

# **Why do people live in high-risk areas?**

- A field study in Akuressa, Sri Lanka

***Johan Askman & Olof Nilsson***

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Division of Risk Management and Societal Safety  
Lund University, Sweden

Riskhantering och samhällssäkerhet  
Lunds tekniska högskola  
Lunds universitet

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### Abstract

A qualitative field study, based on Grounded Theory methodology, has been conducted in the areas around Akuressa in southern Sri Lanka. The method for data collection consisted mainly of semi-structured interviews with local residents. The purpose of the study was to evaluate why people live in high-risk areas. The aim was to do this by looking beyond the purely physical aspect of living with hazards and explore underlying social factors. Four main reasons were identified, namely an *overall good living situation, sense of place, difficulties relocating* and *being well adapted to the situation*. Semi-structured interviews were also held with government officials to explore whether they shared the views of the local residents. The study found that there was a consensus regarding several of the different reasons as to why people live in the high-risk areas included in the study. However, some discrepancies were identified in relation to risk awareness and the efficiency of implemented risk reducing measures. Furthermore, the study identifies and explores underlying social factors, such as risk normalisation and risk trade-off, which seems to influence the decision of living in a high-risk area.

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Riskhantering och samhällssäkerhet

Lunds tekniska högskola

Lunds universitet

Box 118

221 00 Lund

Division of Risk Management and Societal  
Safety

Faculty of Engineering

Lund University

P.O. Box 118

SE-221 00 Lund

Sweden

## Summary

The overall purpose of this thesis is to study reasons why people live in high-risk areas. The study is focused on one type of hazard, namely floods, and the field study was conducted in the District of Matara in the southern part of Sri Lanka.

The common conception and often the focus regarding natural disasters, such as floods, is that of the physical phenomenon. However, by considering a social factor when attempting to understand the impacts of natural disasters, a more complex situation quickly takes form. This is further explained by the fact that if humans, or what humans value, are not present, it is simply a natural phenomenon rather than a natural disaster, whilst the physical occurrence remains unaltered. The aim of this thesis is therefore to look beyond the purely physical aspects of living with a high level of hazard exposure and explore the underlying social mechanisms potentially dictating why people live there.

The thesis is based on a methodology called Grounded Theory where the researchers use the collected data to form new theories instead of trying to support an existing theory. The main method of data collection was semi-structured interviews with local residents living in high-risk areas, as well as with government officials from relevant departments. The data was then analysed and codes, concepts and categories were constructed in order to identify trends and tendencies.

The findings of this field study reveal a complex system of interdependencies and reasons why people live in high-risk areas such as the flood-prone areas around Akuressa, Sri Lanka. A brief overview of some of the findings in this thesis follows below.

**Overall good living situation** – Many of the respondents seemed happy with the overall living situation. The annual floods were expressed as one of the few downsides. It appears that risk trade-off reasoning has resulted in that perceived benefits of living in the areas around Akuressa outweigh the perceived downsides associated with the floods.

**Sense of place** – A strong sense of place was expressed both in terms of being born and raised in the current location, the land and house being passed down through generations as well as a preference of being close to family and relatives.

**Difficulties relocating** – The respondents expressed difficulties associated with moving somewhere else such as a disbelief of finding another place at all, financial constraints as well as a disbelief of finding an equivalent living situation in a new location. One potential reason behind these problems is identified as the static housing system.

**Well adapted to the situation** – Through interviews, informal discussions and field observations it became evident that many local residents felt well adapted to the current situation. However, this study identifies that the long-term exposure seems to have normalised the risks associated with annual floods, which might have a negative impact on their level of preparedness.

Interviews held with government officials revealed a general consensus regarding several of the main reasons for people living in the high-risk areas around Akuressa. However, some discrepancies were found when comparing the risk awareness of local residents and government officials. This study identifies discrepancies which points to potentially misdirected use of resources and inefficient risk-reducing measures.

Many of the findings in this study are supported by existing literature and it is the authors' hope that this study will help shed more light on the complexity surrounding why people live in high-risk areas.

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# 1. Introduction

## 1.1 - Background

Floods are the most common cause for natural disasters around the world and is a phenomenon ranging in size from negatively impacting only a few people to whole communities or countries. However, floods are in many contexts also required for sustained biodiversity, wetlands as well as agricultural demands. As a result, risk and disaster management regarding floods quickly becomes complex as there are many interdependent factors to consider (Becker, 2014).

The common conception and often the focus regarding natural disasters, such as floods, is that of the physical phenomenon. Disasters are often conceived as something overpowering and beyond human control. However, by considering a social factor when attempting to understand natural disasters, this general perception appears simplified. This statement is explained by the fact that if humans are not present, it is simply a natural phenomenon rather than a natural disaster whilst the physical occurrence remains unaltered (Wisner et al., 2003).

Moreover, different groups and individuals in society are affected by disasters differently and have different abilities to cope with the events. Several factors can affect this ability, such as income, living situation, gender, ethnicity and age. These social factors will of course not influence the scale of the physical phenomenon, but can influence how the community is affected and its ability to cope with the outcome of the disaster (Wisner et al., 2003). Consequently, to gain a greater understanding of underlying issues regarding natural disasters it is crucial to not only understand the physical processes of a disaster but also why people decide to live in areas where these events tend to occur (Wisner et al., 2003).

Floods, due to several contributing factors, is the most common hazard in Sri Lanka and is increasingly affecting the residents. The majority of floods in Sri Lanka are caused by rivers overflowing as they have insufficient capacity to accommodate the heavy rain during the two monsoon seasons. In addition, deforestation, improper land-use and a growing population may cause the risks to increase further (Ministry of Disaster Management Sri Lanka, 2012).

The intention of this project is therefore to look beyond the physical aspects of natural disasters in the areas around Akuressa and Malimboda, Sri Lanka and analyse the social aspects of floods.

## 1.2 - Purpose

The overall purpose of this thesis is to study reasons why people live in high-risk areas. The study is focused on one type of hazard, namely floods, and the field study was conducted in the District of Matara in the southern part of Sri Lanka.

An understanding of why people live in high-risk areas is considered important when attempting to improve the situation using risk-reducing measures. Whether implemented measures are successful or not often depend on their suitability for the specific area and local context. A general consensus between residents and relevant authorities is believed to increase the possibilities of successfully implementing risk reducing measures in the future. Therefore, a secondary purpose of this thesis is to explore potential differences between local residents and government officials regarding how the situation is perceived. Through increased understanding of the aspects mentioned above, this thesis aims to present valuable insight for the parties involved.

### 1.3 - Research Questions

In order to achieve the purpose of the study, the following research questions have been constructed.

- Why do people live in high-risk areas around Akuressa, Sri Lanka, according to the local residents themselves?
- Why do people live in high-risk areas around Akuressa, Sri Lanka, according to government officials?
- How do local residents and government officials perceive the risks in the areas around Akuressa, Sri Lanka?

## 2. Methodology

This section of the report contains information regarding the methodology used for data collection as well as a descriptive part of how the data was analysed.

### 2.1 - Grounded theory

This thesis is based on a methodology called Grounded Theory with the intention of developing a new theory based on collected data rather than confirming an existing one. The methodology was developed in the 1960's by researchers Barney Glaser and Anselm Strauss when seeing a need for a methodology facilitating for new theories to be formed based on, or "grounded" in, emerged data. The process is reversed from many other research methodologies where data instead has the purpose of confirming existing theories. The methodology was consequently designed to simplify the creation of new theories. Naturally, there are other methodologies serving this purpose but Grounded Theory was chosen as it provides a well-established exploratory approach (Charmaz, 2006).

When applying this methodology, it is important to minimise the impact of the researchers' preconceived ideas regarding the local circumstances. One of the ways to achieve this is by limiting the research on subjects regarding the specific research questions beforehand. The authors' focus prior to the field study was therefore mainly concentrated to methodology and background (Charmaz, 2006).

Ideally, data collection should continue until theoretical saturation is achieved, meaning no new concepts or categories emerges during the simultaneous process of coding the data. This would indicate that sufficient information has been extracted from the area studied. However, it must be considered a theoretical goal rather than something practically achievable as codes, concepts and categories are influenced by perspectives, which can develop and change over time. Furthermore, it is always possible for completely new ideas or thoughts to emerge, even on the last day of a study.

### 2.2 - Data collection

The first step in the Grounded Theory methodology, after defining the research subject and area, is the data collection. In this study, the data collection was mainly done through interviews with local residents and government officials in the research area. Moreover, the methodology allows for field observations made by the researchers to be included in the dataset as well.

#### Semi structured interviews

The general definition of an interview can be described as the process of verbally eliciting information from a participant (Longhurst, 2016). There are a number of different ways in which interviews can be conducted. A structured interview follows a detailed pre-decided questionnaire and adheres to the boundaries set by that questionnaire. An unstructured interview on the other hand follows no such pre-decided format and the interviewer allows the participant to decide the direction of the interview and to tell it their way (Bernard, 2006; Longhurst, 2016).

The interview technique used in this project can be described as the middle-ground between the two methods mentioned above. The technique, called semi-structured, is often utilised within Grounded Theory and is characterised by the use of a broad interview guide with some pre-decided, open-ended questions where participants are encouraged to elaborate freely within the topic of discussion. Subsequently, there are some pre-decided boundaries to the interview but it is designed to be flexible within this frame (Bernard, 2006; Longhurst, 2016).

Open-ended questions mean that the interviewer does not ask the participant to choose from a number of set responses but rather promote a freely elaborated answer. The purpose of this is to make sure that the design of the interview does not exclude any potential responses. The counterpart of open-ended questions, so called fixed-choice or closed ended, are generally more time efficient but also significantly more controlling (Bernard, 2006). As a result, that method introduces the risk of missing out on potential responses that are not previously quantified by the researcher. The aspect of a less predetermined interview, which is achieved using open-ended questions, is vital within Grounded Theory since the researcher should aim to influence the responses as little as possible.

It should however be noted that open-ended questions were difficult to use in some of the interviews conducted in this study. At times, the open-ended questions resulted in very short answers from the respondents instead of achieving an intended discussion. There are many factors that can explain this difficulty. In this case, it is believed the strongest contributor is the use of a translator making it difficult to have a discussion-based conversation with good flow. To ensure all subjects were covered and discussed, close-ended questions were from time to time utilized. The effects of this are elaborated on in chapter 6.

The interviews were structured in three different phases, similar to what is suggested in Höst, Regnell & Runeson (2006) and the interview guide was developed with the research questions in mind. Interviews were started with a brief presentation of the context, which the translator assisted with. This was followed with initial and general questions, such as "*What is your age and occupation?*" proving interesting insight as well as creating a familiar setting through small-talk. Lastly, the more in-depth questions were discussed regarding hazards, if the interviewee was willing to move somewhere else etc. All interviews except one was recorded to facilitate further analysis. All recordings were preceded with a permission from the respondent.

#### The use of an interpreter

All respondents were speaking Sinhalese resulting in the need for a translator to translate from Sinhalese to English. This was provided through the local Red Cross branch in Matara. The translator had previous experience in disaster management field work and had previously functioned as a translator but with no formal education in the subject. The researchers had no previous experience of working with a translator and the collaboration required adjustments early on and developed through joint discussions. Knowledge in the English language differed requiring the level of English to be adapted accordingly. Even though it took time and effort, the collaboration transitioned from interpreting answers towards translating them. However, due to the constraints caused by the level of English, all interviews are believed to be mostly interpreted rather than translated. When a message is mediated several times between three different parties, and especially from one language to another, information and certain details can disappear or become misleading (Freed, 1988). This is thus an inevitable source of error in this report.

#### Selection of location and respondents

Below follows an account of how the location of the study and the respondents were selected.

##### *Location*

Interviews were conducted in two different main geographical locations, namely Akuressa and Malimboda. More information about the sites is found in chapter 4. The single most important criteria when choosing the location for an interview was that it was flood prone. Therefore, a visit to the Disaster Management Centre in the town of Matara was initially conducted to gather relevant

information before interviews were held. Furthermore, the intention was to speak with people living in rural, semi-rural and urban settings to have the opportunity to check for any discrepancies. Lastly, all interviews were held in a geographically limited area. A larger research area would require greater resources in terms of both time and financial resources as the number of required interviews to reach saturated data likely would increase.

### *Local residents*

Houses of interest were identified whilst walking around in the areas with the translator. The translator initiated contact, presented us and asked if they were willing to take part in an interview. The translator was instructed to present us by explaining that we were university students interested in learning about their way of life in general. He was specifically instructed not to mention anything about risks or floods. This approach would allow the interviewee to freely tell us about the positive and negative things about living in the area and only mention floods should the person consider it important. However, the introduction given by the translator often included risks and floods as well which was notable even without knowledge about the Sinhalese language.

Furthermore, an attempt was made to obtain a good variation of those interviewed in terms of age and gender. Being a qualitative study, this is not required to ensure statistically significant results but however desirable for the results to be demographically representative. The distribution of residents in the District of Matara consists roughly of 48% male and 52% female (Ministry of Policy Planning and Economic Affairs, 2012) and the distribution of those interviewed should ideally be similar to achieve demographically representable results. The overrepresentation of male respondents (28 out of 45) can to some extent be explained by the fact that if a male was present when an interview was conducted, they often considered themselves being the most suitable for taking part in the interview, making it difficult to accomplish an ideal distribution. This effect was actively attempted to be limited while at the same time adhering to the local cultural context and tradition.

The age and gender distribution in the District of Matara is visualised in Figure 1 below. This distribution was considered when interviews were conducted but was not fully replicated due to several contributing factors. First of all, the interviews were conducted during daytime and weekdays, which meant that close to all children and young people attended school. Secondly, and similar to the challenges associated with achieving a representable gender distribution, certain age groups in the families considered themselves more suitable than others to respond. Last but not least, it is important to note that factors other than demographical ones, such as flood exposure, had to be considered and sometimes given priority when choosing respondents.

