VULNERABILITY, CONFLICT AND INSTITUTIONS:

NAVIGATING LIVELIHOODS ON LAKE TANGANYIKA

By

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ABSTRACT

In developing countries, inland fisheries, while providing livelihoods to hundreds of thousands fisherfolk, are adversely affected by changes, driven often by external environmental disturbances including natural disasters and conflicts, which can lead to vulnerability. To survive, fisherfolk respond to vulnerability through coping strategies mediated by institutions. Little is known about how fisherfolk respond to vulnerability being in or near locations experiencing prolonged conflicts, and on how institutions, formal and informal, mediate their coping strategies. This is investigated in this research using Lake Tanganyika, a transboundary water resource. Having been affected by decades of the DRC war, Lake Tanganyika brings additional complexities to both the fishing practices and fisherfolk livelihoods, due to its transboundary nature. The study applied a modified Sustainable Livelihoods Framework (SLF) linked to critical institutionalism, to answer the research question 'How do small-scale fisherfolk secure livelihoods in situations of change?' Informed by literature on vulnerability, livelihoods, conflict and institutions, qualitative data were collected through two rounds of fieldwork in six shoreline villages in Tanzania and the DRC. The findings suggest that fisherfolk, in addition to being differently affected by the DRC conflict-induced vulnerability factors, live in dynamic multiple institutional environments shaped by local contexts. Such a mix of institutions including state rules, management and enforcement structures, social norms, community groups and local beliefs (religious and traditional), mediate fisherfolk behaviours that can either exacerbate/maintain or reduce vulnerability depending on the conditions in which they operate and the socioeconomic categories of concerned fisherfolk.

DEDICATION

Dedicated to the memory of my father, Aaron Namwira Bisina and my mother, Therese M'Bazikomole Nabirhu, who always believed in my ability to be successful in the academic arena. They are gone, but their wish for me has made the completion of this journey possible.

DECLARATION

I declare that this thesis, which I submit to the University of Birmingham in consideration of the award for the degree of Doctor of Philosophy, is my original research work. No portion of the thesis has been submitted to other universities or institutions.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ACLED	Armed Conflict Location and Event Data
BMU	Beach Management Unit
CEMARE	Centre for the Economics and Management of Aquatic Resources,
CI	Critical institutionalism
COSTECH	Commission for Science and Technology (in Tanzania)
DFID	UK Department for International Development
DRC	Democratic Republic of the Congo
FAO	Food and Agriculture Organization
IDMC	The Internal Displacement Monitoring Centre
IPCC	Intergovernmental Panel on Climate Change
MPA	Marine Protected Areas
MCS	Monitoring, Control, and Surveillance
NCU	National Coordination Unit
NGO	Non-Governmental Organisation
NRM	Natural resources management
PIPs	Policies, institutions and processes
PRA	Participatory Rural Appraisal
PRODAP	Lake Tanganyika Integrated Regional Development Programme
RA	Research Assistant
RRP	Refugee Response Plan (RRP)
SAP	Strategic Action Programme
SDGs	Sustainable Development Goals
SSF	Small-Scale Fisheries
TAFIRI	Tanzania Fisheries Research Institute
TBNRM	transboundary natural resource management
UNECA	United Nations Economic Commission of Africa
UNEP	United Nations Environment Programme
URT	United Republic of Tanzania
VOA	Voice of America

Chapter 1

INTRODUCTION

1.1 Research problem

Inland fisheries resources, consisting of diverse small-scale fish catching activities in inland waters, make an important contribution to rural livelihoods in developing countries (Allison, 2005; FAO[1], 2014; Grzybowski, 2012; Smith et al., 2005; Welcomme et al., 2010). These fishing activities, in addition to nutritious food, provide part-time and full-time jobs to people including processing, transport, trade, boat and net building and repair (Allison, 2005). Furthermore, fisheries resources provide an important safety net for households when faced with shocks such as major floods, crop failure and family illnesses (Coomes et al., 2010). It has been argued that fishing is preferred over agriculture because of several reasons including the pressing need for faster food in situations of shocks (Martin et al., 2013). Fisheries are known for their labour buffer function within rural livelihoods in reference to the capacity of small-scale fisheries to absorb surplus labour (Béné, et al., 2010). This capacity to absorb unskilled labour is part of the 'welfare function' of small-scale fisheries (Béné et al., 2010; Nunan, 2014).

According to a report by FAO (2014), nearly 30% of the world's total fish catch come from developing countries small-scale inland fisheries, which are an important source of livelihoods of fisherfolk (Béné and Friend-Water, 2009; Berkes, 2015; FAO, 2014, Jacquet et al., 2010). In Africa, they provide nutritional food and income to many lakeside communities (Bolton and Talman, 2010; Hecky, 2003; Jackson, 1973; Kawarazuka and

[1] Food and Agriculture Organization of the United Nations

Béné, 2010; Tvedten and Hersoug, 1992). Statistics have shown that over 200 million African people obtain their dietary animal protein from fish (Hall et al., 2010).

In many developing countries, inland fisheries, are predominantly located in rural areas and generally in situations of insufficient management and de facto open access (de la Torre-Castro et al., 2014; Salas et al., 2007). As in other areas, inland fisheries resources are adversely affected by changes (Marschke and Berkes, 2006), driven often by external environmental disturbances such as natural disasters as well as protracted violent conflicts (Andersen and Cardona, 2013). Inland fishing families are no less prone than other rural dwellers to such disturbances (Allison et al., 2001; Ellis and Freeman, 2004; Ellis and James, 2003).

Furthermore, small-scale fisherfolk in developing countries represent some of the most impoverished parts of rural societies (Squires et al., 1998). Some of the most cited major causes of impoverishment for small-scale fisherfolk include the fluctuating nature of fisheries, existing institutional arrangements and situations of conflict, which are believed to increase their vulnerability. The fluctuating nature of fisheries resources are due to causes including natural disasters and conflicts (Ahmed et al., 2013; Berkes, 2015) and institutions, given their role in determining the nature of people's access to available natural resources (Lewins, 2004; Nunan et al., 2015).

Conflict can bring consequences such as loss of assets (Marschke & Berkes, 2006; Scialabba, 1998) and displacement away from fisheries livelihoods (McClanahan et al., 2015). Consequences include the erosion of fisheries livelihoods, which can contribute to greater poverty and exposure to vulnerability of fisherfolk (Adger, 2006; FAO, 2015;

O'Reilly et al., 2003; Thorpe et al., 2009). Thus, the vulnerability of small-scale fisherfolk increases if their livelihood resources are eroded, become less accessible or are far from where they reside. Impoverishment factors of small-scale fisherfolk are, therefore, part of the external disturbances to which the wider context of vulnerability relates.

In reference to conflicts, most literature tends to concentrate on their typology, underlying causes, groups involved, impacts and resolution initiatives (Bennett et al., 2001; CEMARE, 2002). There is little documentation on the impacts of protracted violent conflicts affecting fisheries and on how small-scale fisherfolk respond to related shocks and stresses to secure their livelihoods. Evidence from existing research suggests that some conflicts that impact inland fisheries may have causes that are external to fishing communities and can also be associated with protracted crises characterised by intensive long-term violence (Andersen and Cardona, 2013; Collinson, 2003; CEMARE, 2002; Frerks et al., 2014; UNEP, 2011).

These violent conflicts affect rural fishing communities both directly and indirectly (Ballentine and Nitzschke, 2005) with varying effects from country to country. As has been established by several authors, situations of protracted violent conflicts in developing countries are often triggered by social, economic and political motives or grievances (Ballentine, 2003; Bennett et al., 2001; Collinson, 2003; Gilbert, 2008; McClanahan et al., 2015). Adverse impacts and consequences of such conflicts, which include displacement of people (Deng, 2010; FAO, 2015; UNEP, 2011; West, 2001) and sustained erosion of fisheries livelihoods (Béné and Friend, 2009; Collison, 2003; Deng, 2010; FAO, 2015; Goodhand, 2003; Jackson, 2003; West, 2001), are especially significant as they can lead to decline in fish production. This decline can contribute to increased poverty and vulnerability

of small-scale fisherfolk (Alinovi et al., 2007; FAO, 2015; Jackson, 2003; Nkotagu, 2008; O'Reilly et al., 2003; Thorpe et al., 2009).

Fisherfolk responses to survive these conflict-induced disturbances and challenges to their livelihoods centre around building their resilience through a variety of coping strategies (Béné, 2004; Berkes, 2015; Collinson, 2003; Ellis 1998; Nkotagu, 2008; Nunan et al., 2015; Ruckstuhl, 2009; Sanginga et al., 2010). Also, research suggests that livelihoods and livelihood strategies are mediated by institutions (Allison et al., 2001; Levine, 2014; Nunan, 2010; Scoones, 1998; Scoones, 2015). These institutions are regularised patterns of behaviour that include sets of 'rules in use' and operate at macro, meso and micro levels in social communities (Leach et al., 1997). They set the context that shapes people's livelihoods and can mediate adoption of strategies for alternative livelihoods (Grzybowski, 2012; Pretty and Ward, 2001; Reed et al., 2013).

There has been little research on how fisherfolk respond to and cope with vulnerability being in or near locations experiencing situations of prolonged violent conflict, and on how institutions can shape their livelihoods and mediate adaptation of their livelihood strategies. This study seeks to address this gap in the literature and explore in detail these coping strategies. Among these strategies are the diversification of livelihoods and formation of support networks, allowing people to survive when access to available primary livelihood resources is reduced (Levine, 2014; Nunan et al., 2015).

Institutions can also be looked at in the perspective of critical institutionalism. Within this perspective, institutions are multifunctional, dynamic and with unpredictable processes and outcomes (Cleaver, 2012; Cleaver and De Koning, 2015; Jones, 2015). In the critical

institutionalism literature, institutions are understood as context-specific and evolving, shaped by local history and formed within or outside accepted past arrangements (Cleaver, 2012, Jones, 2015), which suggests their socially-embedded nature.

Given the perspective of critical institutionalism that gives greater recognition to socially-embedded institutions, institutions of interest range beyond those formed for natural resource governance as suggested in 'mainstream institutionalism' (Cleaver, 2012; Nunan et al., 2015). Additionally, institutions can also change through the re-ordering of existing institutional elements in response to conflict-induced conditions (Carstensen, 2015; CEMARE, 2002; Cleaver, 2012; Scialabba, 1998).

This connection between fisheries livelihood changes and a mix of institutions in conflict situations warrants fieldwork study, which can allow deeper understanding of fisherfolk's vulnerability through identifying the multiple factors that generate their disturbances and the mechanisms through which a mix of institutions mediate their livelihoods' responses. Linking the vulnerability context of the Sustainable Livelihoods Framework and critical institutional perspective of multiple, diverse and fluid institutions, in an integrated manner, may be one way of bridging this knowledge gap.

As stated earlier, since little research has been undertaken in understanding how small-scale fisherfolk respond to situations of prolonged, violent conflict and how institutions can shape their livelihoods and mediate adaptation of their livelihood strategies, this study addresses this gap in the literature. It applies the concept of vulnerability in the context of conflicts to the Sustainable Livelihoods Framework (SLF) and the perspective of critical

institutionalism (CI) to the analysis of the role of institutions in small-scale fisheries livelihoods.

Therefore, the research firstly investigates how small-scale fisherfolk navigate livelihoods in two different environments, the one being of conflict , the Democratic Republic of the Congo (DRC) and the other being of relative stability, Tanzania, and how institutions, formal and informal, mediate their coping responses to vulnerability in both country contexts. Secondly, it considers how the various coping responses pursued by fisherfolk, when all other alternatives are lacking, are utilised to survive the multiple disturbing factors, which can generate their vulnerability.

1.2 Case study rationale: What does Lake Tanganyika offer?

Lake Tanganyika, fished from the eastern DRC region of Uvira and from the western Tanzanian region of Kigoma, provides a valuable case study for this project for several reasons.

Firstly, while Lake Tanganyika is known as an ecosystem of exceptional importance, ecologically, socially and economically, providing livelihoods to millions of people dwelling inside and outside its basin (Gilbert, 2008; UNEP, 2011), there is a paucity of literature about the livelihoods of small-scale fisherfolk of Lake Tanganyika. Secondly, studies have consistently shown that Lake Tanganyika's fisheries' productivity has declined due to changes including in the lake's ecology, particularly with rising temperature (Borre, 2013; LTA, 2014) and in human activities with increasing deforestation and overfishing (LTA, 2014). Evidence on how Lake Tanganyika's dependent fisherfolk cope with and adapt to changes is very limited, and the lake remains understudied in terms of social

structure and human systems pertaining to small-scale fisheries. Thirdly, the DRC and Tanzania are two of Lake Tanganyika's four riparian countries whose littoral communities share several features, including socio-cultural ties, ethnic identities, tribal groups, customary patterns, and the Swahili language. Of the four countries that border the lake (the DRC, Tanzania, Burundi and Zambia), the majority of the lake is located along the DRC and Tanzanian shores, with DRC having the largest share (45%) followed by Tanzania with 41% (NCU, 2011; Kolding et al., 2019).

Given the situation of protracted conflict in the DRC, many Congolese fishers from the Uvira region cross Lake Tanganyika and flee to Tanzania in the Kigoma region, where some live in camps and others settle within local communities carrying on with their fishing activities on Lake Tanganyika (Betts, 2013). Other Congolese migrants were also attracted by the peaceful and safe environment where they can pursue their fishing in the western region of Tanzania (Landau, 2004).

1.3 Research question, purpose and objectives

The central question of this study is *'How do small-scale fisherfolk secure livelihoods in situations of change?'*

The purpose of the research is to investigate how institutions are used by fisherfolk to mediate livelihoods in response to vulnerability. Within this question, the study has four key objectives. The first is to describe factors and mechanisms causing livelihoods change in small-scale fisheries. The second is to identify which institutions are important and how they interact to enable people to maintain their fisheries livelihoods. The third is to investigate how institutions can be helpful or unhelpful to small-scale fisherfolk in

navigating their access to and use of fisheries resources. The fourth is to determine how fisherfolk use institutions in their coping mechanisms to survive/adapt to changes affecting their livelihoods.

1.4 Research methodology, methods and design

1.4.1 Research site selection and data collection

With Lake Tanganyika chosen as the case study, three sites/villages on its Congolese shores and three others on its Tanzanian shores were selected for data collection purposes. These sites/villages were Kalundu, Mulongwe and Kilomoni, located in the Uvira territory on the DRC's side and Katonga, Kibirizi and Ujiji, located in the Kigoma district on the Tanzanian side. Factors which favoured the choice of these sites/villages included their accessibility and their intensive level of small-scale fishing activities which most of their respective people rely on for livelihoods. Other criteria considered for site selection were: i) their being prone to conflict in the DRC but not dangerous and its transboundary effects, and ii) and their attractiveness to immigrants (for Tanzania).

Qualitative data were collected using semi-structured interviews and Participatory Rural Appraisal (PRA) methods, which included focus group interviews, direct observation and transect walks, as well as informal interviews and life stories narrative. PRA activities included only focus group sessions and personal life stories narratives, in both study areas, DRC and Tanzania, which were conducted by the female RAs alone, in order to encourage freedom to speak allowing more female voices. In addition, field notes recording observations, thoughts, and insights helped to contextualise, interpret and understand the collected data, while at the same time allowed triangulation for validation and credibility of

empirical findings (Saunders, 2016). The qualitative data collected in these sites/villages provided this study with the rich description of fisherfolk experiences of vulnerability supporting deep analysis of the roles of multiple institutions in mediating their livelihood responses in two contexts, of conflict in the DRC and of relative stability in Tanzania.

Key informants included non-randomly selected household/individual participants and officials, through direct contacts based on their availability, activities and diversity representation. Household/individual participants were primarily individuals and households whose primary livelihood activity was fishing on Lake Tanganyika. As to the officials, they consisted of people connected to or engaged with fisherfolk and their livelihoods associated with Lake Tanganyika through local institutions such as research centres, universities, NGOs and government structures. The selection of participants took into consideration different categories of sex, age, marital status, ethnic/tribal groups and residence status for the purpose of stratified sampling and representation of the various groups within the small-scale fisherfolk communities.

1.4.2 Research fieldwork

I undertook the data collection in Tanzania in person, with assistance from a local institution, but had to develop an alternative approach to data collection in the DRC because of the ongoing situation of conflict. In total, 137 semi-structured interviews, 18 focus groups, 15 narrative life stories, 12 direct observation visits and 12 transect walks, were conducted in two rounds of fieldwork. The total duration of the fieldwork was 17 weeks split in two phases of at least eight weeks each. The first round concentrated on semi-structured interviews only, while the second round, which concentrated on a PRA approach, was enabled by funding provided by National Geographic USA. The funding received enabled

employing two local collaborators, one of TAFIRI in person and the other of the Uvira Hydrobiology Centre, with whom weekly meetings were held. These two collaborators offered invaluable guidance on local best practice for fieldwork. At same time, during both fieldwork rounds, weekly email contact was maintained with both supervisors for further guidance and updates.

During the first round of fieldwork, while I was physically present, due to lack of a research permit, all data collection activities were undertaken solely by a RA under TARIRI, which is a local accredited institution of fisheries research. As to the DRC, given the context of state fragility and prolonged conflict, data collection activities were conducted remotely through a locally recruited male RA, with help of a local university 'UEA-Panzi'[2]. In both Uvira and Kigoma, all interviews were audio recorded and saved for evidence and information quality assurance. However, during the RAs assignments, I remained the focus of the research, thus maintaining ownership of the collected data through constant telephone and email communications. Furthermore, it should be noted that activities in Uvira were conducted in Swahili for fisherfolk and in French for official participants, while fisherfolk interviews in Kigoma were conducted solely in Swahili. Given my fluency in both Swahili and French languages, I was able to translate all the transcriptions into English before processing them.

During the second round, a female and male field research staff of the Uvira Hydrobiological Centre, were hired as RAs for data collection activities in Uvira, given their familiarity with the region. Under my guidance, these two RAs executed data collection activities including

[2] Evangelical University of Africa

audio recorded interviews which were sent to me both in audio and text files as data quality evidence for analysis. In Kigoma, again, two RAs, a female and a male, were hired through TAFIRI, and along with myself we conducted all the PRA data collection activities given that this time around I had a research permit in hand, issued after more than a year of processing time.

