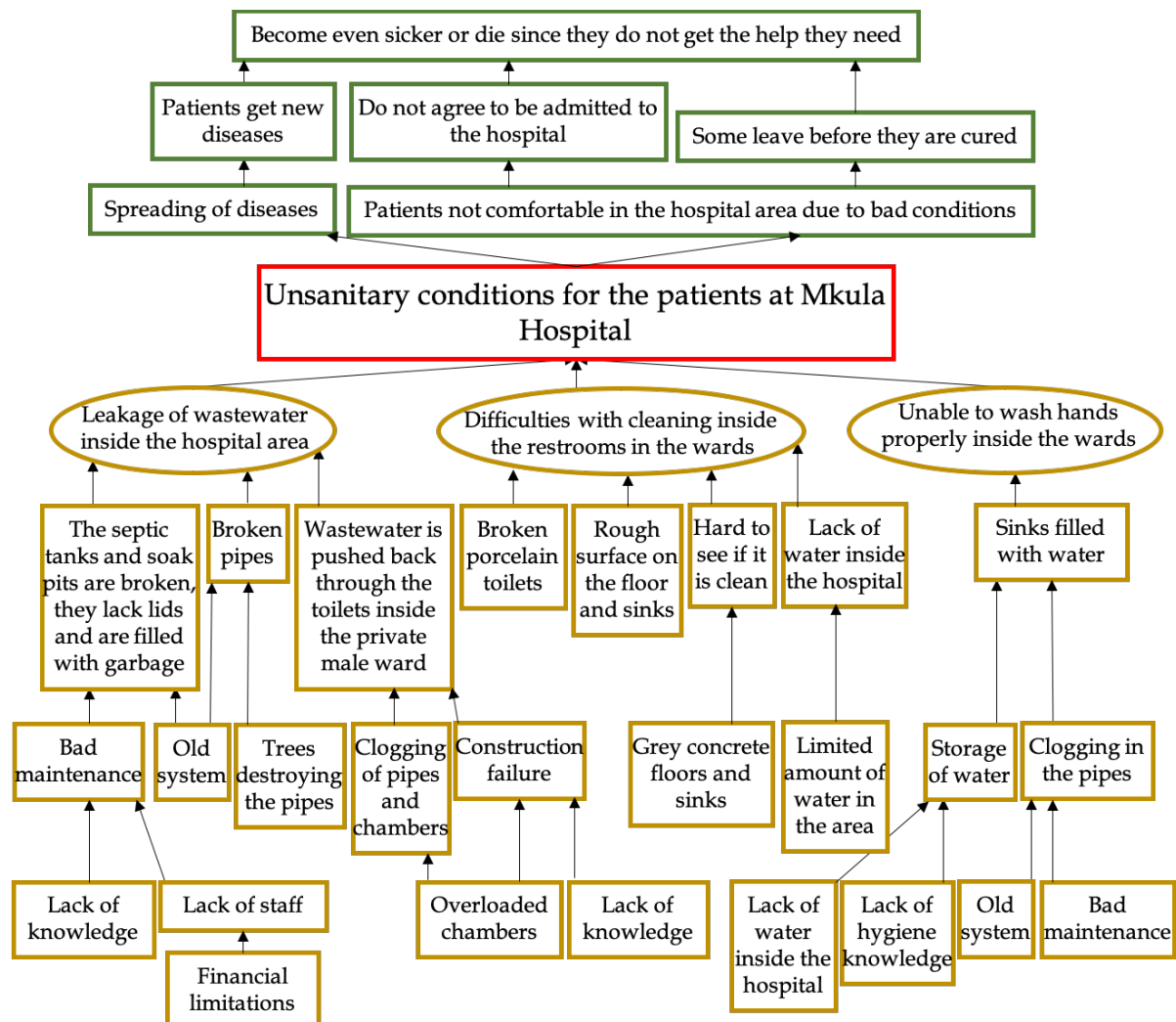


Figure 1. The result after our second problem tree analysis. Parties in the yellow squares contain the causes, the red square contain the main problem, while the parties in the green squares contain the effects.