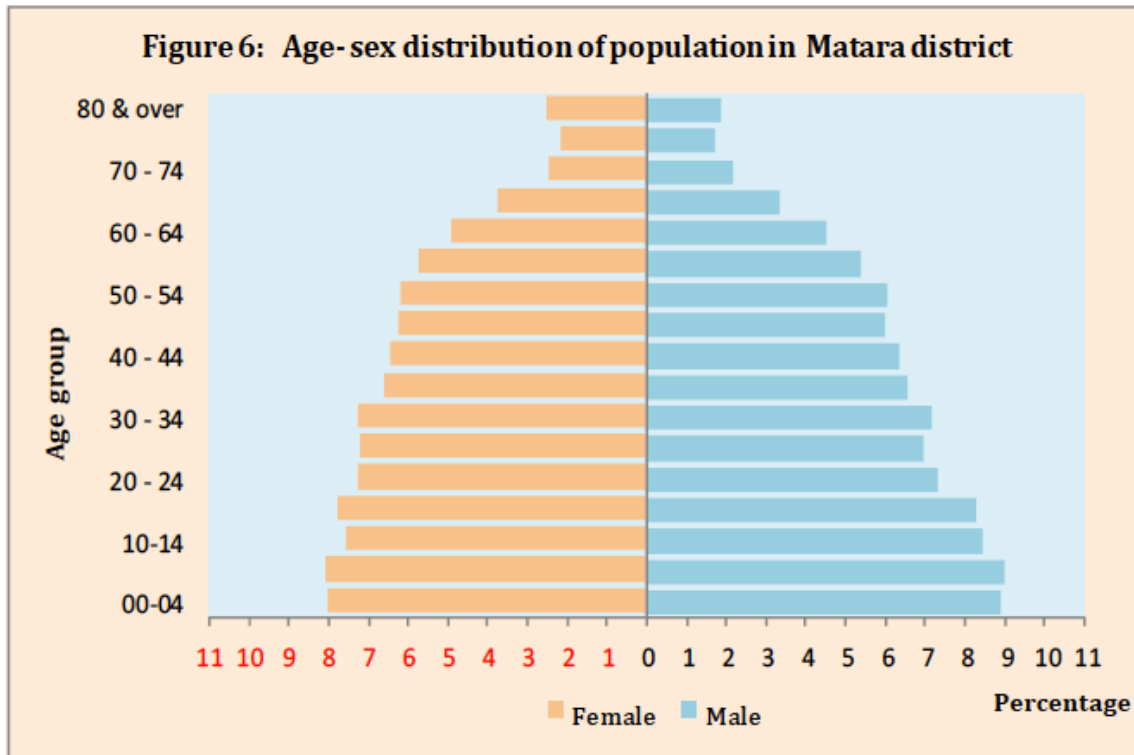


Figure 1 - Age distribution in the District of Matara with percentage of total population on the X-axis and age group on the Y-axis (Ministry of Policy Planning and Economic Affairs, 2012).

In terms of the number of conducted interviews, there was not a predefined goal at the beginning of the interview process. Instead, the desired amount was continuously evaluated throughout the interview process and defined when fewer and fewer new concepts or categories were formed while coding. That stage outlined when theoretical saturation had been approached in accordance with the Grounded Theory methodology.

Throughout the interview stage of the project, a general interview guide was used serving two main purposes. Firstly, to ensure all subjects of interest were covered in every interview and secondly to assist in maintaining a similar structure to each interview. This is important to ensure the results can be comparable. After the first ten interviews, the interview guide was evaluated and underwent minor updates. A few points were added for better follow-up on some of the subjects. In addition, a few points were removed and instead rephrased or covered in other parts. These alterations were however minor in terms of the information obtained from the interviews, and the overall content in the guides remained very similar as can be observed in Appendix A which include both versions.

The first ten interviews were held in the most rural setting. At the end of the study, this rural area was revisited to ensure the altered interview guide did not affect the outcome or quality of the interviews and that the first ten interviews were still applicable. This was done by comparing the results from the first and last interviews and at the same time checking for theoretical saturation. Notably, no significant differences were identified.

#### *Government officials*

A total of six interviews were held with government official out of which five were recorded. In addition, a presentation held by the District Irrigation Department was attended which facilitated a more in-depth understanding of the situation in the district. The most important selection criteria when choosing who to interview was that the respondent was involved in disaster management

and/or had knowledge of the flood situation in the region. Furthermore, it was considered important the respondents were from different departments of government should the views differ between different offices for whatever reason. Lastly, all interviews were held with officials in the higher segments of the organisation in an attempt to speak with people with a good understanding and overview of the situation. The interviews were held at the interviewees respective offices and was set up with the help of the interpreter.

The number of conducted interviews with government officials were not determined through theoretical saturation. Instead, interviews were held with those who were considered important to talk to based on their position. Interviews were held with people from the following departments:

- District Planning Department
- Disaster Management Centre
- District Irrigation Department
- Akuressa Divisional Secretariat
- Athuraliya Divisional Secretariat (bordering to Akuressa)

### Field observations

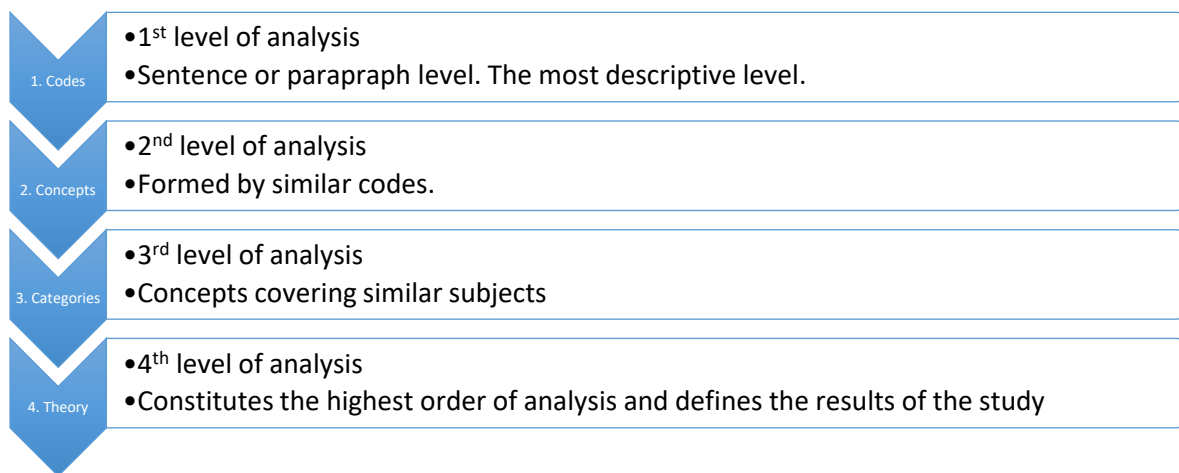
When performing a study using Grounded Theory any information may be used to guide the researcher, whether it is through formal procedures, casual interactions or observations. This allows the researcher to explore the topic of the study through many different channels (Charmaz, 2006).

Field observations are a good source of information in itself since it allows researchers to observe everyday life without integrating themselves in the situation, which is likely to affect the study to some extent. Furthermore, field observations are also considered to provide valuable input to the interviews since the information gathered about the local insight and context can be used to adapt and improve the interviews.

Information was gathered by walking around in the areas without formally interviewing anyone. Spending time just observing everyday life in the Akuressa and Malimboda areas facilitated a better understanding of the local context. Field observations and informal interactions took place throughout the field study and was a valuable complementary source of information and knowledge, especially when coding.

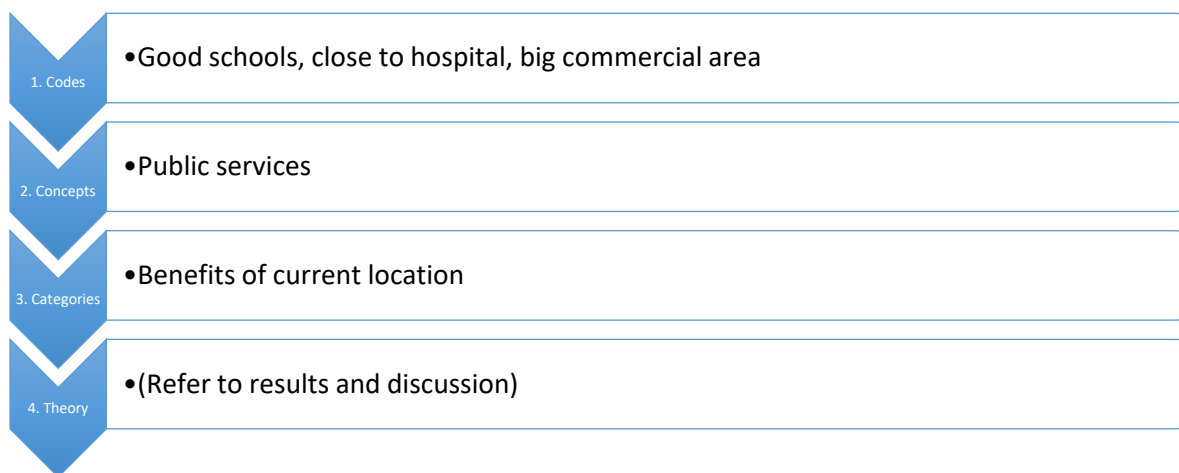
### 2.3 - Data analysis

One of the most basic concepts of the Grounded Theory methodology consists of analysing data on different levels of detail. The data in this case consist of interviews. Generally, the analysis consists of four different orders of detail where *codes* form the lowest and most descriptive level. Later, *concepts* and *categories* based on these individual *codes* are formed. This is done by identifying relationships between the individual *codes*, allowing the researchers to analyse and interpret the data at a more abstract level compared to the descriptive level of *codes*. The final step, and the intention of the Grounded Theory method, is to form a new *theory* based on the *categories*, *concepts* and *codes* established (Charmaz, 2006).



**Figure 2 – Visualisation of the Grounded Theory hierarchy.**

The process of coding started as soon as the first interviews were transferred from audio recordings to text documents. Coding and analysis of the data continued parallel to the interviews throughout the field study in order to identify trends and concepts of interest which then could be further explored in later interviews. Below follows an example from the actual field study to put the theoretical description into a more practical context (Figure 3).



**Figure 3 – Example of the Grounded Theory hierarchy from the study**

The data analysis was performed with the assistance of the computer software program Nvivo. This software enables the user to explore data and code its content in different levels, among other things. The process of coding started out slow as most codes were new and needed to be constructed for the first time. As the coding progressed, the efficiency of the process increased considering the fact that codes reoccurred in the interviews. When the interviews started to become very similar in terms of coding it was assumed that theoretical saturation was sufficiently achieved and the interviews were ceased.



### 3. Conceptual Framework

The following chapter introduces some of the general concepts used throughout this report.

#### 3.1 - Risk

There are several recognised ways of defining risk and many probably have their own notions of what risk is and how it can be managed. One of the more common ways of considering risk in everyday life is to simply think of it as a potentially negative event that may or may not occur (Becker, 2014). In the professional field of researchers, risk managers and likewise, the picture suddenly becomes more complex, especially since there are several different views of how to define "risk". This is important to keep in mind as it can be a source of confusion and misunderstanding. However, the one thing they all have in common is the element of uncertainty. If the outcome is known and with no possibility to influence it, risk is no longer an applicable concept (Zinn, 2008).

From a technical perspective, the risk of a certain hazard can be described with an equation consisting of two factors, likelihood and consequence. By multiplying the two factors, the risk of that hazard can be calculated. Without going into too much detail, these two factors can be described both qualitatively and quantitatively and in several different ways depending on purpose and context (Coppola, 2011). However, many argue (see, for example, Renn 1998; Slovic 2001; Coppola 2011) risk should consist of more than just the technical aspects mentioned above and also include subjective values which serves a purpose in several different situations. For example, when determining if a risk should be considered acceptable or not or when comparing risks with different types of consequences to each other, such as environmental damage and death.

#### Risk awareness

Risk awareness can in simple terms be described as knowledge and consciousness about the risks associated with a hazard (Raaijmakers et al., 2008; Luïs et al., 2016). It is often considered that a lack of awareness regarding a certain risk is likely to result in lacking preparedness in relation to that risk (Scolobig et al., 2012). This is logical since a person who are not aware that he/she is at risk, is not likely to take any risk reducing actions. When individuals or communities experience a hazardous event, their awareness of the risks associated with this hazard tends to increase (Scolobig et al., 2012). Similarly, when a hazard does not affect an area for a long period of time, the awareness of the risks associated with this hazard is likely to decline (Raaijmakers et al., 2008).

As mentioned above, risk awareness is often described as knowledge and consciousness about the risks associated with a hazard, something that is likely to increase with increased experience of the hazard in question. Within the scope of this report, risk awareness is used in terms of *awareness of the likelihood and physical consequences associated with a certain hazard*. When values and feelings are included in the conception of a hazard, it forms part of the more subjective concept of risk perception which is described further in the following section.

#### Risk perception

Studies have shown that risk is often perceived differently than its statistical history. How a risk is perceived can consequently differ between individuals. The reasons behind this depends on several different factors which are important to consider when trying to understand the decisions made by those exposed to certain risks (Coppola, 2011).

How a risk is perceived is to some extent determined simply by the general level of knowledge about the risk. Some other factors proven to be of importance is if the risk exposure is voluntary or not (Sjöberg, 2000), if the risk is new or old (Sjöberg, 2000), if the impact is immediate or delayed, if the

hazard is controllable or not, if there are many fatalities in one event or few fatalities in many events (Smith, 2013) and the uncertainty attributed to the risk (Coppola, 2011).

Because of the likely difference in risk perception between different individuals and groups in society, it is crucial when working with risk management to consider these factors and gain an understanding for those exposed to certain risks. Otherwise, the process is likely to result in efforts that do not correspond to the needs expressed by those affected. As expressed by Coppola:

*Risk perception can also influence the way that the mitigation of a hazard is considered by decision makers or by constituents within a community. If a hazard is not perceived to be a significant risk by those who decide to fund mitigation projects, funding is unlikely to be provided without significant efforts to correct those perceptions. [...] Once again, the presence of differing risk perceptions highlights the need for effective risk communication as a component of mitigation and preparedness (Coppola, 2011, p. 202-203).*

### 3.2 - Vulnerability

The strictly technical way of studying disasters and their consequences is heavily focused on the physical event as such, the magnitude of an earthquake for example, to gain greater understanding of the environments' destructive forces. However, if a potentially destructive event such as a flood occurs in an uninhabited area it is not considered a disaster, it can even be considered beneficial in some areas (Wisner et al., 2003; McEntire, 2005). This has called attention to the fact that human involvement, or the involvement of what humans' value, is a vital component to what constitutes a disaster. The extent of adverse effects caused by natural hazards is in turn highly dependent on the vulnerability of the entity affected.

The concept of vulnerability is not just dependant on the level of exposure to a hazard but also the capacity of the individual, community, system or other entity to anticipate, cope with and recover from the impact of the event (Turner II et al., 2003; Wisner et al., 2003). When studying vulnerability, one must therefore consider a range of factors such as physical, environmental, social, cultural, political and economic (Becker, 2014). Key aspects influencing vulnerability include financial situation, occupation, gender, age, health and ethnicity among others. Poverty is often considered one of the biggest factors to vulnerability. Even though it is not as simple as connecting poverty and vulnerability with a straight line, they are often highly correlated. Consequently, poor people tend to suffer the most from disasters (Wisner et al., 2003).

It is also important to note that vulnerability is dynamic. The level of vulnerability can change over time due to both alterations to local conditions as well as to the ability to cope with a hazard. Furthermore, the level of vulnerability can depend on effects which become visible long after the initial event, adding yet another dimension to the concepts dynamic feature. Subsequently, vulnerability is a very complex concept which is not easily reduced to numeric measurements, making it difficult to quantify (Wisner et al., 2003; Adger, 2006).