To better prepare for fieldwork tasks, I provided training sessions to all the RAs from both DRC and Tanzania, prior to both the first and second phase assignments. The orientation sessions consisted of the presentation of the research project, the explanation of its key concepts, methodological choices and data collection methods to be used. They also included an explanation of the ethical dimensions pertaining to the information sheets; participants' consent; assurance of harmlessness; rights of withdrawal; confidentiality and the anonymous treatment of data retrieved. In addition, I briefed the DRC RAs on practical safety and security measures to observe while in the field. Further information on the data collection and reflection on ethical considerations are given in Chapter 4.

1.4.3 Research methodology and design

This research uses an interpretivist qualitative approach which falls within a research tradition that consists of seeing the situation through the eyes of participants (Cohen et al., 2013). This interpretive approach is based on the social constructivist ontology, which believes that reality is socially constructed and as such seeks the meaning of the phenomenon from participants' understanding (Gray, 2013; Hollway and Jefferson, 2000). According to the epistemology associated with the interpretivist tradition, by paying close attention to participants' views and experiences, researchers can understand how they are affected by situations of prolonged conflict. This can help answer questions such as: How do participants

respond and why? How do institutions influence their response? Which institutions and why?

In particular, based on the interpretivist approach adopted and considering the primary research question, these sub-questions were addressed using a descriptive case study design. This involved cross-sectional elements implemented during two rounds of fieldwork of two-months each. Both the case study and the cross-sectional designs were appropriate for this descriptive, explanatory and field-based research. More specifically, while the case study design was crucial to gain an in-depth understanding of a complex fisheries setting, the cross-sectional approach was necessary to allow comparison between groups, incorporating the time element required to capture the changes in livelihoods. This approach enabled an in-depth understanding of Lake Tanganyika fisherfolk coping mechanisms in their real-life conditions.

1.4.4 Data analysis

Data analysis stage consisted of three phases. First, the coding process was undertaken to organise the data meaningfully into categories of identified themes for preliminary analysis and empirical interpretation (Robson, 2011). Themes identified included i) the vulnerability context, ii) institutions, and iii) coping strategies. Second, the discernment of emerging patterns characterising the study sites/villages, undertaken to develop a strong body of evidence establishing relations between the patterns and outcomes found in the data. In the third phase, analysis was carried out using the thematically organised data through the lenses of factors of vulnerability, roles of institutions and response strategies, in relevance to the research question as captured in the conceptual framework. Applying the adapted theoretical framework, the following questions were generated: What are the sources of

fisherfolk vulnerability and how do they experience it? What livelihood assets are affected? What do fisherfolk turn to in response to disturbances? What existing institutional environments mediate fisherfolk livelihoods and livelihood responses, including access to the lake for fishing activities? With the conceptual framework guiding the analysis, experiences across individuals and households, within and between the study sites/villages, were compared with reference to sources of their vulnerability and fisherfolk coping strategies through activities and capabilities, mediated by institutions, to survive conflict-induced disturbances.

1.5 Why this topic/issue

Beyond the academic justification, I have a deep personal interest in this subject. My life, education and professional background have been crucial in determining and directing my interest in researching how people enduring a double jeopardy of severe poverty and recurrent conflicts can survive and improve their overall living conditions. Especially, those living in naturally resources rich environments such as eastern DRC.

Born, raised and having worked in eastern DRC, I witnessed conditions of abject poverty on a daily basis, within both the urban and rural communities. I also witnessed the abundance of natural resources, including significant fisheries resources such as Lake Tanganyika. Curiously, it was not obvious to me why these fisheries resources rich waterbodies have not been potential sources of income, given the great opportunities they can offer as drivers for economic growth and poverty reduction. Instead, local people's use of them appeared to be limited to some fishing activities for subsistence purposes only, mainly within poor communities. Maybe even more surprising to me, was that beyond paltry regulatory

legislation, the significant potential of these resources rich waterbodies for wealth creation seemed to also be lost on government priorities.

Paradoxically, the passage of time has witnessed a high growth in the population of the Lake Tanganyika basin, including of its fisherfolk, along with concordant reports presenting the lake shoreline regions as places where communities are severely affected by poverty and food insecurity. Consequently, these communities remain dependent on extensive international development assistance, similar to poor communities in other countries of sub-Saharan Africa living in less natural-resource-rich environments. Moreover, because communities fishing Lake Tanganyika have not built up their fishery skills and capacity to meet their growing populations' need for nutritional food, they consume fish which is imported from other countries and Asia.

Focusing on major water resources, particularly the inland lakes as economic resource bases, I had been asking myself why poverty reduction has not happened for example in the countries sharing Lake Tanganyika, and what might be the factors that influence the choices people make in how they use and benefit from the lake the way they do, such as for subsistence rather than for poverty reduction pursuits. Furthermore, it cannot be ignored that, because of the abundant natural resources the eastern DRC is endowed with, it has for decades seen countless foreign companies intensively active in mining exploitation, and also been the victim of protracted recurrent wars. These long term and violent conflicts have impacted local communities including farmers and fisherfolk, bringing both opportunities and threats to their livelihoods.

It is in the above context that I realised I could contribute through this research, to shared efforts of both national and international development actors, to investigate using a case study, the mechanism by which developing countries' communities respond to situations of vulnerability including those induced by prolonged and violent conflicts, and identifying what helps them maintain and possibly improve their livelihoods. It is my expectation that important insights gained this study would help both local and global decision makers understand the approaches and actions that could be adopted and implemented to help strengthen peoples' coping mechanisms in response to conflict-induced disturbances towards securing their livelihoods and enhancing their living conditions.

1.6 Structure of the thesis

This thesis is structured in eight chapters. Chapter 1 introduces the research and sets out the background and scope of the study. In this chapter, elements including the statement of the research problem, question and objectives, are addressed. Chapter 2 presents the background of Lake Tanganyika and its associated fisheries in both DRC and in Tanzania. This chapter also expands on key specific contexts of both countries. Chapter 3 is devoted to a comprehensive review of existing theoretical and empirical literature pertaining to the subject matter, especially to key theories (SLF, CI, and conflict), concepts (vulnerability, livelihood strategy, and institutions), and approaches (lake conservation and human survival), that are particularly relevant to the research. Chapter 4 explains research design and qualitative case study methods used, detailing the theoretical approaches to the research methodology for data collection and analysis. The subsequent three chapters consist of the empirical part of the research. Chapter 5 explores fisherfolk livelihoods in the DRC identifying and analysing sources of vulnerability and response strategies including the role of institutions. Chapter 6 similarly considers data from Tanzania, again identifying and

analysing the sources of vulnerability, response strategies, and the role of institutions. Chapter 7 provides a discussion of the main research findings from Chapters 5 and 6, and interprets them in light of the literature review. It focusses particularly on conflict and vulnerability; mobility and transboundary waters; and institutions and vulnerability; being where comparative and cumulative results are identified between and from the two respective countries, namely the DRC and Tanzania. Chapter 8 concludes the thesis by capturing key contributions to knowledge reflecting on its limitations, while making recommendations for further research.

Chapter 2

BACKGROUND

2.1 Introduction

This chapter describes background contexts of the Democratic Republic of the Congo (DRC) and Tanzania with relevance to Lake Tanganyika with particular emphasis on fisheries resources. The first section describes Lake Tanganyika, giving a historical overview and detailing key characteristics including its transboundary nature, ecology, fisheries resources and management. Key policies and legislation from regional frameworks related to fishing activities are also reviewed. In the second section, the chapter provides background on Tanzania, setting out incoming migrations and settlement, fisheries livelihoods, and the state and local institutional arrangements regulating small-scale fishing activities. The section also looks at current problems caused by migrating fishers in Tanzania in the perspectives of livelihoods opportunities through fishing on the lake. The third section is devoted to the DRC with a focus on the background context of conflict, illustrating its relationship to Lake Tanganyika fisheries livelihoods. Existing management mechanisms and their implication on small-scale fishing communities are also reviewed. The last section concludes the chapter.

2.2 Lake Tanganyika

2.2.1 Historical overview

Lake Tanganyika is an ecosystem of exceptional importance, ecologically, socially and economically. The lake received valuable attention within local communities through its fisheries before it was explored by Europeans. It was first explored in February 1858 by

Richard Burton and John Hanning Speke (Cunnington, 1920), through studying mainly its limnology, biodiversity and fish populations. Several authors have highlighted key aspects suggesting the uniqueness of Lake Tanganyika compared to other lakes.

Before anything was known about Lake Tanganyika's fishes, Burton and Speke, confirmed De Barros' discovery of Lake Tanganyika as source of the Nile after finding species in the lake which were not common to any of the other African Rift Valley Lakes but were common to those found in the Nile (Burton and MacQueen, 1864; Moore, 1903). As part of the effort to explain the factors that may have influenced forms of species found in Lake Tanganyika, Yonge's (1938) work demonstrated that all the species had a common origin but gradually adapted for life in a variety of habitats in the wide and deep waters of Lake Tanganyika. The idea that the Nile had its origin from Lake Tanganyika lost credibility as further explanations emerged suggesting that the lake's width variation from 15 to 65 kms, showed a greater thermal stability than any other lake and displayed conditions that were extremely oligotrophic (with low nutrient concentrations and low plant growth), a possible contributory cause in the development of many different species including abundant pelagic fishes (Beauchamp, 1939; Coulter, 1977; Hecky et al., 1978).

For nearly 100 years after its discovery, research interests on Lake Tanganyika were mainly focused on its size, hydrography and biology and not on its fishery (Hecky et al., 1978) even though fishing at the artisanal level was already taking place as recorded in the 1940s (Coulter, 1977). Since Lake Tanganyika was not much valued as a fishery resource, its fish yield potential was ignored by community development actors. However, later works established that Lake Tanganyika had high potential fish yield, a unique high biodiversity (Allison, 2001; Coulter, 1977; Nkotagu, 2008), and abundant freshwater that the riparian

countries sharing the lake could count on for their economy (Coenen, 1995). It was also found that its fish fauna was very rich and contained 20 fish families and about 240-250 species, more than 60 percent of which were included in one family, Cichlidae (Kawabata and Mihigo, 1982; Van Steenberge et al., 2011).

Initial narratives suggested that Lake Tanganyika could sustain a rich fishery but information on potential yield was required to guide investment and development (Coulter, 1977). Thus, during the 1970s, there were intensive fisheries development projects of African lakes that were funded by the World Bank and the Food and Agricultural Organisation (FAO) of the United Nations that included Lake Tanganyika but which failed to achieve improvement in the wellbeing of most people dwelling in the Lake Tanganyika basin whose livelihoods depend on fishing (Bailey and Jentoft, 1990; Tvedten and Hersoug, 1992). Among the problems linked to these failures were characteristics of fishery resources, which included the absence of property rights governing access to fisheries resources, the vulnerability of fisheries (Bailey and Jentoft, 1990), fisheries policies and tradition (Tvedten and Hersoug, 1992), environmental change contributing to extreme uncertainties (Hersoug, 1992), and a lack of understanding of the wider context of the complex world in which fishermen live (Hersoug, 1992).

It is clear that what was needed was beyond the simple development of fisheries through providing improved technology, better equipment and external expertise. Rather, it required interventions that are better informed by knowledge of the socioeconomic, ecological and institutional environments of fisheries. Parts of these efforts were seen in the emergence of poverty reduction approaches mainly in the rural context (Doulman, 2004), which contributed to the ongoing efforts in understanding socioeconomic factors and institutional

processes in fisheries and their impact on the livelihoods of communities that depend on them.

2.2.2 General characteristics and features

A. Transboundary nature

Natural water resources that are shared between several countries are often referred to as transboundary waters. This is the case for Lake Tanganyika which is one of the three very large lakes of the 23 African transboundary lakes (ILEC and UNEP, 2016). Lake Tanganyika is shared by DRC and Tanzania, with Burundi in the north and Zambia in the south, Lake Tanganyika can be identified as being transboundary. As shown in **Table** 2.1, the majority of the lake is located in the DRC and Tanzania. DRC has the largest share with 45% of the lake. The second largest is Tanzania with 41%, followed by Burundi 8% and Zambia 6% (NCU[3], 2011; Kolding et al., 2019). **Table** 2.1 shows the distribution of Lake Tanganyika.

Table 2.1. Lake Tanganyika Water Distribution by country.

Country	Latitude	Surface area		Perimeter	
		Km²	%	Km	%
Burundi	03°20'30"S - 04°26'40"S	2 600	8	159	9
RDC	03°21'00"S - 08°13'40"S	14 800	45	795	43
Tanzania	04°26'00"S - 08°36'00"S	13 500	41	669	36
Zambia	08°13'40"S – 08°48'30"S	2 000	6	215	13
Total	03°20'30"S - 08°48'30"S	32 900	100	1 850	100

Source: Fermon, Y. (2007, p. 11)

Focusing on the DRC and Tanzania, which are the two countries with the largest shares of the lake but also are the two countries that are used in the case study, the waters serve

[3] National Coordination Unit, United Republic of Tanzania

multiple purposes such as a source of water for domestic and farming usages, protein, means of transport and other economic opportunities to an estimated population of 10 million people living around the lake basin (NCU, 2011). For instance, Lake Tanganyika is a transport link between and within the DRC and Tanzania (Ogutu-Ohwayo and Balirwa, 2006), for moving food and goods through about fifty boats with varying load capacities from 10 t to 100 t per shipment (Omasombo, 2014).

Fig. 2.1. Lake Tanganyika basin

Source: Lake Tanganyika Authority LTA (2011).

Transboundary waters are also known in terms of their threats including to their water resources and biodiversity (ILEC and UNEP, 2016). Lake Tanganyika was declared by the Global Nature Fund as the "Threatened lake of the Year" in 2017, primarily due to effects of human activities and climate change (GNF, 2017). Regarding human activities, from which the lake basin has been increasingly vulnerable, these threats emerge from activities

such as overfishing, deforestation, unsustainable agriculture, mining activities and pollution (Kiprop, 2019). The magnitude of these threats has been intensified by the impacts of climate change and of the population growth in the basin which, at a rate of 2 to 3 percent annually, making it among the highest on the planet (UNDP, 2017). Consequently, there is a transboundary issue in relation to fish stock depletion, which as Kimirei et al. (2008) note, when occurring in one part of the lake, it will consequently affect the others.

Therefore, the transboundary issue of Lake Tanganyika that concerns overfishing has been increasingly associated with growing anthropogenic impacts (Donohue et al., 2003). Regarding overfishing, the general issue has been the high population densities and high poverty (UNEP, 2016). The increasing demand for food products, for both local consumption and export markets, puts considerable pressure on Lake Tanganyika fisheries that are critical resources for local populations (Servos, et al., 2013). A study carried out by GNF in 1995 and in 2011 showed that in 16 years there was a considerable increase in the numbers of fishers and fishing boats, which were believed to be causing a very large decrease in fish production. As shown in **Table** 2.2 below, the estimated number of active fishers increased from 44,957 in 1995 to 94,886 in 2011 while the number of fishing boats increased from 13,192 in 1995 to 28,212 in 2011 in 16 years (GNF, 2017)

Table 2.2. Growth in the number of fishers and boats on Lake Tanganyika.

	1995	2011	Increase / Decrease
Fishers at Lake Tanganyika	44,957	94,886	+111.06%
Fisher boats at Lake Tanganyika	13,192	28,212	+113.86%

Source: GNF, 2017 from https://www.globalnature.org/en/threatened-Lake-2017

Another transboundary issue affecting Lake Tanganyika relates to inadequate fisheries governance (AU-IBAR 2016). This issue has been impacting the sustainable exploitation of the lake's fisheries particularly given the absence of updates and harmonisation on

fisheries policies, as well as of laws and regulations at both national and regional levels (AU-IBAR, 2016). It has been argued that the decline of fish production on Lake Tanganyika is partly due to impact of the massive influx of people due to conflicts and of the lack of proper controls on fishing activities (McGrath, 2016). Therefore, this transboundary issue linked to the effects of the long-running conflict in the DRC creates considerable challenges to effective governance of Lake Tanganyika fisheries resources.

In such a context, a key challenge for transboundary lakes is for the riparian countries' stakeholders to develop coordinated management strategies that can attract the participation of each riparian country. With respect to Lake Tanganyika, there have been many attempts at international agreements addressing transboundary water issues. One initiative was the Convention on Sustainable Management of Lake Tanganyika signed on 12 June 2003 by Burundi, Democratic Republic of Congo, Tanzania and Zambia (Mwima, 2014) seeking to improve institutional processes and governance structures of Lake Tanganyika. The Convention has an overall objective of ensuring the protection and conservation of the lake's biodiversity and the sustainable use of its natural resources along with its basin. The establishment of the Lake Tanganyika Authority (LTA), which occurred in April 2005, was one outcome of the above-mentioned Convention (Mwima, 2014).

B. Biodiversity and Ecology

Being a habitat of more than 1,500 plant and animal species of which 40% are endemic species, meaning that they cannot be found anywhere else, Lake Tanganyika is an important biodiversity hotspot (GNF, 2017; LTA, 2011). According to the Lake Tanganyika Authority (LTA), in addition to Lake Tanganyika's elevated levels of aquatic biodiversity, the basin is renowned for its terrestrial biodiversity and scenic beauty (LTA, 2011). The lake is valuable

not only for the presence of these unique species, but also as a microcosm in which to study the processes of evolution that have led to this diversity. There have been reports of decline in the productivity of the lake due to factors including loss of biodiversity (Cohen et al., 2005; Mannini, 1998; Molsa et al., 1999; Nkotagu, 2008; Plisnier, 2001; O'Reilly et al., 2003; Shirakihara and Phiri, 1993) that may have contributed to the decline in fish catches by small-scale fishers.

Warming on Lake Tanganyika is associated with a sharpened water density gradient between warmer surface water and cooler deep water which has slowed vertical mixing and reduced primary productivity (Verburg et al., 2003). O'Reilly et al. (2003) have shown that the rise in surface-water temperature has increased the stability of the water column, which combined with lower wind speeds, has reduced mixing, decreasing deep-water nutrient upwelling and entrainment into surface waters. This has decreased the lake primary productivity by about 20 percent, which accounts for a roughly 30 percent decrease in fish yields. In Lake Tanganyika, fish reproduction happens to near shore areas throughout the rainy seasons, with peaks in May to June and December to January (Kolding et al., 2019)

Studies have consistently shown that both the biodiversity and the wider ecology of Lake Tanganyika have been changing, resulting in a reduction of fisheries production (Borre, 2013; LTA, 2014). Most of these changes are believed to be the result of increased human population and their livelihood activities (LTA, 2014) as well as of climate change, particularly in relation to water warming (Cohen, 2017). The main human activities influencing change include overfishing, deforestation and agriculture (GNF[4], 2017). For

[4] Global Nature Fund

example, agricultural and settlement activities are associated with pollution and siltation that are believed to affect Lake Tanganyika waters through contamination of sediments (URT, 2010). In particular, along the shores of the lake, springs and ponds, vegetable farming utilizing inorganic fertilizers and insecticides is being practiced. Impact of this anthropogenic disturbances on fish communities, is the alteration of their nearshore habitats which can influence their out-movements and impede their reproductive activities.