Objectives and Activities

This figure presents the outcome of the objective analysis and the plan of operation. Parties in the blue squares contain the activities, the black squares contain the expected outcome, the yellow squares contain the intermediate objectives, the red squares contain the project purpose, and the parties in the green squares contain overall objectives

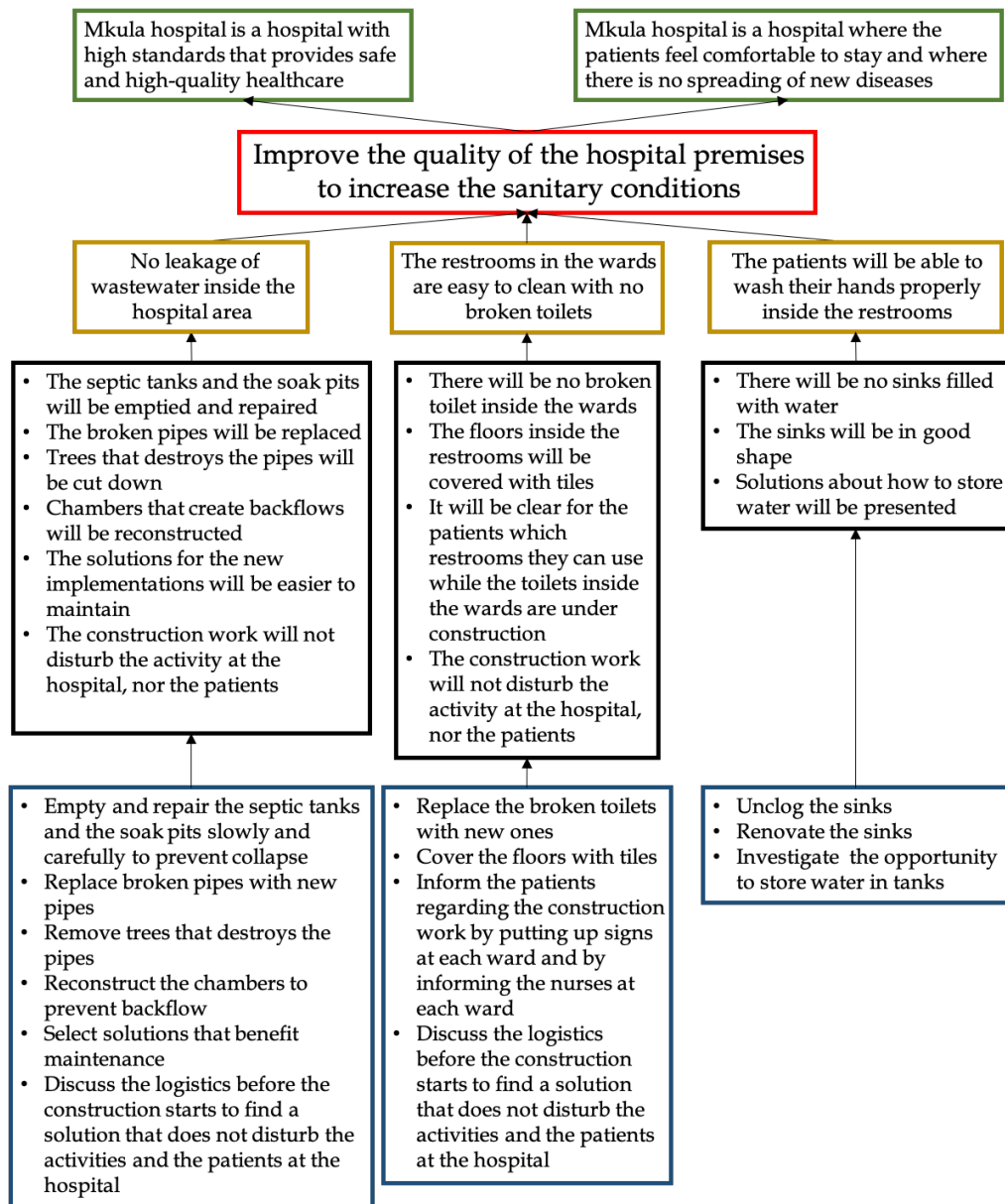


Figure 2. The result of the objective analysis and the plan of operation.

Recourses and indicators

Each table below represent one intermediate objective with its activities, followed by the expected outcome, the responsible person and the budget for each activity. Furthermore, the indicators and verification sources are stated, to be able to measure the project success.

However, the time frame is not included in the table since it was compiled by the contractor, hence it is separate and can be found further down in the report.