## 4. Context Analysis

This section of the report provides information regarding the Sri Lankan context in general terms as well as the regional situation for the District of Matara where the field study was conducted.

### 4.1 - Sri Lanka

Sri Lanka has a population of close to 21 million people out of which 18% resides in urban areas (The World Bank, 2016). A prominent part of the country's economy is based on agriculture with tea, rubber, rice and spice production. Apart from this, the textile, IT and tourism sectors are important contributors to the economy as well (Nationalencyklopedin, 2016).

The history of Sri Lanka stretches back thousands of years with different dynasties and kingdoms. During recent history, the island has been colonised by the Portuguese, Dutch and English until it gained its independence in 1948. The country was known as Ceylon until 1972 when the current name was adopted (Nationalencyklopedin, 2016). Sri Lanka ranks as number 73 out of 188 on the Human Development Index (HDI) presented yearly by the UNDP. An estimated 53% of the population aged 15 and older have formal employment, the expected number of years of schooling is 13.7 and life expectancy at birth is 75 years (United Nations Development Programme, 2015). The majority of the population are Buddhist (70%), followed by Hindu (13%), Muslim (10%) and Christians (7%) (Ministry of Policy Planning and Economic Affairs, 2012).

The country was ravaged by a civil war that started in 1983 when the guerrilla group called the Liberation Tigers of Tamil Eelam (often referred to as the Tamil Tigers) attempted to create their own sovereign state. The war, which is estimated to have cost more than 100 000 lives, ended when the Sri Lankan army eventually defeated the Tamil Tigers in 2009 (Nationalencyklopedin, 2016).

### 4.2 - Local Context – The District of Matara and the Nilwala River

The interviews were conducted in the District of Matara (Figure 4), namely in the urban, semi-rural and rural areas around Akuressa and Malimboda, both of which are located along the Nilwala River.



**Figure 4 - The country of Sri Lanka and the District of Matara in red (Dedering, 2012)**

In the remainder of this report the study area is referred to only as “the areas around Akuressa”. Out of the roughly 800 000 people living in the District of Matara, just over 50 000 resides in the region of Akuressa, a majority of which are estimated to live in rural areas (Ministry of Policy Planning and Economic Affairs, 2012).

Akuressa town functions as a commercial hub with a market where many of the farmers in the region travel to sell tea, rubber, spices and other foods. The climate in the region is suitable for cultivating many different type of crops and spices, making land expensive and high-in-demand according to those interviewed.

The Nilwala River is approximately 70 km long with a total basin area of 970 km<sup>2</sup>. The average annual rainfall in the river basin ranges from 1650 mm to 4000 mm depending on location; the northern, hilly areas are exposed to more rain than the lowland coastal areas. The amount of water contained in the river differs considerably due to two annual monsoon seasons with water flow peaks in November and May. Flows more than triple compared to the dry periods and this is obviously also when most floods occur (Sooriyabandara, 2016). The severity of floods varies yearly depending on amount and intensity of rainfall but the river and its surrounding areas has flooded at least once annually between 1980 and 2011 (United Nations Development Programme, 2015).



**Figure 5 - A map of the Nilwala River basin with Matara and Akuressa circled in red (Sooriyabandara, 2016).**

In 2003 a cyclone formed in the Bay of Bengal resulting in a massive and continuous rainfall from May 11<sup>th</sup> to 19<sup>th</sup> causing the worst natural disaster the country had experienced in over 50 years. No early warnings were issued in the country as the path of the cyclone was remote from the island (Zubair, 2004). The Nilwala River experienced extreme flows and the water level in 2003 was almost twice that of the second largest flood in the area between 1980-2011 (Figure 6) (Ministry of Disaster Management Sri Lanka, 2012).

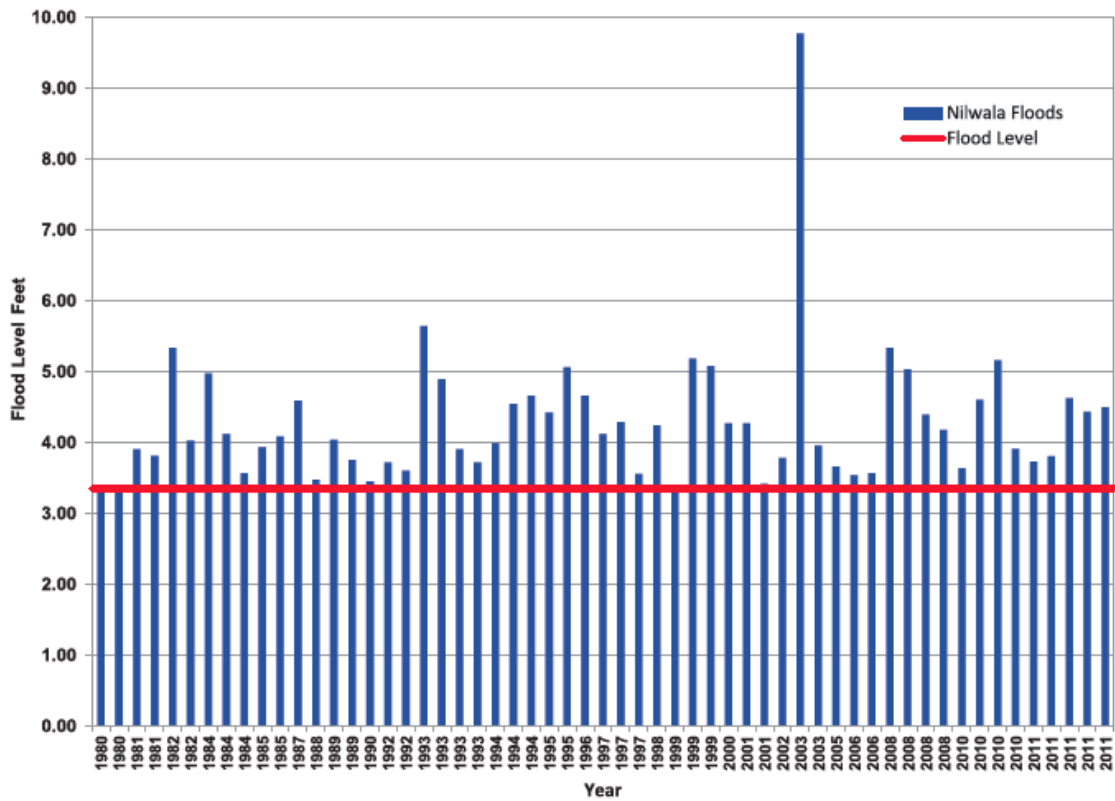


Figure 6 – Nilwala River water levels from 1980-2011 at Pitabeddara. The red horizontal line indicates the water level where floods occur (Ministry of Disaster Management Sri Lanka, 2012).

Attempts to mitigate floods were conducted in the 1980’s in a project often referred to as the Nilwala Project. It consisted of a three-step scheme where step one and step two involved the construction and completion of embankments and drainage systems along the river. The third step involving the construction of a dam was cancelled and never completed. These efforts still provide protection for some areas in the district but far from all (Sooriyabandara, 2016).

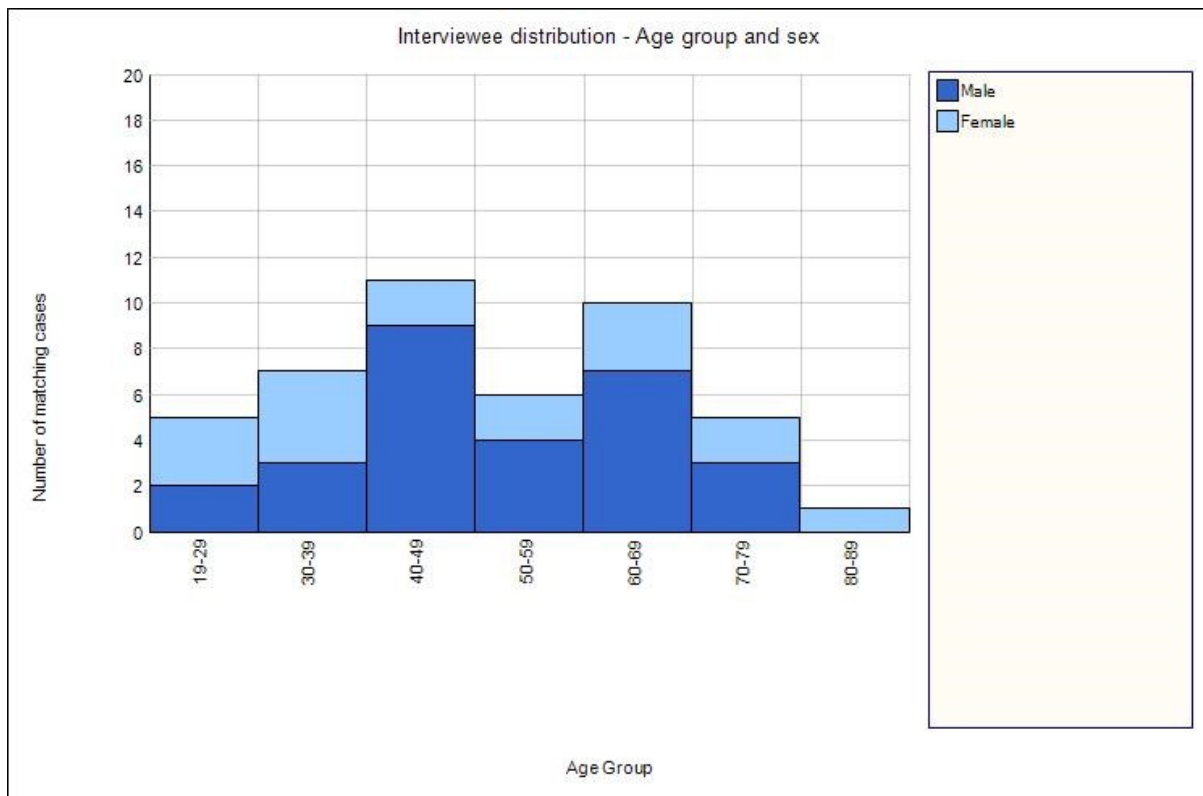


## 5. Results

This chapter consist of results that are of interest in regards to the research questions below.

- Why do people live in high-risk areas around Akuressa, Sri Lanka, according to the local residents themselves?
- Why do people live in high-risk areas around Akuressa, Sri Lanka, according to government officials?
- How do local residents and government officials perceive the risk exposure in the areas around Akuressa, Sri Lanka?

The field study was conducted in August and September, 2016 and consisted of 45 interviews held with local residents out of which 28 (62%) were male and 17 (38%) female. In addition, six government officials were interviewed all of which were engaged in flood or risk management in the area. Consequently, a total of 51 formal interviews were held. Figure 7 visualises the distribution of the local residents interviewed.



**Figure 7 - Distribution of age and sex of the local resident respondents. Out of 45 respondents, 28 were male and 17 female.**

The first section of this chapter detail the results obtained from interviews with local residents whereas the second section provides results from the interviews held with government officials. The final section explores the risk awareness of the local residents and government officials interviewed.

The intention of the presented results is to provide a general picture of the most commonly expressed thoughts by those interviewed. There are consequently many individual answers not included in this material. The presented results are based on analysis of interviews performed with assistance of the software program NVivo. The interviews are coded at different levels as mentioned

in the data analysis section above. Below are two examples of how this can be visualised in NVivo (Figure 8-9).

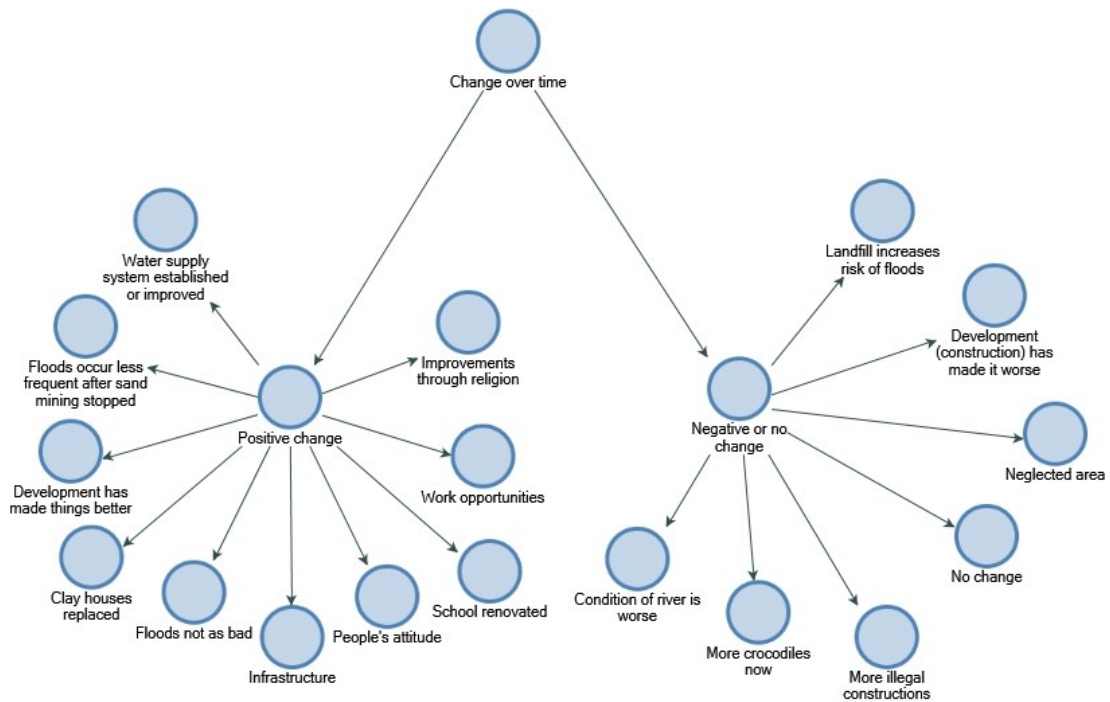


Figure 8 – Visualisation of the code composition in the category “Change over time” in the software program NVivo.