C. Management mechanisms

Given the established importance of Lake Tanganyika as a significant fisheries resource, a great deal of attention of the scientific community has turned to questions including how it could be managed for sustainable use in meeting the needs of populations dwelling inside and outside of its basin in terms of food and livelihoods (Bailey and Jentoft, 1990; Cirhuza et al., 2015; Gilbert, 2008; Jackson, 1973; Kent, 1997; Mannini et al., 1996; Marshall and Maes, 1994; Van Steenberge et al., 2011). Such a trend, according to Hecky (2003), represents a shift from exploratory research towards management issues.

However, given the open nature of Lake Tanganyika fisheries resources, meaning anyone can enter fisheries, and their vulnerability to overexploitation largely following the rapid increase in the number of fishers (Bailey and Jentoft, 1990; Van der Knaap et al., 2014), the decline of fish stocks and catches has led to efforts to coordinate lake's governance. With such a coordinated governance, the improved management of fisheries resources at the individual national level was also expected. One of the coordinated governance initiatives was a formulation of an agreement between the four riparian countries under what was called 'Lake Tanganyika Integrated Regional Development Programme (PRODAP), which aimed to contribute to the sustainable protection of the productive potential of the lake (AU-IBAR

2016). As Nkotagu notes, from the Rio Conference, two initiatives aimed at working towards sustainable management of Lake Tanganyika resources emerged, with more emphasis on Lake Tanganyika's biodiversity. These initiatives were Lake Tanganyika Biodiversity Project (LTBP) and the Strategic Action Programme (SAP) and a convention by the four riparian countries for the conservation of biodiversity of Lake Tanganyika and sustainable management of its water (Nkotagu, 2008).

An important regional management arrangement of Lake Tanganyika has been the Lake Tanganyika Authority (LTA), which was established in December 2008 with a sustainable management objective (Petit and Shipton, 2012; Seyler et al., 2010). Within the framework of LTA, a Convention on Sustainable Management of Lake Tanganyika was signed by all four riparian countries surrounding the lake, which established management measures of fisheries resources (McLean et al., 2014). According to McLean et al. (2014) these measures included the initiatives of developing and implementing harmonised national fisheries policies and regulations and promoting community participation in fisheries management.

In this context, the protection and management of the lake's environment and sustainable use of its natural resources were very much dependant on the four riparian countries through collective actions including harmonized fisheries legislations. In this case, the four riparian countries formulated various strategic planning documents including Fisheries Development Framework Plan (PCAP), the Environmental Strategic Action Programme (SAP), and the Convention for the Sustainable Management of the lake (NCU, 2011)

D. Fisheries resources

Having one of the largest inland fisheries in Africa, Lake Tanganyika is a significant source of food and livelihood to millions of people (Gilbert, 2008). Lake Tanganyika alone counts a total of 2,156 fish species and has one of the largest catches (239,000 tonnes) from inland fisheries in Africa (UNEP, 2011). As such, the lake supplies 25-40% of animal protein (fish) for the communities around and within its basin (Ogutu-Ohwayo and Balirwa, 2006). Additionally, about one million of people are employed in the pelagic fishery, particularly in fishing on and post-harvest activities around the lake (Molsa et al., 1999). The lake holds at least 250 cichlid fish species and 150 non-cichlid species, most of which live along the shoreline down to a depth of approximately 180 meters (NCU, 2011).

But, currently, fishing is constituted by six endemic fish species including the 'sardines' clupeids *Limnothrissa miodon* and *Stolothrissa tanganicae*, referred to as 'Ndakala' together with four predator species of all kinds *Lates stappersii*, *Lates angustifrons*, '*Lates mariae'*, and *Lates microfloppies,* referred to as Mikebuka (LTA, 2014). According to Nshombo et al. (2010), these fished species of Ndakala and Mikebuka breed all year long and constitute themselves 95% of Lake Tanganyika fisheries catches (65% for the Ndakala and 30% for the Mikebuka). A 1999 estimation showed that Lake Tanganyika annually yields up to 200,000 tons of fish. At this stage, no recent estimate has been available so as to be compared to these figures. There is very little information available on Lake Tanganyika in the areas of livelihoods.

Three main fishery types have been identified on Lake Tanganyika; namely, the industrial fishery which no longer occurs in the lake, the artisanal and the traditional fisheries (Cirhuza et al., 2015). By far the largest amount of fishing in Lake Tanganyika is undertaken by

artisanal fishers (LTBP, 2016). The most important fishing gears for the subsistence and artisanal fishermen on Lake Tanganyika are lift nets used from catamarans, beach seines, gillnets and various types of lines (West, 2001). The sardines are caught with methods such as light assisted beach seines, lift nets and ring nets in the littoral and demersal zones, through generally nearshore fishing in majority by the lakeshore inhabitants (LTBP, 2016). Fishing is hard work (typically a 14 - 16-hour night shift) and conducted exclusively by men. Women and children are often involved in the processing (fish are sun-dried, smoked, salted or roasted) or marketing of the catch (West, 2001).

According to Lake Tanganyika Authority (2014), in the past 40 years, the fisheries production on Lake Tanganyika has undergone considerable changes. These changes have been reported to be the result of the expansion of human populations and are associated with factors including unplanned land occupation, unregulated business development, uncontrolled evacuation of industrial and domestic wastewater, destructive agricultural methods, deforestation, introduction of invasive species, pollution, and illegal fishing (LTA, 2014).

Fig. 2.2. Luciolates stappersii (top) and Stolothrissa tanganicae (bottom)

Source: SmartFish Programme Report SF/2012/15

We now turn to the specific context of Tanzania and its access to and impact on the lake.

2.3 Background context of Tanzania

2.3.1 Lake Tanganyika region in Tanzania

In Tanzania, Lake Tanganyika runs along the western border over three regions, namely Kigoma, Katavi and Rukwa. The three regions of Lake Tanganyika basin in Tanzania contains several forest reserves and national parks including Gombe Stream, Katavi and Mahale Mountains National Park (LTA, 2011). The region of Kigoma is the most populated with of 2,127,930 people (2012 census) while the region of Katavi is the largest in size with 45,843 km^2). **Table** 2.3 provides some selected key information on the three regions that border Lake Tanganyika on the Tanzanian's side.

Table 2.3. Tanzanian regions bordering Lake Tanganyika

Region	Area (Km^2)	Population census (2012)	Capital city	Livelihood options
Kigoma	37,040	2,127,930	Kigoma	Fishing, farming
Katavi	45,843	564,604	Mpanda	Fishing, Farming, Animal rearing
Rukwa	22,792	1,004,539	Sumbawanga	

Source: United Republic of Tanzania (2019).

Katavi Region, located in southwest Tanzania, comprises three districts, Mpanda, Nsimbo, and Mlele. Katavi community has a wide range of domestic animals and wildlife. In addition to fishing, people's other economic activities are livestock rearing and small-scale farming. Regarding livestock rearing, Katavi people practice free-range grazing, and for small-scale farming, they cultivate both food and cash crops such as maize and some tobacco, coffee. Livelihood activities include selecting different habitats for trapping rodents, such as plough fields, and tiny bushes around homes. Marshy areas are used for the cultivation of rice and sugar, vegetable gardens, as are areas with garbage close to homes and within homes. Katavi is mainly known for its national parks, including the Katavi National Park, which is composed of seasonally flooded grassland plains, miombo woodlands, small lakes, and swampy wetlands.

The Kigoma region is situated on Longitudes 29. 5 and 31.5. East and Latitudes 3.5 and 6.5 South of the Equator. It is divided into six districts, namely Buhigwe, Kakonko, Kasulu, Kibondo, Kigoma and Uvinza. Kigoma people are of various tribes and ethnicity, among which the Waha is the dominant tribe (URT, 2016). There are also a few Bantu tribes such as the Nyamwezi, Sukuma, Fipa and Wabembe, who originated from the DRC (URT, 1998), and a small number of Tutsi people who live among the Waha tribe. The region of Kigoma is a peaceful and safe environment coupled with extensive access to the Lake Tanganyika fisheries resources which offers livelihood opportunities which bring immigrants to Kigoma

(Landau, 2004). Kigoma is one of the least developed regions in the country due to a lack of essential crops, industries, technical and entrepreneurial capacity, and has fishing among its major economic activities (URT, 2010). Fishing is carried out by artisanal fishermen.

The Rukwa Region is inhabited by people made up of the Sukuma, Fipa, Rungwa, and the Pimbwe ethnic groups, who are largely subsistence farmers (Mgawe et al., 2012; Wandel and Holmboe-Ottesen, 1992). These subsistence farmers also conduct a wide range of other economic activities including commercial agriculture, cattle herding as well raising pigs and hens for cash, fishing and hunting (Mgawe et al., 2012). The Rukwa Region is one of the least developed in terms of state infrastructure and is among the poorest regions in all of Tanzania (World Bank, 2000). Paradoxically, being one of the largest corn producers in Tanzania, the Rukwa Region is seen by some to be the country's granary (Hadley, 2005). Off-farm income-generating activities include the sale of homemade beer and of honey, as well as the harvesting and sale of timber (Hadley, 2005).

2.3.2 Migration and settlement

There is historical and recent evidence of several migration inflows into the Kigoma region of refugees mainly from the DRC, where prevailing conditions have been characterised by protracted conflict, chronic insecurity, state fragility, lack of governance, and absence of public services (Betts, 2013; Landau, 2004; Mtui, 2013; URT, 1998). The long history of Congolese migrations across Lake Tanganyika into Kigoma in Tanzania is also believed to have been facilitated by the relative shorter lake width that averages only 50 km between Uvira and Kigoma. The Tanzanian region of Kigoma, which is located on the shores of Lake Tanganyika, is known to host some 250,000 registered refugees mainly from DRC (Durieux, 2000).

The majority of Congolese from the Uvira region who have crossed Lake Tanganyika and fled to Tanzania in the Kigoma region, were from fishing communities. According to Betts (2013), some of them live in the Nyarugusu refugee camp, which is about 150km away from Kigoma, and many others have settled within local communities carrying on with their fishing activities on Lake Tanganyika. Among the strategies adopted by Congolese fishers who have settled on the shoreline villages of Kigoma was the avoidance of the asylum system and instead integrating themselves into the Congolese fishing communities already present along the Lake (Betts, 2013).

Generally, the Congolese community has been accepted by local populations, among whom are those sharing the ethnic background such as Nyamwezi or Sukuma, which are communities that transcend state boundaries. The peaceful and safe environments coupled with the large sharing of the Lake along with intensive small-scale fishing activities, offer livelihood opportunities that are said to be among the pull factors of immigrants in the western region of Tanzania (Landau, 2004). In addition, it is acknowledged that given the poor conditions in eastern DRC in terms of livelihoods and the quasi absence of social services, the voluntary return of the Congolese migrants is unlikely (Betts, 2010).

Kigoma region is one of the fastest growing areas of Tanzania. Between 1988 and 2012, the region's population increased 248%. About half the local population came as migrants in the 1980s and 1990s, changing local traditions around resource use such as fisheries coming from a country where management was minimal. Thus, migratory movements either to permanent or seasonal resettlements, were driven by the search for better fishing conditions, including fishing grounds, fish catches and prices, which have been observed in several landing sites of the Kigoma region (Odongkara and Baker, 2007; Wanyonyi et al., 2016).

Additionally, migrants found land suitable for agriculture and fishing opportunities in areas near Lake Tanganyika (Hess et al., 2016)

This massive presence of migrants in Tanzania is a spillover consequence across borders of wars that have shaken the Great Lakes region. While in Tanzania, these refugee movements have been associated with problems including armed banditry (Dick, 2002) and destructive fishing such as fishing in spawning areas and using fine-mesh/mosquito nets to catch young fish, depleting the fish stock of the Lake (Hess et al., 2016). The presence of refugees in the region of Kigoma has also been associated with positive effects in the society. With the coming of humanitarian agencies, Kigoma was said to flourish with an upsurge in business, especially in trade retail and housing rentals (Rutinwa and Kamanga, 2003). As well, its agricultural sector has also seen a boom as the demand from aid agencies for food staples increased, boosting its local agricultural production significantly through the influx of cheap refugee labour (Berry, 2008).

2.3.3 Fisheries livelihoods

In Tanzania, the fisheries sector that includes Lake Tanganyika employs 4 million people engaged in fisheries and fisheries related activities while more than 400,000 registered fishers are directly employed in the sector; and the contribution of fisheries to the country's GDP is estimated at 1.4% (TFSDP, 2010). As stated earlier, Lake Tanganyika, known for its extensive fisheries resources, provides significant livelihood to millions of people dwelling inside and outside of its basin (Bootsma and Hecky, 1993; Gilbert, 2008; UNEP, 2011). Fishing on Lake Tanganyika contributes about 30% to the economy of Kigoma by annually creating employment opportunities for active populations, including in fishing, processing and marketing of the fish products (URT, 2010). It has been reported that the

average net fishing income per person in 2014 was of 88,966 shillings [$39][5] (Hess et al., 2016).

Out of 239 landing sites which are found on the Tanzanian shorelines of Lake Tanganyika, 87 are of Kigoma coastline (NCU, 2011). The 2011 frame survey reported a significance increase in the number of landing sites from 134 in 2006 to 239, representing an increase of 105 (78.4%) landing sites (NCU, 2011). It should be noted that landing sites come and go, and some can be very small and temporary, whilst others are much larger and more permanent. According to NCU (2011), such an increase of landing sites might be caused by the increase in both the population and the number of fishers (NCU, 2011). There are about 13000 fishers on the Tanzanian side of Lake Tanganyika with half of them operating from landing sites of Kigoma (Kimirei et al., 2008).

At each landing site in the Kigoma region, an additional 64,432 people are involved in auxiliary employment including fish processors, fish mongers, boat builders, engine repairers, net menders, and fish loaders (Van der Knaap et al., 2014). The most recent Lake Tanganyika frame survey shows that the total numbers of fishers and active fishing boats almost doubled between 1995 and 2011, with average densities of 24 and 49 fishers per km of coastline respectively (Van der Knaap et al., 2014).

Fishing on Lake Tanganyika is completely artisanal meaning categories of fisheries that are of small scale and not commercially orientated, using relatively small amount of capital and in which fishers usually have a traditional involvement with fishing (URT, 2003). Artisanal

[5] Conversion May 2019

fishery uses mainly lift nets fishing with catamarans. A typical catamaran fishing unit consists of two 6–7 m long mainly wooden plank hulls, a lift net (55–65 m circumference), 6–7 lamps and an average of 6 fishermen. Lamps are used to attract the fish during the night and nets are cast several times each night (Plisnier et al., 2009). According to 2011 fisheries frame survey, the estimated numbers of the legal most common fishing gears used in Lake Tanganyika (Tanzania) survey are: 537,126 Long lines hooks; 31,806 Gillnets; 2,194 Hand lines; 1,891 Lift nets and 644 Ring nets (NCU, 2011). Sixty Scoop nets were observed in one district only i.e. Kigoma District Council (NCU, 2011). Illegal gears are also found but are still few as pointed out in the survey report (NCU, 2011).

Fishing activities are carried out mostly within a distance of about 50km of Lake Tanganyika shoreline in areas with potentially high fish production. The predominant Lake Tanganyika fished species are pelagic fish composed of two clupeids namely *Stolothrissa tanganyicae* and *Limnothrissa miodon* commonly known as is "dagaa" and a perch *Lates stappersii* commonly referred to as Mikebuka, are endemic (Kimirei et al., 2008; NCU, 2011; URT, 2016). The northern half of the lake in the Kigoma area is dominated by a clupeid-based fishery while the southern area near Mpulungu is a ''perch'' based fishery (Plisnier et al., 2009). With the increased number of fishers and fishing vessels on the lake, there is a high fishing pressure on Dagaa and Mikebuka, particularly through catching the juvenile ones, jeopardising the future of these pelagic fisheries of Lake Tanganyika (Van der Knaap et al., 2014). For instance, as Van der Knaap et al. (2014) note, along the entire coastline of the lake there is roughly one beach seine per km, exploiting juvenile fish and destroying breeding grounds of cichlids.

Fisheries resources in Tanzania face many problems, among which the most cited include the poverty of fishers and the lack of adequate facilities for fish processing, modern fishing gear, and of technologies. Fishing activities are also affected by piracy (URT, 2010).

2.3.4 Institutions and management structures

Tanzanian fisheries are managed through the National Fishery Policy of 2015 which addresses the changes and challenges facing the fisheries sector through provisions aiming at rationally utilizing fisheries resources sustainably while optimising the available opportunities and benefits (URT, 2015). The main focus of the National Fisheries Policy of 2015 is to increase the fisheries sector's contribution to the GDP and alleviate poverty by integrating the fisheries and aquaculture industry with the rest of the economy (URT, 2015, p. 44). To do that, the government regulates the management, protection and control of the fisheries resources and conservation of aquatic biodiversity, fisheries and aquaculture productivity; and ecosystem processes (URT, 2015, p. vii).

The National Fishery Policy is said have been used as an instrument towards achieving the fisheries sector vision that aims at "having a progressive fisheries sector which is economically, socially and environmentally sustainable. The long-term objective aims at attaining food security, poverty reduction, increased national income and hence increased contribution to national Gross Domestic Product" (URT, 2015, p. vii). The existing regulatory framework guiding the fisheries sector is still influenced by a number of legislations including the National Fisheries Sector Policy and Strategic Statements (1997), which is backed by the Fisheries Act, No. 22 of 2003 and the Fisheries Regulations of 2009, which are the main policy instruments (Sobo, 2012; TFSDP, 2010). The Fisheries Act of 2003, which repeals and replaces the Fisheries Act of 1970, makes provisions on issues

including sustainable development, protection, conservation, aquaculture development, regulations and control of fish, fish product, aquatic flora and its products, and for related matters. The Act stipulates enforcement in terms of offences and penalties. The formulation and the implementation of the Act is under the responsibility of the Minister of Livestock and Fisheries.

