

Risk acceptance in flood affected areas in Nyando, --- Kenya

Viktor Asking & Jonas Nilsson |
Division of Risk Management and Societal Safety |



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Abstract

The area of Nyando wetlands experience floods almost every year due to heavy rainfall in the surrounding highlands. This area is populated, and this thesis aims to understand how the risk acceptance is developed. During a field study in the subject area, observations and interviews were conducted to create a qualitative research based on the respondent's perceptions about human values, risks, their risk reduction and their opportunities. Culture and traditions together with the possibilities of agriculture made the people willing to stay, despite the reoccurring floods and droughts. The natural hazards were forceful, and many people relied on the government or NGO's to come up with sustainable solutions.

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universitet, Lund 2019.

Riskhantering och samhällssäkerhet
Lunds tekniska högskola
Lunds universitet
Box 118
221 00 Lund

<http://www.risk.lth.se>

Telefon: 046 - 222 73 60

Division of Risk Management and Societal Safety
Faculty of Engineering
Lund University
P.O. Box 118
SE-221 00 Lund
Sweden

<http://www.risk.lth.se>

Telephone: +46 46 222 73 60

Summary

The main purpose of this thesis was to describe how the risk acceptability is developed in flood prone areas. By doing this, it will be easier to help the people in need and to decide what measures that should be taken. The risk acceptability compares the human values with the perceived risks within a situation and these factors has been divided into different sub-questions. In addition to these two factors, risk reduction and their opportunities of moving were seen as interesting factors to widen the theory of risk acceptability and tolerability. The risk that has been in focus was the floods but since risk acceptance involves all risks within a situation, others have also been brought up. The data of this study was collected by observations but mainly interviews in Kochogo, Wawidhi and Kakola, southwest of Ahero in Kano plains, Kenya.

This study was conducted with a case study approach. Together with some general observations of the area, the data was collected through semi-structured interviews with open-ended questions. The respondents were all living within the local research area and the researchers tried to cover all different ages, occupations and gender to get a broad picture of the situation. The interviews were done both with individuals and in focus groups, all to give a broad picture. The collected data were then analysed and coded in NVivo to create categories to see trends and patterns. These were used to answer the sub-questions.

The subject area is located in Kisumu County, western Kenya. This place is affected by floods once or twice every year due to heavy rain. The catchment area of the Nyando river is big, and the river easily overflows before entering Lake Victoria. Where the river runs, the land is very flat, and the overflowing water can cover large areas. Due to the soil and the flat land, the water can stay for weeks before it goes down to the lake. This has a huge impact on the people living in the area and much of their properties get harmed or destroyed.

According to the respondents, people were also affected by the drought and the situation then becomes the opposite. It was hard to find water for agriculture and even to survive became an issue. These two natural hazards were the main concern even though other risks like corruption, bad roads and low income were mentioned. Due to limited resources, people became vulnerable and the effects of the hazards could become very serious. Even though people were concerned about the risks, not much work was done to prevent or mitigate the effects. It was believed that the problems were too big to handle themselves and much was expected to be done by the government or the NGO's. Some measures had been done and the people believed that the situation overall has developed over the years to the better.

Even though few people accepted the risks that surrounded them, few wanted to move. The floods created a very fertile soil which made the agriculture favourable, the lake created great possibilities for fishing and the community had created a friendly environment. Tradition and culture had a great impact on the local people and many people referred to this when they said that they wanted to stay. These things, amongst others, were seen as things that the people value and this was compared with the perceived risks to create an understanding of the risk acceptability and/or tolerability.

As a combination of strong values within the community and a fear of the situation in the surrounding areas, almost everyone was willing to stay in the high-risk area. This does not mean that they had accepted the risks. The people spoke clearly that they needed help, and this could be seen as a tolerable situation. Even though the concern about the risks were obvious, it had become a part of their life and they thought that they could do nothing about them. Additionally, in a country exposed to violence between people over the last decades, the natural hazards can be seen as harmless when they compared to other alternative areas.

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1 Introduction

This master thesis was written for MSc. in Risk Management and Safety Engineering at the Faculty of Engineering, Lund University. The study was investigating how the risk acceptability and/or tolerability is developed in the flood prone areas in Nyando wetland, Kano plains, Kenya. All data was collected during a nine weeks field study in Kochogo, Wawidhi and Kakola, southwest of Ahero in Kano plains and this was doable through the Minor Field Studies scholarship from SIDA (Swedish International Development Agency).

1.1 Background

With the global climate change, many people around the world will experience more and worse hazards than before. Some places will be more affected than others but as it seems, the weather will be more extreme and do more harm. Since this phenomenon is fairly new to us, much work needs to be done both to reduce the development of the climate change and to make sure that people can live in these high-risk areas. To be able to live in a high-risk area, you are either not aware of the risk, or aware of and accept or tolerate the risk, or simply don't have any better alternative even if you do not accept the risk. (Wamsler, 2014)

One of the things that will occur more often with the global change is flooding. This will appear in different ways; rising of the ocean level, heavier rainfalls, impact on rivers redirection and the use of land. Tsunamis will continue to occur, and El Niño will continue to affect us (Wamsler, 2014). Lots of research have been done to describe these and the authors of this thesis wanted to investigate how the acceptance of living in areas prone to flooding is developed.

The Western Kenya experiences heavy rainfall two times per year, the first and heaviest is between April and June, and the other is October to November. Nyando wetland is flat and surrounded by mountains and canyons that create a large catchment area. Nyando river, that leads to Lake Victoria, easily overflows and create floods which affects the people living in this area. (Nyakundi, Mogere, Mwanzo, & Yitambe, 2010)

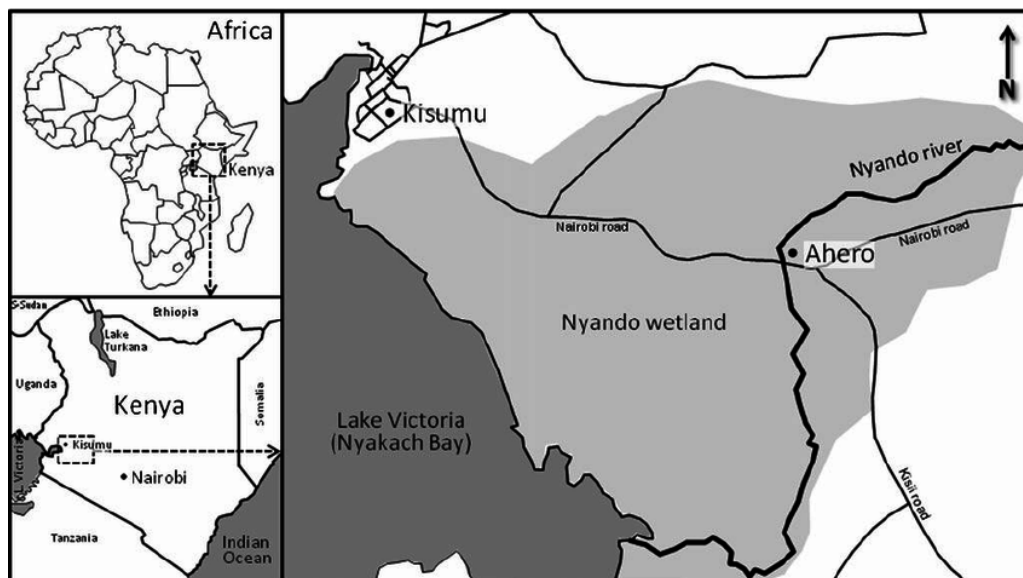


Figure 1. Location and map of Nyando Wetland, Western Kenya (van Dam, Kipkemboi, Rahman, & Gettel, 2013).

Even though the risk of living in flood prone areas seem high, people were still living there. An interesting question then was “why do they live there?”. What benefits were there that made the costs worth it? One way to be able to understand this is by risk acceptability. In short, the theories of risk acceptability compare what human values to the risk that they are subject to (Aven & Renn, 2010). This will be presented more in depth in the Conceptual Framework chapter.

Therefore, this study will look into risk acceptability and the compounds of it and how it was developed in a local community in Nyando wetlands. The reason for people to live in a place and all of its advantages can be seen as part of what they value. Things that people perceive as threatening to them or their values could be seen as risks that they are subject to. How these risks are dealt with affect the consequences and the perception of risk. If there is no better alternative ultimately, people will have developed an acceptability and/or tolerability to the risk if they still live in that area. This was part of the reasoning to construct the research questions presented in Aim and Research Questions below.

The study was limited to the people's perception and why floods occur will not be explained or investigated further. The opinion of people no longer living in the subject area was not relevant since the research was limited to the subject area.

1.2 Aim and Research Questions

The aim for this thesis is to create a greater understanding of risk acceptability and the people who live in flood prone areas.

The field study has one main question:

- How is the risk acceptability developed by the local community in flood prone areas?

This main question will be answered by these sub-questions:

- What are the reasons of the local community to stay in this area, despite the reoccurring floods?
- What is the perceived risk of the local community in flood prone areas?
- What is the preparedness of the people, the government and non-governmental organisations?
- Are there any alternatives for the local people and what is the perception of development of factors affecting risk acceptability in the local area?

2 Research Process

The case study approach was applied in this research. A case study research is defined by a twofold definition, where the first part defines the scope as an empirical inquiry to study a case in depth in its contemporary context. The second part features the research as more variables of interest than data points, and data collection and analysis is guided by prior theoretical propositions. (Yin, 2014)

The case study approach is a preferred methodology compared to other forms of social science research when (1) the research question is “how” or “why”; (2) there is no control over behavioural events; and (3) it has a contemporary focus. (Yin, 2014)

The main question in this research was:

- How is the risk acceptability developed by the local community in flood prone areas?

This case study was descriptive, as the focus was to describe how the situation was, rather than conclude correlations why it was as it was. Therefore, it was only one single case where the research was conducted instead of several, which is needed to be able to compare and see correlations. Since the case study was a social study and mainly about people’s perception it was preferable to do a qualitative study, where perceptions and conceptions can be taken into account compared to a quantitative.

2.1 Method

This section will describe how the descriptive qualitative single case study of this report was conducted. The different stages of the research are presented below, see Figure 2.

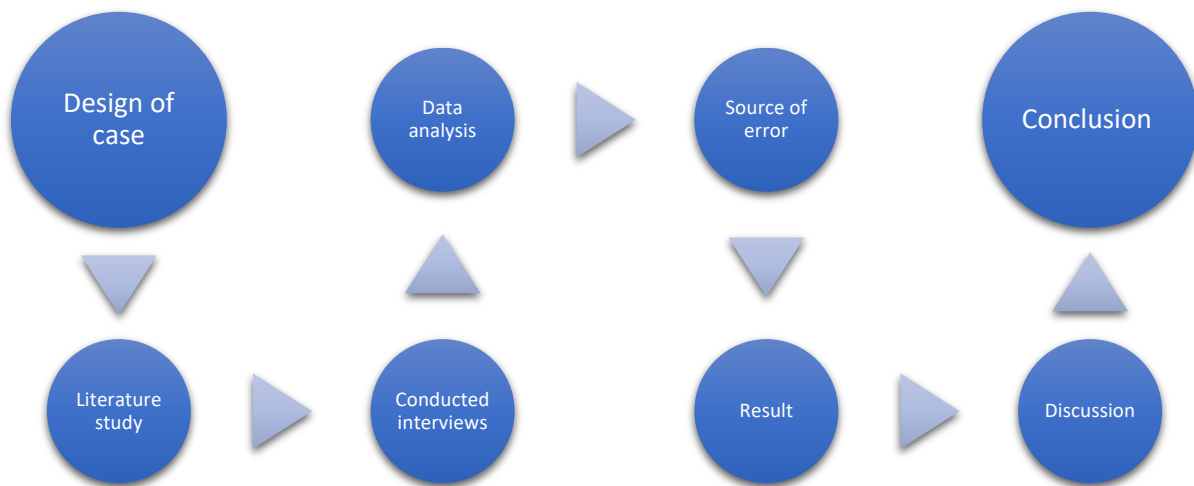


Figure 2. Schematic representation of the research process.

2.2 Design of Case

A literature study was conducted about the theory of risk acceptability and specifically in flood affected areas. To be able to construct the sub-questions, we had to be well informed about the subject. This was done prior to the data collection to construct propositions of the case study, which was used as guidance in the development of the case design. The relevant theories are presented in the Conceptual Framework chapter. While studying the subject and constructing the sub-questions on beforehand there is a risk of becoming subjective, which can lead to biases through-out the research (Glaser & Strauss, 1967). Therefore, it was of importance to be as objective as possible to avoid biases and to conduct an objective research. The four sub-questions were constructed with guidance of theories of risk acceptability and risk perception. Where Risk acceptability is a judgment of an evaluation of benefits compared to cost as risks and also other alternatives. Therefore, the first sub-question covers the benefits of living in the area. The second and third sub-questions covers the

perceived risk, which several factors affect, for example familiarity, control, fatal, trust in state-operated risk control and management and reliability and clarity of information. The fourth and last sub-questions covers the other alternatives that are available. The intention of sub-questions was to make the research conclusion and theories, easier to grasp and manageable. By processing each sub-question with relevant obtained data, this was used to answer the main question. To be able to do this, it was of importance not to simplify too much, as it wouldn't have been sufficient to explain the result and conclusions. But, at the same time, not simplify too little, as it would have made the conclusions to complex and hard to grasp (Eisenhardt, 1989).

2.3 Data Collection

Additionally, to observations, the main source of data was collected through both individual and focus group interviews. Interviews can focus on the desired topic and provide rich, in-dept and detailed information about both explanations and personal views, as perception and meaning (Yin, 2014). The reports topic was mainly built on perception and personal views; therefore, interviews were used as source of evidence.

We did semi-structured interviews with open-ended questions to conduct interviews that were more like a fluid but guided conversation, rather than rigid structured queries. Since Charmaz (2014) point out that this is a preferred strategy in order to obtain rich, in-dept and detailed answers to a set of research questions. Furthermore, Barriball & While (1994) writes that semi-structured interviews allow for a conversation with both perceptions and conceptions. Also, the interview becomes adjustable, both to whom the interviewee may be, and in which order the questions may be asked. This adjustability of our interview guide was a big advantage if we would have the opportunity to conduct focus group interviews. Both structured and unstructured interviews were considered unsuitable for this research. Structured as they are more like a questionnaire and can limit the answers and leave out vital information. Unstructured are without direction and can be very time consuming (Neuman, 2016). Shorter interviews were conducted because we were limited by time and therefore were following the interview guide more than prolonged interviews.

Morgan (1996) defines a focus group interview as a research technic to collect data through group interactions about a subject pre-decided by the researcher. Beside what is mentioned above for individual interviews, there are some additional aspects that needs to be considered in a focus group. In a focus group the number of respondents should be between four and six to have a good conversation. The selection of respondent is of importance to avoid bias, and to get a good discussion, the group should be either homogenous or heterogeneous. The interviewer should guide the discussion of the focus group interview rather than having a dialog in an individual interview. (Wibeck, 2000)

To obtain rich, in-dept and detailed answers from the interviewee, we tried to build up trust and made the interviewee comfortable. In the beginning of each interview we presented ourselves and informed the interviewee about the study and ethical principles. The interview guide questions were constructed to be able to answer the sub-questions, this was done by studying relevant theories presented in Conceptual Framework. The first questions in the interview was easier and familiar to the interviewee and the questions were carefully worded. The interview guide that was used is shown in Appendix B – Interview guide. Furthermore, we tried to be empathic, understanding, sensitive, and affirmative to make the interviewee feel comfortable. Charmaz (2014) and Neuman (2016) both describes the importance of trust before, during and after the interview to obtain valuable, rich, and in-depth data.