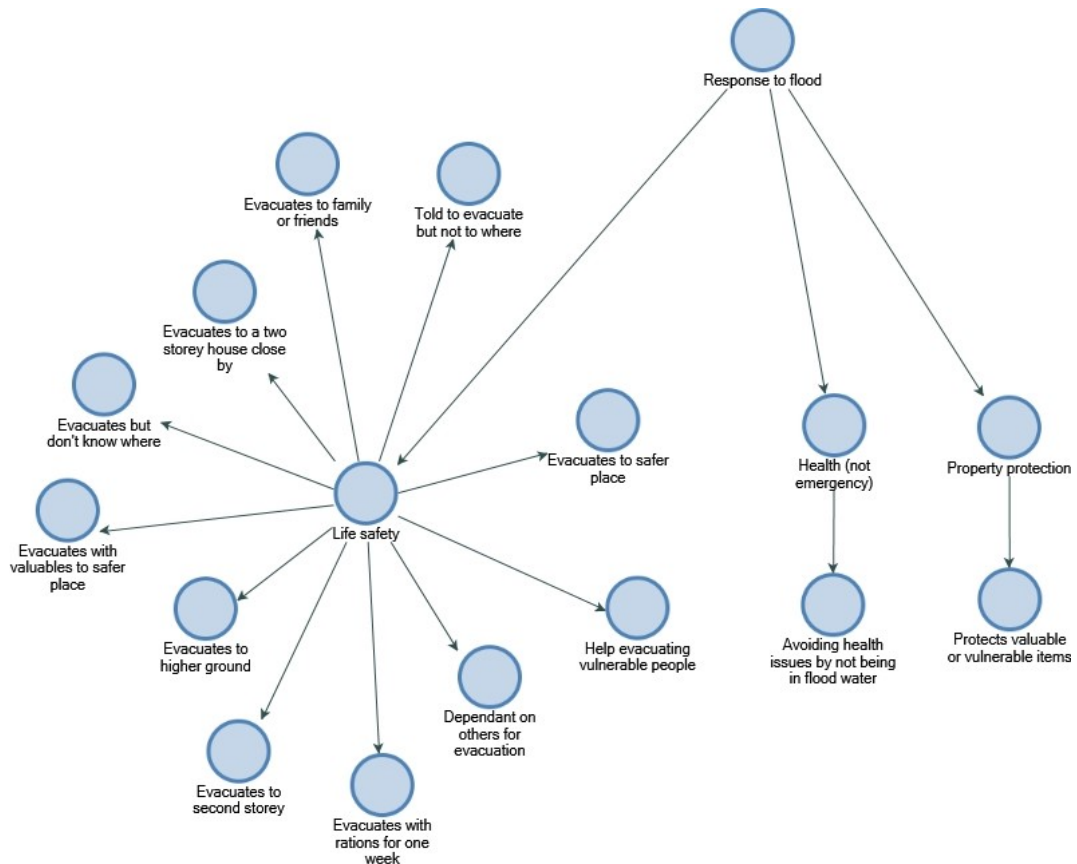


Figure 9 - Visualisation of the code composition in the category “Response to floods” in the software program NVivo.



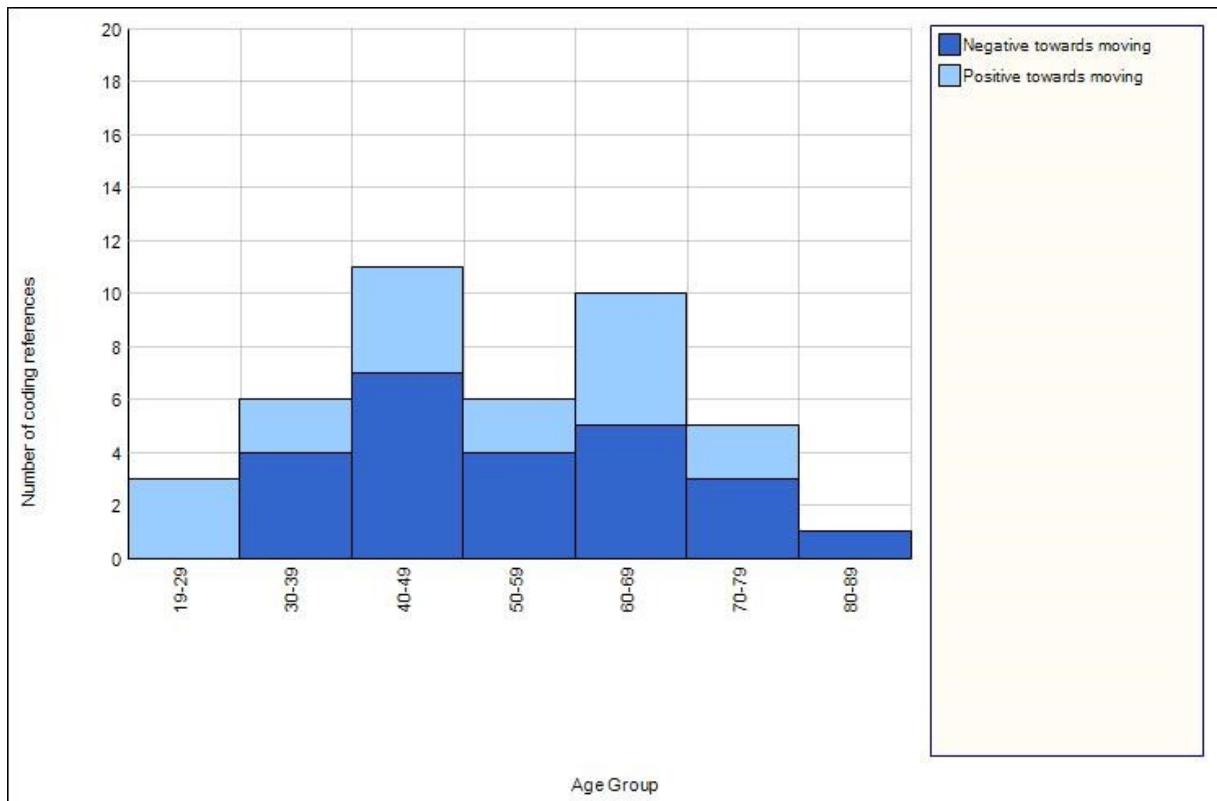
The results presented in this chapter are mostly on concept level, exemplified above by “Positive change”, “Negative or no change”, “Life safety”, “Health (not emergency)” and “Property protection” (Figure 8-9), meaning there is a lot of underlying data that is not directly presented. The main reason for this is that the concept level is where interesting trends start to emerge and where the data begins to “make sense” in a bigger picture. Furthermore, there are also reasons of practicability influencing this approach. Considering that the data consist of over 300 individual codes in total, the data requires to be presented on a higher level of analysis to possibly be included within the boundaries of this thesis. In the different parts of the results section, quotes are presented as examples of the underlying data that forms the concepts presented. The reason for this is to provide the reader with a better insight into the background to the findings. The results are in general presented in a pie-chart format in order to visualise which concepts and codes have been mentioned most frequently as this forms an important part of the results and later the discussion.

In general, the people interviewed have shown good awareness regarding the hazards they are exposed to. The by far most prominent hazard is the seasonal floods according to the interviewees. Some other hazards mentioned were mosquitos carrying the dengue virus, crocodiles and droughts.

## 5.1 - Local residents

This section includes the results from interviews with local residents. Initially, results regarding their general attitude towards relocation is presented followed by thoughts regarding why they are living in their current location.

Out of the 45 interviews held with local residents, 42 clearly expressed their view regarding relocation. A total of 24 stated that they would not consider leaving their current location while 18 expressed either a desire to move or a positive reaction to the notion of moving. A visualisation of the distribution in terms of willingness to move by age group of the interviewees is presented below (Figure 10). All interviewees in the youngest age group expressed a positive attitude towards moving while the percentages in the rest of the age groups are similar to each other (excluding the sole respondent in the oldest age group). The percentages in the age groups with most respondents (30-39 to 70-79) range from 50-67% who were unwilling to relocate.



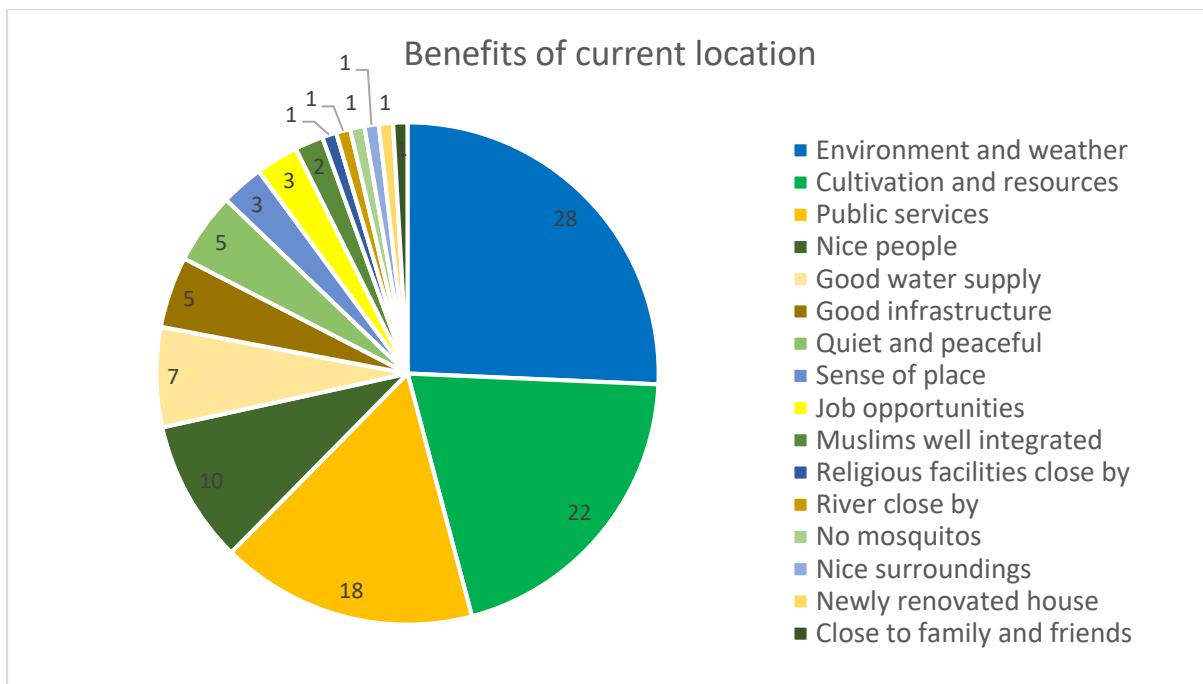
**Figure 10 – Interviewees’ willingness to move by age group. Light blue are positive whereas dark blue are negative.**

The results show no significant differences between interviewees living in urban, semi-rural or rural areas in terms of attitude towards moving. There was a slightly bigger willingness to move in the rural areas though. A comparison between female and male respondents showed that the majority of females had a positive attitude towards moving while the majority of males had a negative attitude towards moving. Possible reasons behind these differences are elaborated on in chapter 6.

The section below presents some of the views expressed by the local residents interviewed regarding why they are living in their current location. Four main reasons were identified, namely an *Overall good living situation*, *Sense of place*, *Difficulties relocating* and being *Well adapted to the situation*.

#### Overall good living situation

Many of the respondents seemed happy with their overall living situation. During the discussions with the residents, half of them mentioned three or more positive things about living in the area, whereas more than 80% of the interviewees mentioned two or less negative things. Floods was by far the most commonly mentioned downside. The respondents mentioned 16 different benefits in total (Figure 11). However, some of them (such as “Cultivation and resources” and “Public services”) consist of several codes under the same theme. The reason for the total adding up to more than 45 in Figure 11 is simply because many respondents mentioned several different benefits, as described above.



**Figure 11 – Benefits of living in the current location as expressed by the local residents interviewed.**

Respondents from the more rural areas emphasized the importance of cultivation to a greater extent than those living urban areas. The urban residents did on the other hand mentioned their appreciation of the public services more often. Regarding the environment and weather, no significant differences were identified.

As can be seen in the figure above, the four benefits mentioned the most are *Environment and weather*, *Cultivation and resources*, *Public services* and *Nice people*. These are evaluated further in the following sections.

#### *Environment and weather*

The most common benefit, which 28 out of 45 respondents mentioned, was the good environment and weather in the valley. The temperature was considered moderate, not too cold or hot, often with a nice breeze and the availability of clean water is good compared to other parts of Sri Lanka. Some interviewees also compared the local environment with the situation in larger cities describing them as dirty, hot and noisy.

*“When compared to other parts of Sri Lanka this is the best place to live in terms of climate I think. It’s not too hot and not too cold, very nice temperature year around.”*

- Interview #6

#### *Cultivation and availability of resources*

Close to 50% of the interviewees expressed how the area is suitable for both cultivation and gathering of resources. Some people, predominantly those living in more rural areas, cultivated their own crops for their own consumption and/or to sell. However, the area also supplied other valuable resources such as coconut, jack-fruit, spices and clean drinking water.

*“If we lived in an urban area we would have to buy all the things like food supplies but here we can grow and supply for ourselves. We still buy things like fish, salt and spices in the city but we can supply a lot of things for ourselves here.”*

- Interview #16

### *Access to public services*

About 40% of those interviewed expressed their appreciation of the easy access to public services and amenities offered in the town of Akuressa. Several services were mentioned such as hospital, schools, shops, the large market, banks, government offices and the recently upgraded central bus stand.

*“It’s close to the road, the town and the hospital. A lot of people here live on the top of mountains but we live close to the city, those are the good things about living here. At any time we can easily get to the market or any place else.”*

- Interview #12

### *Nice people*

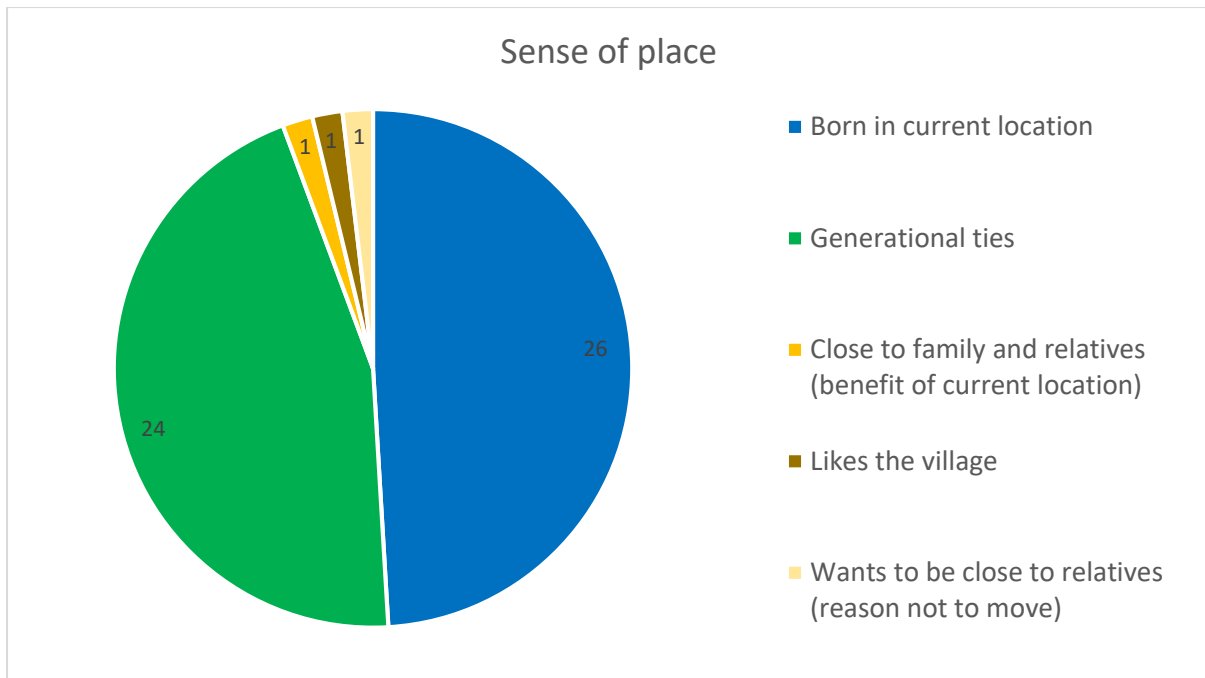
Roughly 20% of those interviewed mentioned their appreciation of the nice people in the community and felt well integrated. Once again, comparisons were made with the people living in larger cities, which by some were considered to have a different mentality.