Under the management and control of the fishing industry, the Fisheries Act of 2003 has a stream of conservation of fisheries resources through prohibition of foreign fishing on territorial waters and requirement of licences for both foreigners and nationals. The Act also requires all fishing vessels and fishers to be registered, licenced, but also imposes closed seasons for designated areas, species of fish and methods of fishing (Fisheries Act, 2003). The management tools include monitoring, control, surveillance, and collaborative resource management (Sobo, 2012). In view of this, various interventions were listed in the Act including establishment of Monitoring, Control, and Surveillance Centers (MCS), Beach Management Units (BMUs), Marine Protected Areas, and Collaborative Fisheries management areas.

According to Hess et al. (2016), despite that some of these interventions aimed at long-term local management of fisheries, there were associated with local costs including lost livelihoods among those using illegal mesh-size fishing nets and those who fish in fish spawning area that become protected. Hence the underlying challenges facing the management of fisheries resources of Lake Tanganyika from Kigoma region include the rapid population growth of the residents as a result of occasional refugees' influx from neighbouring countries primarily of Burundi and DRC (URT, 2016). Additionally, Beach Management Units (BMU), which are the implementation of the participatory management

system, commonly known as co-management, which involved local fishing communities alongside the government sharing responsibility in the management of fishery resources (Sobo, 2012).

2.4 Background context of DRC

2.4.1 Lake Tanganyika Region in the DRC

Lake Tanganyika is in the eastern region of DRC which has been subject to conflict over decades. This eastern region of the DRC as a whole has suffered great damage during the protracted DRC conflict including a large human death toll, political instability, public sector failure, and negative effects on the economy (UNECA, 2015; Goodhand, 2001), as well as negative impacts on Lake Tanganyika fisheries and fishing activities. The eastern DRC's fisheries resources have been used by armed groups for income generation, with fisherfolk on Lake Tanganyika and Lake Kivu frequently targeted for attacks (Laudati, 2013). During these attacks, fishing boats are often seized by combatant forces who demand that fisherfolk pay up to US$200 to get them back (Laudati, 2013). Furthermore, Lake Tanganyika in the eastern DRC region is unprotected and unmanaged, with overfishing and pollution from numerous fishing villages and a few towns around the lake shore, with more than a quarter million people living in the vicinity of the lake (Seyler et al., 2010)

The DRC part of Lake Tanganyika extends over two regions, namely Tanganyika and South-Kivu, on the western shore of the lake. The region of Tanganyika has six districts of which two, Kalemie and Moba, share the southern shore of Lake Tanganyika, while the region of South Kivu is divided into eight districts of which two, Fizi and Uvira, are on the northwest shore of Lake Tanganyika. The shoreline areas of Lake Tanganyika that have road access

primarily comprise the urban centres of Uvira, Baraka, Moba and Kalemie (Breuil and Grima, 2014). **Table** 2.4 provides selected key information on the two regions that border Lake Tanganyika on the DRC's side.

Table 2.4. DRC regions bordering Lake Tanganyika

Region	Area (Km²)	Population	Capital city	Districts bordering the lake	Livelihood options
South Kivu	65,070	4,944,662	Bukavu	Fizi, Uvira,	Artisanal mining, agriculture, trade
Tanganyika	134,940	2,500,000[6]	Kalemie	Kalemie, Moba	Fisheries, forestry, and agriculture

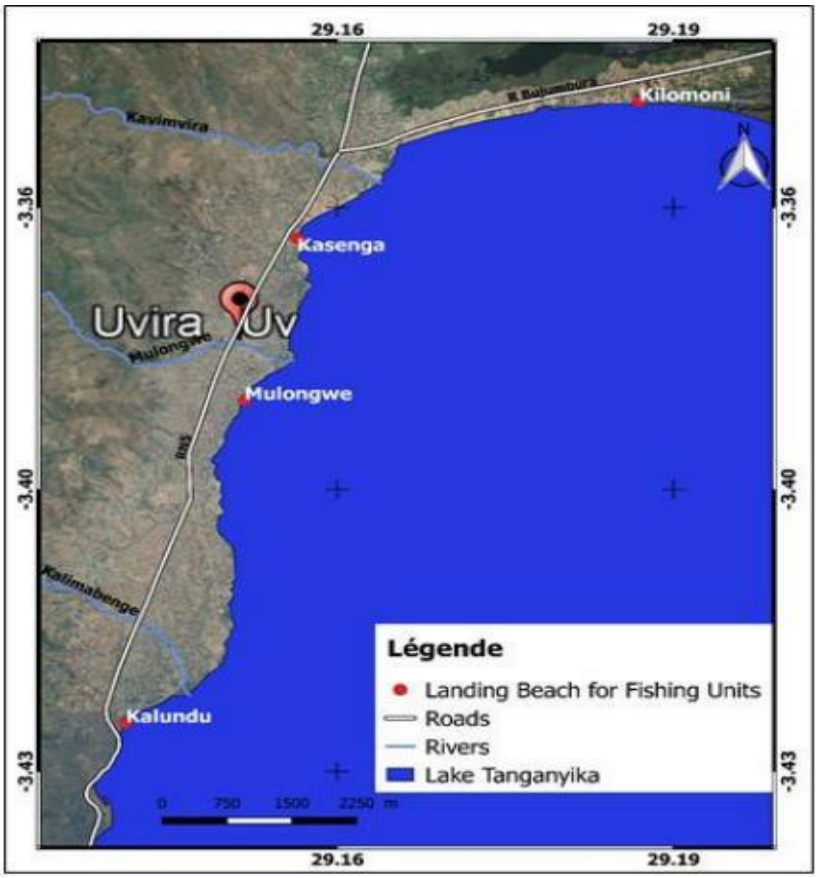
Made from multiple sources: 1) MONUSCO (2015); 2) Omasombo (2014); and 3) IRC (2017).

In the Tanganyika region, cultural and ethnic differences constitute the biggest dividing line between populations (Omasombo, 2014). The city district of Kalemie, which is located on the west coast of Lake Tanganyika, is the largest city of the Tanganyika region in the south-east of DRC (Omasombo, 2014; Saga, 2017). The district of Moba is located on the west shore of Lake Tanganyika, mainly to the east of the Tanganyika region, just like the district of Kalemie. The territory of Moba has an area of 24,500 km^2 and 609,406 inhabitants (Jaroszewicz, et al., 2010). The ethnic populations are predominantly Tabwa (over 80%), Bemba and Luba. There are also other tribes from the DRC and neighboring countries (Tanzania and Zambia). The main activities include agriculture and fisheries.

In the South-Kivu region, there are two large scale fishing territories, which contribute the highest fish production, namely Uvira in the north and Fizi in the south (Mushagalusa et al., 2015).

[6] IRC (2017)

Fig. 2.3. Landing sites for fishing units at Lake Tanganyika in Uvira (DRC)



Source: Dialloh (2019, p 451)

2.4.2 Conflict

Since the DRC gained its independence from Belgium in 1960, the country has experienced decades of instability, coups, corruption, brutal dictatorship and wars. The 1998–2003 Congo war, which is referred as the Second Congo war or as Africa's World War, is believed to be the worst civil war in modern history and the world's deadliest humanitarian crisis since World War II (IDMC, 2009; IRC, 2004; Jackson, 2003; Prunier 2011).

The dominant view on the roots of the horrific crisis in the DRC that developed into a regional and international conflict, sees as its source the greed/competition over natural resources along with a complex mix of poverty, ethnic rivalries, tribal divisions, and land

disputes (Frerks et al., 2014; IRC, 2004; Prunier 2011). According to this view, one common feature of the violence relative to economic motives has been looting, as Montague (2002) notes, with all sides involved in the conflict accused of using the cover of the war to plunder the mineral-rich regions of DRC. Within this context, local, national and regional state and non-state actors became engaged in the conflicts given that the outcomes of their cost-benefit analysis largely showed that war and instability were more attractive than peace and stability (Reyntjens, 2001). As a consequence, the DRC has been engulfed in protracted violent conflicts, with violence increasingly shaping the economy as soldiers, militia, and other war-focused groups continued to exert a growing influence on economic activities, and thus contributed to the emergence of predatory war economies (Goodhand, 2001).

But an exceptional take to this dominant view has been recently noted. For Roessler and Verhoeven (2016), these external pursuits of economic gains in accessing and extracting valuable natural resources were rather the consequences of the civil war. They argue that seeds of this war were sown in the Pan-Africanist revolutionary struggle against Mobutu[7] to give DRC a second independence and consolidate peace in central Africa. Similarly, the UNECA (2015, p. 2) maintains that the causes of the Congolese armed conflict were not in natural resources, but rather in the absence of strong institutions to ensure effective regulatory oversight and protection of human rights, which made the exploitation of natural resources both an incentive for rebellion against the state as well as a fuel of the war machinery.

[7] Joseph-Désiré Mobutu, the president of Zaire (now the Democratic Republic of the Congo) who seized power in a 1965 coup and ruled for some 32 years before being ousted in a rebellion in 1997 (Encyclopaedia Britannica, from https://www.britannica.com/biography/Mobutu-Sese-Seko [Accessed 28 December 2019].

Throughout this complex conflict, recurrent major battles involved rebels dissenting against the government, militia groups wanting control over resources, tribal warriors fighting for their lands, Congolese armed forces supported by the UN, as well as neighbouring countries' and some nine African states' regular armies fighting each other on the eastern DRC soil (Buchanan and Patel, 2015; IDMC, 2009). Being extremely far away from the capital Kinshasa and having much of DRC's mineral resources while lacking roads to Kinshasa and much of the rest of the country, the eastern DRC territories and civilians bore the brunt of the violence as all fighting factions were reported to commit human rights violations and abuses including killing, rape, sexual exploitation, abduction, forcible recruitment of children, plundering of crops, looting, illegal taxation and general harassment of civilians (IDMC, 2009). The eastern provinces of the DRC accounted for 77% of the excess mortality documented in DRC conflict (DRC Mortality Survey, 2004). It is estimated that from 1998-2004, over five million people died in the war and its aftermath (IRC, 2004).

The tactics employed by all factions to gain territorial control fractured the country politically, destroyed people's livelihoods, and led to the collapse of social services (IRC, 2004). When walking around in DRC, there are commonly heard refrains from people almost everywhere such as "the state is dying but not yet dead' and 'the state is so present, but so useless" (Trefon, 2009, p.9). The 1998–2003 Congo War ended when a transitional government took power. The war caused a major exodus of refugees from DRC into neighbouring countries including Tanzania and the destruction of much of the country's infrastructure (Burt and Keiru, 2014). Since 2005, in the post-war period, the eastern region of DRC has continued to be unstable with reports of recurring violent attacks on civilians who are massacred, wounded and/or their houses burned (VOA News, 2016).

According to UNECA (2015) these adverse effects of violence in the DRC have severe implications manifested through loss of government revenue, increased unemployment and deterioration of households' wellbeing. Some of the long-lasting effects of the continuing violence in DRC are in its impacts on the psychological and physical trauma as well as on livelihoods of people that include massive displacement. The internal displacements forced out-migrations and waves of refugees have been acknowledged among significant social implications of violence in eastern DRC that substantially increase the pressure of the human population on the available resources in host villages (Draulans and Van Krunkelsven, 2002). One significant impact of this population displacement has been the disruption of activities in sectors such as agriculture which provides livelihood to the majority of rural population (UNECA, 2015).

Furthermore, beyond massive displacement of populations, the DRC wars are believed to have caused tremendous trauma in particular for women, young girls and boys who have been subject to physical and psychological atrocities (UNECA, 2015). According to Krug et al. (2002), for every person killed or raped, many more are psychologically affected, intimidated or scarred. As a consequence, such psychological and physical trauma compromise the wellbeing of affected people and their families for a long time, leading them to live with fear of their lives and of losing control of their economic destiny (UNECA, 2015). The results of such effects are the war-induced lack of traditional and balanced family structures that lead boys to grow up in fractured or dysfunctional families (Lwambo, 2013; UNECA, 2015). Thus, their propensity to violence becomes a sanctioned way by the community of asserting masculinity through enrolling in armed groups where combatants are able to achieve some socioeconomic gains that are inaccessible to the majority of the villagers and fisherfolk (Lwambo, 2013).

As the Congolese government tended not to respond to the basic needs of its citizens, over time international institutions, non-governmental organisations (NGOs) and private enterprise, stepped in to help people who increasingly tried to survive on their own (Trefon, 2009). As a consequence, livelihood strategies in the DRC became centred on survival, relying on a foraging culture and resourceful 'débrouillardise' skills (UNEP, 2011). Given the weak governance and protracted crisis, "these foraging livelihood strategies have become a standard way of life for the majority of the population who refer to it as 'Article 15', which means fending for oneself in the foraging economy based on a number of activities including production of fuelwood, charcoal, artisanal mining, wildlife poaching, and uncontrolled fishing" (UNEP, 2011, p. 52).

Similarly, the decades of conflict and neglect have left the DRC's transport infrastructure, especially the roads, amongst the sparsest and most dilapidated and deficient in the world even by the standards of other low-income countries (Damania et al., 2016). According to Damania et al. (2016), this transportation infrastructure deficit reinforced national, provincial, and within-city isolation, causing not just economic problems, but also making it difficult to forge economic and social cohesion. Additionally, the situation of armed conflicts in the late 1990s led to the total disruption of river transportation systems which people often use to move between their rural areas and provincial main cities (Béné, 2009).

The DRC is frequently faced with country-wide or regional resurgence of political and security tensions with devastating impacts on its institutional, economic and social stability, which are necessary conditions for lasting peace and sustained economic growth (ADB, 2013; UNECA, 2015). This is reflected in the World Bank's ranking of governance indicators such as 'control of corruption' and 'voice and accountability' showing DRC

below the average for sub-Saharan Africa, typical for institutionally weak and ineffective governments (ADB, 2013). A review of the DRC's history reveals that predatory regimes which have succeeded each other over a century, perpetrated such ineffective governance "characterised by greed, corruption, massive violations of human rights and the commission of all kinds of crimes with impunity" devastating what could have been one of the richest countries in Africa (Kodi, 2008, p.13).

Therefore, it is worth noting that with any of the above identified forms of violence within the context of DRC's protracted conflicts, some of them, depending on their level, frequency, duration and intensity, might be perceived only as shocks, while others could be considered stresses in the context on livelihoods vulnerability (Andersen and Cardona, 2013). While stresses are seen as ongoing and cumulative pressures often predictable, shocks are more sudden impacts typically unpredictable and traumatic change (Chambers and Conway, 1992; Turner et al., 2003). In addition, the same logic applies as to effects of these conflict-induced shocks and stresses to war-weakened state institutions/structures leading to the destruction of basic production infrastructure and resulting in lack of public service delivery (Burt and Keiru, 2014; Gizelis and Wooden, 2010; Trefon, 2016). For instance, the state's failure to meet people's basic needs creates frustration which provides fertile ground for more violence in DRC (Murhula, 2006).

2.4.3 Fisheries livelihoods

The DRC's key economic sectors are mining, forestry, agriculture, and fisheries and the country remains structurally locked into a colonial trade pattern of exporting raw materials, and cash crops (UNEP, 2011). It is worth noting that the agricultural sector, which includes fisheries, dominates the economy of the DRC regarding the employment rate providing, in

fact, jobs to more than 50% of the labour force and accounting on average for 30% of GDP (Herderschee et al., 2012; Jeníček and Grófová, 2015). Fisheries are important for livelihoods and as a source of protein in the population's diet (Partow, 2011). Near-shore artisanal fishing appears to play an important part in the local economy by providing a good income to several dozen fishermen (McLean, 2014). Similar to so many poor people who highly depend on fish (Kent, 1997), fisheries in DRC in most parts are in rural areas and therefore affected by poverty associated with inaccessibility to markets, inadequate road infrastructures and poor access conditions, and inadequate public services such as health and education.

The DRC's extensive endowed fisheries resources include marine fisheries on a tiny Atlantic Ocean coastline and inland fisheries contained in the Congo River Basin (FAO, 2001). The Congo Basin supports the largest inland fisheries on the continent, with an estimated potential production of 520,000 tonnes per year (UNEP, 2011). Most of these inland fisheries resources are located in the eastern Rift Valley Lakes as well as in riverine and swamp areas of the vast Congo Basin (FAO, 2001). More than half of Africa's water resources and 13% of global hydropower potential flows through the DRC Basin (UNEP, 2011), which includes Lualaba/Tanganyika (Partow, 2011).

Lake Tanganyika, despite being a semi-enclosed system with a relatively small discharge via the Lukuga River, holds an estimated one-sixth of the earth's surface freshwater and is part of the Lualaba watershed (Partow, 2011). The DRC part of Lake Tanganyika extends over 14,800 km² (45%) of the lake's surface and 795 km (43%) of its perimeter (Van Steenberge et al. 2011). This lake supports one of the largest fisheries in DRC, comparable in tonnage to the entire Congo River system. Better management could not only improve

protection of the biodiversity but also lead to improved fish harvest (Seyler et al., 2010). In the DRC, Lake Tanganyika fisheries attract people from several towns in the DRC and neighboring countries: Kalemie, Mbuji-Mayi, Kananga, Uvira, Bukavu, Lubumbashi, Kolwezi, Pweto and Kirando (Tanzania) (Kabemba, et al., 2017).

Along the shores of Lake Tanganyika on the DRC side, fishing activities are the primary source of income for small-scale fisheries communities (Vlassenroot et al., 2007) who as in most developing countries represent one of the most disadvantaged elements of rural society (Neiland and Béné, 2013). Artisanal and traditional fisheries make up most of small-scale fisheries productions on DRC's Lakes and predominantly rural areas (Sarch and Allison, 2001). Jackson (1973) argued that it was not reasonable to expect hungry populations, rife with protein deficiency diseases to live around lakes containing enormous reserves of protein foods such as Lake Tanganyika. This paradox is attributed to several factors including recurrent conflict environments, high population increases, and governance failure of natural resources, which are believed to constitute an impediment to poverty alleviation and food security efforts pursued by both local and international development actors. Such a challenge justifies this research work seeking to understand how vulnerable communities dependent on Lake Tanganyika fisheries' livelihoods are enduring the double jeopardy of poverty and conflict.