Intermediate objective: The restrooms in the ward is easy to clean with no broken toilets				
Activity	Expected outcome	Responsible person	Time	Budget/activity [SEK]
Replace the broken toilets with new ones	There will be no broken toilet inside the wards	The contractor		15 400
Cover the floors with tiles	The floors inside the restrooms will be covered with tiles	The contractor		13 800
Inform the patients regarding the construction work by putting up signs at each ward and by informing the nurses at each ward	It will be clear for the patients which restrooms they can use while the toilets inside the wards are under construction	HMT		-
Discuss the logistics before the construction starts and find a solution that will not disturb the activities and the patients at the hospital	The construction work will not disturb the activities at the hospital, nor the patients	We		-

Monitoring: Indicators	Source of verification
New porcelain toilets installed	Inspection of the restrooms
Satisfied cleaning staff	Interviews
More frequent use of the toilets by the patients	Inspection

Intermediate objective: The patients should be able to wash hands properly inside the restrooms

Activity	Expected outcome	Responsible person	Time	Budget/activity [SEK]
Unclog the sinks	There will be no sinks filled with water	The contractor		1450
Renovate the sinks	The sinks will be in good shape	The contractor		*
Investigate the opportunity to store water in tanks	Solutions about how to store water will be presented	We		-

Monitoring: Indicators	Source of verification
Prerequisites for the patients in the ward to wash their hands	Inspection of the wards
Pleased patients at the wards	Interviews
Stationary water in the sinks during a year	Inspection

* These activities were identified after the contract was signed. The contractor executed the measure without extra cost.

Intermediate objective: The patients should be able to wash hands properly inside the restrooms

Activity	Expected outcome	Responsible person	Time	Budget/activity [SEK]
Unclog the sinks	There will be no sinks filled with water	The contractor		1450
Renovate the sinks	The sinks will be in good shape	The contractor		*
Investigate the opportunity to store water in tanks	Solutions about how to store water will be presented	We		-

Monitoring: Indicators	Source of verification
Prerequisites for the patients in the ward to wash their hands	Inspection of the wards
Pleased patients at the wards	Interviews
Stationary water in the sinks during a year	Inspection

* These activities were identified after the contract was signed. The contractor executed the measure without extra cost.

Time plan for the constitution work

CONTRACTOR'S WORK PROGRAMME FOR : EMPTYING AND REPAIRING OF THE SEWAGE SYSTEM AT AIC MKULA HOSPITAL.

EMPLOYER
ICT MKULA HOSPITAL
P.O.BOX 213
MAGU
MWANZA TANZANIA

CONTRACTOR
LASSIWA INVESTMENTS LIMITED.
P.O.BOX 798
SHINYANGA

Durations: 4 Weeks

S/NO	DESCRIPTIONS	DURATION / WEEKS			
		1	2	3	4
1	Site mobilization, Emptying of Septics and Soak away Pits and Demolishion of WCs				
2	Repairing of Septics , Soak away Pits and fixing of WCs				
3	Tiling work to toilets and shower rooms				
4	Demobilization and site handing over				

Project funding

From	Amount
Healthy Hospital (Mkula Phase 1)	
Engineers Without Borders	
Chalmers MasterCard	
ARQ	
RISE	
WSP	
In total SEK	232 500 SEK
In total TZS	Ca 58 125 000 TZS

Risk analysis and mitigation

Overall risks

Risk: The implemented buildings and infrastructure solutions are actually not needed at the hospital.

Measures: Make sure that all suggestions from the HMT are carefully considered and that it is the HMT that have the final say in the decision making.

Risk: Losing money and possibly breaking the budget because of big changes in local currency.

Measures: Be aware of the local currency when making the budget and have a buffer.

Risk: Not granted building permits or problems with other permissions.

Measures: Be prepared and informed. Find out early what permissions are needed for the tasks that are planned and make sure to apply in good time. Be ready to be flexible.

Risk: Issues in collaboration with Mkula Hospital Management Team.

Measures: Have meetings regularly with open dialogues.

Risk: Master students not able to complete the task due to sickness or other personal events.

Measures: None, but the probability is low that all of us become sick so that none of us can continue.

Risk: Master thesis students become short of time to finish the project.

Measures: Be prepared to scale down the project if signs would indicate this.

Risk: The rain could lead to flooding that prevents the project to move forward.

Measures: None, but the probability is low.

Risks during construction

Risk: Collapse of the septic tanks and soak pits while emptying.

Measures: Be careful when emptying, do not empty too fast.

Risk: Further breakage of the sewage system is found, which leads to additional costs.

Measures: The inspection of the area should be thorough, and everybody should be fully aware of what measures to take before the construction starts. It should clearly be stated in the contract what happens if additional measures and therefore an increased cost would be needed.

Risk: The information regarding the rehabilitation of the restrooms does not reach the patients in the wards, entailing confusion for the patients when the restrooms are locked.

Measures: Put up signs at each ward and inform the nurses that they have to talk to the current patients regarding which toilets they can use.

Risk: The construction work is performed so it affects the patients (logistics, noise and dirt).

Measures: Discuss the logistics before the construction starts, to find a solution that will have the least impact on the patients.