*“People are good and not aggressive here. They are educated and have sober habits. In the city there are a lot of people with polluted minds, their characters are not so good.”*

- Interview #8

### Sense of place

Sense of place is in this definition an overarching result of different codes and concepts one way or the other connected to a sense of place. For example, more than half of the respondents were born in their current place of residence. The land and house had in many of these cases been inherited through generations, seemingly resulting in a strong connection to the current location. Furthermore, expressed benefits of the current location included being close to family members and relatives which also is a clear indication of the concept. Figure 12 below illustrates different concepts and codes connected to a sense of place. In total, 36 out of 45 local residents interviewed expressed views associated with a strong sense of place in one way or another which emphasises the importance of this overarching concept. Several respondents mentioned more than one factor contributing to a sense of place, which is why the total number of inputs exceed 36. For example, a majority of the interviewees born in their current location mentioned generational ties, both of which are included in sense of place.



**Figure 12 - Responses from local residents associated with a sense of place**

No significant differences were identified between respondents from different locations or of different gender. Apart from the factors presented above, there are other responses from the interviews which could indicate or influence a strong sense of place. Several interviewees mentioned for example benefits of their current location such as nice people and being a well-integrated community. Even though these examples are not as clearly related as the ones visualised in the figure, it is likely that they also influence the interviewees towards feeling more connected with their current location.

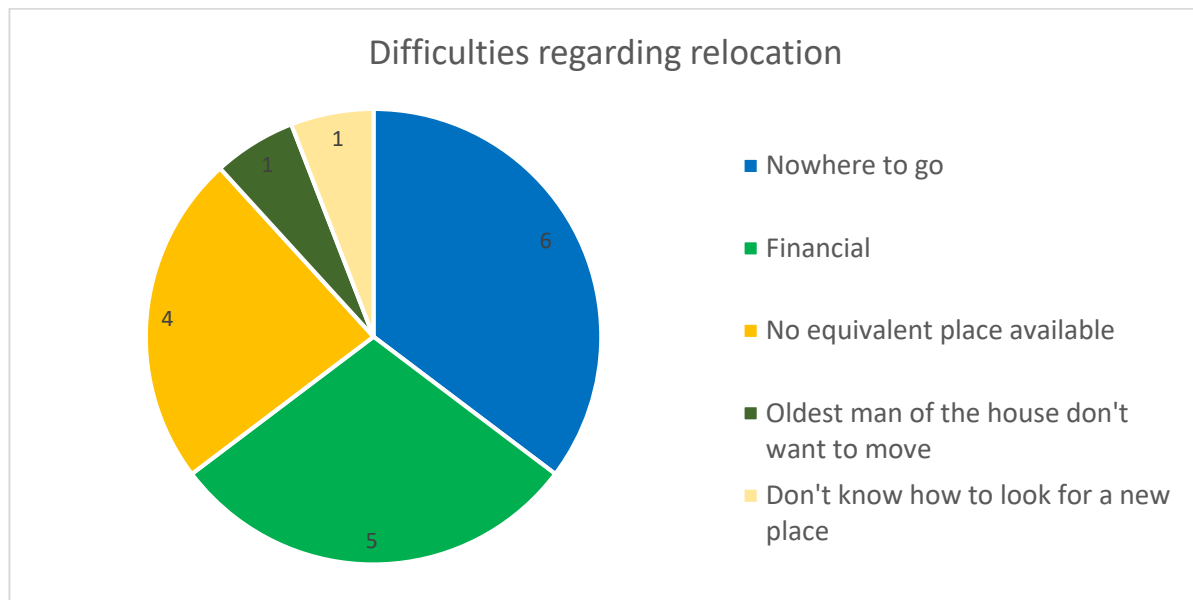
Out of those who expressed their unwillingness to relocate from their current location, almost half (10 out of 24) mentioned sense of place as one of the major reasons. Sense of place in that respect (using it as a reason not to move) mainly includes views regarding generational ties and the house being a heritage but also a liking to the village and the preference of living close to relatives were mentioned.

*“No, I would not like to move, we have been here for generations and I was born here. This is my heritage.”*

- Interview #39

## Difficulties relocating

One significant reason why the respondents live in the high-risk areas around Akuressa seems to be the difficulties associated with moving somewhere else. When asked if they would consider moving somewhere else, 40% (18) were inclined to do so. However, around 70% (12) of these respondents expressed serious difficulties regarding relocating. The difficulties expressed are visualised below (Figure 13).



**Figure 13 – Difficulties expressed by the local residents regarding relocation.**

Comparisons between age groups, gender and location revealed some interesting differences. The age group comparison showed that no one in the youngest group (19-29 years) expressed any difficulties related to relocation while all the other did. The comparison between males and females showed that the most frequently mentioned difficulty among males was financial constraints, this difficulty was however not mentioned by any females. Finally, the comparison between urban, semi-rural and rural residents showed that urban residents did not express any difficulties related to relocation while rural and semi-rural residents did.

As the figure shows, the most frequently stated issues were a disbelief of finding another place at all, financial constraints as well as a disbelief of finding an equivalent living situation in a new location.

*"We have thought about it [moving] several times but we won't be able to establish a place like this somewhere else with this kind of house and these surroundings."*

- Interview #16

## Well adapted to the situation

This part of the results section is based on several different factors such as interview responses, field observations (e.g. building modifications) and implicit indications from interviewees (e.g. experience).

A majority of the interviewees seemed accustomed to the annual floods and confident in how to handle such a situation. This is believed to be heavily connected to the fact that many of them were born in their current location of residence or had lived there for a long time. When asked how the floods affected them, a frequently reoccurring response was that they would evacuate to friends or family on higher ground and stay there for a few days. When the water recedes, they return to their

homes, clean out the debris and rubbish from the flood and move back in. There was an evident sense of inherent knowledge within many of the interviewees and it is believed that the long-term exposure to floods has “forced” the inhabitants of this region to find ways of living with this risk.

Some households were fitted with an external stairway leading to an inhabitable roof or a semi-completed second storey (see Appendix B for picture). Some respondents with this kind of arrangement stated that they move to the inhabitable roof or second storey when they see signs of a flood or alternatively use it to store valuables such as furniture during floods.

*“No, there’s no need to worry! If there’s a flood we move to the second storey. We will survive there. [...] Normally we open all the doors and windows. If they are closed the pressure of the water can damage them. If they are open, the water can freely come in here and we get no damages. We knew before we came here this area was flood prone, that’s why we built with concrete. [...] We only need to clean.”*

- Interview #45

## 5.2 - Government officials

To investigate potential differences in how local residents and government officials perceived the situation, six interviews were held with officials from different departments. The interviews with government officials revealed a good level of consensus in terms of the main reasons why people live in the high-risk areas around Akuressa (Figure 14).

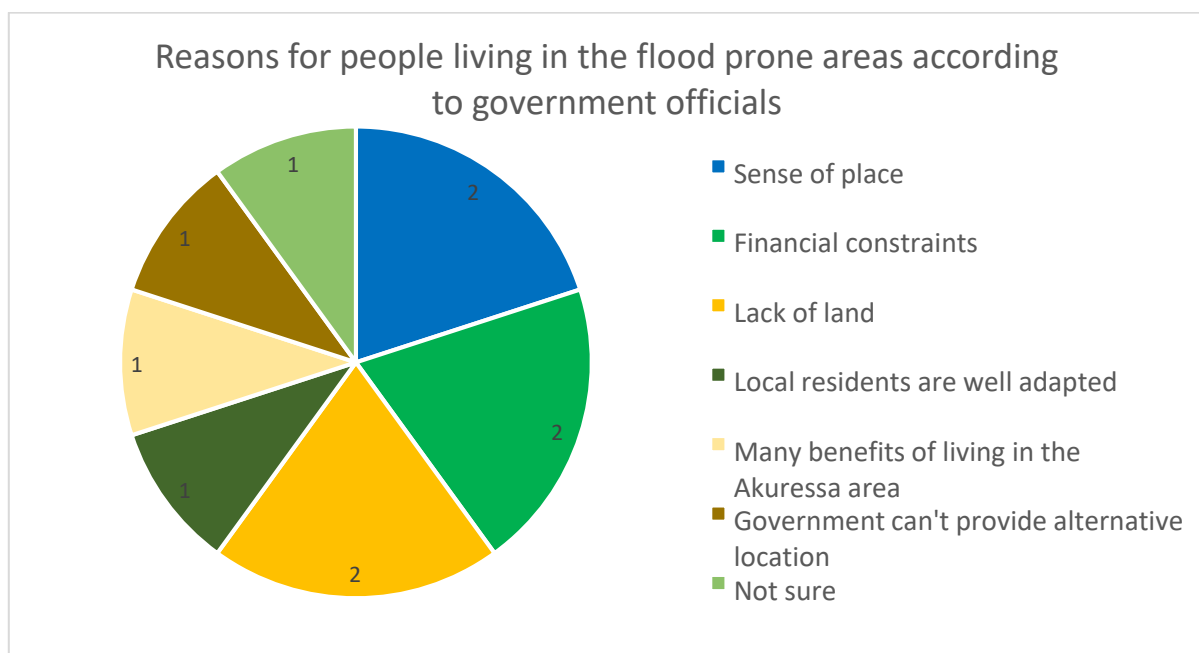


Figure 14 – Government officials’ views of why people live in the high-risk areas studied.

Out of the four officials directly addressing the possible reasons, three reasons were expressed by more than one person, namely *generational ties*, *financial constraints* and *a lack of land*. The reasons stated by the officials correspond well with the local resident’s own views. In order to visualise the responses further, a selection of quotes is presented below.

*“In addition, they have their own culture and tradition. They don’t like to move from their own land which has been taken from generation to generation. They are used to always live in the same place.”*

- Interview #47

*“They have adapted to the situation. Most people have lived here through generations and that is also why they dislike to move to other places in combination with their ability to protect their valuables [in the event of a flood]. In case of a flood, they rush to a safe place and stay there. But there have been lots of fatalities reported too. In 2003 this whole area went under water. [When there’s a flood] the water returns after a week and then they can start their lives again. They have their own strategies; they know how to protect themselves.”*

- Interview #49

### 5.3 - Risk awareness of residents and officials

In order to further explore why people live in the high-risk areas studied, it is considered important to explore the risk awareness, as previously mentioned. This section explores the risk awareness of local residents and government officials in order to see if the views corresponds or if they perceive the situation differently.

#### Preparedness

Risk awareness regarding floods can be seen in preparations made to manage these events. The majority of local residents showed signs of having a high level of risk awareness and roughly one third actively took steps to mitigate or in other ways manage the effects of floods. The different preparedness actions taken are visualised below (Figure 15).

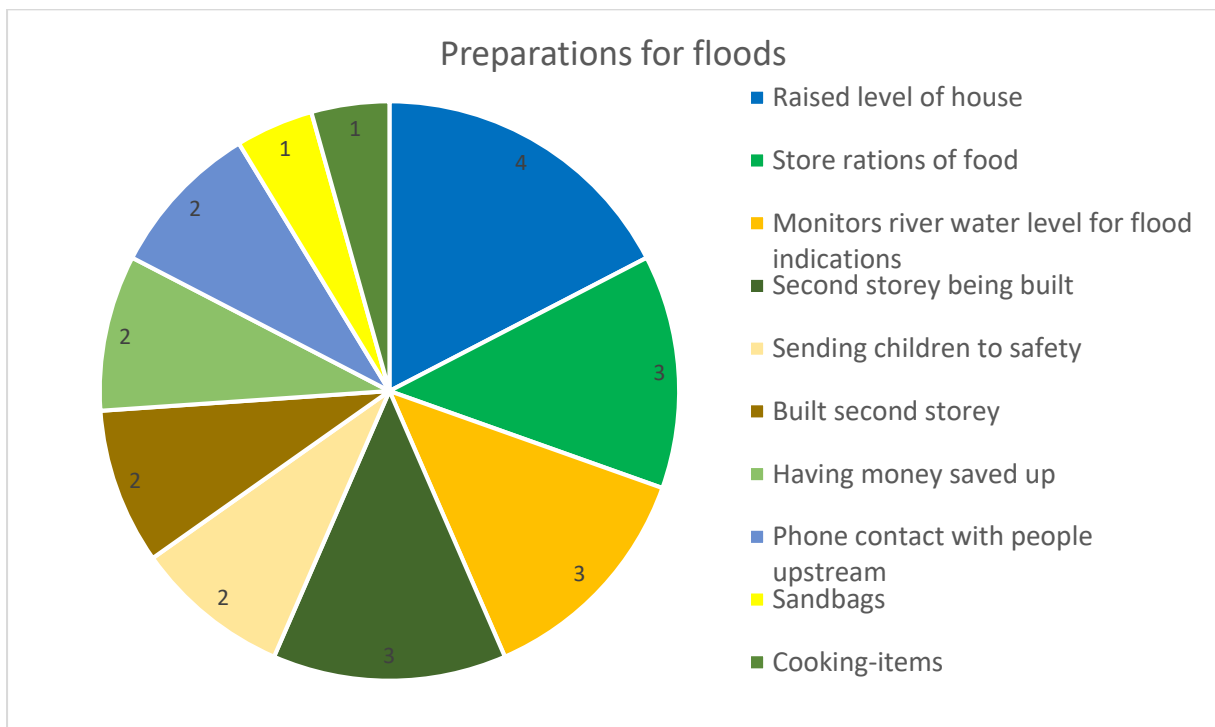


Figure 15 – Preparedness efforts mentioned by local residents. “Raised level of house” was the most commonly expressed action with four mentions.

In addition to the third of the respondents explicitly mentioning preparedness measures, some were engaged in activities connected to preparedness without realising it. A common example of this was that the interviewees had a plan regarding where to evacuate in case of a flood.