According to the International Food Policy Research Institute, DRC is among the four countries in the world where the food situation is described as being "extremely alarming" (Jeníček and Grófová, 2015). Given this context, FAO, for example, played a crucial role in food security interventions helping eastern DRC's communities near lakes including Tanganyika who were affected by severe malnutrition. These interventions consisted in

distributing nets and fishing gears to rehabilitate fishery activities (Vlassenroot et al., 2007). Among the most cited causes of this high level of food insecurity within Lake Tanganyika fishing communities, are the population displacements associated with the chronic insecurity, and the abject poverty (Jeníček and Grófová, 2015, p. 141).

It is difficult, however, to get accurate fish production data because of a lack of reliable fishery production statistics in the DRC (Van der Knaap et al., 2014). Available statistics suggest that, despite its largest share of Lake Tanganyika of 45 percent in terms of surface areas (Jorgensen et al., 2005), the DRC's actual fish production from Lake Tanganyika is of 43,600 tons against the estimated potential production of 135,000 tons in 1990, which represent only 32% of its potential production (Greboval and Maes, 1991). In the same period, Tanzania produced 52% with its 41% of the lake's share (Greboval and Maes; 1991; Jorgensen et al., 2005).

The fisheries sector suffered a decline in the number of boats from one boat for one to two fishers before the war to one boat for six fishers after the war between 1998 and 2002 (Briand and Mbonyo, 2012). Furthermore, despite favourable conditions for catching and producing fish, and strong cultural preferences for eating it, fishing and fish farming have not helped improve the country's food security situation (Trefon, 2016). Nevertheless, within the overall context of fisheries in the DRC, it has been established that small-scale fisheries contribute to the livelihood and local economy of populations living in remote rural areas (Béné et al., 2009). As a consequence, a large number of farming households engage in seasonal fishing activities as part of their diversified livelihood strategy such as in the example of the region along the Salonga River (Béné et al., 2009).

According to Béné et al. (2009), the main fishing periods are the ‘short and ‘long’ dry seasons (respectively January–March and July–September), although a few households also engage in fishing during the rainy season (October–December). Fishing activities involve both male and female household members but remain relatively strongly gender differentiated. In such fishing, "men engage individually using mainly passive gears including gillnets and hooks on the main river channels while women fish collectively using a traditional method using basket-traps called eboko" (Béné et al., 2009, p. 109). According to studies conducted by Béné et al. (2009), overall, households can generate 65 to 90 percent of their total cash-income through fishing highlighting that the increasing role of fishery resources as a ‘bank in the water’ for local communities that largely relies on fishing as a source of income mainly within lower-income groups in DRC.

Regarding fishing problems in the DRC, waters are overfished, poorly managed and regulated, and increasingly polluted (Trefon, 2016). Some examples of threats that affect small-scale fishery livelihoods include the emergence of artisanal mining as a result of the influx of foreign mining companies authorised to operate in eastern DRC inciting many people including fisherfolk around Lake Tanganyika to abandon their activities to go looking for precious minerals (De Failly, 1999). In various villages on the DRC's side, fisherfolk also use bed nets to fish along Lake Tanganyika (McLean et al., 2014). Additionally, recurrent armed conflicts have caused mass migrations from rural areas where most fisheries are to urban centres (UNEP, 2011; West, 2001).

Table 2.5. Principal Fishing Regions in the DRC

No	Waterways	Potential (tonnes)	Halieutic Species
1	Lake Tanganyika	250,000	214 species of fish, Stolothrissa tanganicae, Limnothrisa miodon, Lates and Luciolates, etc
2	Lake Kivu	12,000	Baremore, Hyd'ocynus porskalili, lates niloticuls albertinus, Tilapia, hydocyon Goliath ubangersis Bagi, etc
3	Lake Albert	13,300	Baremore, Hyd'ocynus porskalili, lates niloticuls albertinus, Tilapia, hydocyon Goliath ubangersis Bagi, etc
4	Lake Moëro	28,000	Tilapia macrochir, Clarus, Synodontis, Barbus attirelis, Mormyridae
5	Lake Tshangalele	4,500	Tilapia, Serrono Chromis, Clarias
6	Lake Nzilo	2,500	Labex, Barbus, Clarias, Tilapia
7	Kamalondo Depression	25,000	Lates niloticus
8	Congo River	137,000	Tilapia, Haplochromis Melander, Athiopius Protopterus, Protopterus Senegalus
9	Atlantic Coast	27,700	Captain, Ray, Conger, Perch, Soles., Bream, Daradas, catfish (Arius), Sardinella (mackerel), etc.
Total		**707,000**	

Source: ANAPI – Invest in the Fisheries Sector, Power Point Presentation, January 2013

2.4.4 Institutions and management structures

It is known that the DRC is one of the countries where water resources management structures including fisheries have been undermined by internal conflict (Gizelis and Wooden, 2010), which has created conditions of political instability (Turton and Warner, 2002). Consequences of this political instability include the deterioration of existing water resources management and control of its usage (Burt and Keiru, 2014; Gizelis and Wooden, 2010).

There are several legislative instruments that govern the management of water resources, use and control of DRC's fisheries including the 1932 Decree on Exclusive Fishing Rights, the 1937 Decree on Fishing and Hunting, Ordinance No. 432/Agri. of 26 December 1947, the 1981 Ordinance regulating the use of fishing devices, and the 1979 Ordinance (amended 1983) on fishing fees and license categories (Seyler et al., 2010). For example, "a regulation of 1981 prohibits fishing using electrical devices, explosives or toxic substances throughout

the then Zairian territory and provides for the seizure by the authorities of any such articles and any catch caught by such means" (Seyler et al., 2010, p. 105).

In the DRC, the Ministry of Agriculture is responsible for fisheries management (Partow, 2011). This ministry as other state institutions in the country, have historically suffered from corruption, abuse of authority, and large numbers of public servants equipped with limited means and training (Seyler et al., 2010). Within the Ministry of Agriculture, the overall fisheries management responsibility nominally lies with the National Service for Development of Fisheries (SENADEP—Service National pour le Développement des Pêches), which is theoretically represented at different levels within each of the country's fisheries regions (see **Table** 2.5 above) by coordinators and supervisors (Seyler et al., 2010). The basic fact is that fisheries administration in the DRC effectively does not exist, and accurate statistical information on specific water bodies is either lacking or very outdated (Seyler et al., 2010). These management provisions have largely been unsuccessful due to complex reasons that include difficulties in developing credible monitoring, conflict, and increasing numbers of fisherfolk (Petit and Shipton, 2012).

Similar to many African Lakes, population growth on the DRC side as stated previously is seen as one of the main challenges to the management of the fisheries resources of Lake Tanganyika (Ogutu-Ohwayo and Balirwa, 2006). The population growth has resulted in a high human population that has increased fishing pressure on Lake Tanganyika in conjunction with other issues including accelerated rates of deforestation and erosion, which constitute threats to Lake Tanganyika that need to be contained through viable management systems and mechanisms (Nshombo et al., 2010).

2.5 Conclusion

This background section has highlighted the contexts of the DRC and Tanzania with a particular emphasis on Lake Tanganyika fisheries and management mechanisms. The transboundary nature of the lake makes a coordinated, effective management approach challenging, even more so when one of the countries bordering the lake has been subject to conflict and violence. In addition, instability and chronic armed conflicts in DRC is believed to have impacted the management of the lake within and outside the DRC. While adverse effects were reported spilling over into Tanzania through massive refugees' influxes, leading to fishing pressure and insecurity on the lake.

Despite the above-mentioned conflict-induced disturbances in both countries, the basic fact is that their shared inland transboundary lake has been under continued exploitation on both sides. In other words, the differently enforced regulations of artisanal fishing activities being carried out on the lake, illustrate not negligible levels of adaptation and coping strategies of fishing communities in both contexts considering past and current circumstances of disturbances. In essence, the fisheries resources although generally undervalued and declining in productivity, are still playing their role of providing livelihoods to many lakeside communities. Unlike Tanzania, in the DRC, small-scale fishing activities and benefits have not been part of major policies of the public sector and therefore remain unprotected and unmanaged by formal government legislation.

From this background information, it is possible to conclude that the lack of adequate state institutions in the DRC has provided space for some kinds of management arrangements tailored to fit local circumstances that may have allowed fisherfolk to carry on with their subsistence fishing activities. It is on the patterns and importance of such arrangements

embedded in social realities that this study concentrates on comparing the DRC with Tanzania using the particular context of shared Lake Tanganyika.

Chapter 3

LITERATURE REVIEW

3.1 Introduction

This chapter reviews the literature regarding key theories, concepts and findings that are relevant to the research question of '*how do small-scale fisherfolk secure livelihoods in situations of change*?' in the context of vulnerability in relation to situations of conflict. Firstly, it begins with reviewing the literature on vulnerability including in relation to conflict, paying attention to how the locations of violence, boundary dynamics, and types of violence affect resources and livelihoods, generating vulnerability for people and communities. Then, the chapter examines conditions under which livelihoods change in the context of conflict. Secondly, this chapter provides a synopsis of small-scale fisheries in a transboundary context, describing their nature and analysing their functions as well as how the transboundary nature of waters affects small-scale fishers. Thirdly, the chapter provides a critical review of institutions as mediators of livelihood strategies and outcomes focusing on bureaucratic and socially-embedded institutions within the perspectives of critical institutionalism. Special attention is given to which institutions matter in small-scale fisheries, why and how they work to mediate livelihoods and livelihood strategies of fishing-dependent communities. Finally, it provides a conceptual framework that draws on the entire chapter linking the Sustainable Livelihoods Framework and the critical institutionalism perspective to guide the research design and analysis of data. A conclusion is provided at the end of the chapter.

3.2 Vulnerability

3.2.1 The concept of vulnerability

This section conceptualises vulnerability by reviewing its key aspects which can help to understand how vulnerability is generated. It discusses how people experience different sources of vulnerability and how they experience vulnerability differently. Sources and experience of vulnerability may differ in a situation depending on characteristics of social difference, such as gender, age and ethnicity. The section concludes with a summary of key points.

The term vulnerability has been used in many traditions and disciplines, including the fields of geography, disaster risk reduction and development. Its use was also extended to other fields such as information security, climate change and livelihoods. Vulnerability in these antecedent traditions and disciplines paid particular attention to entitlement failure and hazards (Adger, 2006). For instance, in the field of development, a study by Allison et al. (2009) recognises vulnerability in relation to disturbances of national economy from a single large-scale driver i.e. climate change, and can be measured through exposure, sensitivity and adaptive capacity. Similarly, in the field of human geography, the work by Adger et al. (2005) illustrates and presents vulnerability as a function of the risks to which people are exposed, sensitive and adaptive to.

The above stated views are covered in definitions of vulnerability. For Proag (2014, p. 370) vulnerability is "the degree to which a system, or part of a system, may react adversely during the occurrence of a hazardous event". The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as "the degree to which a system is susceptible to, or

unable to cope with, adverse effects of climate change, including climate variability and extremes" (IPCC, 2007, p. 89). Adopting this definition, the IPCC considers vulnerability as "the predisposition to be adversely affected as constituting an internal characteristic of a vulnerable element" (IPCC-SREX., 2012, p.32).

In the same context, Kuol (2014) uses three dimensions to define vulnerability: susceptibility, sensitivity, and resilience. Thus, susceptibility relates to the exposure to risk, sensitivity implies the intensity with which risk events are experienced, and resilience entails the resistance capacity resulting from the occurrence of a risk event (Kuol, 2014). Similarly, Adger defines vulnerability as "the state of susceptibility to harm, from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt" (Adger, 2006, p. 268).

These definitions identify three recurring themes of exposure, sensitivity and adaptive capacity as key dimensions of vulnerability of people and communities to risk factors. Thus, through these dimensions of vulnerability, identified threats and risks that can inflict harm to people's livelihoods can be explored. Furthermore, whilst these definitions appear to associate vulnerability with hazardous situations, they seem to differ on their view of the nature of the drivers causing vulnerability and the affected elements. In particular, these vulnerability perspectives are shown mainly to draw attention to the detrimental effects on people's livelihoods. Scoones (2015) seems to agree with these definitions in noting that livelihoods are vulnerable to threats and risks from various factors such as climate change, conflict, or natural disasters.

Furthermore, as reflected in these definitions of vulnerability, Kuol (2014) along with Mallett and Slater (2012), note that considerable attention is given to factors that produce vulnerability that may have adverse effects on diverse elements in any society including people and their livelihoods. As in many past studies on vulnerability, the aim has also been to better understand how a variety of threats and risks within different contexts affect people's livelihoods (Allison and Horemans, 2006; Ellis, 2000).

Given the importance of the concept of vulnerability, and the challenges in operationalising it both in terms of processes and measurements, several frameworks were developed to capture its different dynamics and outcomes. One framework relevant to livelihoods is the Sustainable Livelihood Framework (SLF), in which the vulnerability context is associated with external shocks, stresses, trends and seasonality that affect poor people and their livelihoods (Ellis, 2000; Allison and Horemans, 2006). Further to external shocks and stresses to livelihoods, Chambers and Conway (1992), associate vulnerability with internal elements, which pertain to the capacity of people and their livelihoods to cope and adapt. Thus, the context of vulnerability, which is the starting point in the SLF (Levine, 2014), examines the types of trends, shocks and stresses, that affect livelihood assets (natural, human, social, physical and financial). In addition, the existing institutional environment, is an important determinant of the states of and how these assets and how people use them to sustain their living (Morse et al., 2009).

Thus, varied dimensions and mechanisms of vulnerability can be identified in diverse livelihood settings and contexts, including fisheries within which vulnerability is one of the key characterising features of poverty (Béné, 2004; Bailey and Jentoft, 1990). As Allison et al. (2001) note, the concept of vulnerability captures all the critical factors that affect the

livelihoods of fisheries resources dependent individuals or families. For Allison et al. (2006), the concept of vulnerability is central in understanding the impoverishment of fishing communities.

In relation to this, many scholars such as Mills et al. (2011), hypothesised that the sources and intensities of vulnerability factors affecting different households would depend on their main livelihood activities. Thus, cases of destruction or loss of fishing equipment affect fishers and result in the lack of fishing ability and loss of fishing income (Mills et al., 2011), which will render them less secure and thus vulnerable. A loss of access to the main livelihood asset, such as water resources, can be a good example, which Brown (2016) refers to in relation to the establishment of 2000 Marine Protected Areas (MPAs) in Mnazi Bay in Tanzania. This resulted in people's vulnerability and disempowerment as it contributed to loss of livelihood by reducing the area where people could fish, forcing them to fish further from shore.

Furthermore, Sarch and Birkett (2000) demonstrated in their study on Lake Chad how fisherfolk's social capital played a role in livelihood strategies in response to the effects of climate change that manifested itself through fluctuations of the water level since 1973. The social capital is made up with resources upon which people draw in pursuit of their livelihood objectives and which can include community networks, trust, and extended families (Nunan, 2010). Thus, Sarch and Birkett (2000) went on to show that the livelihood choices that people made included resettlements eastwards to other sites along the lake shores and evacuation of those locations after the rising lake flooded them at the end of 1994 to move back to farm the lake floor. This illustrates a diversification of assets rather than

relying on fishing only; they combined social capital in their relocations or alternative assets through farming the lake floor after the flood.

To conclude this section, it can be said that vulnerability is understood in terms of the risks or threats to which people are exposed, sensitive and adaptive. The first two dimensions, exposure and sensitivity, are related to external risks or threats to people and livelihoods, while the third dimension of adaptability is referred to as resilience, suggesting means of coping with vulnerability factors. In this regard, there is a link between livelihood assets and vulnerability, as suggested in the discussion. Factors that affect the availability of assets will tend to render people vulnerable if relying on them for livelihoods. Thus, as noted by Allison et al. (2001), vulnerability has dual aspects; the external threats to livelihood assets and the internal aspects of coping strategies which are determined by the availability of livelihood assets. Therefore, the focus on the context of vulnerability is crucial because it allows identification of factors that are generating vulnerability, which livelihood assets are affected, and what resources are available for response strategies.

3.2.2 Conflict and vulnerability

This section further explores the context of vulnerability, looking at the literature on violent conflict and its changing nature as factors of vulnerability through three identified dimensions, exposure, sensitivity and adaptation. The section pays attention to how the locations of violence, the transnational boundary dynamics, and types of violence affect resources and livelihoods, generating vulnerability for people and communities. The section first discusses definitions of conflict and violence, drawing on the 'new war' literature to show the rise of protracted/chronic violence. Second, it considers how the locations of conflict, particularly crossing borders and in rural locations, affects vulnerability. Third, the

section examines literature on the importance of conflict resources, discussing livelihoods, banditry by soldiers and non-state actors, and considering how they affect assets and vulnerability. Fourth, the section moves on to explore how conflict based on identity affects vulnerability, focussing specifically on gender and ethnicity. The section concludes by identifying links between vulnerability and conflict and the implications for livelihoods.

Conflict is an ever-present human phenomenon (Cramer, 2006). Definitions of conflict vary, often relying on statistics and quantitative measures of fatalities on the one hand, or more qualitative aspects, such as changing locations and impact on people and communities on the other. In discussing definitions of conflict, we will briefly consider both of these in turn.

One feature of conflict that has dominated the literature is 'armed conflict', which has been central to post-colonial experiences and to which in particular Africa is and has been vulnerable (Straus, 2012). Armed conflicts are defined "as open, armed clashes between two or more centrally organised parties, with continuity between the clashes, in disputes about power over government and territory" (Smith, 2004, p. 3). An armed conflict can also be defined using the Uppsala Conflict Data Program (UDCP), as "a contested incompatibility that concerns government and/or territory over which the use of armed force between the military forces of two parties, of which at least one is the government of a state, and that has resulted in at least 25 battle-related deaths each year" (Collier et al., 2008, p. 6).

Contemporary literature on armed conflicts has tended to focus on civil war (Humphreys, 2003; Li et al., 2017), which is considered as the most common form of conflict in the

modern states and societies since the end of the Cold War in 1991 (Gleditsch, 2007). The term civil war refers to an "ideological, political or perhaps religious contest for control of the state usually between the government and the rebel group" (Keen, 2008, p.12). According to the Correlates of War (COW) project, "a civil war is any armed conflict that results in a total of at least 1,000 battle-deaths during each year of the war" (Sarkees, 2010, p.5).

Beyond those who categorise conflict by counting the numbers and identity of victims, there are others who identify different criteria for recognising conflict. Wolfendale suggests (2017, p. 16), that "a war exists when the following conditions are met: 1) there are two or more organized groups; 2) These groups are engaged in intense hostilities; 3) No party to the conflict and no other third party has the authority and ability to effectively adjudicate between the opposing sides, punish them, and otherwise maintain effective control in the arena of the conflict". The third condition is important since it goes beyond the traditional focus of old styles of wars to include new forms of war. Older instances of war, as Patterson (2005, p. 42) notes, were: i) fought between states; ii) generally over territorial disputes; iii) involved combatants that included soldiers, professionals and conscripts; and iv) fought away from civilians with deliberate use of uniforms as a way of distinguishing combatants from non-combatants.