Risk: The contract is not followed.

Measures: Clearly state in the contract the consequences if something deviates from the contract.

Risk: Master students leave Mkula before the project is finished entailing that it is no one that monitors the project on site.

Measures: Extend the time on site by handing over the project to another responsible person.

Risk: The contractor cannot proceed with the work due to problems at the company.

Measures: Ensure that the company is reliable and that they can present documents on previous works that prove their credibility.

Sign of agreement

I hereby agree that I have read and understood the project plan for phase 2.

Project group:

Hospital management:

Place and date:

Place and date:

Signature:

Signature:

Clarification of signature:

Clarification of signature:

Appendix 1: Guidelines

The Healthy Hospitals Mkula Project is carried out according to some elementary guidelines in order to be a successful and sustainable aid project. To achieve this, the project should:

- Aim to reduce long term aid dependency.
- Focus on the recipients main and most relevant issues and challenges.
- Pursue recipient involvement and ownership at all stages of the project.

Aid dependency is a problem following all aid work. The Healthy Hospital Mkula Project should therefore aim to reduce long term aid dependency by implementing economical and social sustainable solutions and systems. Implemented solutions should not result in unnecessary costs or maintenance which the hospital cannot bear.

To pursue recipient involvement and ownership at all stages of the project, the Mkula hospital management or relevant hospital staff should be involved in the project from its beginning to the end. The chosen aims, goals and priorities should be decided by the hospital management and architectural and engineering group together. However, the hospital management will have final say in all major decisions in the project and the architectural and engineering group should only offer its professional advice. Future responsibility for implemented solutions, systems, buildings and so on lies with the Mkula Hospital management.

Focus on recipients main and most relevant issues and challenges means that the Healthy Hospital project priorities should be done with the aim to increase the hospital's possibility to, now and in the future, provide better and safer healthcare to more people. When possible, the project should also be performed so that it is beneficial to the hospital staff, hospital students and the surrounding community in the short and long term. This also includes sourcing local materials and using local building techniques

Appendix 2: Partners

African Inland Church Tanzania (AICT)

The AICT is a Faith Based Organisation (FBO) whose goal is to support individuals, families and communities, both physically and spiritually. The organization is working to try to achieve quality health care for all individuals, regardless of economic status. AICT has several medical facilities and also conducts field activities. The organizations headquarter are based in Mwanza, Tanzania.

AICT Mkula Hospital is located in the Busega district, in the eastern part of the Mwanza-region in northern Tanzania. The hospital was established in 1986 and has a current bed capacity of 105 beds.

Engineers without borders (EWB) is a Swedish NGO and they are a part of an international network which supports development projects based on engineering, often in cooperation with local organizations. Their goal is to find technical solutions adapted to and with respect to local capacity, culture and values.

Architects without borders (AWB-Sweden) are an NGO, which is a part of the network AWB-International that works for sustainable and socially equitable architecture. They aim to create better opportunities for people in difficult living situations and disasters as well as solve financial and knowledge-based obstacles in the way of a safe, fair and sustainable environment. Their projects are in cooperation with local organizations and seek to involve the community.

C

Appendix - Contract Agreement

The two contract agreements that were conducted by us, agreed upon by the HHPG, HMT and the contractor and signed by the HMT and the contractor. The first contract regards the rehabilitation of the restrooms and the second one regards the reparation of the sewage system.

Contract Agreement

- *Rehabilitation of Restrooms inside wards*

Africa Inland Church Tanzania



TABLE OF CONTENT

1. CONTRACT AGREEMENT.....	3
2. ATTACHMENTS TO THE CONTRACT	4
3. DURATION OF WORK	4
3.1 DELAYS	4
3.2 EXTENSIONS OF TIME	5
4. CONTROL AND RESPONSIBILITY.....	5
4.1 ALTERATIONS	5
5. SUBCONTRACTING.....	6
6. PAYMENT	6
6.2. DEDUCTION OF PAYMENT DUE TO DELAYS.....	6
6.3. DEDUCTION OF PAYMENT DUE TO LACK OF QUALITY	6
7. CANCELLATION OF CONTRACT.....	7
ATTACHMENT 1: CLARIFICATIONS.....	8

1. Contract Agreement

This agreement was made on: 2019-03-05

between AICT Mkula Hospital P.O. Box 213, Magu, Tanzania (hence known as the Employer) and Lassiwa Investments limited P.O. Box 798 Shingyanga, Tanzania (hence known as the Contractor).

The Employer gives the Contractor the mission to execute construction of REHABILITATION OF RESTROOMS INSIDE WARDS (known as the Construction).