*“Apart from raising the level of the new house we have identified a place in the hills that would be a good place to evacuate to if a big flood happens. We would take our valuables and go there ourselves.”*

- Interview #8

*“I can examine the water level from here and I can tell when there will be a flood and then I buy some supply from the shops nearby.”*

- Interview #41

The government officials interviewed also expressed a view suggesting a high level of awareness among the local residents in many aspects. One government official stated that many local residents live in the same area for generations and knowledge as well as strategies to cope with flood events are passed down through generations. However, some government officials also express the view that, despite a generally high level of awareness about the risks present, people still act in seemingly ill-informed ways due to different underlying reasons such as lack of land or financial constraints. Subsequently, it is suggested that a high level of awareness not necessarily leads to a high level of preparedness.

*“Other than that, people don’t have land, because of that they are going to the lowest levels and they are building constructions in these low-lands. Naturally the floods come to these areas when there’s a flood, it’s low-level land and it’s going to flood.”*

- Interview #47

## Response

An indicator used when analysing risk awareness is how people respond in an actual flood event. Their actions and priorities can potentially hold important information regarding their awareness of flood consequences for example. Considering that the areas where the study was performed are annually affected by floods, this aspect can rather easily be explored since all of the interviewees have experienced a flood in recent history.

Out of the 45 interviews held with local residents, 30 brought up concrete response actions related to flood events. The majority of these actions were associated with life safety (Figure 16). The concept of life safety consists of different evacuation strategies expressed by the local residents. Roughly half of those mentioning life safety measures (evacuation) stated that they evacuate to friends or family when they realise that there will be a flood. Other common variations of evacuation expressed where “evacuates to higher ground”, “evacuates with our valuables to safer place” and “evacuates to second storey”. The concepts of health and property protection consists of “avoiding health issues by staying away from the flood water” and “protecting valuable and/or vulnerable items” respectively.

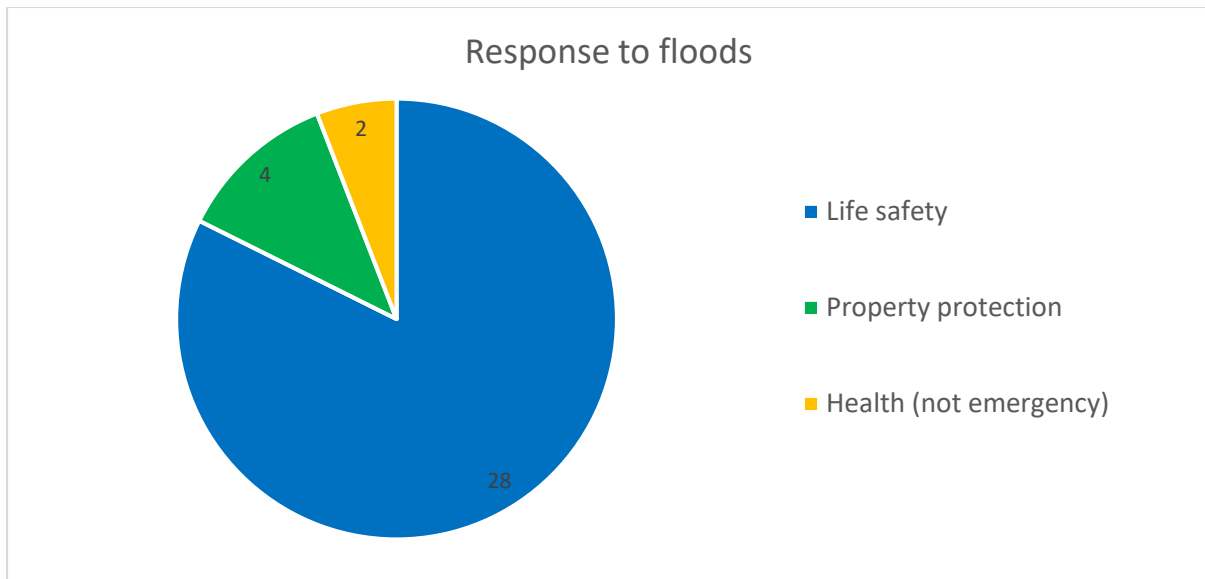


Figure 16 – Distribution of concepts under the category “Response to floods”.

When analysing what relevant government officials express on the topic of response a few interesting aspects emerge. Firstly, the government officials prioritisation seems to match that of the local residents well in most cases. According to the officials interviewed, life safety and initiation of emergency response is of highest importance in the event of a flood. An interesting statement from one of the government officials, related to a growing issue with crocodiles in the river, brings up another dimension of the potential consequences of floods:

*“Due to the crocodile problem the younger generation can’t swim because no one touches the river. 10 years ago, everyone in this valley could swim. But the crocodile problem is a big issue, now no one touches the water resources. And in this area people dislike to go to the ocean. It’s a big problem because now, if there’s a big flood, the younger generation can’t swim. The older generation is weak. The generation in between can survive.”*

- Interview #49

Another interesting aspect emerging when comparing views of the local residents to that of government officials is the seemingly big discrepancy regarding where people evacuate to. The government has, according to interviews, established a number of safe locations where people can evacuate to.

*“The Divisional Secretariat has been divided into 46 local administrative areas. I’m responsible for contacting all officers of each local district. There are 46 safe places introduced by me in collaboration with the DMC [Disaster Management Centre] in Matara. Just after any hazard [has happened] I have to contact these 46 officers and inform about an evacuation to the safer place. As well I have to initiate the immediate action to help people and rescue. [...] [The safe places] should not be prone to floods or any other hazards. Secondly, it should be easily reached, accessible for the people living in the area. Third, the place should have good facilities and amenities. Good infrastructure. These are the best places. The majority of the safe places in Sri Lanka are schools or temples because these have been built on top on hills as well as public toilets are there. They are usually spacious too.”*

- Interview #49

In an interview with one government official it was clear that there was a belief that the majority of people use these established safe places. However, according to the data collected through interviews with local residents this does not seem to be the case. As mentioned above, roughly half of those talking about evacuation explicitly stated that they evacuate to friends or family. There were some responding that they evacuate to “safe places” and didn’t elaborate further but no one specifically stated that they evacuate to one of the safe places established by the government. One interviewee mentions the safe places established by the government and shed further light on the problems associated with them:

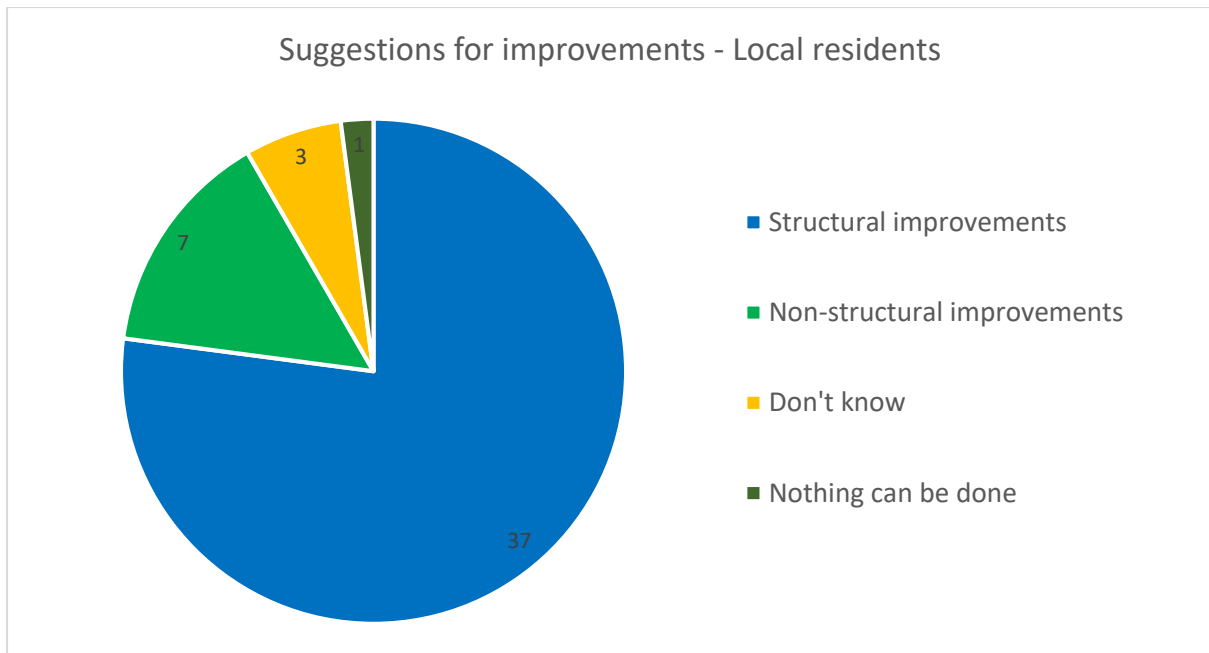
*“Also there is a safe place established for the community. When the early warning group detects signs of flooding everyone has to go here. But if a flood happens quickly, a flash flood, we wouldn’t have time to go there and that’s why we wanted to get a boat. The DMC [Disaster Management Centre] have told us that if we don’t go to the safe place established we will not receive any relief or help in case of flood emergencies. But we feel it is risky to go this safe place, we could die on the way there, so we want to go to our parents place instead since it is closer. But if we go there we will not get any help from the government since they only send evaluators to this established safe place to assess damages.”*

- Interview #4

#### Proposed improvements

In the following section, proposed improvements to the current situation are presented. Depending on the responses given it may be possible to identify what the interviewees value and explore their overall risk awareness. A comparison between local residents and government officials in terms of proposed improvements is also performed in order to evaluate whether there is a consensus regarding what needs to be done to improve the situation in the areas around Akuressa.

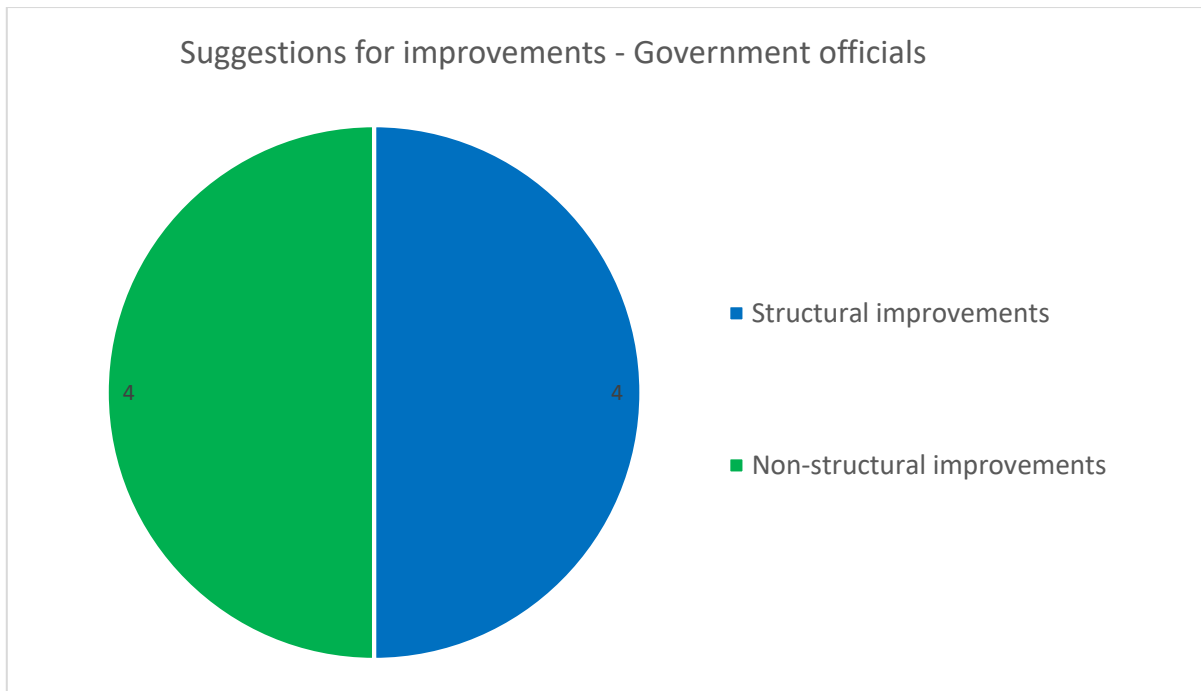
All of the interviewed local residents (45) expressed suggestions for improvements to the current situation in the local areas. The vast majority of respondents suggest some form of structural solution or improvement to the situation. Figure 17 visualises the number of interviewees mentioning the different kinds of solutions. However, some interviewees mentioned two or more structural improvements which is not visualised below (Figure 17).



**Figure 17 – Distribution of local residents’ answers regarding suggestions for improvements.**

As Figure 17 show, 37 out of 45 respondents mentioned some form of structural improvement. By far, the most common structural suggestion was the completion of the Nilwala Project (mentioned in the local context) which 26 out of 37 interviewees mentioned. The second most common structural suggestion was an improved drainage system which 8 out of 37 interviewees mentioned. Other suggestions include building bridges so water can flow underneath, establishing a proper irrigation system, building protective walls and embankments. Non-structural suggestions include cleaning the river from rubbish and debris, improving maintenance routines and to try and stop the pollution of the river.

Turning to the interviews with government officials there is a much more even distribution of structural and non-structural suggestions for improvements, keeping in mind the significantly lower number of respondents in this interview group. Out of the five government officials interviewed, three mentioned both structural and non-structural suggestions while one mentioned only structural suggestions and one mentioned only non-structural resulting in a total of four mentions in each concept (Figure 18).



**Figure 18 – Distribution of government officials’ answers regarding suggestions for improvements.**

Structural suggestions from government officials include Nilwala Project, improved drainage and irrigation systems, building houses in safer areas and renovating flood banks. Non-structural suggestions include relocating people to safer areas using compensation, cleaning the river so that it flows smoothly, improving policies for maintenance, clearer directives on responsibilities among authorities and educating the local public.

In contrast to local residents, government officials also address complexity and the need for sustainable solutions when expressing the difficulties of some improvements. As an example, one government official explained the issues regarding the fact that some implemented solutions might improve the situation in one area but at the same time have a negative impact on another area.

*“The problem is that we need houses, there are many homeless people in Sri Lanka. They should be provided with houses but we need to be careful about where to build. If we solve the housing problems that means that the floods will become worse and that will be harmful to everyone. So, a feasibility study must be done before we implement any project and now we do that. We are responsible to find a suitable location. Sustainable development is the most important thing.”*

- Interview #48



## 6. Discussion

This section of the report forms a discussion around the results presented as well as potential trends emerging from those results. Sections 6.1-6.6 consists of discussions surrounding the findings of the field study and sections 6.7-6.8 entails reflections about potential uncertainties and sources of error as well as validity and generalisation.

### 6.1 - Risk perception and normalisation

The vast majority of people interviewed stated that they experience floods annually and in many cases even several times per year. Consequently, there seems to be a general sense that the floods are a part of life. Therefore, the local residents living with this hazard appear to normalise the risks associated with it. Several interviewees did not seem to consider the floods as “disasters” but rather inconveniences. In case of a flood they would evacuate to friends or relatives for a number of days, return and clean the house when the water has receded and then move back in.