Rigterink (2012) argues that 'New Wars' have become more common relative to other types of wars and differ from 'Old Wars' in who fights, who is targeted and how and where fighting occurs. There are two intriguing aspects that derive from this characterisation of 'new wars' on which other authors expand. First, regarding who is targeted, Kaldor (1999) states that the ratio of military to civilian causalities in war, which was eight to one at the

turn of the 20th century, has been reversed to one to eight since the 1990s. From the vulnerability perspective, such a feature suggests the sensitivity of civilians as the most adversely affected, given their increased causalities. Bates (2011) further suggests that civilian causalities connected to war can happen in a variety of ways including those killed directly and those dying from indirect effects of war such as disease, hunger, and lawlessness. Additionally, the types of violence considered by conflict scholars have also changed. Raleigh and Dowd (2017) note that violent conflict inflicts physical and social damages to properties and people causing suffering including migratory movements. These can generate vulnerability.

Second, the feature of where fighting occurs could relate to another observed change in the nature of conflict, which is that wars have become multifaceted and more prolonged, tending to stay localized in rural areas. In these locations, they are chronic, with no clear start or end point, suggesting the vulnerability dimensions of exposure. In unending conflicts, as Keen (2008) has observed, the longer-term political, economic, and social grievances that lead to wars are overlaid with new grievances. Within such conditions, wars turn into a phenomenon that is not only without beginning or end but also without any clear contours and involving no limits in time and space on the use of violence (Münkler, 2005). Moreover, in such 'new wars', armed groups attempt to control territory through controlling the population (Rigterink, 2012). Thus, in controlling populations, armed groups seek to assert wider claims.

This is reflected in Goodhand's definition of conflict as "a struggle, between individuals or communities, over values or claims to status, power and scarce resources in which the aims of the conflicting parties are to assert their values or claims over those of others" (1999, p.

15). Further recognising the importance of control over resources, Keen argues that conflict is generated and sustained by particular patterns of profit seeking (2008, p. 15): "conflict is simply a breakdown in a particular system, rather than an emergence of another, alternative system of profit, power and even protection". Then the endowment of scarce resources in certain areas can make people living in them more exposed to conflict-induced vulnerability. Thus, both definitions characterise conflict as a consistent part of the social landscape. Both definitions also suggest that at least two parties are involved in a conflict situation and are opposed in their pursuits. These involved parties, which can be found at every level of a conflict, may include citizens, protesters, rebels, societal groups, governments, and other states (Walter, 2017).

To conclude, there seems to be an agreement that conflict has changed in nature and characteristics leading scholars to suggest that 'New Wars' have developed. These wars have been fought along identity, rather than ideological lines (Kaldor, 2001); with extensive social and economic ramifications, including cross-border dynamics, spillover effects, and reduced possibilities of achieving conflict resolutions (Beswick and Jackson, 2013). These new conflicts impose suffering on civilians, impoverishing present and future livelihoods of hundreds of millions of people (Goodhand, 1999), increasing vulnerability. Thus, the patterns that emerge in terms of vulnerability in situations of conflict in the context of contemporary wars, point to three key categories, namely location, resources and identity, on which the next three sections concentrate in relation to the three vulnerability dimensions: exposure, sensitivity and adaptation.

A. Location of conflict

This section reviews the literature on locations in which conflicts occur in relation to forms of violence that affect vulnerability, concentrating on cross the border nature of conflict and the prevalence of rural locations as sites of conflict. First, it considers how the transboundary dynamics of conflict affect resources on which people depend for livelihoods and thus influence vulnerability. Second, it reviews how the rural location of conflicts affects rural population vulnerability.

Regarding the transboundary dynamics of conflict, in most contemporary cases, wars are fought by groups operating on the peripheries of states. This may be a reflection of strong cross-border connections between armed groups and those who fund or otherwise support them, as Straus (2012) has observed in the context of Africa. Gleditsch (2007) notes that when conflict is taking place in a state, the risk that neighbouring states will also experience war increases. This can result from direct contagion or from non-actor-specific spillover effect (Gleditsch, 2007). Both can be influenced by transnational factors.

According to Straus (2012), most rebel groups involved in today's wars have strong transnational links, allowing them to move fluidly between states. In reference to Africa, Straus (2012), notes that the character of warfare has shifted from large to small wars, with small numbers of factionalized insurgents operating on the peripheries of states, rarely holding substantial territory, and exhibiting strong transnational networks. Some of the most cited of these transnational factors include shared ethnic transnational ties between people living across borders that can facilitate the transfer of violence between neighbouring countries (Dunne and Tian, 2013).

As Carmignani and Kler (2016) have stressed, as a result of artificial borders established by colonisers, ethnic groups tend to be split into separate adjacent countries. They show that spillover effects are more likely to originate across land borders, which can have large transnational movements of refugees, rebels and combatants, compared to maritime borders. One among many examples occurred following the Rwandan Civil War that broke out in 1994; belligerent activities by both Hutu refugees who fled to Congo and by Tutsi people from both sides of the border were believed to be among the factors that triggered the First Congo War of 1996, in which several other African countries were involved (Carmignani and Kler, 2016). These Rwandan Hutu refugees who fled to neighbouring Zaire and Tanzania in 1994 are estimated at 1.5 million people (Ansoms and Marysse, 2011; Barber, 1997).

Thus, through the perspective of vulnerability, two key dimensions can be identified, the exposure and sensitivity. Cross border locations will be more exposed than others to conflict occurrences and living within these locations as well as having ties with conflict actors will elevate the sensitivity of particular people and communities to conflict effects and vulnerability. Research shows that territorial spillover of conflict can negatively impact the economy of neighbouring countries (Geiβ, 2009; Murdoch and Sandler, 2002). Dunne and Tian (2014), demonstrate that these spillover effects are not isolated events from singular shocks on economic growth, but rather have prolonged impacts on several factors including physical and human capital assets, and institutions.

The literature on conflict spillover shows that when domestic state capacity is higher, conflict spillover is reduced (Brathwaite, 2010). Some positive effects have been noted in relation to population displacement within and across borders resulting from armed conflicts

(Muhwezi et al., 2011). According to Dunne and Tian (2014), through displacement of refugees a productive labour force can be created within the host country, which may positively impact economic growth. However, a study by Korf (2004) in Sri Lanka found that people living in villages located at or closer to the border between uncleared (rebel/militia-controlled) and cleared (state-controlled) areas, faced increased uncertainties with frequent incidents of violence and intimidation given the presence of armed groups.

With respect to rural location of conflict, as stated in the previous section, the multifaceted and protracted 'new wars' take place mostly in rural areas. Evidence indicates that growing numbers of conflicts are over livelihood resources, which are generally concentrated in rural areas (Straus, 2012), and therefore can make rural populations particularly vulnerable. In this regard, recent studies have demonstrated that in rural areas, external parties can play a dominant role in the conflicts' escalation and persistence (Gleditsch, 2007). This characteristic of conflict is an important element given that it shows the change in the nature of civil wars, which are largely considered as an internal conflict (Hegre, 2009; Li et al., 2017). Thus, these armed conflicts with external actors and factors, are generally lengthy and more violent (CEMARE, 2002; Frerks et al., 2014; Ramsbotham, 2005; UNEP, 2011).

The existing literature on conflict acknowledges that violence from protracted armed conflicts is particularly known for generating uncertainties, which negatively impact the productivity of rural people and communities' livelihood assets, leading to increased vulnerability (Collinson, 2003; Goodhand, 2001; Keen, 2008; Steiner et al., 2009). Because rural communities rely on their livelihood assets, any loss of one particular livelihood asset can affect their living conditions and other assets to which they will shift reliance in order to survive (Alinovi et al., 2007; Hermans 2012). Thus, taking the example of fishery-based

livelihoods assets, which are generally located in rural areas in most developing countries (Allison et al., 2002; FAO, 2014; Welcomme et al., 2010), they will be more exposed to vulnerability with increased pressure from displaced people, but at the same time fishers will be more sensitive to the effects of wars such as insecurity.

Furthermore, as noted by Welsch (2008), the intensity of conflict can vary depending on the types of natural resources with which rural areas that are affected are endowed. Thus in rural locations, as Welsch (2008) has shown, the probability of armed conflicts directly varies with the size and value of 'lootable' resources, such as mineral resources. Whereas, as he notes, the abundance of renewable resources such as agricultural lands which can raise labor productivity tend to reduce the incidence of armed conflicts. Lootable resources are those that can be easily appropriated by even small groups or individuals that can consist of militias and bandits (Welsch, 2008). This explains the use of violence that is seen in most cases of protracted conflict, in which combatants prefer deep bush close to rural areas where it is far easier to raid and loot (Gettleman, 2010; Hegre et al., 2009). Recognising the availability of lootable resources in rural areas, combatants can use tactics that give them access to areas and resources they can control. Therefore, looking closely at some of most intractable conflicts, as observed in the cases of Niger Delta and the DRC by Gettleman (2010), as well as in Sri-Lanka by Goodhand et al. (2000) it is instructive that wars affecting rural areas never seem to end suggesting the particular high exposure of rural areas to, and high sensitivity of rural communities to outbreaks of armed violence, thus representing the two dimensions of their vulnerability.

To conclude this section, it can be said that protracted armed conflicts with changing forms of violence have been predominantly taking place in rural areas (Hegre et al., 2009),

generally on border locations within national territory. With trans-border dimensions of factors and actors (Ramsbotham, 2005; Straus, 2012), and in a context of state fragility, these conflicts exacerbate the vulnerability of both people in affected areas and across borders. Additionally, such conflicts arise from complex causes often beyond the local communities' participation but through which they are the primary victims in affecting resources that support their livelihoods. Thus, the two conflict location factors of rural and near border, can represent two of the three dimensions of their vulnerability: exposure and sensitivity to the effects of conflict, including losses of or reduced access to livelihoods, which can be disastrous for their lives.

B. Resources and livelihoods

This section discusses relevant literature on how, in situations of violent conflicts, livelihood resources are affected by various actors, including state and non-state, in relation to vulnerability. Regarding resources, the section discusses creativity and the ways people engage with the opportunities provided by conflicts within unstable and fragile states. As well, those resources and livelihoods, allowing people to survive or enhance their lives as well as giving rise to multiple conflicts, are also discussed.

Situations of conflict in any country "create the environment in which all forms of violence are possible" (Dunne, 2012, p.4). These forms of violence, as Cliffe and Luckham (2000) stress, once they emerge, transform themselves and all situations around them including people's livelihoods. As noted by several authors, protracted conflicts are often characterised by various forms of violence that can both benefit and destroy people's livelihood resources (Alinovi et al., 2007; Collinson, 2003; Grzybowski, 2012; UNDG – ECHA. 2013; Warner, 2000). An important body of work on armed conflicts analyses how

violence, typically from civil wars, are devastating and destructive of infrastructure, livelihoods and lives (Keen, 2008). This is corroborated by the broader literature on conflict (for example, Mallett and Slater, 2012; Mayadunne and Phillips, 2016) that identifies effects on people and livelihoods including asset losses, decreasing income, disruption of social relationships, and loss of lives. In this regard, studies on conflict have demonstrated that during civil wars, civilians are targeted and suffer heavy tolls from extreme levels of violence inflicted to them (Jeong, 2000).

But the forms of violence used in situations of conflict can be manipulated for a wide variety of purposes (Keen, 2008) by parties benefiting from it. There are damaging political and economic systems of benefits that may emerge in the course of a war (Keen, 2008). Such beneficial opportunities which arise as result of war, according to Kaldor (2012) can lead to the persistence of the conflict and thus prolonged conditions of vulnerability. A noteworthy point here is about the creativity with which people use different forms of conflicts in engaging with opportunities and challenges that are brought by conflict (Bøås, 2013; Straus, 2012; Welsch, 2008). So, people can be part of the state army but also part of the rebel groups, plundering and ransoming to survive or to accumulate capital. As a consequence, the wars become difficult to end given that groups including those formed over the course of conflict will not accept giving up their gained livelihoods (Münkler, 2005). So, the longer the war, the more vulnerable populations living in affected areas will become.

In small-scale fisheries, impacts of the above cited types of violence can be either direct or structural, presenting challenges and disturbances on people's livelihoods (Allison et al., 2001; Ellis and Freeman, 2004; Ellis and James, 2003). Specific examples of direct violence point to livelihood loss mainly through destruction of assets, including social and physical

ones following deaths/injuries, displacement and/or forced migration, as well as infrastructure destruction (Alinovi et al., 2007; Collinson, 2003; FAO, 2015; Goodhand et al. 2000; Thorpe et al., 2009). As to structural violence, vulnerability will derive from human conditions and constraints including poverty, repression, hunger, social exclusion (Gerwarth and Horne, 2010; Goodhand, 2001; Krug et al., 2002; Lwambo, 2013), insecurity (Goodhand et al., 2000), and oppression (Gang, 2013). For Nigel (2009), structural violence can also include harassments from armed groups, restrictions on access to available assets and markets, and general breakdown of law and order, compelling people's migration to other countries. Thus, living in rural territories endowed with natural resources desired by the warring factions, will expose people to greater vulnerability.

Similar vulnerability factors were reported by CEMARE (2002) working on fisheries livelihoods in the Tangail district of Bangladesh. CEMARE identified three ways in which conflicts increase vulnerability of households. First, from losses of financial and physical assets forcing people to migrate. Second, from increasing pressure on fisheries resources leading to fish stock decline given the massive incoming of people forced to turn to fishing for survival. Third, from institutional failure leading to lack of fisheries regulations enforcement resulting in further conflict as most powerful players will tend to ignore the rules.

Institutional failure as a result of conflict can include political instability and fragility of the state, which can have significant impacts on resources and services that support livelihoods (Morse et al., 2009; Murshed, 2014), such as disintegration of management structures (Mallett and Slater, 2012; Mayadunne and Phillips, 2016). Alinovi et al. (2007) and Warner (2000) report instances of failure in natural resources management such as absence of

adequate relevant state structures, which consequently lead to the sustained depletion of resources on which local communities depend for livelihoods and thus increasing their vulnerability (Alinovi et al., 2007; Warner, 2000).

Several conclusions can be drawn from this section on resources and livelihoods in situations of conflict. First, various forms of violence can both benefit and/or destroy people's livelihoods, including the devastating and destructive effects on infrastructure and assets, such as decreased income, disrupted social relations, and loss of life. Second, forms of violence used during conflicts can be creatively manipulated by parties benefiting from them, leading to the persistence of conflict and thus prolonged conditions of vulnerability. Third, other forms of violence experienced such as election-related violence can cause mass killing, destruction of and less access to people's resources and livelihoods. Thus, people become vulnerable if their livelihood resources are less accessible. So, the longer the war, the more vulnerable populations living in affected areas will be.

C. Identity dimension

This section reviews the literature to identify how conflicts that are based on identity affect vulnerability, focussing on key identity attributes including ethnicity and gender. In doing so, the section elaborates on ethnicity across borders, paying attention to connections between groups, and gender-differentiated experiences.

In any given society, people construct their identities around certain social and cultural attributes such as ethnicity, gender, religion, etc. through which they can define themselves and which can assume the likelihood of violence (Fearon and Laitin, 2000). The ongoing debates about civil wars, have also been around the understanding of this identity dimension

which is acknowledged to be at the heart of most wars, especially the 'new wars' that are affecting communities and increasing their vulnerability. Most authors researching on wars have observed that the new wars' goals are about identity along either ethnic or religious lines, rather than about geopolitical interests or ideological pursuits (Beswick and Jackson, 2013; Fearon and Laitin, 2000; Kaldor, 2012; Rigterink, 2012; Smith, 2004). As noted by Keen (2008), official narratives, rumours and social productions of hate are often associated with these social identities, suggesting conflict as an innate part of a complex social environment within which human and social systems interact.

Regarding the ethnic identity, as noted by Smith (2004), groups can identify themselves as belonging to the same ethnic community on the basis of markers such as language, skin colour, religion, location, or history. Thus, in his view, ethnicity is a central component of identity and also a powerful component of common prejudice that has long been politicised in fueling various conflicts. Moreover, concerning ethnic identity, Smith (2004) identifies two factors that can be associated with violence resulting in people's vulnerability. First is a group's experience of discrimination in the community compared with other groups. Second is the group's deliberate mobilisation for defense of its perceived interests.

As Rigterink (2012) argues, fighting can occur with the aim of removing individuals with a different ethnicity from a particular territory rather than seeking to defeat the state with a competing ideology. With such a tactic, he notes, one group can instill the fear of retribution into the other group, leading to consequences including forced displacements, rape and ethnic cleansing. There are also other motivations that can be covered by ethnic violence including looting, land grabs, personal revenge and activities of thugs, which can threaten

certain groups within a community compelling them to seek protection (Fearon and Laitin, 2000).

Ethnic identity can also play a role in facilitating migrations out of conflict zones for people linked through inter-ethnic networks, as migrants can find refuge with people of similar ethnic groups settled earlier in destination communities (Schlee, 2004). At the same time, those of the perceived hostile ethnic group will feel themselves to be in danger, thus vulnerable due to exposure to possible mass violence.

Regarding gender identity, vulnerability has been observed in the sense that males and females, experience violence differently as they can experience conflict-induced risks differently (El-Bushra, 2003). Gender identities refer to "expected or idealised characteristics and behaviours of different sexes" (El-Bushra, 2003, p. 265). Several studies have suggested that in situations of conflict, while recruitment of combatants by the state and non-state armed groups is much higher for men than for women (Fearon and Laitin, 2000), women are much more exposed to sexual violence risks than men (Cramer, 2006; Lwambo, 2013; Mukwege and Nangini, 2009). Thus, during conflict, men are more vulnerable to physical harm given their exposure to taking part in the fighting as well as in organised criminality, banditry and robbery. Women are particularly vulnerable to displacement, either internally or across borders as refugees, and to physical harm given their exposure to sexual violence such as rape and sexual mutilation. Within this perspective, men are often considered as both perpetrators and targets of violence, while women are often spared as actor and often presented as victims, mainly of sexual violence.