The Employer has accepted the tender by the Contractor for the execution and completion of such works and the remedying of any defects therein the sum of:

8,442,900 (eight million four hundred and forty -two thousand nine hundred) TZS.

The project should start on:/.....- 2019

The due completion date shall be after starting date.

SIGNED ON BEHALF OF THE EMPLOYER:.....

Clarification of signature:.....

Place and Date:.....

SINGED ON BEHALF OF THE CONTRACTOR:.....

Clarification of signature:.....

Place and Date:.....

2. Attachments to the contract

The Scope of Work, which includes clarifications and drawings, establishes what the Contractor is to construct and what quality and quantity is required.

The Bill of Quantities provided by the Contractor and agreed upon by the Employer specifies amounts and costs calculated by the Contractor for the work to be conducted.

The Contractor will prepare a schedule, which shows how the work will progress, so that all the work will be completed by the due completion date.

3. Duration of work

The Employer promises to give the Contractor access to the site starting from the commencement date stated in the contract. If the Employer does not give sufficient access by the commencement date, and the Contractor will be delayed or will suffer additional costs, they may claim for reimbursement of such additional costs.

Completion is reached when the Construction stands according to drawings and clarifications, and is approved by the Employer. The Construction is to be handed over to the Employer, being cleaned and cleared of all excess material, equipment and tools used by the Contractor. This cleaning is to be performed by the Contractor before completion is reached.

3.1 Delays

In the case of delays, two cases apply:

- Delays which are the fault of the Contractor, will result in deductions of payment in the event that the Construction is not completed by the due completion date.
- Delays which are not the fault of the Contractor.

The following causes of delay are not the fault of the Contractor;

- compliance with the Employer's instruction arising from an ambiguity or discrepancy between documents;
- failure by the Employer to give possession of the site in accordance with the provisions of the contract;
- failure by the Employer to timeously comply with the Contractor's request to provide information required for the execution of the work;
- failure by the Employer to examine the work within a reasonable period after being given notice by the Contractor to do so;
- the ordering of the suspension of the work by the Employer which is unrelated to the proper execution of the contract, for reasons of weather conditions, the safety of the works, or the safety of the public;
- non-compliance with the terms of the contract by the Employer, their agents, employees or other contractors;
- adverse physical conditions which an experienced contractor could not have reasonably foreseen at the time of submitting a tender;
- outbreaks of war, armed hostilities or the imposition of economic sanctions and the contract is not cancelled.

3.2 Extensions of time

In the case that the Contractor is not at fault for the delay, they may claim for an extension of time. The extension of time may make the due completion date later so that they will not incur deductions of payments. This claim of extension has to be submitted in writing to the Employer no later than 7 days after the cause of delay occurred. The extension of time will be valid when it is agreed upon by both Contractor and Employer

4. Control and Responsibility

When the Contractor takes over the site, they are responsible for any loss or damage on the site, including materials brought onto site for the work to be done.

The Contractor is responsible for not causing unnecessary disturbances to the routines and functions of Mkula Hospital. The supply of electricity and water to nearby buildings needs to be functioning at all times during construction. If there is a need to temporarily disrupt either the electricity or water supply, the Contractor need to inform the Employer in writing 2 days before the disruptive work begins. The electricity or water supply to nearby buildings cannot be compromised without the approval of the Employer. All now existing electric and water systems must be functioning at completion of the Construction.

The Employer can order the Contractor to remove and redo any work which has not been properly done according to the specifications, drawings and instructions. If this happens, the Contractor must obey the order, and will receive no additional payment for doing so. If the Contractor does not obey the order, the Employer may employ someone else to do as the Employer has ordered, and the Contractor will be responsible to pay the costs of that other person.

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4.1 Alterations

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5. Subcontracting

A Contractor subcontracts when they hire someone else, a subcontractor, to do some of the work that the Contractor are contracted to do for the Employer. The Contractor must get written permission from the Employer to hire a subcontractor. The Contractor do not need permission when;

- they employ or hire labour;
- they buy materials which are required by the contract;
- they buy or hire construction equipment.

The Contractor is still responsible for all of the work required by the contract with the Employer, even if a subcontractor does some parts of it. This means that if the Employer rejects work done by a subcontractor, then;

- the Contractor must ensure that it is redone properly, by that subcontractor or someone else and that;
- the Construction is not completed until the work is redone to the approval of the Employer.

If the Contractor does not reach completion by the due completion date because a subcontractor is late, the Contractor will receive deductions of payment.