Data was also obtained from observations, which were useful to get a greater understanding of the situation of the interviewees. Observations were made throughout our stay in Kenya, but mainly in the subject area. The researchers of the study obtained knowledge of the local environment, culture, and politics amongst other things. This was done by interacting with the local inhabitants and by exploring the subject area. Some observations were something that the researchers actively wanted to observe,

others were more spontaneous without any previous thought. Pictures from the subject area are presented in Appendix D – Photos.

2.4 Conducted Interviews

The interviews were conducted sporadically during our stay in Kabongo village in Kochogo outside of Ahero in Kano Plains between 2018-10-17 and 2018-11-07. During our stay we had a lot of help from our hosting family, who were highly respected in the area, to get respondents for our interviews after our requests. Obtained data that could give a result that was represented by the subject area, we wanted a good representative selection of respondents and to obtain saturated answers. We had a total of 62 respondents participating in seven individual and six focus group interviews. The respondents were between 18 and 107 years old, both male and female from different villages nearby Kabongo, located within Kochogo, Wawidhi and Kakola area. The occupations were also of importance to represent the community. There may have been some occupations that weren't represented, but the researchers of this study believed that the occupations covered represented the community well. The different occupations that were included were as follows: area chief, pastor, head teacher, retired teachers, business, odd jobs and unemployed, but mainly farmers. To keep the respondents' integrity, they were kept anonymous in the interviews and in the report, and neither were the interviews published within this report. There were between 6 and 13 respondents in the focus group interviews which all knew each other well and have weekly meetings. Therefore it was natural to interview them in focus group instead of individual interviews. The statistics of the respondents is presented in Appendix A – Respondents. Most of the interviews were conducted in the homes of the respondents, accompanied by Collins from our hosting family, who also interpreted when needed. Collins was well aware of our project and how we wanted to conduct the interviews, so that the source of error to use him as an interpreter was minimised and the benefits maximised. During the interviews both researchers were conducting the interviews. One of the two researchers were interviewing while the other one was taking notes and assisted the interviewer. The individual interviews were more like a dialog, while in the focus group interview the researchers tried to create discussions in the focus group. The interviews were recorded. When transcribing the interview both the interpretation of the answers in lou and the respondent answers in English were transcribed. The interviews were from 30 to 60 minutes long. Successively as the data was collected it was transcribed, coded and analysed to see if it was sufficient saturated. The researchers were satisfied with 62 respondents, since they had obtained saturated answers and had a good representation of the community.

2.5 Analysing of Data

During the interviews, a large amount of data was collected. This data referred to everything that the respondents said during the interviews and the observations that were made by the researchers. The amount of data quickly became large why there was a need to organize, integrate and examine the data to be able to do the analyse (Neuman, 2016).

Due to the concept of case study research, coding was done both to organize the data but also to analyse in the next step. To organize the data, all interviews were first transcribed, word by word, to match the physical interview with a text document. These documents were then used in NVivo, a Computer-Assisted Qualitative Data Analysis Software, where all relevant quotations were marked and categorised. Even though some quotations seemed simple or shallow they were to be used since all data could be of importance. The researchers decided not to use data that were irrelevant since it didn't contribute to the report.

Figure 3 describes the different stages of the analysis process of the collected data. NVivo is used in Initial Coding, Focused Coding and Categories.

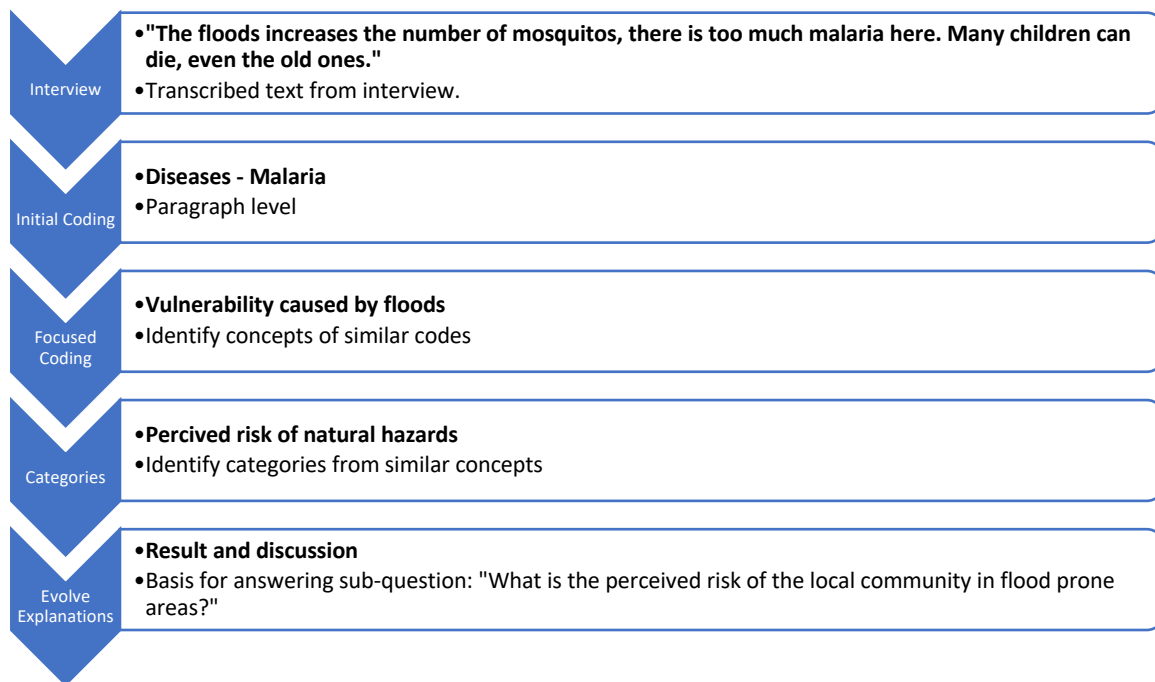


Figure 3. The different stages of the analysis process of collected data.

In the initial step of coding, we tried to be as objective as possible and not to do any analysing of the data. The data also needed to be short and precise to fit into only one paragraph. By this, it was important to be open to any theoretical direction. Even though all data should first have been coded by its own category, the researchers sometimes found quotations that were relevant to an existing category, then that quotation was placed in the same category without being further analysed. Furthermore, some quotations were coded twice if the researches were convinced that the interviewee answered two questions at the same time. For example, some interviewees named *the floods* as a disadvantage, as it was, but described it as a hazard, and it was then coded both as a disadvantage and a natural hazard.

When all relevant quotations were marked and coded, they were placed into more general categories. This is the focused coding and was an iterative process. This means that the work was to continue to jump back to the initial coding and back for deeper understanding. Also, some changes might have been done in the initial coding due to the fact that more experience in coding also developed the way of analysing. The process continued until the researchers were satisfied with the coding. The research sub-questions were the top-categories from where the data was coded into more specified sub-categories. This was done since also the interview questions was divided into the different sub-questions. Finally, these categories that were developed helped to show patterns, matching logic and insights.

The researchers found it advantageous to start processing the data early after the interviews, since the memory of the interview helped. Also, by analysing the first interviews early, the researchers got more experience and understanding of what was important to achieve during the later interviews.

Again, the main objective of the coding was to organize all the quotations, the data, to make it useful. When this was done properly, the researchers were able to answer the sub-questions of the research which further on were used, together with different theories presented in Conceptual Framework, to answer the main question in Discussion and Conclusion. By analysing the data further, the researchers were able to detect other trends and patterns, which made the case study deeper and more descriptive. These analyses were not part of the result but were brought up and discussed in Discussion, since it was considered valuable to answer the main question. An example of this could be that women's

answers differed from men's in certain topics. These patterns are not related to our main or sub-questions but still, the researchers found these interesting.

3 Conceptual Framework

In this chapter the theories of risk acceptability and tolerability along with other relevant theories as risk, risk perception and risk reduction will be presented. These theories will define and clarify and are used in this study to be able to answer the sub-question and finally main question.

3.1 What is Risk?

There are many definitions of risk and a broad definition of risk, which was applied in this research, was: *“Risk refers to uncertainty about and severity of the events and consequences (or outcomes) of an activity with respect to something that humans’ value.”* (Aven & Renn, 2009).

Risk is a concept that includes a couple of different factors which will be explained here, and hazard is one of them. Hazard is defined as something that has the potential to harm or affect someone in a negative way. In the definition of risk that is presented above, hazard connects to the “activity”. The concept of hazard itself does not include likelihood or consequences which mean that this concept should not be misinterpreted with risk. (Renn & Walker, 2008)

In addition to hazard, as described above, vulnerability is an important factor when defining risk. Wamsler (2014) means that vulnerability is a combination of three different sub-factors. According to her, these three would be: exposure, sensitivity and adaptive capacity. Exposure represent the target area for the hazard, which is not only the geographical area but also the surrounding environment. Sensitivity means how critical the consequences are, especially in the aspect of valuable things and finally, the adaptive capacity, is the ability to keep on developing after the event. Renn & Walker (Global risk governance: concept and practice using the IRGC framework, 2008) defines vulnerability as “the various degrees of the target to experience harm or damage as a result of the exposure”. This would mean, in other words, everything that is affected in a negative way by the hazard and connects to “severity of the events and consequences or outcomes” in the definition of risk. Coppola (2011) agrees with these authors and says that there is a big difference between the vulnerability and the exposure. By this, Coppola means that hazards will occur regardless what we do but the disasters are something we can affect.

According to the definition of risk, presented above, risk refers to “humans’ value”. In addition to just “living” our life, we need goals and values to feel that we can keep on living, or in other words, life with quality. Since every action comes with a risk, regardless if we walk along the street or buy stocks. We do not want to be entirely safe, since that kind of life would not be worth living, and a totally secure society would mean no freedom. This means that things other than safety is essential for us to survive. What these things are depends on who you ask, but it is important to remember that the more safety we force on people, the less independent they become. (Möller, 1986)

What a human value in a certain situation is socially constructed in its context. Each and every person have their own constructed values. When summarising what a group values, it is important to be aware of that each person’s values is highly subjective. But to collect data from more persons and summarise it, is an important step in grasping the common values of the group. (Becker, 2014)

Maslow’s constructed the hierarchy of needs in 1943, where physiological needs for survival has the highest priority followed by safety. To continue this hierarchy with socialisation, get respect and being independent, one prioritize to feel safe. The physiological needs include food, air, water and health, which then are more important than safety, but all other human development would be less important (Zalenski & Raspa, 2006). This is strongly connected to human values and so on to risk acceptability and in many cases, it also involves a risk to miss these things.

3.2 Perceived Risk and Risk Acceptability

The perceived risk is influenced by a person’s judgment, its own calculations and assessments, dreads, and behaviour, but also by facts, and scientific risk assessments. Perceived risk is based on personal beliefs, affects and experiences irrespective of their validity. (Aven & Renn, 2010) Furthermore, Slovic (1999) mentions some aspects that risk perception is highly related to, he points out sex as one

of these aspects, but also educational level. This shows how subject the perceived risk is and highlights some of the factors that can influence. In every culture there is several philosophies and values, which all affects the perceived risk (Olofsson & Öhman, 2009). An example can be a fatalist, who don't think that it is possible to change a situation and that it is destined to be as it is.

Perceived risk is a vital part of risk acceptability which not only depends on the perceived risk, but also about the benefits the risk brings and available options. Therefor risk acceptability has to be evaluated in its context with its cost and benefits, compared to risks which may be estimated in isolation. (Slovic, Fischhoff, & Lichtenstein, 1982) The evaluation of risk acceptability and/or tolerability is a complex task without one distinct answer, especially when evaluating not only one individual, but an entire community. Then characterization can be used to easier evaluate the risk acceptability and/or tolerability of the community. The distinction between acceptable, tolerable and unacceptable may be simple, but still useful in its purpose of pointing out the general attitude. (Aven & Renn, 2010)

Risk acceptance is an important aspect in decision-making, since it gives a general idea of what the society is willing to accept and pay. Public values, risk perceptions and social concerns are crucial factors of risk acceptance, and they are therefore important to consider. However, it is important to note that science and policy cannot be replaced by public perception and common sense. (Aven & Renn, 2010)

If risk is accepted in a situation, it means that the situation is morally satisfied and there is no need to mitigate the risk. The opposite is if the risk is unaccepted, where the situation has to change in some way. There is also a place in between accepted and unaccepted, where the risk is tolerable. To tolerate the risk means that the situation is warranted due to associated benefits, and measures will be taken if possible to reduce the risk to a more accepted level. Risk acceptability and tolerability criteria and threshold are often used in risk assessments, these criteria must be derived from value-based dimension. Both the acceptable and the tolerable thresholds need to be determined by ethical reasoning. Furthermore, the analytic studies answer to how great the risk is, and this is then compared to the thresholds to see if the risk is acceptable, tolerable or unacceptable. Additionally, to establish acceptable and tolerable thresholds, public values, perceptions and social concerns can guide risk assessments to process and focus on interesting topics. (Aven & Renn, 2010)

3.3 Risk Reduction

There are several ways of reducing risk, Becker (2014) summarise them to five adapting functions below. Furthermore, he highlights the importance of the different actors' capacities when analysing these functions, being individuals, communities, and organisations. As for the three first proactive functions one important thing is that they must be ongoing processes, even when everything seems alright, to protect what humans' value.

Preventing – proactively reducing the likelihood of risk. For example, construct levees to prevent flooding.

Mitigating – proactively reducing the consequences of risk. For example, constructing stronger houses to mitigate the possible damages of flooding.

Preparing – proactively preparing to respond to and/or recover from a risk. For example, to learn and plan proactively on how to respond and recover after and/or during a risk have occurred.

Responding – addressing the immediate consequences after and/or during a risk have occurred. For example, getting yourself and others to an evacuation centre when your house is flooded.

Recovering – restoring the consequences after and/or during a risk have occurred. For example, to repair the house after damages due to flood.

Prevention and mitigation are both proactive measures to reduce risk, the difference is that they have different focus, likelihood, and consequence of risk. Many proactive measures reduce both the likelihood and the consequence of risk. For example, a dike will both reduce the likelihood by more water is needed to cause flooding and at the same time if it would flood, the flood would cause less damage. Therefore, these were combined in this report.

Preparedness is defined as the work done before an event to raise capacity to respond and/or recover from the expected damages done by the hazard (Becker, 2014). It is to plan proactively so that you know what to do, how to do it, and/or to be equipped to be able to do it after or during a hazard (Coppola, 2011). Examples of preparedness can be external help that are stand-by, like ambulance, fire & rescue service, and police. But also, to have plans in situations of chaos, both for individuals, communities, organisations, and government.