Under such conditions of vulnerability, fewer men will remain in the village as the majority are forced to flee, fearing for their lives, if they do not join the militias. This compels women to take on other roles and increases their social consideration standing in their communities (Cramer, 2006; Goodhand, 2000; Kaldor 2013). The change of territories following displacements caused by conflict is usually undertaken at the expense of other livelihood capitals such as social capital through marriage, kinship, and gender relations, which tend to erode when communities are dislocated and relocated. Gender as a constitutive element of social relations between men and women, known as unequal (Scott, 1986), ties in with the social capital dimension of social relations in the livelihoods perspective (Scoones, 1998).

In this context, vulnerability to situations of conflict will translate into the disruption of socio-cultural ties of people leading to destruction of the structural sources of people's livelihoods at household levels (Muhwezi et al., 2011). One particular consequence of men's exposure to fleeing and dying as a result of conflict, is in generating increased numbers of vulnerable single-female headed and widow-headed households, "who in their everyday struggles for survival will have to navigate through structures of constraints that include social norms to carve out spaces for agencies or access to resources" (Ramnarain, 2016, p. 81).

While recognising that the social capital, through gender norms and relations, may be challenged in some communities as a result of conflict, there is some evidence that they can rather be strengthened in others (Collinson, 2003). In a study conducted by El-Bushra (2003) in Angola, within a displaced people settlement in the municipality of Viana, it was demonstrated that gender can influence how people experience conflict-induced relocation. The study revealed that men were experiencing more difficulty than women in adjusting to

the new situation. Another finding was that women were bearing the main financial responsibility given their involvement in traditional forms of savings, while men were forced to look after domestic chores including attending children needs. According to El-Bushra, the new environment was characterised by the lack of gender identity differences to which people were accustomed in their villages of origin due to patriarchal norms. Thus, the absence of gender difference considerations, was found to be the source of frustrations for men, as both women and men were compelled to pursue survival objectives.

Such a situation resonates well with Kaldor's claim that conflict alters gender hierarchies, facilitating the creation of new entrepreneurial opportunities (Kaldor 2013). Evidence is found in another study conducted in Mali by El-Bushra (2003) that demonstrated how conflict aggravated the erosion of traditional ways of life, resulting in nomadic women becoming less subdued and more involved in economic activities and decision making at the household and community levels. However, in all the case studies by El-Bushra, it was demonstrated that while gendered power structures, identities and roles changed as result of conflict, the ideological bases of gender relations appeared to remain unchanged, and may rather have been further entrenched. Such findings agree with Goodland (2001) who noted that violent conflict situations experienced can serve as a catalyst for increasing the role of women in society and politics, for example in Liberia and Rwanda.

In conclusion, this section showed that identity is at the heart of most 'new wars', affecting communities and increasing their vulnerability. Some groups are vulnerable based on their ethnicity, which exposes them to discrimination and possible mass violence in their communities. As to gender, the vulnerability of men is greatest to physical harm through exposure to participation in the fighting, while the vulnerability of women is greatest through

exposure to sexual violence. In both cases, sensitivity to displacement could translate in the disruptions of socio-cultural ties of people leading to destruction of structural sources of people's livelihoods including generating an increased number of vulnerable single-female headed and widow-headed households. Nevertheless, armed conflict situations can also be catalysts for increasing the role of women in the society.

Overall, despite significant research on violence and livelihoods, there is a paucity of references to fisheries settings experiencing effects of wars, in which fisherfolk are not participants and which are mainly over resources fishing communities do not need for their livelihoods. As these wars occur, they impact local communities' livelihood assets, particularly social assets which are disrupted with forced displacements and affect access to natural assets, which in fisheries reduce income opportunities. Most authors do not seem to elaborate on the mechanism of how these conflicts generate vulnerability to populations from their livelihoods perspective. The key observation is that there is limited reflection in the literature about vulnerability related to these 'new wars'. More accounts are needed in terms of conflicts exacerbating vulnerability in the fisheries sector.

3.3 Small-scale fisheries in a transboundary water context

3.3.1 Small-scale inland fisheries and livelihoods

A. General characteristics

Inland fisheries, which are characteristically small-scale, harvest fish from inland water environments including rivers, streams, and lakes (Funge-Smith and Bennett, 2019) and account for more than 90 percent of fishers (Tietze, 2016). The importance of small-scale inland fisheries as sources of income and nutritious food for people has been increasingly

considered within scientific communities (Béné, 2004; Neiland and Béné, 2013). In 2017, small-scale inland fisheries (SSF) were reported to contribute 11.9 million metric tonnes of fish representing an equivalent of 12.7% of the global fish catch (FAO FishStatJ, 2019). They support poor people's livelihoods, particularly those with limited alternative employments and either minimal or non-existent social security programmes (Béné et al., 2007). This important role is due to the open-access nature of SSF and their lower entry barriers (Funge-Smith and Bennett, 2019), compared to restricted access regulations known as limited-entry methods of fishery management, which uses licence limitation (controlled number of vessels) and catch rights (allowable catch), considered economically efficient (Waters, 1991).

Yet, as Tietze (2016) as well as Funge-Smith and Bennett (2019) note, the lack of quantitative data has undermined the recognition of SSF in high-level policy discussions. Their viewpoint is that SSF remain marginalised in major policy decisions pertaining to water ecosystems both at national and international levels including the SDGs[8], suggesting a lack of recognition of the importance of SSF. According to Funge-Smith and Bennett (2019), SSF receive attention in terms of conservation of fish habitats and species rather than in terms of their important role of providing food security and income to economically and nutritionally vulnerable groups of people.

Some of the characteristics of SSF include fish harvesting activities performed by self-employed fisherfolk, using diverse, low-tech types of fishing methods, gears, and boats, and targeting a wide range of fish (de la Torre-Castro et al., 2014; Salas et al., 2007). Other

[8] Sustainable Development Goals

known characteristics of SSF include the facts that: i) they tend to be artisanal (using traditional gear and involving fishing households), ii) they are often decentralised in their operations, iii) they are predominantly low in investments with simple equipment, iv) they are conducted in short fishing trips and near-shores, and v) their primary aim is subsistence (Tietze, 2016; World Bank, 2015). Additionally, as Tietze (2016) notes, SSF use relatively small amounts of energy if fishing is done mainly for local consumption.

Furthermore, SSF are mainly located in developing countries and generally in situations of insufficient management given their de facto open access nature (de la Torre-Castro et al., 2014; Salas et al., 2007); they experience resource overexploitation, and post-harvest problems include lack of infrastructure (Salas, et al., 200), such as processing equipment (smoking and drying) and cold storage facilities. In Latin America and the Caribbean as well as elsewhere in developing countries, small-scale fishers are known as multi-gear and multi-species, with low capital but labour intensive with remote landing sites, large numbers of migrant and seasonal workers, weak markets, and inadequate bargaining power among fishers (Salas, et al., 200). In **Table** 3.1, some of these common characteristics as pertaining to Africa are listed.

In developing countries, small-scale fisherfolk are among the most impoverished groups of people in rural areas (Allison and Horemans, 2005; Kebe and Tallec, 2006; Squires et al., 1998). Their incomes, which are often low and not sufficient to sustain households, are generally supplemented with other sources for income and food (Tietze, 2016). As Tietze (2016, p. 9) highlights, "other aspects of poverty in small-scale fisheries include poor housing, health, sanitary and environmental conditions; inequality and exclusion; lack of

infrastructure; and a lack of access to financial, social, health, education and other services, as well as a lack of political participation".

Table 3.1 Characteristics of small-scale fisheries and fishing communities in Africa.

Criteria	Characteristics
Technological	Use of mixed types of fishing technologies combining low- and high technology crafts and gear Use of motorized and non-motorized craft capable of beach landings (canoes, rafts, smaller boats)
Sociocultural	Use of traditional fishing practices and techniques, e.g. dugout canoes in West Africa Fishing units often involve family kin groups Fishing units usually involve smaller numbers of people than commercial operations
Economic	Small-scale catches Labor as opposed to capital intensive activity Owner of boat and/or fishing capital personally involved in fishing operation Clear gendered division of labor, e.g. fishers are men, and processors and traders are women Dependence on external inputs (general credit, boats, sails, motors, motor oil, petrol, spare parts), middlemen, and markets Fluctuating production and incomes linked to variations in natural fish stocks as well as man-made factors (markets and prices, availability of inputs) Combination of commercial production for sale and production for home consumption Diversified economic survival strategy combining fishing and agricultural activity Lower general standards of living in fishing communities than in other rural areas
Geographic and Demographic	Work out of scattered decentralized settlements along coastal and inland water areas Geographic mobility to follow seasonal migration of fish Higher fertility and population growth
Resource Access and Institutions	Fishery resources generally treated as common property Often open access. Some type of regulation of access through informal rules and Institutions

Source: Marquette et al. (2002, p. 325)

The states of poverty of small-scale fisherfolk are often associated with conditions such as decreasing availability of fish, low fish prices, inadequate provision of public services at landing sites and their low status in society (Allison and Ellis, 2001; Ellis and Freeman, 2004; Sarch and Allison, 2001; West, 2001). Other views attribute the origin of poverty amongst small-scale fisherfolk to the very nature of fisheries resources, which fluctuate due to external factors including conflict, seasonality, and natural disasters (Ahmed et al., 2013; Berkes, 2015).

As explained in the previous section, conflict can bring consequences including violence, loss of life, damage to physical property, or financial loss, and social disruption (Marschke

and Berkes, 2006; Scialabba, 1998) as well as displacement away from fisheries livelihoods locations (McClanahan et al., 2015). For example, following rebels' attacks during the war in Sierra-Leone, fisherfolk's boats and nets were destroyed as they were fleeing for their lives and relocating to neighbouring countries, principally Guinea and Gambia (Thorpe et al., 2009). Thorpe et al. (2009) further explains that some fisherfolk managed to move back to the South after local Kamajors civil defence militia were successful against rebels restoring some stability to the region with others migrating inland to seek alternative livelihoods. Similarly, during the Sri Lankan conflict, small-scale fisherfolk repeatedly suffered heavy losses of equipment and other livelihoods assets due to regular raids by fishers using fishing boat with dragnets from India plying the inshore waters of northern Sri Lanka (Bavinck et al., 2014).

Contrary to the previous perspectives, some authors have identified an institutional dimension through underlying causes that are often associated with fisherfolk poverty, in the sense that fisheries livelihoods are facilitated by institutions through various fisheries management mechanisms and arrangements (Béné, 2004, Ellis and Freeman, 2004; Lewins, 2004). This institutional focussed view considers the role of institutions in determining how and to what extent people access available natural resources (Allison and Horemans, 2005; Nunan et al., 2015). Consequently, the institutional focus in small-scale fisheries has climbed on the agenda of the intellectual efforts in natural resources management over the last three decades, leading to an extensive and rich literature on sustainable livelihoods and institutional processes in relation to fisheries livelihood coping mechanism to external environmental disturbances (Cinner and Huchery, 2014; Jentoft, 2004; Kosamu, 2015; Scoones, 2009).

B. Diversified nature and response strategies

In fisheries settings affected by conflict, response strategies used by fishers can be temporary, either including diversification or adaptation, or permanent, including withdrawing from fisheries to non-fisheries livelihoods (Coulthard, 2008). The concept of livelihood diversification suggests that "income and subsistence are derived from multiple sources, including casual employment, crops, livestock, migration and remittances" (Nunan, 2015, p. 113). As such, "livelihood diversification is believed to help households to continue making their living because adverse shocks typically do not attack all livelihood sources at the same time, generally leaving one or more other sources available to enable it to keep functioning" (Andersen and Cardona, 2013, p.2).

Whilst the importance of livelihood diversification is clearly emphasised in livelihood literature, there are differing interpretations of diversification choices by rural households. According to Ellis (1998), some argue that it is a deliberate household strategy (Goulden et al., 2013), while others consider that it is an involuntary response to a crisis that is shaped by the broader policy and institutional environments in which the rural people live (Levine, 2014; Scoones 2015). Moreover, in the perspective of departure from fisheries, Coulthard (2008) suggests that decisions to leave fisheries as well as that of adaptation are likely to be influenced by socially-embedded institutions including local cultures and fellow friends within fisheries. For example, as Korf (2004) suggests, when households migrate out of war zones, or send individual household members outside, they have to rely on their social assets. In this regard, prospects of remittance income, for instance, benefit migrant families as well as non-migrants by fostering trade and service delivery (Nyberg–Sørensen et al., 2002).

Nigel (2009) argues that most of these strategies are context based. Thus, under the conditions of insecurity, people involved in small-scale fisheries' activities suffer most from fear, especially single women whose husbands were either forced to flee or killed (Nigel, 2009). For example, in the Sri-Lankan conflict, the most fundamental problem that affected small-scale fisheries livelihoods was according to Nigel (2009), the insecurity which restricted mobility of fisherfolk and fish traders, limiting their choices of livelihood strategies. In another study by Korf (2004) in Sri Lanka, it was found that people living in villages located at or close to the border between uncleared and cleared areas, faced increased uncertainties with frequent incidents of fighting, violence and intimidation given the presence of armed groups. Furthermore, as Korf (2004) notes, small-scale fisherfolk's fishing can be substantially reduced during the conditions of insecurity, brought about by conflict situations that lead to the establishment of security areas, with some considered as cleared (state-controlled) and others as uncleared (rebel/militia-controlled).

Within the fisheries literature, there is the notion of safety-net function of fisheries, which suggests "armed conflicts occurring in developing countries create conditions that compel affected households to turn to fisheries as alternative employment" (Béné et al., 2010, p. 338). This safety-net function of fisheries is assumed to be of temporary assistance to people's livelihoods when faced with shocks (Coomes et al., 2010). As Coomes et al. (p. 519) argue, "fishing is preferred over forest extraction because of the pressing need for food and its higher returns to labour". Furthermore, fisheries can also serve as labour buffer, which refers to its capacity to absorb rural surplus labour (Béné et al., 2010). The rural labour surplus is defined as "the total number of rural employed persons that are not involved in agricultural employment, rural non-agricultural employment, and rural urban employment" (Yinhua and Peng, 2009, p. 9). Thus, according to Béné et al. (2010, p. 331),

this “labour buffer or safety valve function of the fisheries is linked to their common-pool-resource nature”. Such a capacity for absorbing unskilled labour force is what some authors refer to as the ‘welfare function’ of SSF (Béné et al., 2010; Béné, 2006; Nunan, 2014).

In conclusion, two key points can be identified from this section. Firstly, when faced with the effects of conflict, fishers respond with diversification to derive income from multiple sources with a possibility of departure from fisheries, choices that are shaped by existing institutional environments, both formal and informal. Secondly, the bigger problem brought on by conflict is insecurity which can i) restrict fishing mobility and limit livelihood choices of fishers due to fear; ii) reduce fishing substantially with the establishment of areas controlled by rebel/militia; iii) compel people to turn to fisheries as alternative temporary employment given the safety-net, labour buffer and welfare functions of fisheries; and iv) result in husbands fleeing or killed, leaving single women–headed households. Additionally, given the reliance on social assets, migrations can bring prospects of remittance income that benefit migrant families left behind.

3.3.2 Transboundary fisheries context and livelihoods

A. General context

Waterbodies, which range in size from oceans to rivers form natural physical barriers that often serve as geopolitical boundaries between countries (Dave and Munawar, 2014). Such shared waterbodies, referred to as transboundary waters, are important for the development of states (Schmeier, 2010). According to Duda and La Roche (1997), Asia, Africa, and Latin America each have over 60% of their land area as a part of transboundary river basins. They note that, “fully 23 countries in Africa have at least three-quarters of their area in portions

of transboundary basins compared to 13 nations in Europe and 8 in Asia" (1997, p. 129). However, in a situation of transboundary water, what happens to the waters in one country has implications for other countries sharing the resources, creating collective problems across the borders of nation states (Schmeier, 2010), including transboundary impacts on fisheries. Such problems have often been recognised as sources of conflict mainly due to competition for resource exploitation (Lubovich, 2009; Martin et al., 2011).

Therefore, the complex nature of transboundary water resources makes their sustainable and equitable management difficult for riparian nations (Ashour et al., 2019; He et al., 2014; Lawrence et al., 2018; Lubovich, 2009). Transboundary water issues are critical as they have enormous implications, including for food security of peoples and peace among riparian nations (Duda and La Roche, 1997). Given this complexity of transboundary water resources, efforts to address their associated issues have involved international cooperation between the countries sharing the resources in several parts of the world.

Earlier efforts to understand and address transboundary water problems involved international and regional framework conventions with cooperation between countries (Duda and La Roche, 1997; Duffy, 2006; Lawrence et al., 2018; Sengo et al., 2005), which were designed to effectively manage transboundary water resources while providing potential contributions for sustainable development and peacebuilding (Martin et al., 2011). These mechanisms at different levels, which include international environmental agreements (IEAs), have fallen short of their objectives given the disparity of economic status of concerned nations and sovereignty issues (Dave and Munawar, 2014; Duda and La Roche, 1997).

As a consequence, transboundary natural resource management (TBNRM), which is premised on the idea of the ecosystem being the most appropriate scale by which to manage resources, emerged among management alternatives that were considered suitable to address transboundary water issues and resolve their associated conflicts (Abbott et al., 2007). TBNRM in theory allows for a greater geographical range of protection for certain ecological features (Abbott et al., 2007). However, the application of TBNRM has been limited to marine environments, where fisheries straddle national and/or international pelagic waters (Abbott et al., 2007).

Literature relating to transboundary waters resources makes it clear that forms of exploitation of the waters by certain countries to respond to their rising development needs, including, among others, hydropower, navigation, irrigation, and water supply, can have important negative effects on the same shared river resources needed by other countries, thus impacting the livelihoods of millions of people. As recognised by Winemiller et al. (2016), projects that address important energy needs often overestimate their economic benefits but underestimate their far-reaching effects on the biodiversity of the exploited waters resources, which is critically important to its fisheries (Winemiller et al., 2016).

B. Effects on fisheries and fisherfolk

Fishers and fisheries appear to be affected by transboundary waterbodies through several factors; the main effects of transboundary waters on fisheries livelihoods, with emphasis on small-scale fisheries, are discussed below. It is by no means an exhaustive list but presents some key elements that derive from the literature.