6. Payment

The Contractor are to receive payment from the Employer of shares of the total amount specified in the contract. The payment will be performed;

- 20% of the total contracted amount will be transferred from Sweden at the start of the construction. The transferred will take around a week and the Contractor will need to stand for the costs during this period.
- 80% of the total contracted amount will be paid at completion of work, the payment must be received by the Contractor at latest 28 days after completion.

6.2. Deduction of Payment due to Delays

If a delay past the due completion date is the fault of the Contractor, the payment will be deducted with 1% of the total contracted amount for each day past the due completion date. This deduction may not exceed 10%.

6.3. Deduction of Payment due to Lack of Quality

If the work done by the Contractor does not match the drawings and clarifications attached to the contract, the Employer can:

- Order the work to be removed and redone or;
- Make deductions of payment.

The deduction of payment due to lack of quality in the work will be parallel to the consequences on the completed Construction. This deduction is decided by the Employer, and may not exceed 10% of the total contracted amount.

7. Cancellation of contract

A cancellation of contract needs to be handled with the supervision of a neutral, third party. The contract may be cancelled for one of the 3 following reasons:

- 1) Due to war or emergency in which case the cancellation takes place after agreement between Employer and Contractor.
- 2) Due to the Contractor's fault in which case the Employer may cancel the contract. The Employer may cancel the contract if the Contractor;
 - has abandoned the contract; is not working or performing their duties as required by the contract;
 - has not commenced work in 14 days after the commencement day;
 - has suspended work for a period of 14 days;
 - has not removed defective materials or has not redone defective work within 7 days after being told by the Employer to do so;
 - had subcontracted part of the work without the Employer's consent.

The Employer gives a written notice to the Contractor that they are cancelling the contract, and 7 days later, the contract will be cancelled. Thereafter:

The Employer may expel the Contractor from site.

- The Employer may employ other Contractors to complete the Construction.
 - The Employer may use any material, equipment or temporary work brought onto site by the Contractor to complete the Construction.
 - The Employer may sell any material, equipment or temporary work brought onto site by the Contractor.
 - The Contractor will not be entitled to receive any further payments from the Employer.
 - If the Employer has to pay more to complete the work than it would have cost them if the Contractor had completed the work, then the Contractor must pay the Employer the additional cost.
- 3) Due to the Employer's fault in which case the Contractor may cancel the contract. The Contractor may cancel the contract if the Employer;
 - Fails to pay the amount stated in the Contractor within 28 days after stated date of payment;
 - Passes the rights and duties of the Contractor to someone else without the permission of the Contractor.

The Contractor gives a notice in writing to the Employer that they have cancelled the contract. Thereafter:

- All unused materials, which have not been paid for by the Employer, and all construction equipment and temporary work brought to site by the Contractor must be removed by the Contractor;
- The Employer must pay the Contractor;
 - for all the work done and not yet paid for;
 - for all materials or good which the Contractor has ordered for the work, and of which they have to accept delivery. These materials and goods then become the property of the Employer;
 - for the costs of removing construction equipment and temporary work which are on site at the time of cancellation;
 - for additional costs suffered by the Contractor due to the cancellation.

ATTACHMENT 1: CLARIFICATIONS

Quantities of the restrooms:

- The tiles should be placed on the floor in the restrooms
- The porcelain toilets should be removed and replaced with new ones
- The sinks are clogged so the pipes need to be cleansed or exchanged if needed
- Investigate if the drainage in the showers are working. If not, repair and unclog.

Private male ward		<u>Unit</u>
Tiles	12	m ²
New squat toilets	2	No
Showers	2	No

Male ward (with private)		
Tiles	22	m ²
New squat toilets	3	No
Showers	2	No
Sinks	3	No

Male ward		
Tiles	22	m ²
New squat toilets	3	No
Showers	2	No
Sinks	3	No

Female ward		
Tiles	22	m ²
New squat toilets	3	No
Showers	2	No
Sinks	3	No

Maternity		
Sinks	3	No

Total		
Toilets	11	No
Sinks	12	No
Tiles	78	m ²

Contract Agreement

- *Emptying and Repairing the sewage system at Mkula Hospital*

Africa Inland Church Tanzania



TABLE OF CONTENT

1. CONTRACT AGREEMENT.....	3
2. ATTACHMENTS TO THE CONTRACT	4
3. DURATION OF WORK.....	4
3.1 DELAYS	4
3.2 EXTENSIONS OF TIME.....	5
4. CONTROL AND RESPONSIBILITY.....	5
4.1 ALTERATIONS.....	5
5. SUBCONTRACTING.....	6
6. PAYMENT	6
6.2. DEDUCTION OF PAYMENT DUE TO DELAYS.....	6
6.3. DEDUCTION OF PAYMENT DUE TO LACK OF QUALITY	6
7. CANCELLATION OF CONTRACT.....	7
ATTACHMENT 1: SEWAGE SYSTEM AT MKULA HOSPITAL.....	8
ATTACHMENT 2: REPARATION OF THE SEWAGE SYSTEM	9

1. Contract Agreement

This agreement was made on: 2019-03-04

between AICT Mkula Hospital P.O. Box 213, Magu, Tanzania (hence known as the Employer) and Lassiwa Investments limited P.O. Box 798 Shingyanga, Tanzania (hence known as the Contractor).