Somewhat paradoxically, local residents included in the study showed a high level of risk awareness but in many cases low levels of personal risk perception, which could be one of the reasons for people living in the high-risk areas. This could also be part of the explanation as to why a relatively small portion of the interviewees were actively engaged in preparedness actions (considering the large portion of highly risk aware interviewees). Naturally, risk awareness is a prerequisite for increased risk perception and preparedness. If you are not aware that you are at risk, you are not likely to take any risk reducing actions. It begs the question though, is there such a thing as being too aware of a certain hazard?

Over the last couple of decades there has been a lot of research on risk perception and different factors that influence risk perception (see, for example, Slovic et al., 1984; Nighswonger Kraus & Slovic, 1988; Renn, 1998; Sjöberg, 2000). Many influencing factors can be traced back to psychological biases and cultural context. One influencing factor that is identified in many research papers is the level of awareness and knowledge about a hazard. This can be expressed in several ways including whether the risk is known or unknown (Slovic et al., 1984; Nighswonger Kraus & Slovic, 1988), the level of familiarity with the risk (Renn, 1998) or whether the risk is new or old (Sjöberg, 2000).

There seems to be a consensus on the fact that awareness and knowledge about a certain hazard will affect the way in which the risk associated with it is perceived. This is considered natural since increased knowledge about a hazard includes increased knowledge about the likelihood and potential consequences related to the hazard. However, it is not considered that increased awareness and knowledge necessarily leads to higher personal risk perception, *i.e. results in a person to consider him/herself more at risk*, even if the “evidence” would say so. The popular and much used phrase ‘people fear what they do not understand’<sup>1</sup> provides a fitting initial thought in this context and has proven accurate on many occasions. Whether people feel less afraid of what they *do understand* naturally depends on the knowledge they gain. In the case of flood hazards in the area studied in southern Sri Lanka it appears awareness has resulted in a lower risk perception, even though experience and knowledge has made the local residents aware of the potentially devastating consequences. This notion is also supported by research papers on the topic. Renn (1998) states that familiarity with a certain type of risk is likely to increase the tolerance for it while Slovic et al. (1984) found a correlation between hazards rated as “well known” and “controllable”.

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<sup>1</sup> Commonly used quote with debatable origin but is suggested to date back to ancient Rome.

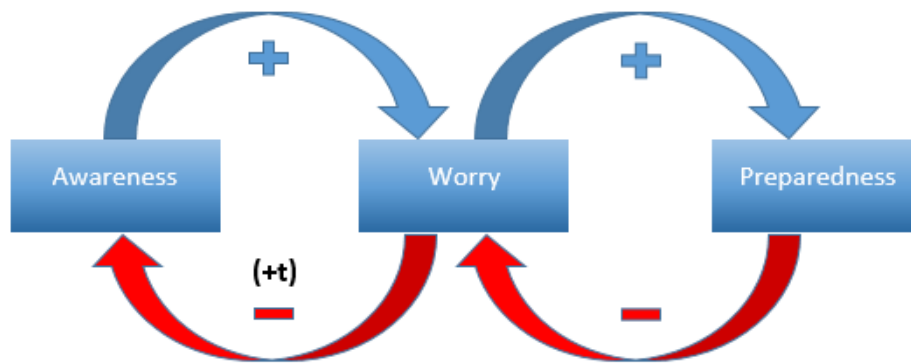
How is it possible that an increased awareness and knowledge about a hazard can render lower risk perception? Based on the interviews conducted it is evident that floods have become a part of everyday life for the local residents. This is particularly true for the vast majority of respondents who have been living in the area for a long time. The flood risk becomes normalised and no longer shrouded in clouds of uncertainty, which likely takes away a considerable degree of worry and fear associated with the risk. This normalisation of the flood risk might stem from years of adaptation and ability to cope with the hazard but it can also pose a serious threat for the future.

Positive illusion is a psychological bias often associated with a decrease in personal risk perception. It can be explained as a coping strategy that individuals use to give a sense of control over something that is in fact not controllable and often result in a sense of false security (Johnson & Levin, 2009; Luis, et al., 2016). Subsequently, positive illusions might contribute to increased vulnerability since it may compromise preparedness efforts. Johnson & Levin (2009) convey that positive illusions can disappear once an individual is directly affected by the hazard in question and the risk consequently goes from being hypothetical to real. However, that aspect is not quite applicable to the current study since the risks associated with floods are not hypothetical to any of the interviewees seeing as they all have experienced floods before. Therefore, it might not be a question of positive illusions but rather a sense of confidence in one's ability to manage the situation. In many cases it is likely a correct sense of confidence when it comes to managing the small to medium floods which occur annually. However, it may still also result in a sense of false security regarding the ability to cope with bigger floods like the major one in 2003.

A likely outcome of normalising the risks associated with floods, whether it is due to experience and adaptation or potential biases such as positive illusions, is a decrease in worry as mentioned earlier. Could the absence of worry then be the missing link to increased risk perception and improved preparedness? It is logical to think that someone who worries a lot about the risks associated with floods would be more inclined to take action to reduce these risks. However, it might be that even if an individual is worried he/she does not express an increased inclination towards risk reducing measures due to real or perceived constraints to change. Perhaps it is then even more logical the other way around: someone who is not worried about the risks likely don't see any reason to take risk reducing measures.

A study on flood risk perception by Raaijmakers et al. (2008) supports the idea that worry is a potentially important aspect when it comes to perceived level of risk. The authors present three factors that in their view dictate an individual's level of flood risk perception. These factors are awareness, worry and preparedness which are thought to be interconnected (Figure 19).





**Figure 19 - Visualisation of the connection between awareness, worry and preparedness. Adapted from (Raaijmakers et al., 2008, p.312).**

As the figure shows, Raaijmakers et al. (2008) suggest that increased awareness may lead to increased worry which in turn may lead to increased preparedness. After a while of heightened preparedness, the level of worry might decrease again and if more time passes (+t) without a flood, this might in turn lead to a lower awareness. However, the authors also emphasize that awareness not necessarily leads to worry every time and worry does not necessarily lead to higher preparedness since these kinds of concepts are highly contextual.

As mentioned in the results section, roughly one third of the respondents expressed that they were actively engaged in preparedness activities. The general sense was that many local residents seemed prepared for, and were confident in their ability to manage, the small to moderate annual floods. However, having the capacity to cope with a major flood like the one in 2003 is an entirely different question.

Making people worry more to increase preparedness and risk perception should be done with caution in order to avoid evoking fear in the community, which is likely to do more harm than good. However, being able to raise “harsh reality” awareness in a way that makes inhabitants in flood prone areas contemplate their situation more could have positive effects on risk perception and preparedness. One way of potentially achieving this is to have awareness campaigns which include locally based “harsh reality” aspects such as it is likely that floods in the current area will become worse in both frequency and consequence due to climate change. Another way of achieving a more critical awareness among local residents might be to include negative experiences of past flood victims from the region in the campaigns to make some of the information feel closer to home. It is believed that an awareness campaign like this would serve the purpose of increasing personal risk perception among the local residents in flood prone areas and put preparedness higher on the agenda. It might also facilitate the efforts of keeping the areas most at risk as scarcely populated as possible by deterring people to move there.

It should be noted that the discussion and conclusions drawn in this section are based not only on actual responses conveyed by the interviewees. It is also based on the authors’ perception of the local residents during the interviews, which is subject to biases. During the interviews, it was difficult to properly evaluate deeper topics and emotions such as worry. This was mainly due to language barriers and the challenges associated with working with an interpreter. However, using some responses as indicators combined with being receptive to reactions of the interviewees it is considered possible to explore these kinds of aspects to an extent sufficient for this analysis.

## 6.2 - Risk trade-off

All humans evaluate risk on a daily basis, either consciously or subconsciously. When going to work in the morning there is a risk of crashing your car. When swimming there is a risk of drowning. Smoking cigarettes increases the risk of cancer, but we still choose to engage in these activities. The list is close to infinite and each and every one of us has to come to terms with how to deal with the risks we choose to expose ourselves to.

All of the respondents mentioned the floods as a downside of living in the area and everyone had experienced the seasonal floods and their consequences first-hand. It is easy to assume that the people living in these areas would like to move somewhere else because of the floods. However, that does not appear to be the case in this area. Many respondents did not wish to move when at the same time expressing a good awareness regarding the flood risks. Based on the collected data, this attitude can partially be explained by the benefits associated with staying, i.e. the benefits appear to outweigh the risks.

This phenomenon is for example supported by Fischhoff et al. (1978) and Raaijmakers et al. (2008). When an individual accepts the existence of a certain risk, the person can relate to it in two different ways; it is either acceptably low, or too high. However, the acceptable level of risk is cannot be determined in isolation as the risk tolerance heavily depends on the level of the perceived benefits associated with the risk exposure in question. A perceived high risk can be acceptable if the perceived benefits are large as well and the risk tolerance is therefore context dependent.

Applying this theory in the local context of the studied areas around Akuressa, it appears a risk trade-off has taken place in many of the cases. First of all, there are those who clearly expressed an unwillingness to move. Due to the many perceived benefits, they prefer staying in the area despite of the risks associated with the floods. Secondly, there are those expressing a willingness to move. However, some of these interviewees say they would be willing to move but as long as they find a comparable place, and it consequently appears they are reluctant to trade the benefits in the area for a lower risk exposure. Furthermore, it is likely decisions about not leaving the area are affected by social aspects. Decisions affecting family relations can become collective, where the family is seen as one unit, and it therefore becomes difficult to base decisions solely on a person's individual preferences.

At the same time, it is important to also consider the perceived risk in the area, as discussed in the section above. The respondents are in general well aware of the situation expressing an ability to cope with the floods and the perceived risk is, at least for the researchers, surprisingly low which strengthens the unwillingness to relocate. This knowledge is important to consider when working with disaster management to avoid simplified and incorrect assumptions about the situation of those living in high risk areas which in turn may lead to non-functional solutions (Oliver-Smith, 1991).

## 6.3 - Officials contra local residents – differentiating views

Based on the interviews held with local residents and government officials it appears to be a general consensus regarding both the existing hazards in the area as well as the benefits of living there. However, some of the data collected suggest that resources might not be spent in the most effective way in terms of the implementation of risk reducing measures. In order to unlock the full potential of risk reducing measures, an understanding of the target group is of high importance.

The importance of being aware of the local context and to make sure that risk reducing measures are rooted locally in order to be successfully implemented are well documented (see, for example,

Quarantelli, 1997; Perry & Lindell, 2003; United Nations Development Programme, 2004; Coppola, 2011; Becker, 2014). One clear indication of a mismatch in terms of resources spent and actual needs of the target group seems to be the establishment of government safe places. As presented in the results section, the views of the relevant government institutions appear to be that the implementation of safe places is a successful initiative and that most people evacuate to these locations in case of floods. However, the data collected suggest otherwise. The fact that the vast majority of interviewees who mentioned evacuation stated that they evacuate to family or friends is believed to be a result of two main reasons.

Firstly, after conducting the interviews it became clear that family values are generally strong and most of the respondents seemed inclined to live close to family. This means that in many cases the distance to a member of the family or a friend, who lives in a safer area, is likely to be shorter compared to the distance to one of the established safe places. Secondly, in the aftermath of the initial emergency of disasters it is believed that people are generally more likely to seek support from close ones rather than government officials or other strangers. Going to a safer place that belongs to a family member or friend likely gives more than the sense of physical safety, it also provides a better forum for social support in a more familiar environment.

It should be noted that the size of the selection of respondents is not considered large enough to draw any conclusions regarding how many people that use the established safe places. However, if the indications in this study would turn out to be applicable to a greater population, the established safe places would form an example of misdirected use of funds and resources. This study does not include any information regarding how much funds and resources it takes to establish and maintain the governmental safe places though. Considering that they mostly consist of existing schools and temples it might not be a big monetary investment, however it could potentially undermine education and the social fabric in the community should the schools and temples be occupied with evacuated people.

When it comes to proposed improvements to the flood situation, the results indicate that government officials seem to have a better grasp of the associated complexity, which is expected since it is included in their line of work. The majority of local residents wanted structural solutions which might be easier to see direct benefit from, such as protective embankments and the completion of the Nilwala Project. The government officials interviewed also expressed a will to see the Nilwala Project completed but were more aware of different non-structural solutions such as changing peoples' perception of how to treat the river as well as policy changes. The Nilwala Project was mentioned a lot, especially by the local residents, and hailed by many as the best solution. Without evaluating that proposal properly it is difficult to tell if it actually is the best solution or if it is being hailed as the best solution as a result of being an ongoing topic of discussion for roughly 30 years. Some of the local residents interviewed seemed to be stuck on the idea of the Nilwala Project, which might get in the way of exploring other options.

Another aspect of the difference between the proposed improvements is that government officials seemed to think more along the lines of sustainability. One government official expressed the view that it is not possible to build away all problems and risks associated with floods, there is also a need to change the mindset and behaviour of the people. Another one mentioned that it is very difficult to find a solution that will benefit everyone. If flood protection measures are constructed at one location that might lead to more severe floods somewhere else along the river, or even drought in some areas.

In order to shift the public opinion more towards sustainable and 'soft' solutions such as keeping the river clean and retaining unbuilt environment, information and communication is believed to be key. This communication needs to be adapted to the specific situation and put into a context which is relatable. Coppola (2011) describes the importance of contextual communication and conveying possibilities and consequences of certain actions in relatable terms. Effective communication of information is likely to be one of the most cost-effective improvements possible.

#### 6.4 - Difficulties relocating

Even though many wish to stay, there are still those who expressed a willingness to move but find it difficult to do so. The identified main underlying factors for this are; a disbelief of finding another place at all, finding an equivalent living situation in a new location and financial constraints.

When discussing options regarding moving it became apparent this is often conceived as difficult. It is uncommon to rent a place to live, even more so in rural areas, and most people instead own their house and land resulting in static housing system. This could also mean that the current place of residence is more of an investment compared to if it would have been a rental house. Based on the interviews, moving seems to be an unusual activity in general and it often seemed like interviewees were not especially used to think along those lines. Even though expressing a willingness to move, very few concrete stories about how this could be done were told and it generally felt like a remote option. The same goes for the people expressing a wish to move given that the new place is equivalent to the present one. Few could tell where such a place was to be found. There were also those who expressed a willingness to move but other parts of the family wanted to stay. The family bonds often appeared strong when family at the same time provide social security. Last but not least, financial constraints were discussed. This factor can however be derived from many of the other types of responses. With strong financial means it of course becomes easier to buy suitable land and build a new house for example.