4 Context of Research

Kenya is located on the African east coast with the equator cutting right through the country. The country borders to Tanzania in the south, Uganda in the west, South Sudan and Ethiopia in the north and Somalia in the east. With both coast line and mountains, the landscape differs much depending where you are. The north is mostly covered by dry flatland and the Great Rift Valley divides the country with high mountain plateaus in the south which rises up to 3000 meters above sea level. In the south east, the climate in some areas are tropical and the ability to farm is much easier than in the north. (UNDP, 2018)

The country is a former colony of the Great Britain and got independent in 1963. During the colonization era, violence against the British and the colonization resistance led to many rebellions in the early 20th century. Before the colonization, the land was occupied by different tribes. These tribes have all different culture, traditions and language which made things complicated when determining the colony borders since these tribes are also found in the nearby countries. Even today, the tribe's lives on and creates the feeling of security, but it also divides the country. The different tribes are known for different characteristics and the languages are totally different. To be able to reach out to all people, the colonialists introduced English, which is now used by all governmental institutions. The more common language is Kiswahili, which is used in school and used over the tribe borders. (Aswani, 2018)

After the independence in 1963, confusion over who owned the land between the tribes had led to insecurity, violence and migration to other parts of the country. Even though many people see the colonialism as something good for the country with developed infrastructure, growing economy and better education, it is clear that during the independence the colonialists left the country too fast. The country was left without sufficient governance which takes time to develop. (The Commonwealth, 2018)

Kenya's first president, Jomo Kenyatta, was one of the leaders of the fight for independence and are by many seen as a hero. Since then, three other presidents have been ruling the country and since 2012 it is Jomo Kenyatta's son, Uhuru Kenyatta, who is in charge. Over the years, the country has been influenced by corruption and even though it is seen as a democratic country, many elections have been hard to determine due to uncertainties. This is of course a big reason for the high unemployment, but it also leads to lack of trust from the people. To be able to develop the country despite the corruption, the country is dependent on the funds from other countries and has also let rich countries invest in, for example, the infrastructure. When the work is done it is time for the government of Kenya to pay back which leads to raised tax and even less trust by the people. (The Commonwealth, 2018)

Despite the many drawbacks, Kenya is seen as one of East Africa's most developed countries with its growing economy and developed infrastructure and healthcare. The school is mandatory up to secondary school, which includes 12 years in total. The school is governmental, and education is seen as the best way to develop the country. Unfortunately, students who complete university still have a tough time to get a job. (The Commonwealth, 2018)

4.1 Nyando District

This Minor Field Study took place in Western Kenya in Nyando wetland, as shown in Figure 4. Nyando River traverses Kericho, Nyando and Kisumu Districts and in Ahero, east of Kisumu City, the Nyando River meander on its way to Lake Victoria and periodically overflow the banks. The Ahero and West Keno agricultural irrigation schemes are found in these flat areas (Opere, 2013).

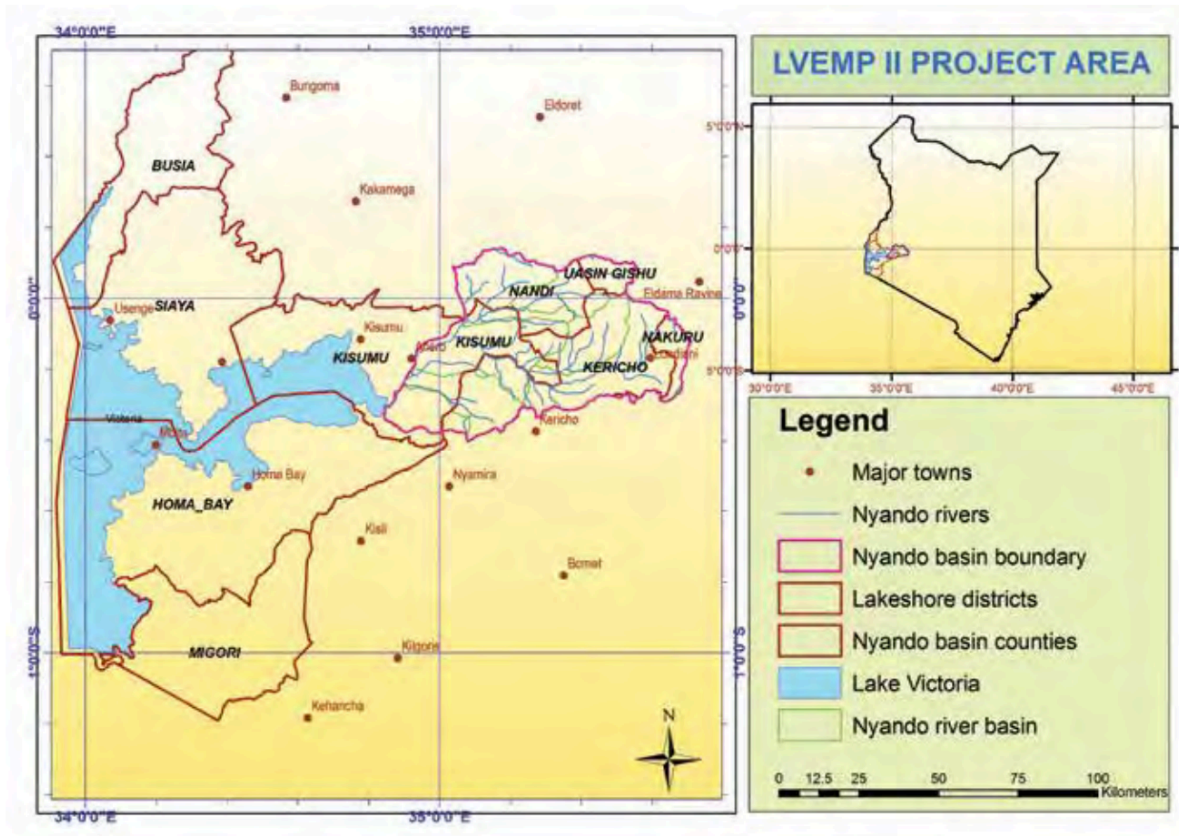


Figure 4. Location and map of Nyando Wetland and the catchment area of the river, Western Kenya (Ministry of environment, water and natural resources, 2015).

The Western Kenya experiences heavy rainfall two times per year, in April to June, which is the heaviest of the two, and October to November. The rain falls in the river catchment areas and flows downstream from the surrounding highland to the lowland in Nyando wetland. The Nyando wetland topography has moderate fertility and poor drainage. These factors make the Nyando wetland prone to flooding. There are over 5,000 people affected by the flood, where loss of life followed by damage to property and infrastructure are the main consequences. (Nyakundi, Mogere, Mwanzo, & Yitambe, 2010)

Additionally, to the perennially small and medium sized floods caused by heavy rainfall, El Niño events cause major floods. The residents suffer equally from the accumulative effect of the perennial floods as of the major floods caused by El Niño. (Nyakundi, Mogere, Mwanzo, & Yitambe, 2010)

The flooding is a growing public health problem, that has many consequences like erosion, water associated diseases, constrained crop and tree selection, transportation, interrupted schooling, and as mentioned earlier, destroyed property and infrastructure. The impact of the flooding combined with socio-economic constraints have made the people more vulnerable and marginalized in terms of investment by the central government (Nyakundi, Mogere, Mwanzo, & Yitambe, 2010). But the floods also give opportunities. Big wetland areas are man-made and used for rice fields or fish ponds (Raburu P.O., 2012).

5 Results

This chapter will present the results that the researchers collected from the case study. The results were mainly based on the individual and the group interviews, but also other observations done during the time that was spent in the affected area. These observations were made to understand how the community was built up and how the landscape looked like. Most of the observations are presented in this chapter to describe the respondents' answers in the right context. The results have been divided into the sub-questions to be answered one by one. By answering the sub-questions, it will be possible to answer the main question of this research in the following chapters, Discussion and Conclusion.

Main question:

- How is the risk acceptability developed by the local community in flood prone areas?

Sub-questions:

- What are the reasons of the local community to stay in this area, despite the reoccurring floods?
- What is the perceived risk of the local community in flood prone areas?
- What is the preparedness of the people, the government and non-governmental organisations?
- Are there any alternatives for the local people and what is the perception of development of factors affecting risk acceptability in the local area?

The results from the case study are presented as categories and concepts, according to the coding of the data. The method of the obtained concepts was presented in Method and all nodes and sub-categories are presented in Appendix C – Output from data analysis. Some nodes are presented for better understanding of how the respondents either confirmed each other or widen the ideas. When quoting from an individual interview, the respondent's gender, age-group and occupation are presented. When quoting from a group interview, this will be referred to the group number, gender and occupation. The quotations are presented the same way as they were told by the respondents. More information about the groups and individuals are presented in Appendix A – Respondents. To present the result, figures are sometimes used to grasp the situation. The result presented in these are estimations due to the uncertainty with focus groups as described in the chapter Individual and Group Interview.

5.1 What are the reasons of the local community to stay in this area, despite the reoccurring floods?

The first sub-question was made to be objective and simple to answer. The goal of this question was to see what people valued in their local area. The respondents were asked simple questions about their household and were then told to come up with all advantages without comparing between the things. Since it is natural to bring up the most important things first, other things might feel unimportant and wasn't brought up, why the researchers encouraged the respondents not to compare the things. The concept of this sub-questions is simply presented as *Advantages*.

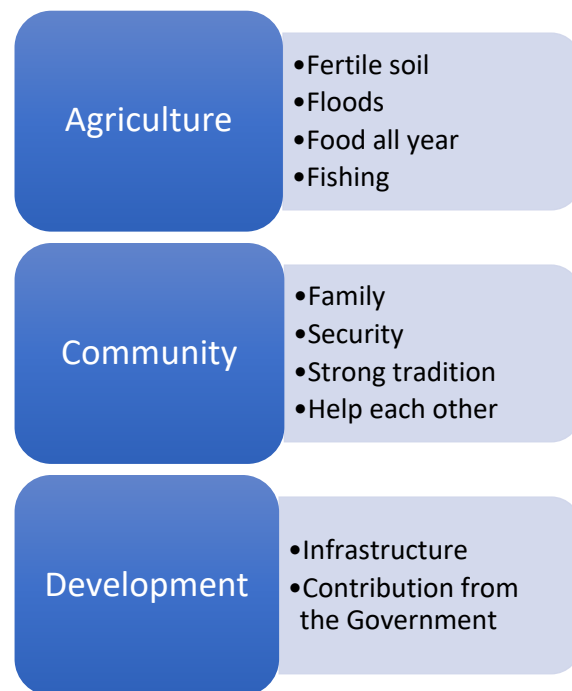


Figure 5. Advantages of the local area.

Many things were brought up when the respondents were asked to name all good things about the local area. These things were divided into three sub-categories, shown in Figure 5.

5.1.1 Agriculture

The main thing that all individuals and groups brought up was the *Fertile soil*. The soil was known to be very fertile and this was due to two reasons, during the floods, a lot of water from the lake brings important nutrition to the soil and, as the rain water comes from the highland, it also brings fertilisers from their farms down to the Kano plains. This made many of the respondents to also mention the floods as an advantage of the area.

There is also that good part of the floods, because it is coming from the highlands, the water, and they use a lot of fertilizers in their farms so when this water comes down here and overflows we are getting those fertilizers free of charge, so there are no fertilizers here but they do well. – Male, Age group 45-64, Head teacher

The agriculture was the one major occupation by the habitants in this area and it was made both for own consumption, and for selling and economical profit. This made the living cheap which was a big advantage due to the low income and economic instability. The agriculture included both farming and breeding of cattle, but the biggest income came from farming rice fields and sugarcane, which both can survive the floods. But due to the fertile soil and the favourable environment, many other things, such as fruits and vegetables, can grow very well.

In this area we grow so many things. The area is very fertile, because of the silt. When the river overflows the silt comes from up, and when it comes here it sits, which is suitable to grow here. – Focus Group 4, Mixed, Mostly Farmers

The Kano plains are big and gives great opportunities to breed cattle besides the farming. Due to the reoccurring floods, people has migrated further away from the lake to be less affected. This created great areas that are not occupied and enabled the farmers to bring their cattle during daytime to breed. During night, all cattle were brought back to the farmers homes where they were secure.

We always like to keep animals, domestic animals. So around that place we have some enough space for keeping them. - Male, Age group 30-44, Pastor

Fishing was the main income for many habitants in the area. Due to the history, the Lou tribe came by boat on the river Nile from Sudan, entered Lake Victoria and settled in the area because of the fine opportunities to do fishing. The Lou's were therefore seen as "The People of the Lake" and traditionally lived close to water, as today. But beyond the strong tradition, the opportunities of fishing were very favourable. It was easy to access the lake, but the floods also created shallow dams where some fishes were trapped and the work that had to be done by the fishermen became very easy.

First, may I tell you about the Luo's Nilos. Water brought us to Lake Victoria and Nyando. We like living close to the water because of we like fishing. We found this place comfortable because we can get fish. – Male, Age group 64-, Retired Teacher

The advantages that we do see and experience, is that there is a lot of fish, when it is flooded, you can easily do fishing next to the house. – Male, Age group 45-64, Area chief

5.1.2 Community

The community was a big advantage and was also mentioned by many in different ways. As brought up in the previous part, the tribes and tradition were an important thing to remember as it affects both reasons to stay and human values. This was not as objective or economical valuable as the *Fertile soil*, but it was just as important. The traditional way of living from generation to generation was explained by almost every respondent but mainly the men. The traditions also brought security and a sustainable

way of living for the families which made the women wanting to stay even though they were forced to settle there in the first place. This also brought another advantage, to own land.

Ancestral land. My father, my grand grandfather found this land. So, we inherited the land from the grandfathers. – Male, Age group 65-, Farmer/Retired Teacher

Due to good security and wide network within the area, the freedom of living was an important advantage. Many respondents valued their helpful neighbours and how they kept their animals outside their house during the nights without being worried. The security was much dependent on the local chiefs, who were working for the government. These men were always the first to handle any local problems before, if needed, proceeding to the county government or the police.

When I live here I feel very much comfortable. Nobody comes and attack me by night. I can just leave the animals where they are. Or my property, nobody will come and take it. The security is very comfortable. – Male, Age group 64-, Retired Teacher

I feel safe because we have a good chief in my area. – Focus Group 3, Males, Mostly Odd jobs

5.1.3 Development

The subject area recently got new roads, which many respondents pointed out. These were made by gravel and stone, and not by the soil like before. This soil might be fertile, but it got very slippery and muddy when it's wet, which made it both dangerous and easily eroded during floods. The new roads were enabling the transportation of the harvest from the farms in a more efficient way.

Yeah, infrastructure, especially roads. For now, since the government devolved the functions, it is now proper. - Male, Age group 65-, Farmer/Retired Teacher

It was also pointed out that the government contributed. To see the government putting effort and money into the development of the community and see that they tried to mitigate the disadvantages of the area. As described in Context of Research, the trust of the national governments was not always high but still, people saw how the work was being done, even if it wasn't as fast as they wanted.

5.2 What is the perceived risk of the local community in flood prone areas?

This chapter presents the respondents perceived risk in the local area. As described in the Conceptual Framework chapter, the expression of risk is the combination of a hazard, both natural and man-made, and the vulnerability. In Figure 6, the most important risks that the respondents brought up are presented. Together with the natural events, the vulnerability will be presented in detail to describe how these risks affect the community.