The Employer gives the Contractor the mission to execute construction of EMPTYING AND REPAIRING THE SEWAGE SYSTEM AT MKULA HOSPITAL (known as the Construction).

The Employer has accepted the tender by the Contractor for the execution and completion of such works and the remedying of any defects therein the sum of:

9,728,000 (nine million seven hundred and twenty-eight thousand) TZS.

The project should start on:/.....- 2019

The due completion date shall be 1 month after starting date.

SIGNED ON BEHALF OF THE EMPLOYER:.....

Clarification of signature:.....

Place and Date:.....

SIGNED ON BEHALF OF THE CONTRACTOR:.....

Clarification of signature:.....

Place and Date:.....

2. Attachments to the contract

The Scope of Work, which includes clarifications and drawings, establishes what the Contractor is to construct and what quality and quantity is required.

The Bill of Quantities provided by the Contractor and agreed upon by the Employer specifies amounts and costs calculated by the Contractor for the work to be conducted.

The Contractor will prepare a schedule, which shows how the work will progress, so that all the work will be completed by the due completion date.

3. Duration of work

The Employer promises to give the Contractor access to the site starting from the commencement date stated in the contract. If the Employer does not give sufficient access by the commencement date, and the Contractor will be delayed or will suffer additional costs, they may claim for reimbursement of such additional costs.

Completion is reached when the Construction stands according to drawings and clarifications, and is approved by the Employer. The Construction is to be handed over to the Employer, being cleaned and cleared of all excess material, equipment and tools used by the Contractor. This cleaning is to be performed by the Contractor before completion is reached.

3.1 Delays

In the case of delays, two cases apply:

- Delays which are the fault of the Contractor, will result in deductions of payment in the event that the Construction is not completed by the due completion date.
- Delays which are not the fault of the Contractor.

The following causes of delay are not the fault of the Contractor;

- compliance with the Employer's instruction arising from an ambiguity or discrepancy between documents;
- failure by the Employer to give possession of the site in accordance with the provisions of the contract;
- failure by the Employer to timeously comply with the Contractor's request to provide information required for the execution of the work;
- failure by the Employer to examine the work within a reasonable period after being given notice by the Contractor to do so;
- the ordering of the suspension of the work by the Employer which is unrelated to the proper execution of the contract, for reasons of weather conditions, the safety of the works, or the safety of the public;
- non-compliance with the terms of the contract by the Employer, their agents, employees or other contractors;
- adverse physical conditions which an experienced contractor could not have reasonably foreseen at the time of submitting a tender;
- outbreaks of war, armed hostilities or the imposition of economic sanctions and the contract is not cancelled.

3.2 Extensions of time

In the case that the Contractor is not at fault for the delay, they may claim for an extension of time. The extension of time may make the due completion date later so that they will not incur deductions of payments. This claim of extension has to be submitted in writing to the Employer no later than 7 days after the cause of delay occurred. The extension of time will be valid when it is agreed upon by both Contractor and Employer

4. Control and Responsibility

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The Contractor is responsible for not causing unnecessary disturbances to the routines and functions of Mkula Hospital. The supply of electricity and water to nearby buildings needs to be functioning at all times during construction. If there is a need to temporarily disrupt either the electricity or water supply, the Contractor need to inform the Employer in writing 2 days before the disruptive work begins. The electricity or water supply to nearby buildings cannot be compromised without the approval of the Employer. All now existing electric and water systems must be functioning at completion of the Construction.