It is fair to assume most people would be willing to move if, for example, offered an equivalent living place with the only difference of having no floods. Expressing a willingness to move, given those conditions, is in many ways like saying "I'd rather not be exposed to the floods" which is not a surprise. At the same time, none of those interviewed expressed or appeared to be forced to live in the area. It has to be, to some extent, considered a choice to live in the area even though this decision might be based on the lack of better alternatives. Due to these reasons, the discussion regarding the subject of moving tends to become hypothetical.

To gain better knowledge about this it would be interesting to interview people who have made the decision to leave the area. What factors were considered and how do they compare their currently living situation with how they had it previously? Unfortunately, this project had no resources for that.

#### 6.5 - Sense of place

Sense of place is probably something most can relate to in one way or another, for example a special affection to your childhood home which many experience (Chawla, 1992). Some of the respondents in the study have expressed a strong connection to the area. The most prominent reasons for this connection was generational ties. Family history often played a big role, either that the house and land had been inherited through generations or that other family members were living close by. In addition, the respondents also expressed a strong connection to the geographical location and community. Many identified themselves with the surrounding areas where they were either born or had spent a substantial part of their life and considered it home.

Over the last decades there has been much research on sense of place and its significance in regards to natural disasters and human behaviour. Bonaiuto et al. (2016) performed a review of 31 works on the subject, identifying general trends in terms of the effect sense of place (referred to as place attachment) have on for instance risk perception and risk coping. Based on the review, it is suggested that individuals with a strong sense of place tends to have a well-developed awareness regarding the risks associated with the area. At the same time a strong sense of place appears to, in many cases, result in poor coping mechanisms as a result of low risk perception. This corresponds well with the results obtained from the interviews conducted in the areas around Akuressa where the local residents are well aware of the situation but at the same time seldom engage in preparation efforts. Any theories as to why is not given and more research about the subject is likely needed.

However, maybe it can be seen simply as a human coping mechanism. It is possible that an individual with a strong personal bond to a certain area combined with a disbelief in finding a better alternative subconsciously underestimates the risks associated with living there. That would justify the decision of staying and likely also release both stress and worry associated with the knowledge of living in a high-risk area.

Another interesting factor of living in disaster struck areas is the establishment of a particularly strong sense of community (Cox & Perry, 2011). Residents are often eager to move back to their community as soon as possible after a destructive event to start the rebuilding process and return to normal. During that time, the people in the community come together to help each other and the sense of community is strengthened (Silver & Grek-Martin, 2015). When already experiencing a strong sense of place and connection to the community, the unwillingness to relocated might be enhanced. This effect is likely even more apparent in areas such as Akuressa since seasonal floods mean that the community gather in joint efforts annually.

## 6.6 - Comparison of the different interviewee categories location, age group and gender

Where applicable and possible, interviews with local residents were categorised into location (rural, semi-rural or urban), age and gender and compared in an attempt to identify different trends based on the given answers.

The most prominent difference from the dataset appears in the discussions regarding difficulties with relocating and covers the subject of financial constraints. This was mentioned 5 times, however only by males and it appears likely that men more often are responsible for the family economy. Furthermore, rural respondents seem to find it difficult to move by expressing several different difficulties. Urban respondents however did not mention a single difficulty. The data provides no apparent explanation to this but it appears urban residents find it easier to relocate. One possible explanation could be that they are not depending on land for cultivation to the same extent as rural residents. Another factor could be traditions as well. The urban population is more likely to come from a family who has taken part of the urbanisation process, with previous relocation experience within the family. If a rural family has lived in the same area for generations, relocation might be conceived as a more complicated task.

Regarding sense of place, the indicators are similar between respondents from different locations, age groups and gender. Due to traditional reasons, the wife often moves to the husband's house after marriage, which has also been true in the majority of the interviews. Because of this, it was expected that women would show a lower sense of place compared to the men but that was not the

case. The dataset provides no apparent reasons as to why, but it might be that the women in many cases have not move especially far, maybe from the neighbouring town or similar. Another possible reason could be that the interviewed women express the view of the household which to a greater extent might correspond with the husband's views instead of her own.

Lastly, urban residents valued the public services to a much greater extent than those living in rural areas. This is not very surprising as these services are located in the town making it more accessible for them. The rural residents on the other hand mentioned cultivation as one of the benefits of the area which is also expected as farming is a more prominent part of in the rural life.

## 6.7 - Sources of uncertainty and error

Even though efforts were made throughout the study to minimise the effects of uncertainties and error, it has not been possible to fully avoid them. Given the fact that the people interviewed only spoke Sinhalese the only realistic option to extract information from the area was to use a translator. According to the authors, this is the most prominent source of error and uncertainty in the study.

First of all, using a translator governs the way the interviews are conducted as it is not possible to have a regular conversation where two parties are constantly engaged in either speaking or listening. Instead, one of the three parties is always passive without the opportunity to ask quick questions for clarifications if things are not understood. The dynamics of the conversations is simply different and unfamiliar. Considering that the intention of using semi-structured interviews is to have a relaxed conversation where the interviewee can tell his or her story, the error becomes more apparent. A conversation without a translator is believed to have identified more areas of interest to dig deeper into and allow for the conversation to develop in itself.

Using a different method with close-ended questions or a questionnaire could have been applied to minimise this error. However, this would result in another error as the authors would affect the interview subjects to a much greater extent by setting the agenda. This would make it more difficult for the respondents to tell their own story and the results of the study would to a greater extent be affected by the authors' preconceived ideas. This wanted to be avoided.

Furthermore, having an interpreter decreased the level of control of the situation from the authors' point of view. For example, questions should ideally be asked in a very similar way to each and every respondent to produce comparable results. This was explained to the translator, but it has not been possible to check if that was the case.

As discussed in previous chapters, the level of English differed considerably between authors and translator and the communication had to be simplified. This sometimes resulted in the inability to ask questions a certain way and it is obviously safe to assume the translation from Sinhalese to English had to be simplified as well. Inevitably, detail and character in each individual interview were lost due to this.

Last but not least, it is believed many of conversations were *interpreted* rather than *translated*, i.e. conversations were not spelled out "word-by-word". A perfect and constant translation most likely requires years of practicing, even for a professional translator, which the project had no access to. Instead, the translator listened to the respondent and later recounted the answer. This resulted in a loss of control from the researchers' perspectives with no ability to intervene to ask follow-up questions. Furthermore, it cannot be ruled out that the translator summarises the answer and/or *interpret* what has been said and consequently introduces his own thoughts and ideas when responding (Freed, 1988).

Furthermore, the researchers cannot guarantee all answers are truthful. It cannot be ruled out that the respondents gave answers to support special interest or drive certain agendas. It is possible that answers were exaggerated in an attempt to direct funds to the research area or that the respondents simply, with good intention, gave answers they thought were good or useful for the study. The reasons could be many and can only be speculate about. At the same time, it is important to emphasise no such indications have been identified.

## 6.8 – Validity & Generalisation

Discussing the validity of the study is done through two different perspectives, namely internal and external validity (Kapborg & Berterö, 2002). Internal validity requires the researchers to present convincing and transparent evidence for the results and conclusions in the report. In other words, the presented results and conclusions correspond to what was told by those interviewed. In this report, that has been done by presenting quotes, figures and other sources of information allowing the reader to explore the actual dataset from which interpretations and conclusions were drawn. The study is considered to achieve internal validity. Some information and level of detail has likely been lost as previously discussed, but the researchers are confident the results reflect the thoughts of the interviewees in general terms.

External validity, however, is more difficult to achieve as it requires the results to be applicable in other settings or locations. The results in this report focuses on why people live in the areas around Akuressa which, of course, are influenced by the local context in terms of general conditions, habits, culture etc. If applying these results elsewhere it is important to evaluate the prerequisites and determine if the results are transferable (Kapborg & Berterö, 2002). The explanation as to why people live in the areas around Akuressa has proven complex and several different reasons have been identified as part of this study. Some of the more general concepts are likely applicable in other areas as well, especially those well supported in the scientific literature such as sense of place, risk trade-off and risk normalisation. Context specific reasons on the other hand, such as lack of land, might very well be transferable to other settings as well but is of course heavily dependent on the local situation.

Lastly, identifying possible interdependencies between the different reasons, and how they may affect each other, has not been the main focus of this study. Therefore, it is important to not analyse the factors as individual and isolated components but instead acknowledge them on the basis of being a complex system.





## 7. Conclusion

This study is based on data collected through semi-structured interviews in the areas around Akuressa, Sri Lanka. The study was performed in order to answer three research questions. These are presented below including their respective conclusions.

*Why do people live in high-risk areas around Akuressa, Sri Lanka, according to the local residents themselves?*

- **Overall good living situation** – Many of the respondents seemed happy with the overall living situation. The annual floods were expressed as one of the few downsides. It was however common for the local residents to mention several different benefits. Consequently, it appears that risk trade-off reasoning has resulted in that perceived benefits of living in the areas around Akuressa outweigh the perceived downsides associated with the floods.
- **Sense of place** – A strong sense of place was expressed both in terms of being born and raised in the current location, the land and house being passed down through generations as well as a preference of being close to family and relatives. Out of those who expressed their unwillingness to relocate from their current location, almost half mentioned sense of place as one of the major reasons.
- **Difficulties relocating** – The respondents expressed difficulties associated with moving somewhere else such as a disbelief of finding another place at all, financial constraints as well as a disbelief of finding an equivalent living situation in a new location. One potential reason behind these problems is identified as the static housing system. It is uncommon to rent a place to live, even more so in rural areas, and most people instead own their house and land. This means that the current place of residence is likely considered more of an investment compared to a rental house.
- **Well adapted to the situation** – Through interviews, informal discussions and field observations it became evident that many local residents felt well adapted to the current situation. There was an evident sense of inherent knowledge within many of the interviewees and it is believed that the long-term exposure to floods has “forced” the inhabitants of this region to find ways of living with this risk. However, this study identifies that the long-term exposure seems to have normalised the risks associated with annual floods, which might have a negative impact on their level of preparedness. The sense of being well adapted to the situation is likely based on being just that to some extent but it might also be a result of positive illusions regarding internal and/or external capacity to cope with the hazard, something that is often associated with normalisation of a risk.

In order to explore if the views of the local residents were shared by government officials, six interviews were held with officials from relevant sectors of government. The purpose of this part of the study was to evaluate the second research question:

*Why do people live in high-risk areas around Akuressa, Sri Lanka, according to government officials?*

Responses from government officials corresponded well with what was expressed by the local residents. The interviews revealed a consensus regarding several of the main reasons for living there such as a strong sense of place, financial constraints regarding relocation and a lack of land. The view of local residents being well adapted to the current location was also expressed as a reason to why they live in the high-risk areas studied.

The third research question was constructed with the purpose of obtaining a deeper understanding of why people live in the high-risk areas around Akuressa. In order to go beyond the more direct reasons and explore the potential underlying factors, a third research question has been evaluated:

*How do local residents and government officials perceive the risks in the areas around Akuressa, Sri Lanka?*

To answer how local residents and government officials perceive the risks in the areas around Akuressa, their respective risk awareness was explored by looking at three different factors, namely preparedness, response and proposed improvements.

Residents generally exhibited a high level of awareness, however this does not seem to have resulted in high levels of preparedness. Only a few respondents mentioned preparedness efforts such as raising the level of their house, storing food or monitoring the water level. This notion was supported in the interviews with government officials as well, where it was expressed that some residents act in seemingly ill-informed ways even though they exhibit a high level of awareness. This study identifies risk normalisation as one potential reason for the level of preparedness as it likely affects the local residents' level of personal risk perception.

In terms of response during the floods, residents predominantly had life safety in focus, i.e. evacuating. The majority of the residents said they evacuated to either non-affected family or friends. At the same time, government officials communicated a different understanding believing most residents evacuated to the safe places established by the Disaster Management Centre. This was one of the most prominent discrepancies identified in the study. It may partially be explained by the fact that family and friends live close-by compared to the designated safe places and that people want to be close to their family and friends during the floods.

Lastly, there were differentiating views between residents and officials regarding proposed improvements. Residents had a clear focus on structural options such as building dams, levees or similar. Government officials, however, expressed a need for both structural and non-structural improvements and generally exhibited a more complex understanding of the issues related to improving the situation in the areas around Akuressa. In order to shift the public opinion more towards sustainable and 'soft' solutions such as keeping the river clean and retaining unbuilt environment, information and effective risk communication is believed to be of high importance.

The overall purpose of this thesis was to study reasons why people live in high-risk areas around Akuressa, Sri Lanka. The aim was to look beyond the purely physical aspects of living with a high level of hazard exposure and explore the underlying social mechanisms potentially dictating why people live there. Many of the findings in this study are supported by existing literature and it is the authors hope that this study will help shed more light on the complexity surrounding why people live in high-risk areas.

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# Appendix A – Interview guides

## Interview guide #1

### 1. Familiarise with the interviewee

- Age
- Gender
- Occupation
- Tell us more about yourself, what do you do except work?

### 2. Why do you live here?

- Were you born here or did you move here?
- Benefits of staying here?
- What do you like most with life in this community?
- Downsides of living here?
- Did you choose to live here? Did you consider any other options?
- What factor is most important to you? (Where to live)
- What would make you move from here?
- Difficult to move somewhere else? (How/why)
- Quality of life change over time? How?
- If you could change one thing in the community, what would that be?

### 3. Dangers

- What dangers do you experience here? Rank them?
- Causes? Each danger.
- How does it affect you? Consequences (each danger)
- What can be done to improve the situation?
- Have you done anything yourself?
- Do you need support? How?
- Who do you think is responsible?

## Interview guide #2

1. Familiarise with the interviewee (general conversation, no need for consistency)

2. Age and occupation

- Household composition

3. Why do you live here?

- Were you born here or have you moved here?
  - o If yes: Were your parents born here as well? (generations)
  - o If no: When did you move here? Why did you choose to move here?
- What are the benefits of living here today?
  - o Follow up: Why is that important for you?
- What are the downsides of living here today?
- Have you ever considered moving away from here?
  - o Follow up: Why/why not (dig deeper)
- Has the living situation here changed the last 10 or 20 years?
  - o Follow up: How has that affected you?

4. Dangers

- What kind of dangers/hazards do you experience here?
- In what ways do they affect you?
- Do you feel prepared to deal with these hazards?
  - o What makes you feel prepared/not prepared?
- What can be done to improve the situation?
- Have you done anything yourself to improve the situation?



## Appendix B - Photos



**Figure B 1 – A building with a second storey used as shelter during floods.**



**Figure B 2 – A ladder which was used by a family to reach the suspended ceiling when the house was flooded.**





**Figure B 3 - A picture from the research area with a flood prone house located right next to the river.**



**Figure B 4 – A typical market place for produce such as vegetables, rice, meat, spices and tea.**





**Figure B 5 – A typical rural setting where interviews were conducted. Houses can be spotted in the tree line. In the foreground are paddy fields.**



**Figure B 6 – A typical urban setting along a main street.**