5.2.1 Natural Events

The major disadvantage that was brought up by almost all respondents were floods. The



Figure 6. Perceived risks within the local area.

floods affected people in many different ways, some were positive as described earlier, but most things were negative.

5.2.1.1 Floods

Floods was the most frequent event brought up and also the most described. The floods were the outcome from heavy rain in the highlands which rapidly moved towards the lake. When the water entered the lake, there was a backflow and the water cover a large area. If the amount of water was large enough, the river would overflow even before entering the lake which meant that more people would be affected. The floods also brought mosquitoes, which made the malaria harder to avoid. The rain also brought a lot of lightnings that affected the people.

The area is flat, and they don't have any like, how to frame it, when it rains it floods a lot and have no place to move. – Focus Group 5, Females, Mixed Occupations

The effects of floods were many and mostly very serious. Firstly, one of the major effects was the physical destruction made by the floods. The poorly built houses easily broke down when the strong flow of water came. This didn't only destroy the house but also everything that was stored inside unless some preparations were made. In addition to the main house, most people had a separate latrine. This latrine was very vulnerable since they stood on top of a hole and easily sank when the hole was filled with water.

Homes, with these semi-houses, during floods you can go to a home and see that the walls are affected up to 1 meter. No walls. – Male, Age group 45-64, Head teacher

During the flood, the latrine pits they have is normally sunken. – Focus Group 2, Females, Mostly farmers

The floods also swept most of the harvest and crops. This meant that most people's major income was lost and many community members experienced poverty. But since farming not only provided the people economical profit but also were for private use, hunger and starvation became a problem.

When it floods it affects crops and people and so it brings a lot of starvation. Since the crops that they rely on are affected. – Female, Age group 65-, Retired farmer

The floods also affected the cattle if nothing has been done to prevent it from doing so. Cows, goats, cheap and chickens were killed by the force of the water or drowned if the water gets high enough. Even though the cattle would survive, the possibilities of finding food has decreased dramatically. Farmers rarely stored food for their animals since they got their food every day at the grazing areas around the lake. With the floods, animal diseases also came and affected the animals.

Do you think that one will be enough for the cattle to graze on, no. – Focus Group 4, Mixed, Mostly Farmers

But the floods didn't only bring diseases for animals, it also came with others for humans. The malaria was described as a growing problem during floods since the mosquitoes increased, but there were also others like cholera and typhoid. The cholera is waterborne and was spread due to the bad latrines that were destroyed by the floods. Few people had the resources to protect themselves and many people were affected. The quality of people health decreased in a serious way during floods.

Since we don't have the proper latrine, the outbreak of the cholera sometimes gets worse. It kills people and that affects the whole community. - Focus Group 1, Females, Mostly farmers

When it rains uphill, the down part, which is our area here is flooded by water. So, when water is flooded, we really suffer. On health wise. - Male, Age group 65-, Farmer/Retired Teacher

Even though the infrastructure might be challenging during dry periods, it got much worse during floods. Many roads were impossible to use, and the need of movement was much greater. Not only to access evacuation centres or dispensaries but also to get to the local market to get food.

*During the flood you won't have access to the market, so it is hard to get food. –
Female, Age group 45-64, Farmer*

The bad roads also made it hard for the children to access school. Since the floods stayed in the area for more than two months, this highly affected the education and lowered the students' knowledge compared to other schools within the country.

Children will not go to school, because the school is flooded. That also reduces the academic performance in school. – Focus Group 6, Mixed, Mixed Occupations

Due to the lightning prone area, the people have experienced damage caused by lightnings. This affected people by either damaged properties or, in the worst case, being struck and killed.

Earlier this year, two families were affected here even though they have declared this area in the 1980th that this area was lightning prone area. – Male, Age group 45-64, Head teacher

5.2.1.2 Dry Periods

When it wasn't raining, the climate was the complete opposite. Long periods of drought were experienced in the area, which can be just as serious as the floods. These periods can be up to six months and in the hot sun, the soil quickly dries out. With the dry soil, there was a lot of dust in the air which made the outdoor climate even less welcoming.

*And after floods there is also dry season. It just comes drastically. After heavy rainfalls all the water are going back to the lake, after that there is dry season. –
Focus Group 6, Mixed, Mixed Occupations*

Comparing to the floods, the drought came slowly and started to affect people after a few weeks. During drought season, it became very hot and the ability and motivation to do physical work decreased. This meant that the level of production decreased and so did the income.

Drought affects us, because if you plant, you are not very sure that it will yield. When drought is there People tend to relax, they don't work. Because even if you work you will only get tired. So, you sit and waiting for the rain. - Male, Age group 65-, Farmer/Retired Teacher

When the drought continued, the soil dried out and soon the crops died if there was no irrigation.

We don't have enough input to buy a water pump to use for irrigation, especially during the dry spell. – Focus Group 2, Females, Mostly farmers

Without any crops, the storage of food from the last harvest was soon gone and people was, again, beginning to starve.

Majority of those who are affected don't have food. They are just roaming and no eat well. When the rain does not come, you will not be easy with this. – Focus Group 4, Mixed, Mostly Farmers

Keeping the cattle also became very hard, since the animals depended on much water every day. This gave even more work to the farmers who already lacked energy because of the heat.

Here they keep livestock, during dry-spell there is not enough water to cater for them. And that makes them to move to other places to look for water, which is far. - Focus Group 4, Mixed, Mostly Farmers

5.2.1.3 *Dangerous Animals and Diseases*

Due to the nearby lake, some wild animals lived close to the people. The hippopotamus was one that was of a major concern since they not only destroyed crops, they also harmed and killed people. Mosquitoes and snakes were also constantly present, but they all increased and came closer to the human settlements during floods.

Even though diseases increased during floods, they were present all year around. Malaria, cholera, typhoid etc. were some of the diseases that the respondents named as concerns. Malaria was seen as one of the deadliest diseases and most of the community members have been affected in some way.

*The killer disease in Kenya number one killer malaria, followed by cancer. –
Male, Age group 45-64, Area chief*

5.2.2 Community

Even though many good things were brought up about the community, there were still things that the respondents weren't satisfied with.

According to all different age groups, drug abuse within the area was becoming a big problem. The reason for this differs but most respondents blamed it on the lack of employment and low discipline. The drug abuse also led to insecurity for the other members of the community. Many respondents felt unsafe when using the streets at night time, especially the women. The sexual violence, both within and outside marriage was brought up by a few respondents. There was also a feeling among the women that they were dependent on their husband and without them, the women would have gotten a hard time making a living.

To most of the youths, the drug abuse is high, due to that, they tend to rape many girls and even the women. – Female, Age group 45-64, Farmer

In addition to the violence and drug abuse, thieves were mentioned to be present and this increased the insecurity. The members of the community were very vulnerable to this since the recourses of security were low, no fences, bad locks on the houses and no protection for the cattle or farms during night time. Since the income and the household capital was low, loss of property affected people in a very serious way.

*Due to insecurity, you can be working hard to get as much as you can, only to realize that there is a time when thieves come and steal, which really affects you. –
Focus Group 2, Females, Mostly farmers*

In addition to the bad locks on the buildings, many respondents mentioned that the construction of their houses was bad. Very few houses were built by bricks and armed concrete since this was expensive. Therefore, almost all houses were made out of mud, mixed with cow dung and with a structure made out of tree poles. This was cheap and fulfilled its purpose of a dwelling. But the construction needed a lot of maintenance since the mud was affected by both water and also the heat and the sun as it dried out and cracked.

There was also a feeling that being dependent on farming was a disadvantage. As described in the previous section, the fertile soil made it favourable to farm, why most habitants do this as their occupation. But it is known, by only having one source of income within a community, this makes it vulnerable if this source in some way loses its value. This can be caused either by damaged goods but also if the demand and the price decreased. Since the area was affected by floods and drought, the security of making a profit for every harvest was low.

We are depending on farming and we get so much disappointed when the crops are destroyed. Our children won't go to school, we have nothing to sell for them to get money for their school fee. – Focus Group 4, Mixed, Mostly Farmers

5.2.3 Government

As described in the previous section, the government was involved in the development of the community. Despite that, there was a wide dissatisfaction about how they worked. The roads that were built were according to some respondents not good enough. The new roads were made of gravel and stone, which always will be dependent on continuous maintenance. The roads that were still not rebuilt was made of soil, which are bad, as described previously. In many places, the new roads were so badly built that people rather went on the side of the road, which got even more damaged. The bad roads affected the accessibility to necessary facilities such as dispensaries and schools. In addition to the poor infrastructure, the traffic wasn't organized, and many cars was old and not equipped with the safety technique like modern cars. Young men pointed out the dangerous jobs that they had when they were transporting up to four people on their motorbike.

Riding a motorbike puts my life at risk. – Focus Group 3, Males, Mostly Odd jobs

According to the respondents who were involved in either the local school or dispensary, there was a great need of more and better equipment from the government. This made the quality of their services less efficient and affected the members of the community in many different negative ways.

Our children are not learning in proper places or having good equipment to learn from. – Male, Age group 45-64, Head teacher

I'm not safe because, if I get sick right now maybe here in the health centre, we don't have enough equipment that can be used to the patient to end my suffering. – Focus Group 6, Mixed, Mixed Occupations

One major issue that impairs the attitude of the government was the bad possibilities of getting job. Some respondents pointed out that even after graduate university, the possibility of being hired was still low. Without jobs, the household income decreased but more important, the motivation of young people to continue their studies after secondary school decreased. Even though many job opportunities came from the private sector, the respondents still blamed the government for not doing enough. This led to private farming with low income but also without large expenses, though it made people more vulnerable to unexpected expenses.

We take our children to school, but after completion they don't get jobs. Like now I have a daughter that is now graduated. She is jobless, from university, even first-class honours. – Male, Age group 64-, Retired Teacher

5.3 What is the preparedness of the people, the government and non-governmental organisations?

This chapter presents the preparedness done by both individuals and by external organisations in aspect of the different risks that were mentioned by the respondents. As shown in Figure 7, there was five type of measures that could have been done to decrease the risk, and these was to be presented for both stakeholders. These measures were presented during the interview to investigate how the respondents cope with them. They were also asked what kind of external help they get, who they think are the most responsible and in what way they would like to be helped if they could choose.

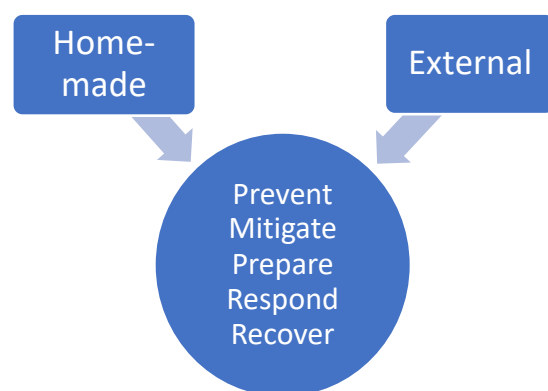


Figure 7. The different stakeholders to preform risk reduction work.

5.3.1 Home-made

The measures that is brought up here was only done by individuals without any external help by others. This means by their own motivation and knowledge.

One important factor was the awareness of the risk. There was a well-established knowledge about why different event appeared, like the floods and drought. All respondents described in detail how the water came from the highland towards the lake.

*The reason is because the place is flat, and the water can't move after the rain. –
Female, Age group 45-64, Farmer*

The respondents were also asked if they were aware of these risks before they settled in the area. According to the traditions, described previously, men were born, raised and supposed to settle very close to his parents. His wife could come from anywhere but were expected to live with her husband after marriage. Therefore, almost all men said that they were aware of the risk and have learned over the years how to deal with them. Some pointed out that they don't have a choice.

*We were here by birth. We did not come here and settle here. Our grand grand
grand parents were here, so we did not move. – Focus Group 6, Mixed, Mixed
Occupations*

Some women knew about the situation when they came the first time, but many felt deceived as they were not aware of the situation. Most were also brought to the area during the dry period when it was very hard to imagine what risks that are subjected to the area.

*For men here, when they want to marry, they normally do that during dry spell.
We never knew. – Focus Group 2, Females, Mostly farmers*

5.3.1.1 Prevent

Many of the respondents said that they have tried to prevent the risk but without success. The force of the water was too strong to be able to be controlled by measures done by one man. They felt the same according to the drought, the events were too powerful. Some measures that have been done was building small levees, canals and dikes to lead the water away from the property. This worked when the amount of water was little, which wasn't the case during floods in the area.

*Again, people are trying to dig some canals for water to flow directly to the lake.
But because of heavy rain and floods, when it comes it overflows everywhere. All
the rivers, all the canals are flooded. – Focus Group 6, Mixed, Mixed
Occupations*

It was mentioned, since cholera is a waterborne disease, it can be prevented by building good latrines. Malaria was prevented with the help of mosquito nets. Also, due to the drought, some irrigation was made, and wells were built.

5.3.1.2 Mitigate

One major mitigation that was being done was plantation of trees. These trees mitigated erosion and kept the river the way it is today without interfering with people's properties. The trees also helped keeping the environment stable.

*We are able to see trees as a very good frame and a good component in our
livelihood. So, people are planting trees. Which is good for keeping our
environment. – Male, Age group 45-64, Head teacher*

The motivation of attending education can also be seen as a way of mitigation since this was of interest by the individuals. By building houses out of bricks instead of mud, the consequence decreased but it was expensive.

As described previously, people have migrated further away from the lake over the years. This is a way to mitigate the effects of the flood since they need to move far away to be completely unaffected.

5.3.1.3 Prepare

Few of the respondents could name any preparation that has been done in case of floods or drought. The main reason was that these were impossible to predict. Since the people don't know how these events appear or when they came, people don't know how or when they should start preparing. Many say that floods often came without warning and sometimes during the night and then you have no time to prepare.

One reason why it is hard to prepare either the flood or the drought is because the unpredictable weather conditions. – Focus Group 4, Mixed, Mostly Farmers

Storage of supplies was one of few things that some respondents brought up.

5.3.1.4 Respond

The major thing that people in the area have done due to floods, was to evacuate to higher grounds and evacuation centres. These held many people in need, also during night, but the lack of supplies and food was something that was brought up frequently. Due to that and to keep the valuable things safe, some people decided to stay in their homes even if it was flooded.

People go to evacuation centres, but others normally just contain with the situation. Because going to evacuation centres have a lot of risk also. – Focus Group 6, Mixed, Mixed Occupations

To deal with the diseases, most people treated their drinking water to avoid cholera and used mosquito nets during night time to avoid malaria.

5.3.1.5 Recover

Few respondents gave examples of how they recovered after an event that had caused damage. Most people talked about how they rebuilt their houses and latrines, but that they were used to it and it was a part of their lifestyle. Doing this every year was expensive, especially for people who were already economically vulnerable.

5.3.2 External Help

The respondents were asked who they thought was more or less responsible for the risk reduction work that was needed to be done and the answers were wide spread as shown in Figure 8. Due to the focus groups, the distribution in the figures are estimated and the government was believed to be the most responsible stakeholder followed by the individuals. Even though NGO's always came with aid during floods, they weren't seen as having the responsibility. When talking about the community, this could be seen as individuals that cooperate, but it was probably aiming for the community workers. These were paid by the government and can therefore be seen as a part of that group. "Others" refers to other kinds of external donators or investors.