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Attachment 1: Sewage system at Mkula hospital

Drawing

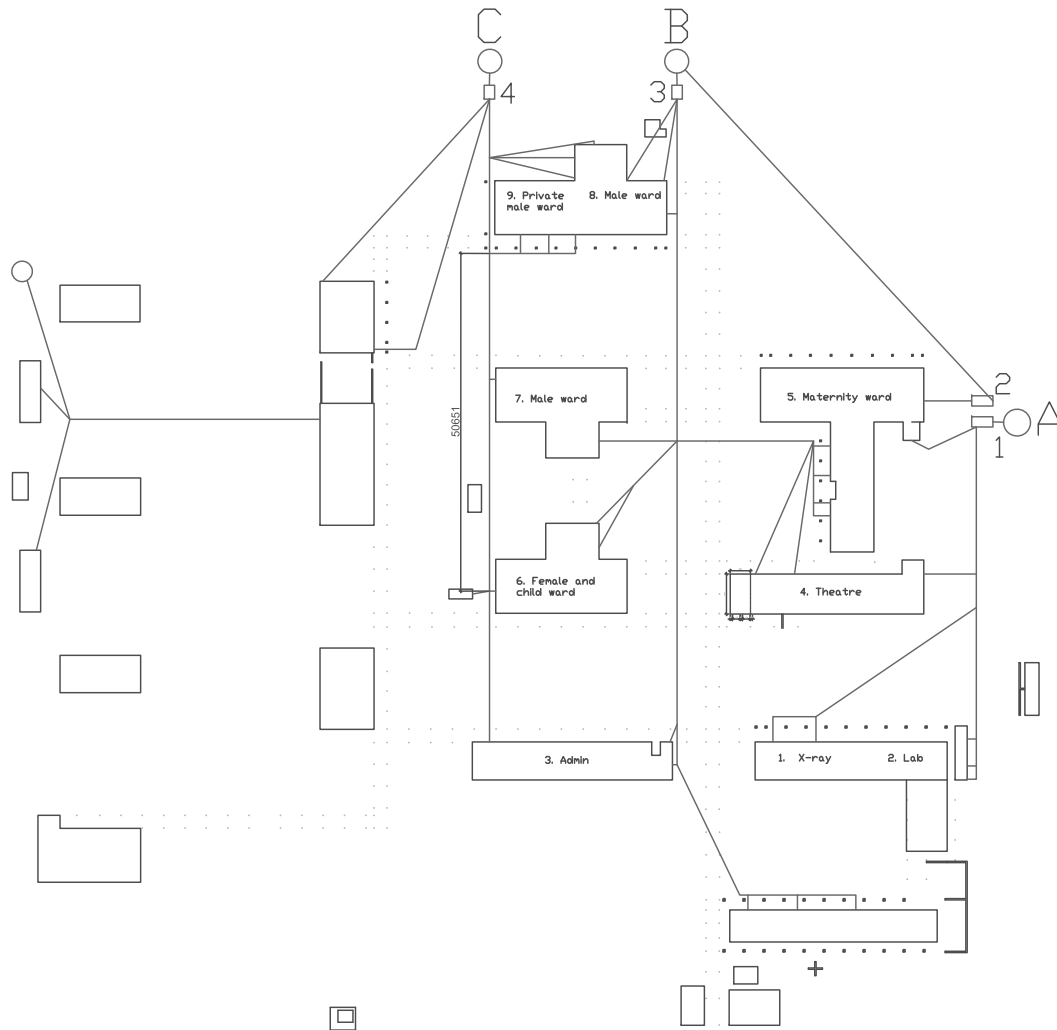


Figure 1. The soak pits are named A-C. The septic tanks are named as 1-4.

Attachment 2: Reparation of the sewage system

Clarifications

We want to prioritize reparations before building new things. Therefore,

1. Start by carefully empty and flush the tanks and soak pits to avoid collapse
2. Reparation of the septic tanks and soak pits as well as new lids will be needed. This should be done in consensus with the onsite engineers

Septic tank 1

- In the third chamber on the wall facing the soak pit, a hole of approximately 30 cm in diameter can be seen in the construction.
- 3 lids are missing

Soak pit A

- Vegetation inside the soak pit

Septic tank 2

- What we have seen there is no hole in this septic tank and it works good.

Septic tank 3

- The second chamber has a close by tree that grows into the chamber with its roots.

Soak pit B

- In the soak pit there are two large holes, which makes it easy for the surface water to reach into the chamber
- One lid is missing

Septic tank 4

- The flow between chamber one and two is broken, needs to be repaired.
- The holes on the walls needs to be repaired as well
- 3 lids are missing

Soak pit C

- Have not been able to investigate due to large vegetation around

Replacement of wastewater pipe

- The pipe that goes from the female and child ward towards Septic tank 4 needs to be investigated and replaced if needed.
 - If possible, we would like a new pipe from the private male ward to septic tank 4 in order to avoid overload the connecting pipe, or another solution that would prevent the clogging from the private male ward
- The pipe from male ward to septic tank 3 needs to be replaced and the tree removed.

D

Appendix - First problem tree

The first problem tree conducted together with the HMT during the problem tree workshop