Due to the influence of Christianity, some respondents mentioned God as the one responsible for the events and therefore people can't stop them.

5.3.2.1 Government

The government was seen as the most responsible stakeholder due to the risk reduction within the area.

Our constitution says that the government guaranties our right to live everywhere, anywhere you want. But that everywhere should be the government's responsibility that it is safe for humans to live there. So, if this area is not fit for human to live, then it is the government's responsibility to see where we can live. – Focus Group 6, Mixed, Mixed Occupations

The respondents mentioned many different things that the government had done to reduce the risk, especially in terms of floods. The main thing that have been done, and mentioned by almost every respondent, was the building of levees along river Nyando. This had been done to prevent the overflowing river to spread to the nearby houses. These levees were called *dikes* by the local people. Other things have been done to make the flooding less dramatic, was channels, stages and excavating.

People are able to remain in their homes during rainy seasons because of the dikes that have been reected along the river bonds. – Male, Age group 45-64, Head teacher

The respondents also mentioned other good things about the risk reduction that has been done in terms of response. The government did have the ability to notify the people in the area to move when heavy rainfall was approaching. The evacuation centres were being prepared and people left their homes before the water came. While in the evacuation centres, people were given food and supplies.

The government comes with sugar, blankets, cooking pans, food. To the flood victims. - Male, Age group 45-64, Area chief

Even though the government was seen as the most responsible stakeholder, there was a wide lack of trust. Corruption and a feeling of being exploited as farmers made few people believe in what the government said.

The level of corruption in our society is also to be mentioned as a serious vice. Because had it not been for high corruption, no poor accountability, we would have had so much. – Male, Age group 45-64, Head teacher

Every time they give us empty promises that they will make all those things they have been talking about, but in vein. Whatever they tell us. We are here because of their empty promises. – Focus Group 4, Mixed, Mostly Farmers

In addition to the lack of trust for the government, some respondents felt that the government were unable to help them. There was no rescue service that dealt with floods, fires or other emergency events. There was a hospital nearby, with ambulance, but due to the bad roads, they were not to trust, especially during floods.

The government has no way for rescuing us. No rescue. – Focus Group 4, Mixed, Mostly Farmers

Much of the work that has been mentioned earlier was done in a non-sufficient way and many respondents felt that the work that has been done was not enough. The levees, for example, did go along most of the river but not all the way down to the lake. This meant that the people who lived close to the lake were even more affected now than before the levees were built, while some were not affected anymore.

Also, according to the evacuation centres and provision, this didn't seem to be enough. The few centres there was in the area quickly got overcrowded by people and the supplies and food didn't seem to cover for all people in need.

The government has new routines to measure the amount of quantity that

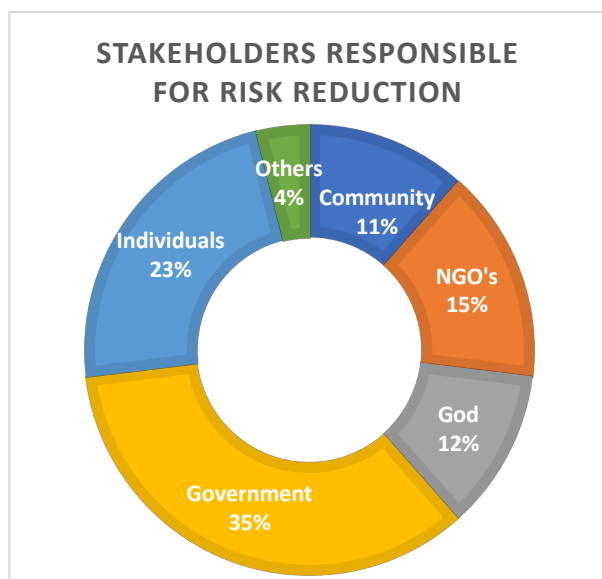


Figure 8. Stakeholders that are believed to be responsible for risk reduction.

should be given per household. And since then it has just been 2 kg, weather if you are 10 people, so it has worsened. Before somebody maybe had 2 children in 1990 and when the flood come you gave her more than 2 kg. But now you have 4-5 children but still only 2 kg. - Focus Group 6, Mixed, Mixed Occupations

Therefore, the respondents were asked what kind of help they wanted. The most frequent answer was that they didn't want any relief help, they wanted a long-lasting solution. The help given during floods was welcomed but the floods were expensive and took a lot of energy. Many respondents wanted the government to extend the levees all the way down to the lake and saw that as the best solution.

I want the government to find a way to avoid these floods once and for all. If they can construct dikes like they did on the other side. So, it doesn't affect the people who are living here, something that is sustainable. - Female, Age group 65-, Retired farmer

Others mentioned a dam and controlled drainage as a sustainable solution. Since the soil was dependent on the flooding, people wanted to use the water in a controlled way. By having a dam and collect the water that was causing damage, farmers could use this water also during drought.

We hope to have dams, this access water should be actually harvested in such a manner that during dry season we can still use it for irrigation purposes, there is still a lot of water going to the lake. – Male, Age group 45-64, Head teacher

Other things that were mentioned by the respondents due to the response during floods, other than food and supplies, was more and better drugs and medication.

5.3.2.2 NGO's (Non-Governmental Organisations)

The NGO's were often seen as the ones who came first with relief help. Even though the government was involved in the evacuation centres, it was the NGO's who were managing them. They provided needed ones with food, supplies and medication and the view on the NGO's was very positive.

When it floods, we normally receive help from the Red Cross. – Focus Group 1, Females, Mostly farmers

During floods the NGO's have also chipped in by doing that during floods diseases come out, cholera, malaria, so at that time it is being advised not just to take a drink anyhow. Now there is a medicine that is being during flooding areas are being distributed all over, so that it can help all those people. – Focus Group 6, Mixed, Mixed Occupations

People thought that the supplies provided wasn't enough and that they only focused on the immediate help and not on a long-lasting solution, just as the work from the government.

The NGO's are targeting the relief measures, they don't target long-lasting solutions. So, they also need to start thinking about, because they are the people that are in a position to get the government to do what he says. You see, NGO's when they are coming, they come with short-term solutions, it should be long-term solutions. – Focus Group 6, Mixed, Mixed Occupations

We don't want to be so much dependent on NGO. – Focus Group 4, Mixed, Mostly Farmers

For a long-lasting solution is to construct more dikes to direct the water to the lake, and if they can be trained to be fully equipped they will be able to know what to do when the flood comes. That sounds more sustainable than just getting relief stuff. – Focus Group 2, Females, Mostly farmers

5.4 Are there any alternatives for the local people and what is the perception of development of factors affecting risk acceptability in the local area?

In order to grasp the situation in the area, the respondents were asked questions about their present situation and how things in the community had developed and what they thought about the future.

5.4.1 Perceived Safety

Even though the respondents had been talking about many disadvantages and hazards within the area, their perceived safety at this moment was divided. As shown in Figure 10, many respondents felt safe in the area.

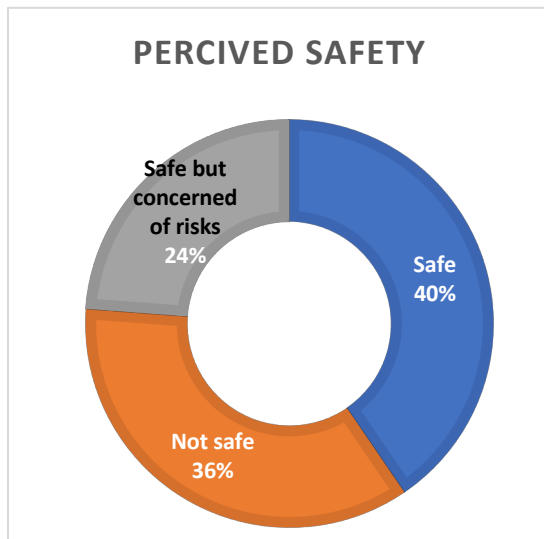


Figure 10. Perceived safety by the respondents.

Even though some said that they were safe at the moment, they wanted to add that they don't feel safe about the future events that may occur.

For now, we are safe but when it starts to flood we are not safe because we need to move. – Focus Group 1, Females, Mostly farmers

Some respondents said that they weren't safe, either because of their concern about future events or because of other things that can harm them. These things could be lack of food, bad security or lack of medicine.

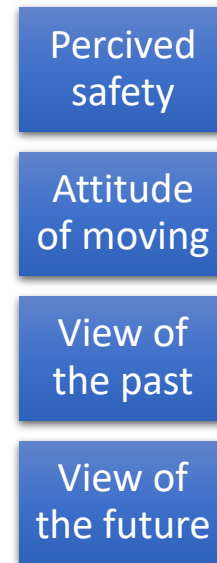


Figure 9. Thoughts about present situation.

5.4.2 Attitude of Moving

The respondents were asked if they were willing to move or stay in the area. They were also asked if they knew of a place where they would like settle if they were forced to move. The answers were very similar. Few people wanted to move and almost none knew a place where they would like to settle instead. Besides the family and traditions, their fertile land and fishing was the main reasons to stay.

We love this place and that's why we got married here. We don't want to move out. The family is the main reason to stay. – Focus Group 1, Females, Mostly farmers

We don't see where to move to. – Focus Group 2, Females, Mostly farmers

Many came up with reasons why other places were disadvantageous compared to this area. The main reason was that there was no land for them anywhere else. The land that they owned has been within their family for many years and they believed that all other land was occupied and wasn't available for them. Some also felt that moving would bring insecurity.

Some time back some of our people in 1962, some of us migrated and went up the hills. But where they are living, everytime they are battling with the Nandis there. So, they are not in peace. Everybody has his own land, you cannot go to somebody's land. There is no anymore land left in Kenya, more so vacant for migrants. – Male, Age group 65-, Farmer/Retired Teacher

If they wanted to move, the reason was mainly the unsafe environment or because of the lack of job opportunities. Young men dreamed of a football career in Europe.

This place is not good. If I could get another place to move, I can move. – Female, Age group 45-64, Farmer

5.4.3 View of the Past

The respondents were also asked how things had developed in the area over the years. Some said that things were worse now than before. Migration from highly affected areas had created overpopulated and insecure villages. Drug abuse affected the young people and the education was more expensive. The commercial industry has made the food less nutritious and harder to get.

Now a days the food that we are using contains a lot of chemicals. Which is strange and not healthy. I am not happy by the current situation. - Female, Age group 65-, Retired farmer

But most respondent felt that things have developed and made the area to a better place. The infrastructure was mentioned as one thing that had improved the community, this included both the roads and electricity.

I've seen a lot of changes, long time ago there were no good roads and there was no electricity at all. – Focus Group 2, Females, Mostly farmers

The development of the education was something that some respondents mentioned as an important factor. The quality of education has improved which generates more knowledge to the students. For the community to be able to survive, they thought this was an important factor.

Education was only made for boys, women were only meant to get married when they get old. But now it is different, the government and the community has put a lot of emphasis on Girl children. The composition of girl and boy children is 50/50. - Male, Age group 45-64, Area chief

Furthermore, there were at the time schools everywhere which made it possible to include all students. This also shortened the travel distance for the students.

Before, we had to go to Ahero Ungiko Primary and Secondary, very far from here. But for now, we have Disi Secondary very close. Then we have Bunde it's about 2 km from here. We have Kenuagual, we have Ombaka, very good catchment area of secondary schools. – Male, Age group 65-, Farmer/Retired Teacher

In addition to the infrastructure and education, the respondents brought up security, buildings, health centres as things that has improved. Most importantly, many respondents felt that they weren't affected by the floods in the same way that they were before.

And if you compare the floods during that time, they effected more people before more than now. – Focus Group 2, Females, Mostly farmers

5.4.4 Attitude of the Future

When the respondents were asked about how they think that things will be developed in the future, many were positive. Some said that they think that the problems that they had with the government will be solved and the people will get the support that they have the right to get. This would lead to a developed community and self-reliable people.

Looking for a positive future. If they can have access to money to borrow, so they can run their own business, that would be good and really help them in the future. – Focus Group 5, Females, Mixed Occupations

The new ways of communicating and travel also developed the community and the people. The education will be better, and the drugs and hospital equipment will improve. The respondents hoped that this will prevent or mitigate the problems.

If they try to educate pupils there will be changes in the community. – Focus Group 2, Females, Mostly farmers

Some respondents were more critical and pointed out that the attitude of the young people needed to change, otherwise the future won't be sustainable. There was also a concern regarding money.

To me, in future it is unpredictable. But we are trying to get it, problem is money. If you have money, you educate your child. The child will just go and be educated, being a professor. – Focus Group 4, Mixed, Mostly Farmers

6 Discussion

The theory of risk acceptability compares the possibilities and human values in an area or situation with the risks (Aven & Renn, 2010). To be able to understand how this is developed, different theories has been presented previously and will now be connected to the data that is presented in Results. The sub-questions will be processed one by one in the following chapter. When this is done, we will proceed to discuss and answer the main question.

6.1 Human Values

When discussing the first sub-question: “What are the reasons for the local community to stay in this area, despite the reoccurring floods?”, human values is a vital part, which will be discussed below.

Agriculture was one of the main reasons why people wanted to stay in the subject area. It was also the reason why people decided to stay in the area in the first place. It was clear that the whole community depended on the agriculture, both the commercial business but also the private use. Even though some respondents were seniors and retired years ago, they still saw themselves as farmers. This made the statistics of the interviewees more complicated due to the attribute “Occupation”. But it is also necessary to enlighten that the farming made the living cheap and most people’s economic situation was not stable enough to rely only on the pension.

Even though the agriculture presently was a big part of people’s income, it was still used as their own food. In other words, agriculture was their main source of food. According to the theories about human values, Maslow states that physiological needs are greater than the need of security (Zalenski & Raspa, 2006). Food is seen as one of our physiological needs and is essential for human survival and will therefore be prioritized higher than the safety. Which means that they are willing to give up safety and live in a high-risk area to be able to grow food.

Many of the respondents mentioned the community as something to value. The community is a group that includes family, neighbours, friends and so on. These things are important to the people and the people would not be able to live the same life without them. The good community and availability of doing agriculture creates a freedom of living, but this also comes with risks. Presented in Conceptual Framework, Möller (1986) mentions that it is necessary to be exposed to risks in order to live a free life, since safety also comes with a less independent lifestyle. When asking the participants if they were willing to move, few said yes and when the answers where described, the feeling of isolation and lack of freedom was the most frequent.

By living in this area, the people had a feeling of freedom which they couldn’t imagine having anywhere else. The freedom included security, community and work, they felt that they were able to do what they wanted. The feeling of development can be seen as the aspiration towards goals, as Möller (1986) described. Even though most of the development mentioned by the respondents was made by someone else, e.g. the government, many people felt that they lived a better life now than before, which can be seen as a goal in life.

Becker (2014) states that human values are subjective and hard to describe for a single individual but since the number of respondents during this research is high, clear patterns shows that things like agriculture and community are things that they value.

6.2 Hazard and Vulnerability

The hazards and vulnerabilities that has been brought up by the respondents is of importance when discussing the second sub-question “What is the perceived risk of the local community in the flood prone area?” below.

When defining risk, we used a broad definition included human values and which both hazard and vulnerability were explained how they were linked to our definition of risk. Human values have been discussed previously and we will now focus on the hazards and vulnerability. As mentioned in What

is Risk?, it is still important to remember that the including factors of hazard and vulnerability, does not equal the risk themselves.

Hazard is defined as an activity that has the potential to harm what human values (Renn & Walker, 2008). The respondents talked clearly about the natural hazards like floods and drought but also animals as things that could harm them or something they value. These things are easy to picture as hazards since they affect the people very quickly and in a somehow logic way. Other things like insecurity, unemployment, bad roads or corruption can also be seen as hazards, even though they affect people in different ways, direct or indirect. Still, since these things made the people's life harder to live, they will affect things that people value. For example, bad roads affect the possibilities of communication and transportation which can lower the income and therefore also lower the possibilities of developing things that human values.

By asking for all different risks, or things seen as disadvantages, people came up with a few different things. For them, these things might not be seen as hazards, but are valuable to us since they give a broad picture of all different kind of risks that were perceived by the people. The ability of understanding which hazards that the area was subject to was very mixed. Some respondents or groups only came up with some of the obvious like floods, mosquitoes or low income while others understood that there, for example, was a risk in being too dependent on farming. This ability comes with education and observations done outside of the area. The more you have seen and understood how things are, the more critical you can be to your own system (Slovic, 1999). This became clear since educated respondents often gave a broader and more critical picture of the area than the respondents who only had a low education and a simple job. This can also be connected to the difference in gender and age. Since many women were supposed to stay home, not much resources was put in to their education and therefore the analytical level of answering the questions was sometimes more limited. The same result applied to young people, who still hadn't seen much of the surrounding area. This can be a reason why they mostly mentioned the obvious hazards. Still, this does not make the different opinions unequally valuable. The research was aimed to understand the situation in the whole area and therefore everyone's opinion should be treated equally. Of course, opinions that the researchers found interesting would take part in the result, even though they were only mentioned a few times.

Even though the respondents were asked not to value and compare the different hazards, it was clear that the floods and the drought was the most serious according to the respondents. Out of these two, the drought was seen as the most critical by some people since it lasted for a long period and affected all living plants and animals, and of course humans. But since the flood entered very rapidly and had such devastating consequences, this was the thing the people was most concerned about. This research was only based on interviews and observations which made the perceived hazards the only things of importance. A quantitative analysis could give a different answer by focusing on actual events and their actual consequences, but this was not included in the research.

When talking about vulnerability, it was easy for the respondent to connect to the natural hazards. Vulnerability is defined as the exposure of something valuable and degree of harm done by a possibly hazard (Renn & Walker, 2008). This could mean that the respondents also described vulnerability when describing hazards. For example, the low income and the struggle of finding a job sometimes led to drug abuse and further on to insecurity. The bad infrastructure could be a reason of low income since it affected the possibilities of transportation. Low income also leads to bad buildings and lack of equipment in public facilities. It is possible to go many steps back to find the main hazard and the corruption within the country could be a big part of this.

The outcome from the natural hazards were described very well and the answers were similar amongst the respondents. It was described that when the floods came, people became very isolated and were all affected in the same way, no matter the difference of gender, age or education. Of course, there could be differences between individuals and larger areas. People realized that most of the consequences affected not only the individual and their family, but the whole community in a similar way. Not all

people had big farms, but most people mentioned that these were very affected by the floods and food became a limited resource. The same applied to the roads, even though few people had cars, bad roads affected by the water became a big problem. Some things, like the increase of malaria affected everyone in exactly the same way. What was important was the widespread feeling that this was something that not only affected the individuals but the whole community and people were willing to cooperate to survive. In the definition of vulnerability, exposure and sensitivity is given as two factors (Wamsler, 2014). We can state that the drought and the floods will continue to occur, which means that the people will be exposed and affected in some extent. The people can affect the degree of exposure and how sensitive they are to the consequences, and this will be discussed in Risk Reduction.

Even though the drought did not destroy the things people have built, the extensive effect on the plants and animals affected the people very serious. It lasts for a long period of time and took a lot of energy from the people. The exposure of the hazard is obvious, but since the respondents rather talked about the floods, the sensitivity concerning the drought might not be as serious.

6.3 Risk Reduction

Now, after the hazards and vulnerability has been discussed above we are going to discuss the measures that were mentioned to reduce the risks. The measures will be discussed as they were presented in the Results, according to the stakeholders, home-made or external. This will also be part of discussing the third sub-question “What is the preparedness of the people, the government and non-governmental organisations?”.

The respondents were first asked about measures they had done on an individual or on a community level. They brought up measures of all the five different types that Becker (2014) talks about: prevention, mitigation, prepare, respond and recover. The respondents were well aware of their problems and many had a clear view of how to overcome the problems. But the relatively small measures that they were able to do on such a small level was not sufficient for the great forces of flood and drought. This contravene what Scolobig, De Marchi & Borga (2012) tell us about how higher awareness increases the preparedness regarding that specific risk. Poverty and lack of motivation were two big reasons that made them unable. The failure of risk reduction made the consequences greater and also contributed to the feeling of helplessness.

Comparing the attention drought were given to floods, drought was not given as much attention as floods. It might be because drought comes slow and takes a long time for it to really affect. But when it has been a long dry-spell, the situation could be even worse than during floods. Despite this the focus in measures were mainly to reduce the risk of floods and not drought. One reason could be that the respondents saw an easy and accessible solution to the drought, irrigation. If they only were able to harvest the water from Nyando river and Lake Victoria they would be able to cope with the dry-spell. Unfortunately, most people couldn't afford the equipment necessary for irrigation, so they continued to be vulnerable to drought.

The respondents were clear that they wanted a sustainable, long-lasting solution and they were hoping that the government or maybe any NGO would provide that. One solution that was mentioned several times was to build a dam up the river, to collect the water which otherwise would flood the plains. Additionally, the stored water could be used to generate power and to be able to distribute water in a dry-spell. Ultimately one solution to many problems which also brings other benefits. This is of course a solution only the government can implement because of the size of the project. One aspect that the researchers thought of was by preventing the floods the area would also miss out on the benefits of the floods. This might be crucial to remain the fertility of the land, which was the main reason that people settled in the area in the first place. So, the flooding is a complex problem that requires a holistic solution.

There was a majority of the respondents sharing the opinion that themselves were incapable of taking effective measures. This was both because they had to struggle to make their own living because of

poverty and the feeling of helplessness. They were claiming that it was the government responsibilities to take measures to reduce the risk, since they have the capability, power and money. Douglas (1966) and Wiedemann (1993) both speak of how the stakeholder who is able to take measures but fails to, can be seen as accountable for the natural disasters. Some bigger measures, like the construction of levees had been taken, but it was uncertain who actually did it and who got the credit for it. But the main opinion was that the government were credited for the measures. This contribute to what Enander (2010) says about how trust in governmental authorities will make the individuals less willing to take measures themselves. Since the flooding still occurred even after all these measures, and the evacuation centres were insufficient both in capacity and in supplies, the respondents expressed helplessness. Parallels can be drawn to learned helplessness which Peterson, Maier and Seligman (1995) talks about. If no one, not even the government could do anything about it, why should they as individuals then even try? Additionally, the abuse of power and corruption was always on everyone's mind, and many expressed their dissatisfaction and suspicions to the government. All of this made the respondents motivation to take measures very low, and as Aven & Renn (2010) points out the importance of motivation in risk perception to act upon them and take mitigation measures.

When people were stranded at overcrowded evacuation centres with insufficient supplies respondents told us that they were expecting help from NGO's. As they often had a quick response with relief help to aid people in desperate need. The respondents did mention that the government could come to aid, but if they did it was late. No one mentioned any rescue service which could aid people with evacuation. This was basically because there was no rescue service available, neither governmental nor private.

Some of the respondents pointed out that the government and NGO's have moderators in the local areas to communicate between the people and their organisations. So that the government and NGO's were able to do assessments of what and how much that is needed, and also who are in need of the help. Even though it is with good intentions, the respondents were clear that the aid given was not enough, and how it was distributed was unfair. This led to that the people felt powerless and helpless, and even less trust in the government and NGO's.

This made it clear that the people were in a situation where they themselves did not prepare or could take measures sufficiently. They relied on the corrupt government to take measures for them, which hasn't been going that well in the past. Then they were responsible for their own evacuation to places that again was insufficient, which were govern by the government. This made them dependent on the relief help from the NGO's when stranded at the evacuation centres. Then they returned to their homes to recover and build everything as it was, only to experience the same thing again next time it would flood.

6.4 Opportunities

The forth sub-question: "Are there any alternatives for the local people and what is the perception of development of factors affecting risk acceptance in the local area?", will be discussed below.

Despite the obvious risks and the limited risk reduction, a majority of the people felt overall safe, maybe since the risks has become a part of their lifestyle. There was also a poor attitude of moving which could mean that this was the best place for them to live according to them. Discussed earlier, the ability of analysing a situation comes with education and observations and this can also have a large impact on the perceived opportunities in other areas (Slovic, 1999). Often the perception of other areas was grounded on stories that had been told and not by own experience. Even if the subject area was safer than other available areas and the people was right about the choice of staying, the grounds of the decision becomes very shallow. This also applies to the answers on where the respondents were willing to move if they had to. Almost no one came up with reasonable specific places where they could be able to settle. Even though this was a question made to create a free room of discussing opportunities elsewhere, it turned out to be almost the opposite.

According to the researchers, the respondents didn't have much knowledge of other surrounding areas. Reasons, except that they haven't been to other places, could be that not media nor education did inform the people about other areas. We believe that it is important that both media and education is objective and inform about the local situation and its surroundings. This so that people can create their own opinions, rather than believe in rumours that is spread, to get an objective view of the world. This is important for people to be independent, evolve and understand their own situation. During this research, the actual education was not observed and should therefore not be blamed, but it became clear that there was a lack of knowledge about possibilities in other areas.

Within the country, violence between tribes has been present over the decades and this has led to insecurity in many areas. There was a feeling amongst all respondents that this area had been spared from the man-made violence which can be perceived as more dangerous than the natural hazards. When answering if they felt safe in the area, there is a chance that they rather referred to the security rather than the risks that comes from the natural hazards. This could mean that they prefer to stay and deal with the natural hazards rather than move and deal with man-made hazards. This could be attested to Smith (2013) who says that uncontrollable risks, like the perception of man-made, are perceived to be worse than controllable risk, like many of the natural risks were perceived. The floods and drought have been present for many decades and Sjöberg (2000) states that this can decrease the concern about the risks.

To understand the risk perception of the subject area further and to observe the willingness to stay, the respondents were asked about the development in the past but also what they think of it in the future. Connected to the human values, discussed above, development, even the feeling of development, can create goals and affect the willingness to continue living in the situation (Möller, 1986). The overall feeling was that things have developed over the years to make the community better now than before and people could also imagine a brighter future. Comparing these answers to the ones about the willingness to move, people now were more analytical and could describe their thoughts in a better way. They often described why things would or would not turn out better and there was a feeling that they were more dedicated in this subject comparing to moving away. This can also strengthen the argument that there was a lack of knowledge about other areas. They knew much about their own history and had a clear idea about what can happen since this is what surrounds them every day. The widespread faith in the future made people hopeful. There were many areas which the respondents hoped to see change and therefore they might see more possibilities coming.

6.5 Risk acceptability

All four sub-questions have now been discussed and this will now be the ground to answer the main question. Throughout this report, the theory about risk acceptability, comparing the human values to the risks within a situation, has been presented frequently (Aven & Renn, 2010). These two factors are presented first, followed by Risk Reduction, which can help to decrease the perceived risk. The last question was made to generalize the situation and come closer to the main question. It was obvious that people realize that the floods was a major risk and almost everyone was concerned about this. Since the people was able to argue about their opinions concerning the risks, they gave us a clear picture of what the actual situation was.

In the theory about risk acceptability, three different stages are presented, accepted, not accepted, and tolerable situation. This is simplified and generalized, and not equivalent to how a human actually thinks about the perceived risk. By staying in the area, not accepting the situation is unlikely, since this would result in instant actions to reduce the risk, either by measures or by moving. Of course, many people have moved away, and they probably have different opinions about the situation comparing to the people still living in the subject area. Consequently, people who stayed in the area likely accepted or tolerated the situation.

To be able to accept the risk, one must see greater possibilities within the situation than the risks that threatens it. In this situation, this would mean that the human values, that has been discussed, should

be greater than the perceived risk of natural hazards and insecurity facing the area. For some people, this was the case, even though they were concerned about the risks. According to the discussion about risk reduction and opportunities above, where the respondents did in some way analyzed their situation, accepting the risks was a rare case. To be able to accept the risk, no other situations should be considered. One must focus only on their own situation and not take in the possibilities or disadvantages in other situations. Additionally, by accepting the risks, they should not be concerned of their situation.

This means that many people lived in, as what we have defined, a tolerable situation. They were either unaware of other areas and did not accept the risk, or they had a feeling that this area was safer compared to other areas. By being unaware of other areas, this excludes the alternative of moving and they were forced to live with the risks even though they did not accept them. The second alternative, realized that this area was safer than others, didn't made the risk to be accepted.

Concerning the risk reduction and preparedness they were neither willing, nor able, to take measures to reduce the risk, which may be a sign of accepting the risks. But when seen in its context, with a long history of both trying to cope with the risks themselves and lacking support from the government, it may show that they could be victims of learned helplessness and suffer of corruption. This could be the reasons why they were lacking willingness to reduce risk instead of accepting the risk, which also correlates to the other evidence of them tolerating the risk. Since they had expressed frustration and a desperate need of external help, it is clear that they believed that they could overcome the major risks. This is a strong sign of them tolerating the situation but that some also expressed that their patience is running out.

After presenting the result and combining them with theories in our analysis the researchers of this study have a general view of the risk acceptability of the subject area. The general view was that the people are tolerating their current situation, and that they are mainly concerned about the risk of flood, and secondly droughts. The people were lacking motivation to prepare and to take measures to reduce risk, the reason is unknown and probably depending on a lot of different things. One could be that they are subject to learned helplessness, lack of motivation because of corruption, and feeling incapable. Respondents expressed their need of sustainable measures to deal with these two major risks. Some desperately expressed that their patience of waiting for mainly the government to come to their aid is running out.

6.6 Further Research

To be able to live in the area with acceptable risks there is a lot of work that need to be done. To accomplish this, measures needs to be taken. The area was prone to floods and drought but since the people were used to these hazards, the perceived risk was well developed. According to theories, this could mean that the perceived risk is lower because the risks are so familiar to the people. Therefore, a lot of research which includes people's opinions regarding risk can be done with good possibilities of getting good results.

Since the local people asked for a lot of external help and had a clear picture of what should be done, it would be interesting to continue the research and compeering qualitative findings with quantitative analysis. This would be interesting and helpful in the decision making of what type of measures to be taken and how the people are willing to accept. This kind of research would then be made both for the actual hazards but also for the measurements. The ideas of how things were and should be treated were often not that thoughtful and not as holistic as it should be when trying to handle the natural hazards. As brought up in Risk Reduction, measures that the respondents brought up can in fact have other negative effects besides the obvious good ones and it would therefore be interesting to see what the actual best solution would be.

Similar researches have been done in other areas and it would be interesting to combine these to generalize the perceived risk in flood prone areas. This would also make it possible to apply the conclusion on other areas that are still not prone to floods but might be in the future.

6.7 Source of Error

In this section, possible sources of error that have been identified will be presented and processed. These sources may have an effect on the validity and/or reliability.

6.7.1 Generalisation

The main question of the research was to describe how risk acceptability was developed by the local community in flood affected areas, where the subject area was Kochogo, Wawidhi and Kalua, located between Ahero and Lake Victoria in Kano plains, Kenya. As so, the research was conducted in a certain place with a certain situation, and in its specific context, it is limited in its applicability to other areas, situations and contexts because of validity. These things were brought up in Context of Research and for the reader to be aware of if applying the research, results or the conclusion of this report. The researchers of this study do find the results of this report representative and applicable for the area in Kano Plains which is subject to floods and droughts in general.

6.7.2 Subjective

According to Charmaz (2014) it is hard, if not impossible, to be completely objective and unbiased throughout a whole research. During the research, we acknowledged and accepted this, while we at the same time saw it as a source of error and tried to be as objective as possible to minimise the biases for the research. Demetriou (2009) and Kohn (1997), explains how subjectivity affects both the result and reliability. Our background of course affected us, especially since we have been studying risk management, we did have a certain perspective on the subject of the research. This may have affected the result in some extent, but not only in a negative way, but also positive. Some things we may have missed and others we have picked up, both because of our backgrounds.

6.7.3 Experience

The researchers of the study had no earlier experience of similar case studies. That made this research more exposed for biases. Especially the interviews were a challenge, since they were semi-structured and needed the interviewers to be sensitive in how to manage them and to come up with good follow-up questions without bias. This was improved during the research due to gained experience.

6.7.4 Selection of Respondents

The selection of respondents was of great importance to be able to obtain results that were represented by the whole subject area. This was to make sure that all age groups, gender and occupations was covered, so that no important data was missed out. Since the research was limited in time, only 62 respondents were interviewed, but we tried as good as we could to cover as much as possible and to get a good representation of the subject area. There was also a risk for overrepresentation of certain groups in the selection of respondents, like females. But as they were mostly participating in group interviews, the number became big. Other reasons for this were the gender roles, the women were supposed to take care of the family and household chores. This made them both more available to participate and had valuable data for the research. It would have been interesting and of great value to have the opportunity to interview some of the people who had moved away from the area. To get a clue of their thoughts about the subject area. This was not possible in this study which was limited by bot time and money as well as it would be a challenge both to find and to organize an interview with these people.

6.7.5 Interview Guide

When constructing the interview guide, the focus was in getting rich data that covered the subject of the research. This was done by trying to create a comfortable situation through a well-constructed interview guide as described in **Fel! Hittar inte referenskölla..** Where the participants understood the questions and were able to give describing answers of their own perception. There was no pilot study done because of limitation in time. However, the interview guide was both supervised and tested prior the field study, still there were several sources of error which are described below.

The questions were carefully worded in English to be easy to understand, so that they were perceived as intended. But this wasn't always the case. Sometimes the respondents didn't understand the

questions, either they asked about it or the interviewers tried to clarify. The important thing was that the respondents understood the question well, the perspective of their answer was a part of the result.

The intention was to obtain rich, in-depth and describing data through semi-structured interview with open-ended questions with follow-up questions. However sometimes the answers from the respondents were short and not very describing, where valuable data could have been lost. There can be many reasons for this, but some may have been that the respondents weren't motivated to give describing answers, in their mindset of thinking critical about their situation and what they have experienced, or due to poor follow-up by the interviewers.

Some follow-up question may have been leading. This was intentional and in the beginning of the interview to help the respondents to get into a mindset of thinking critical about their situation. This included a source of error but also a benefit of getting better answers in the remaining of the interview. This trade-off was known and accepted.

In several situations' respondents expressed their appreciation for our visit and research. At times they hinted about how we were the key to get more external help and at some occasions respondents even directly asked us to come to their aid to help them in their situation. This could have been more than enough reason for the respondents to think about "right" or "wrong" answers to both achieve their goal and to please us as privileged guests. Also, some respondents could have been in a position where opinions can be sensitive to express. This gave us misleading data that wasn't the real perception of the respondent and therefore a source of error.

6.7.6 Interpreter

There were several sources of error in using an interpreter. But alternatives like structured interviews, where the source of error of using an interpreter is limited, or questionnaire. Both were considered worse when it comes to the intention of obtaining rich, in-depth and describing data compared to the source of error using an interpreter. All reasons mentioned below are sources of error because valuable data may have been lost, misunderstood or misleading due to various reasons.

Some data could have been lost in the translation, both in questions from English to Luo and vice versa in answers. Apart from the translation, the interpretation of answers may have led to loss of reflections and details. This limited both the respondents in answering, and the interviewers when the interviews were conducted and managed. Sometimes the answer that the respondent replied were long, but after the interpretation the answer was short and vice versa, sometimes the answer was short, but after the interpretation the answer was long. This made the data less rich, in-depth and reliable.

Collins, who was a member of our hosting family, was well known and respected by the respondents and has lived in the subject area for about five years at the time of the research. This could have affected the interpreting and the respondents during the interviews in a way that the data collected could have been misleading or lost due to, for example, dishonest answers. But we believed that the benefits of Collins being our interpreter were a lot bigger than the possible biases. The respondents were comfortable with someone they know and trust, and therefore gave richer, more in-depth and describing data.

6.7.7 Individual and Group Interview

In the research, both individual and group interviews were conducted. Our intention was to conduct individual interviews, but were prepared for group interviews as well, in both how we managed the interview and that the interview guide was easy to adapt to a group from an individual interview. The main thing that differed from the two types of interviews were that in group interviews some questions were skipped, see Appendix B – Interview guide, to keep the core questions so that the group had time to discuss and for everyone to have their say. Since questions were skipped, some data was not obtained. But as the respondents in the group had more time to think, discuss and answer, we believed that it made the data obtained just as valuable as if all the questions were to be asked, therefore the trade-off was accepted.

During group interviews, some group dynamics could have occurred that can bias and influence the data collected. One could have been group pressure, that it is easy for a respondent in a group to think like the rest of the group, and hard to think differently from the majority in a group. It could also have been hard to tell and be honest when you know the other respondents, if there is something you don't want them to know or that you are ashamed of. This may have the effect that some data was misleading, and that valuable data got lost. The benefit of group interviews was that it was possible to have more respondents and for them to have a discussion, where they complemented each other with many different answers. At times when only one individual or a few respondents said something, it was challenging to know whether the answer only applied for the individual or for the whole group or how many. Sometimes some respondents kept quiet, but when asked how they felt about the question, they agreed with the former answer. Another bias was the language or motivation, even if asked if everybody understood the questions and that they were encouraged to collaborate, some of the participants just kept quiet throw-out the whole interview. There was also a challenge in managing the interview, to get the discussion started compare to an individual where we had a dialog. Which could have been a reason for not obtaining as rich data as expected by the group interviews. This was probably affected by the big number of respondents in the focus group interviews, which were between 6 and 13 respondents.

6.7.8 Design of Case

When designing the case, the main question was to be answered with help by four sub-questions. Each contributed with certain information crucial in trying to answer the main question. The reason and benefits were stated in the Method. But there were some downsides in managing the research in that way. Some aspects may have been lost due to not being covered by the sub-questions, and because the main question and sub-questions were constructed prior to the data collection. This could have limited the objective mindset, but the benefit was that the research could have a better focus on the subject.

7 Conclusion

This research has been done to analyse how the risk acceptability is developed. The answer to that is highly subjective and requires a thoughtful analysis of the collected data. This has been done throughout this report and the conclusion will be presented below.

Human values have been presented as something very important concerning risk acceptability. The people of this local community had a clear view of what they valued in life and almost all of their values were in some way connected to this area. These have been developed over the years since culture and tradition within the community have a large impact on the people's values. In addition to the traditions, people saw a great value in agriculture since it was a source of income and puts food on the table. The freedom within the community and the safety created a good and positive atmosphere that made the living easy. This would mean that they had a big motivation to stay, despite consequences of the risks.

The people were well aware of the risks that threatens them. Natural hazards like floods and drought affected them in a serious way including destroyed buildings and infrastructure, hunger and diseases. Floods were seen to be the most serious risk and people were very concerned about this. In addition to the perceived natural risks, other risks like low income, corruption and drug abuse was described. Even though these might be present in other areas, they contribute to the general perception of risks within this area.

The preparedness and risk reduction in the subject area was insufficient according to the respondents. The individuals and community were lacking motivation to take measures and there may be two reasons of this. Firstly, they were incapable and felt helpless. Secondly, that the government, who they held most responsible for the risk reduction, still haven't taken sufficient measures even though they have the ability to do so. The people had a clear view of solutions to their two main concerns, flood and droughts, which they were waiting for the government to implement. Therefore, they also have an optimistic mindset about the future when the measures are in place.

Despite the risks within the area, the attitude of moving was poor. This had many reasons and some of them has been mentioned as human values. The lack of knowledge about the surrounding areas created an idea that moving away would be surreal. People in this community thought that moving away would create more problems and risks than they were facing at the moment. They also saw a great potential within the community and most people had a feeling that the area has developed in the right direction over the years. This also gave faith to the future and they think that the problems that they were facing right now will be solved someday.

According to this study, the people's risk acceptability in the subject area was that the majority of the inhabitants tolerate the risks that were present. This has been developed over many years and decades since the risk acceptability includes both human values and perceived risks. This conclusion was reached through discussing the sub-questions in the discussion above. This study and this report give a deeper understanding of how the risk acceptability was developed and about the situation of the people in the subject area. Due to their strong traditions, the development of the risk acceptability, and tolerability, has gone from generation to generation and the people have learned to live with risks even though they consume both energy and money and can be physically dangerous.

The risk acceptability of the people is an important aspect to consider when choosing measure, but vital in the implementation. When choosing measure, a qualitative study of the actual events should be done, but for a successful implementation the people need to accept it. This study can be used to get a greater understanding of the people and to get a sense of how they will respond to specific measures.

8 References

- Aswani, N. (2018). *Kenya Population by Tribe as of 2018*. Retrieved 12 15, 2018, from TUKO: <https://www.tuko.co.ke/269810-kenya-population-by-tribe-2018.html#269810>
- Aven, T., & Renn, O. (2009). On risk defined as an event where the outcome is uncertain. *Journal of Risk Rescherch*, 12(1), 1-11.
- Aven, T., & Renn, O. (2010). *Risk management and governance: concepts, guidelines and applications*. Berlin: Springer-Verlag Berlin Heidelberg.
- Barriball, L. K., & While, A. (1994). Collection data using a semi-structured interview: a discussion paper. *Journal of Advanced Nursing*, 19(2), 328-335.
- Becker, P. (2014). *Sustainability science: managing risk and resilience for sustainable development*. Amsterdam: Elsevier Science Ltd.
- Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage Publishing.
- Coppola, D. P. (2011). *Introduction to international disaster management* (2 ed.). Amsterdam: Elsevier.
- Demetriou, H. (2009). The case study. In E. Wilson, *School-based Research* (pp. 203-215). London: Sage.
- Douglas, M. (1966). *Purity and danger: an analysis of concepts of pollution and taboo*. London: Routledge & Kegan Paul.
- Eisenhardt, K. M. (1989). Building theories from case study research. *The academy of management review*, 14(4), 532-550.
- Enander, A. (2010). Human needs and behaviour in event of emergencies and social crises. In L. Fredholm, & A.-L. Göransson, *Emergency response management in today's complex society* (pp. 30-72). Karlstad: Swedish Civil Contingencies Agency.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: strategies for qualitative research*. New York: Aldine de Gruyter.
- Kohn, L. T. (1997). *Methods in case study analysis*. Technical Publication No.2. Washington: The Center for Studying Helth System Change.
- Möller, G. (1986). *Risker och Männikolivets värde*. Uppsala: Almqvist & Wiksell International.
- Ministry of environment, water and natural recources. (2015). *Ombeyi integrated wetland*. Nairobi: Ministry of environment, water and natural recources. Retrieved from <http://documents.worldbank.org/curated/en/955041467980513750/pdf/E4760-V4-P153466-Ombeyi-Box385446B-PUBLIC.pdf>
- Morgan, D. L. (1996). Focus Groups. *Annual Review of Sociology*, 22, 129-152.
- Neuman, L. W. (2016). *Social research methods: qualitative and quantitative approaches* (7 ed.). Harlow, Essex: Pearson.
- Nyakundi, H., Mogere, S., Mwanzo, I., & Yitambe, A. (2010). Community perception and response to flood risks in Nyando District, western Kenya. *JAMBA: Journal of Disaster Risk Studies*, 3(1), 346-366.
- Olofsson, A., & Öhman, S. (Red.). (2009). *Risker i det moderna samhället: samhällsvetenskapliga perspektiv*. Lund: Studentlitteratur.

- Opere, A. (2013). Floods in Kenya. In P. Paron, D. Ochieng Olago, & C. Thine Omuto, *Kenya a natural outlook: geo-environmental resources and hazards* (pp. 315-330). Oxford: Elsevier.
- Peterson, C., Maier, S. F., & Seligman, M. E. (1995). *Learned helplessness : a theory for the age of personal control*. New York: Oxford University Press.
- Raburu P.O., K. P. (2012). *Community Based Approach to the Management of Nyando Wetland, Lake Victoria Basin, Kenya*. Nairobi: Mcpowl Media Ltd .
- Renn, O., & Walker, K. D. (2008). *Global risk governance: concept and practice using the IRGC framework*. Dordrecht, The Netherlands: Springer.
- Scolobig, A., De Marchi, B., & Borga, M. (2012). The missing link between flood risk awareness and preparedness: findings from case studies in an Alpine Region. *Natural Hazards*, 63(2), 499-520.
- Sjöberg, L. (2000). Factors in risk perception. *Risk Analysis*, 20(1), 1-12.
- Slovic, P. (1999). Trust, emotion, sex, politics, and science: surveying the risk-assessment battlefield. *Risk Analysis*, 19(4), 689-701.
- Slovic, P., Fischhoff, B., & Lichtenstein, S. (1982). Why study risk perception? *Risk Analysis*, 2(2), 83-93.
- Smith, K. (2013). *Environmental hazards: assessing risk and reducing disaster* (6th ed.). Milton Park, Abingdon, Oxon: Routledge.
- The Commonwealth. (2018). *Kenya*. Retrieved 12 15, 2018, from The Commonwealth: <http://thecommonwealth.org/our-member-countries/kenya>
- UNDP. (2018). *About Kenya*. Retrieved 09 17, 2018, from United Nations Development Programme: <http://www.ke.undp.org/content/kenya/en/home/countryinfo/>
- Wamsler, C. (2014). *Cities, Disaster Risk and Adaptation*. London: Routledge.
- van Dam, A. A., Kipkemboi, J., Rahman, M. M., & Gettel, G. M. (2013). Linking hydrology, ecosystem function, and livelihood outcomes in african papyrus wetlands using a bayesian network model. *Wetland*, 33(3), 381-397.
- Wibeck, V. (2000). *Fokusgrupper - Om fokuserade gruppintervjuer som undersökningsmetod*. Lund: Studentlitteratur.
- Wiedemann, P. M. (1993). Taboo, sin, risk: Changes in the social perception of hazards. In B. Ruck, *Risk as a construct: Perceptions of risk perceptions* (pp. 41-63). Munich: Kneesebeck.
- Yin, R. K. (2014). *Case study research: design and methods* (5 ed.). London: SAGE.
- Zalenski, R. J., & Raspa, R. (2006). Maslow's hierarchy of needs: a framework for achieving human potential in hospice. *Journal of Palliative Medicine*, 9(5), 1120-1127.

9 Appendix A – Respondents

Respondent Number	Gender	Age group	Occupation	Type of interview
1	Female	18-29	Farmer	Focus group 1
2	Female	18-29	Farmer	Focus group 1
3	Female	30-44	Farmer	Focus group 1
4	Female	30-44	Farmer	Focus group 1
5	Female	45-64	Farmer	Focus group 1
6	Female	65-	Farmer	Focus group 1
7	Female	65-	Retired farmer	Individual
8	Male	45-64	Area chief	Individual
9	Female	65-	Business	Focus group 2
10	Female	18-29	Farmer	Focus group 2
11	Female	45-64	Farmer	Focus group 2
12	Female	30-44	Farmer	Focus group 2
13	Female	30-44	Farmer	Focus group 2
14	Female	18-29	Farmer	Focus group 2
15	Female	18-29	Farmer	Focus group 2
16	Female	30-44	Farmer	Focus group 2
17	Female	30-44	Farmer	Focus group 2
18	Female	30-44	Farmer	Focus group 2
19	Female	45-64	Farmer	Focus group 2
20	Female	65-	Farmer	Focus group 2
21	Male	65-	Retired teacher	Individual
22	Male	18-29	Odd jobs / Unemployed	Focus group 3
23	Male	18-29	Odd jobs / Unemployed	Focus group 3
24	Male	18-29	Odd jobs / Unemployed	Focus group 3
25	Male	18-29	Odd jobs / Unemployed	Focus group 3
26	Male	18-29	Odd jobs / Unemployed	Focus group 3
27	Male	18-29	Odd jobs / Unemployed	Focus group 3
28	Male	18-29	Odd jobs / Unemployed	Focus group 3
29	Male	18-29	Odd jobs / Unemployed	Focus group 3
30	Female	45-64	Farmer	Individual
31	Male	45-64	Head teacher	Individual
32	Male	45-64	Farmer	Focus group 4
33	Male	18-29	Farmer	Focus group 4
34	Male	65-	Farmer / Retired teacher	Focus group 4
35	Male	65-	Farmer / Retired teacher	Focus group 4
36	Male	30-44	Farmer	Focus group 4
37	Female	18-29	Farmer	Focus group 4
38	Male	65-	Farmer / Retired teacher	Individual
39	Female	30-44	Business	Focus group 5
40	Female	45-64	Farmer	Focus group 5
41	Female	30-44	Farmer	Focus group 5
42	Female	30-44	Farmer	Focus group 5

43	Female	30-44	Business	Focus group 5
44	Female	65-	Nanny	Focus group 5
45	Female	45-64	Business	Focus group 5
46	Female	65-	Farmer	Focus group 5
47	Female	30-44	Farmer	Focus group 5
48	Female	18-29	Farmer	Focus group 5
49	Female	30-44	Business	Focus group 5
50	Female	30-44	Business	Focus group 5
51	Female	30-44	Farmer	Focus group 5
52	Female	30-44	Business	Focus group 6
53	Male	30-44	Farmer	Focus group 6
54	Male	30-44	Farmer	Focus group 6
55	Female	30-44	Farmer	Focus group 6
56	Male	45-64	Farmer	Focus group 6
57	Female	18-29	Farmer	Focus group 6
58	Male	18-29	Spiritual leader	Focus group 6
59	Female	30-44	Business	Focus group 6
60	Female	18-29	Student	Focus group 6
61	Female	18-29	Secretary	Focus group 6
62	Male	30-44	Pastor/Business	Individual

10 Appendix B – Interview guide

Before the interview the interviewers introduced themselves and eventual interpreter, then the interviewees were informed about the study, interview, and ethical principles, that they are free to ask, not answer, and anonymity. Just before the interview the interviewees were encouraged to give rich, in-depth and detailed answers as far as they are comfortable.

The first questions in the interview were easier, familiar and carefully worded. To both start off easy to make the interviewees comfortable and for the interviewers to get a perspective of the interviewees. Then the rest of the following questions were asked as shown below. The interview was intended to be adjustable both in order of asked question, follow-up questions to the open-ended questions and to individual and group interviews. The follow-up questions are not included in the interview guide. First the interview guide for the individual interview will be presented, followed by the one used for group interview.

The field study will have one main question:

- How is the risk acceptability developed by the local community in flood prone areas?

This question will be answered by these sub-questions:

- What are the reasons of the local community to stay in this area, despite the reoccurring floods?
- What is the perceived risk of the local community in flood prone areas?
- What is the preparedness of the people, the government and non-governmental organisations?
- Are there any opportunities for the local community to move and how could this be arranged?

Individual interview guide

Gender: Male/Female

Age group: 18-29, 30-44, 45-64, 65-

Occupation:

What are the reasons of the local community to stay in this area, despite the reoccurring floods?

- ❖ Do you have any family?
- ❖ How do you live?
- ❖ What do you think are the advantages of living here?
- ❖ What do you think are the disadvantages of living here?
- ❖ How long have you and your family lived here?
 - Where have you lived?
 - For what reasons did you settle here?

What is the perceived risk of the local community in flood prone areas?

- ❖ What dangers are you aware of that can happen here?
 - Do you have any experience of these dangers?
 - Can you rank the threats according to which poses the main concern to you?
 - Why do you give this rank?
- ❖ Were you aware of these dangers before deciding to settle here?
- ❖ How often do these dangers happen?
 - Do you know why they happen?
- ❖ How will these dangers affect you/your family?
- ❖ How will this affect other families, your neighbours and community?

What is the preparedness of the people, the government and non-governmental organisations?

- ❖ Do you think there is something you can do to mitigate these dangers?
- ❖ What have you done to prevent or mitigate these dangers?
 - How did you do that?
 - How have you prepared for these dangers?
 - What do you do in case of these dangers happen?
- ❖ How are you motivated to improve your preparedness for dangers?
 - In what way?
- ❖ What expectations do you have on external help to cope with these dangers?
 - Is there any place you can go to get help?
 - What kind of help?
 - What kind of help would you like to get, and how?
 - From whom?
- ❖ Who do you think is less or more responsible for the preparedness in case of these dangers?
- ❖ Do you feel safe in the area where you live?
 - How about your family, neighbours and community?

Are there any alternatives for the local people and what is the perception of development of factors affecting risk acceptability in the local area?

Based on the topic and answers in this interview:

- ❖ Would you prefer to move or to stay?
 - Main reasons?
- ❖ Is there any specific place that you know of that you would like to move to?
 - Why, for what reasons?
- ❖ What do you think about the past?
- ❖ What do you think about the future?

Group interview guide

Gender: Male/Female

Age group: 18-29, 30-44, 45-64, 65-

Occupation:

What are the reasons of the local community to stay in this area, despite the reoccurring floods?

- ❖ What do you think are the advantages of living here?
- ❖ What do you think are the disadvantages of living here?

What is the perceived risk of the local community in flood prone areas?

- ❖ What dangers are you aware of that can happen here?
 - Can you rank the threats according to which poses the main concern to you?
 - Why do you give this rank?
- ❖ Were you aware of these dangers before deciding to settle here?
- ❖ How will these dangers affect you/your family?

What is the preparedness of the people, the government and non-governmental organisations?

- ❖ Do you think there is something you can do to mitigate these dangers?
- ❖ What have you done to prevent or mitigate these dangers?
 - How did you do that?

- How have you prepared for these dangers?
- What do you do in case of these dangers happen?
- ❖ What expectations do you have on external help to cope with these dangers?
 - Is there any place you can go to get help?
 - What kind of help?
 - What kind of help would you like to get, and how?
 - From whom?
- ❖ Who do you think is less or more responsible for the preparedness in case of these dangers?
- ❖ Do you feel safe in the area where you live?
 - How about your family, neighbours and community?

Are there any alternatives for the local people and what is the perception of development of factors affecting risk acceptability in the local area?

Based on the topic and answers in this interview:

- ❖ Would you prefer to move or to stay?
 - Main reasons?
- ❖ Is there any specific place that you know of that you would like to move to?
 - Why, for what reasons?
- ❖ What do you think about the past?
- ❖ What do you think about the future?

11 Appendix C – Output from data analysis, NVivo

Name	Files	References
Human values	0	0
Advantages	0	0
Agriculture	0	0
Big areas for Agriculture	3	3
Cheap living	3	4
Fertile soil	13	20
Fishing	5	5
Floods	6	14
Food all year	4	6
Good weather	2	2
Irrigation	2	2
Community	0	0
Awareness of dangers	1	1
Family	7	10
Freedom	3	4
Help each other	7	7
Large population	1	1
Ownage of land	3	5
Religious	1	1
Security	9	14
Strong tradition	5	8
Development	0	0
Contribution from the Government	1	2
Infrastructure	3	3
Disadvantages	0	0
Community	0	0
Bad buildings	2	3
Dependent on farming	2	2
Drug abuse	3	5
Insecurity	5	8

Overcrowded	1	1
Problems with land ancestral	1	1
Relying on husband	1	1
Government	0	0
Bad drinking water	1	1
Bad infrastructure	5	6
Hard to find jobs	4	6
Illiteracy	1	1
Lack of equipment	0	0
Hospitals	1	3
Schools	1	2
Low income	3	3
No help from government	1	1
Natural events	0	0
Dangerous animals	1	3
Dry periods	8	8
Floods	12	16
Heavy rains	0	0
Lightning prone	1	1
Mosquitos	2	2
No proper yield	2	2
Relying on the natural rains	1	1
Opportunities	0	0
Attitude of the future	0	0
Things will be better	2	2
Better houses	2	2
Better medicine and control of diseases	3	4
Better support from the government	4	4
Developed community and self-reliable people	7	8
Dreams of becoming a professional football player	1	8
Education	2	5
Infrastructure	3	6

More secure	1	1
New technique	1	1
Things will be worse if not controlled	4	6
Everything depends on money	1	3
Perceived safety	2	2
Not safe	10	17
Safe	7	21
View of the past	1	1
Things are getting better	3	5
Better education	4	6
Funding's for education	1	2
Better health centres	1	1
Better houses	2	2
Better infrastructure	6	8
Better knowledge of environment	2	2
Better security	1	1
Commercial farming	1	1
Evacuation Centres	1	1
Irrigation	1	1
Less drought due to global warming	1	1
Not affected by the floods like before	4	7
Things are getting worse	1	1
Bad food	2	3
Expensive education	2	2
Insecurity	1	1
Overpopulated area	1	1
Tough life	1	1
Young people's lack of attitude	0	0
Drugs	1	1
Willing to move	0	0
Disadvantages with other areas	1	1

Cold	1	1
Insecurity	3	3
No land	4	8
Good attitude of moving	5	6
England	1	1
Other side of the river	1	1
Sweden	1	1
Not knowing where to go	3	3
Poor attitude of moving	11	17
Perceived risk	0	0
Hazards	0	0
Man-made	0	0
Dangerous jobs	0	0
Motorbike	1	1
Insecurity	3	3
Sexual violence	4	4
Thieves	2	3
Natural	0	0
Animals	6	10
Diseases	0	0
AIDS	1	1
Malaria	2	2
Drought	8	13
Floods	12	17
Backflow from lake	2	2
Frequency	5	7
High speed	2	2
Large coverage	5	6
Mosquitos	4	4
Snakes	1	1
Lightnings	1	1
Weed	1	1

Vulnerability	0	0
Caused by drought	1	1
Agriculture becomes hard	5	6
Hard to work	1	2
No food	4	5
Caused by floods	0	0
Bad health	4	5
Bad infrastructure	6	10
Can't go to school	5	9
Destroyed harvest	12	25
Destroyed houses	6	21
Diseases	6	7
Animal diseases	1	1
Cholera	7	11
Malaria	7	10
Typhoid	4	4
Hunger	7	13
Killed animals	5	6
Drowns	0	0
No grass	3	3
Migration	1	1
No toilets	4	5
Poverty	4	6
Caused by lightning	0	0
Death	1	1
Destroyed buildings	1	1
Preparedness	0	0
Awareness of dangers	0	0
Before settle	0	0
Aware	6	7
Not aware	5	5
current knowledge	0	0

Good	4	7
External help	0	0
Responsibility	0	0
Community	2	3
God	3	3
Individuals	5	6
NGO's	4	4
Don't want to be dependent	4	4
Others	1	1
The Government	5	6
Lack of trust	1	3
Corruption	3	6
Feeling of being exploited as farmers	3	9
Work desired	1	1
Wished from NGO's	2	3
Wished from the community	2	2
Wished from the government	2	3
Better dikes	8	13
Better information	1	1
Better roads	2	2
Dams and drainage	7	20
Drugs	2	3
Food and supplies	2	3
Fresh water to drink from the river	2	2
Job creation	1	1
Lightning arresters	1	1
Mosquito nets	1	1
Preparedness	0	0
Better training	1	1
Work that is or has been done	0	0
Church	2	2

Community	1	1
NGO's	4	9
Education	1	1
Evacuation Centres	4	4
NGO's are the quickest	3	3
Red Cross	4	4
Not enough	3	4
UNICEF	1	1
Work done by the government	0	0
Alert people to move	2	4
Desilting	1	1
Dewatering	1	1
Dikes	4	7
Good response from Government	4	8
Movement of river	1	1
Poor work by the Government	2	6
Dikes	3	8
Drainage	1	1
Excavating	2	3
Metrological	1	1
No compensation for economic loss	1	1
Poor economic help for students who can't afford school	1	1
Poor response from the Government	7	15
Stages	1	1
Mitigation, home made	0	0
Education	2	3
Fields close to the river	1	1
Organisational involvement	1	1
Plant trees	3	4
Motivation	1	1
Knows what will come	1	1

Large responsibility	1	1
Prepare	0	0
Know what to do	1	1
No preparedness	4	5
Impossible to predict	6	9
No training	1	2
Notify neighbours	2	2
Storage of supplies	2	3
Prevent	0	0
Good latrines to prevent cholera	1	1
Have tried, no success	2	4
Irrigation during drought	1	1
Lightning arresters	1	1
Small dikes	5	8
Stages	2	3
The flood is too strong	2	4
Wells during drought	2	2
Recover	2	2
Respond	0	0
Diseases	1	1
Cholera	2	2
Malaria	3	4
Drought	1	2
Floods	0	0
Move to higher ground	13	26
If rich, move to urban areas	1	1
Not good, lack of supplies	5	8
Report to authorities	1	1
Safeguard the animals	1	1
Stay in their homes	2	2
Storage	1	2

Water treatment	1	1
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12 Appendix D – Photos



Figure 11. River Nyando.



Figure 12. Built walls along River Nyando.



Figure 13. House damaged by floods.