Management

Managing transboundary lakes is challenging and complex due to several factors that pose serious threats to fish stocks as well as to fisherfolk's wellbeing. The first factor consists of the institutional difficulties which are associated with complex governance challenges frustrating management efforts (Song et al., 2016). According to Song et al. (2016), this problem often derives from mismatches between management approaches of legal boundaries on the one hand and approaches to social-ecological sustainability for fish stocks availability on the other. In other words, the management of transboundary waters is complex and challenging in the face of increasing pressures owing to the influence of politics of reconciling political borders and waters basin boundaries (Zeitoun et al., 2013).

In addition, Curtin and Martinet (2013) note that a transboundary fishery that is exploited by two countries with unequal technologies, has unequal quota allocations given the differences in economic efficiency, and results in the rise in unemployment. These unequal quota allocations can affect the viability of the economic activities of local communities dependent on the fishery (Curtin and Martinet, 2013). As Servos et al. (2013) observe, such political differences and social-ecologic priorities can represent real barriers to transboundary lake management and governance (Servos et al., 2013). For instance, treaties can sometimes be signed without considering international water-sharing norms, and can become unfair and irrelevant due to socio economic and environmental consequences both upstream and downstream (Zeitoun et al., 2013).

This difficulty of managing a transboundary lake by two riparian countries having different and often conflicting water exploitation approaches was also observed by Nyikahadzoi et al. (2017) in their work on the case of Lake Kariba shared with Zambia (45%) and Zimbabwe

(55%). As they note, while in Zambia the focus was on maximising employment opportunities from the fisheries, in Zimbabwe the emphasis was more on the sustainability of fisheries resources. These differences in management priorities, which were illustrated in the specification of required types of gears between the two countries, had been reported to generate conflict in the use of fisheries resources. As the authors note, during the post-1999 period, after the institutional protocol's signature between Zambia and Zimbabwe on technical co-operation in the use of lake resources, Zimbabwean fishers were allowed to use up to five gillnets with 102 mm mesh size, while Zambian fishers were allowed to own as many nets as they could afford with mesh size not exceeding 63mm. Consequently, where the lake is narrow, Zambian fishers would capture the fish that escaped Zimbabwean fishers. As a result, Zambians had a large quantity of small fish to sell through the Zimbabwean market, threatening the viability of fishing in Zimbabwe and creating impediments to livelihoods of fisheries dependent people (Nyikahadzoi et al., 2017).

Another aspect within the management of transboundary waters through which fishers have been affected, is linked to agreements between riparian countries. Using the example of the 2004 Agreement on Lake Victoria between Uganda, Kenya and Tanzania, it was reported that with this agreement access to Lake Victoria fisheries was open for fishers from any of the three nations to fish in their territories provided that they followed the applicable local laws such as related to catch sizes and net sizes, which, however, had not been standardized in riparian countries (Lubovich, 2009). As a consequence, there have been cases of arrests of fishers during cross-border fishing in foreign waters for violating local fishing laws (Lubovich, 2009). This often is the case as earlier works by Lungu and Hüsken (2008), have demonstrated in relation to the movements of fish, which mostly determine the movements of fishers. Lake Tanganyika fish movements are generally caused by food

availability, spawning and predator avoidance (Phiri and Shirakihara, 1999). The literature also documents the effects of anthropogenic eutrophication in the widespread out-migration of fish (Barletta and Lima, 2019). Thus, as migrating fish have no boundaries, some fishers in search of increasing their catches can pursue fish beyond their national water boundaries (Allison et al., 2001; Nunan, 2010).

Overfishing

A third factor in how transboundary lakes affect fisheries resources and fishers, is overfishing, which leads to fish stock reductions with major impacts on ecosystems as well as human development (Servos et al., 2013). According to Lubovich (2009), overfishing has become a major problem that has significantly affected the livelihood security of people. The danger of overfishing is greatest in the waters belonging to the government with the weakest laws. As Lubovich (2009) notes, overfishing can cause the fish population to decrease in one part of the lake that can have repercussions for the species across the entire lake.

Lubovich (2009) observed that following the strong European demand for Uganda's Nile Perch, there were yearly increases in the value of fish exports that motivated unsustainable catches. So, Lubovich's study shows that the unsustainable rate at which the Nile perch fish was taken from the lake led to fish catch decreases in recent years due to the increased number of fishers and the use of modern equipment (Lubovich, 2009). As explained by Odada et al. (2004), due to the boom in the Nile perch export market, many more people who were never fishermen moved to cash in on the "lucrative" industry. This may have pushed traditional fishermen to resort to the use of destructive fishing methods to sustain their level of livelihood and food requirements.

In summary, much of the literature on transboundary lakes has been limited to management issues. More significantly, the extent of cooperation arrangements for managing the transboundary effects of hydrological and environmental changes, can address issues of different and unequal exploitation by different countries. The literature on transboundary waters acknowledges the transboundary challenges of managing fisheries resources given that any form of waters resources exploitation by one riparian country, will have impacts on the other riparian countries and on the fisheries based livelihoods (Lawrence et al., 2018). In addition, the literature notes that transboundary waterbodies are used in various ways including for water supply, power generation, shipping transportation, and food security, which lead to various impacts on fisheries (Nunan and Onyango, 2017). However, it appears that impacts of external conflicts on fisheries resources and fishers are largely overlooked by the transboundary lakes' fisheries literature.

3.4 Institutions

3.4.1 Context, definitions and types

Researching on institutions is relevant to the study of coping with and adapting to conflict-induced change and understanding the role played by different types of institutional arrangements in influencing people's livelihood decisions related to natural resources available to them. Therefore, sufficient insights into the forms of institutions and the types of impacts on natural resources management and livelihoods are of the utmost importance.

North (1990) and Nee (1998) view institutions as rules, norms and values which are produced and maintained in relation to economic growth. North's (1990) concept considers institutions as "rules of the game" that constrain and/or enable behaviour in social and

economic life. For Leach et al. (1997, p. 11), institutions are defined as ‘‘regularised patterns of behavior between individuals and groups in society’’. Such an approach, according to them, blurs the distinction between rules and practices suggesting that rather than existing as a fixed framework, 'rules' are constantly created and recreated through people's practices. The definitions above seem to imply a managerial function, which matches the mainstream institutional theory’s take on institutions as rules, regulations or conventions (Mehta et al., 1999).

In the perspective of environmental entitlements, Leach et al. (1999) recognize that multiple institutions with sometimes diverse interests are involved in natural resources management and many of these institutions are informal and dynamic. This view has root in North’s (1990) argument that distinguishes institutions from organizations or formal structures. However, as Jentoft (2004) explains, organisations use rules to function, and the rule systems operate by organising people into functioning bodies. For instance, within the rural context, informal institutions can emerge internally within communities or groups of people, rather than be driven by external interventions (Slater and Twyman, 2003).

For the purpose of this study, institutions are seen as ‘rules of the game’, with structures and arrangements beyond those formed for natural resources management, which set the context that can shape people’s livelihoods and mediate their livelihood strategies in the context of vulnerability. A range of institutions, both formal (e.g. government policies and regulations) and informal (e.g. kinship and local norms), may be drawn on to enable people respond to uncertainty, shocks and change.

Theoretically, “institutions may thus be both formal and informal, often fluid and ambiguous, and usually subject to multiple interpretations by different actors” (Scoones, 1998, p. 12). Such an approach makes vague the distinction between rules and practices, suggesting that rules do not exist as a fixed framework, rather they are constantly created and recreated through people’s practices (Leach et al., 1999). There is evidence within natural resources literature that institutional arrangements are created by people in their communities to help them in the allocation of benefits for resource users (Agrawal, 2001). These institutional arrangements through which rules are implemented (Imperial and Yandle, 2005), affect human decisions, actions, and outcomes in relation to natural resources (Tang, 1991). Much of the dominant institutions' literature makes it clear that the roles of institutions, through enforcement of restriction mechanisms over access to and utilisation of available natural resources, are for resource conservation outcomes (Barrett et al., 2001), rather than for improved resources users’ livelihoods outcomes.

Institutions, in their contexts and times, are viewed as shaping livelihoods by mediating access to natural resources and consequently impact the livelihoods of communities in the rural areas. This view considers that “institutions play a critical role in determining the nature of access people have to natural resources” (Nunan et al., 2015, p.203). This perspective is reflected in the SLF, where institutions are seen as critical in mediating ways that enable or constrain people in their choices of using livelihood assets that are available to them (Scoones, 1998). A key assumption in SLF is that policies, institutions and processes (PIP) set the context that shapes livelihoods of people. Such a position attests to the powerful role that institutions play in mediating access to and benefits from natural resources and to their impact on the livelihoods of communities (Nunan, 2015; Scoones, 1998).

Within this context, "the policy and institutional contexts include the role of state regulations and 'community' based rules that affect access to resources" (Allison et al., 2001, p. 71). It is important to note that institutional factors that impinge upon people's livelihoods at the local level may be outcomes of larger policies and processes at the macro level (Krantz, 2001). In the case of government failure, according to Acheson (2006), government agents will not generate effective management rules of open-access resources such as inland waters. In the literature on state failure, such inability of government agents is linked to the behaviours of political actors and government officials, as opposed to that of the public at large (Lemarchand, 1997).

Linking the above to fisheries resources, which are considered as an important component of rural livelihoods in developing countries, one can understand why it is argued that poverty is more related to institutional factors than to fluctuating conditions from a variety of natural causes (Béné; 2004; Ellis and Freeman, 2004; Lewins, 2004). It may further explain how well-intended policies for the benefit of fisheries ecosystems can be at the same time stressors to fisherfolk (Brown, 2016) setting adverse institutional contexts that can make and keep people poor (Allison et al., 2006; Béné, 2003). For example, as stated earlier, Brown (2016) refers to policies in 2000 that established MPAs in Mnazi Bay in Tanzania, which contributed to loss of livelihoods by reducing the area where people could fish, forcing them to fish further out from shore. It appears that while the main objective was to ensure sustainable conservation of fisheries resources (Agrawal, 2001), such an institutional environment can absolutely restrict people's choice of livelihood strategies (DFID, 1999). Thus, the assumption that, while the empowerment of marginalised users has been seen as key to institutional approaches to natural resource management (NRM) (Nunan, 2006), it has not always yielded positive outcomes in fisheries settings.

Furthermore, literature on social capital while recognizing the positive role of social networks, suggests that there are instances in which local institutions in forms of social norms or traditional taboos can trap people within harmful social arrangements and can hinder the adoption of effective coping strategies (Pretty and Ward, 2001; Reed et al., 2013). This ties in with the social capital dimension of social relations (Scoones, 1998), which relates to issues of marginalisation and the exclusion of certain groups from the rights and opportunities of accessing and using available livelihoods resources (Allison et al., 2011). For example, Ellis (2000) and Nunan et al. (2015) have observed that men and women have different assets, different access to resources, and different opportunities in fisheries livelihoods strategies. According to Smith et al. (2005), such social relations, reflected in the differentiation of labour, livelihoods strategies, and opportunities, are important elements of the "institutional environment" (Smith et al., 2005).

3.4.2 Critical institutionalism

In the literature on institutions, while there has been an emerging consensus that institutions operate as mediators of people-environment relations in facilitating people's access to and benefit from available natural resources in their environment (Leach et al., 1999), discussions remain over understanding the dynamics of institutional arrangements engaged in this role. Most discussions include questions about their formation processes, nature and functioning in influencing and shaping resource users' livelihood options and outcomes (Lewins, 2007).

Therefore, the focus of this study is placed on dynamic institutions within the perspectives of critical institutionalism (CI). The rationale for using CI stems from elaborating on the

PIPs[9] box of the SLF which shows that institutions mediate livelihoods. CI argues that communities are heterogeneous given people's complex social identities (Cleaver, 2012; Hall et al., 2014) and it is thus relevant because of its view that institutions cannot always be designed since those that are designed may not last or be effective.

Critical institutionalism (CI) approaches begin by focusing on the interactions between the natural and the social worlds rather than by predicting the outcomes of particular institutional processes (Cleaver, 2012). In the CI perspective, institutions are multifunctional, dynamic, and can rarely be explicitly designed for a given purpose (Cleaver, 2012; Cleaver and De Koning, 2015; Jones, 2015). Thus, CI refers to the literature which understands institutions as context-specific and evolving, shaped by local history, created as a result of human actions in response to new circumstances and with reference to accepted or past arrangements (Cleaver, 2012; Jones, 2015). Furthermore, there are power structures that work to sustain institutions and to shape participation, access and outcomes in relation to the diversity of livelihoods, resources and uses (Cleaver and De Koning, 2015). Within this view, CI recognises diversity in social phenomena and highlights the influence of social structures in shaping individual behaviour, unlike mainstream institutionalism which assumes that human behaviour is shaped by rational choice (Cleaver, 2012).

In this line of Critical institutionalism thinking, the underlying assumption is that institutions for natural resource management are "borrowed or adapted from other available arrangements such as multipurpose village assemblies, women's groups or savings clubs" (De Koning and Cleaver, 2012, p. 279). In other words, they are borrowed from existing

[9] Policies, institutions and processes

institutions and sanctioned social relations (Clever, 2002). One of the key aspects of Critical institutionalism is the distinction made between formal/bureaucratic institutions and informal/socially-embedded institutions (Jones, 2015). As Cleaver (2002, p.15) notes, "without such bricolage and the social embedding of new arrangements, bureaucratic institutions are unlikely to be effective". However, it should be noted that bureaucratic institutions and socially-embedded institutions are not necessarily easily distinguishable.

The distinction between bureaucratic institutions and socially-embedded institutions was first mentioned by Cleaver (2002, p. 13) suggesting that "bureaucratic institutions are those formalised arrangements based on explicit organisational structures, contracts and legal rights, often introduced by governments or development agencies, whereas socially-embedded institutions are those based on culture, social organisations and daily practices, commonly, but erroneously referred to as 'informal'. Thus, for Cleaver (2002), bureaucratic institutions are forms that often take on the overall mechanism of access to natural resources drawing on formal procedures to implement different relevant policies and legislation at national and regional levels. According to Gutu et al., (2014), bureaucratic institutions are likely to be perceived by local people as costly, cumbersome, and lacking in legitimacy. As to the socially-embedded institutions, they are recognised to be associated with social and cultural identities in relation to aspects of bricolage processes in mediating local livelihoods based on available natural resources (Cleaver, 2002; De Koning and Cleaver, 2012). The theory as conceived by Cleaver considers the process of bricolage happening in the context of complex social identities and unequal power relations that shape management arrangements and outcomes of natural resources (Cleaver, 2012), a key feature of fisheries resources.

The literature on CI considers that outcomes of socially-embedded institutions in contexts and time can be either part of the problem or part of the solution to community livelihood concerns. Therefore, according to Hall et al. (2014, p.73), "Critical institutionalism builds on three key premises; i) the complexity of institutions entwined in everyday social life; ii) their historical formation; and iii) the interplay between the traditional and the modern, formal and informal arrangements". An unanswered question that emerges for CI is whether more decentralised or democratic institutions will necessarily generate more equitable livelihood outcomes and vice versa (Hall et al., 2014). Jones (2015) makes a point of suggesting that despite the evolution of Critical institutionalism, unequal outcomes will still happen, and that win-win solutions should not be assumed.

One of the defining characteristics of CI is referred to as institutional bricolage (Nunan et al., 2015), which is defined as a process of piecing together new and existing institutions to adapt the institutional arrangement to the context (Cleaver, 2002). In Critical institutionalism thinking, bricolage is seen by some scholars including Cleaver (2015), Wang et al. (2018), as well as Khan and Gray (2006), as a strategy for dealing with fragmented or weak governance arrangements. Such weak governance arrangements are generally found in conflict-ridden societies or fragile states, where voids created by governance failure provide space for arrangements that are tailored to fit local circumstances with varying degrees of effects on different actors (Carstensen, 2015; Cleaver and De Koning, 2015). Bricolage is also seen as offering processes that allow new institutional arrangements to become embedded in everyday life and so to increase the potential for creativity and pragmatic conflict resolution between actors in resources usage (Cleaver and De Koning, 2015; Lewins, 2007).

Within such a context of institutional bricolage, those marginalised can selectively choose to engage with institutional arrangements that best align with their interests and dynamically adapt others to a multi-livelihood situation (Cleaver and De Koning, 2015; Lewins, 2007). In this way, they use what is already part of existing institutions to make them fit better with livelihood priorities (Cleaver and De Koning, 2015). Cleaver and De Koning (2015, p. 8) go further to argue that "it is highly unlikely that a single institutional solution will represent all users and livelihood interests". Thus, Cleaver (2002, p. 15) postulates, “Without the social embedding of new arrangements, bureaucratic institutions are unlikely to be effective”.

With regard to fisheries livelihoods, the complexities of fishing communities and the fact that they are heterogeneous groups with unequal power and access to natural resources, are recognised in the perspectives of institutional bricolage (Hall et al., 2014; Lewins, 2007; Nunan et al., 2015). According to Cleaver and De Koning (2015, 10), "poor and marginalised people often find it difficult to influence the formal rules and the rules in use, to negotiate norms, and experience the costs and benefits of institutional functioning differently to more powerful people". Additionally, as Cleaver (2012) notes, the ability to negotiate institutional spaces that can affect the rules-in-use of resource access is also determined by the physical presence, which can be a challenge for groups in constant mobility and displacement from conflict-induced constraints, limiting their ability to pursue sustainable livelihoods.

Furthermore, institutional processes in rural communities relate to their strong association with social and cultural identities, which influence local institutions being so deeply embedded in local livelihoods that make it difficult for outside actors to consciously identify

and draw upon them (De Koning and Cleaver, 2012). This being the case, focusing on a single aspect of people's identities can be problematic (Cleaver, 2002). In such a context, people will rarely fit into the divide of their livelihoods. This is illustrated in the example of the Usangu people of Tanzania, who to maintain themselves economically, move between pastoralist and agriculturalist identities, sometimes investing their farming surplus in cattle and at other times in gold mines, etc. (Cleaver, 2002).

In summary, it is clear from the literature that institutions, while being undoubtedly important in natural resources management including natural livelihood resources, their formation processes either explicitly designed or borrowed from existing socially-embedded arrangements, have no linear outcomes. However, given the understanding of the complex and socially construed reality from which the bricolage approach stems, bricolage activities can offer institutional solutions in most challenging environments where supports to formal institutions are weak (Funder & Marani, 2015; Haapala et al., 2016).

3.5 Analytical framework

Following the literature review, it can be established that Sustainable Livelihoods Framework and Critical institutionalism both point to the idea that institutions mediate livelihoods and livelihood strategies of vulnerable people and communities. Therefore, the theoretical framework, combines elements of both the SLF and the CI to guide and inform the analysis of how institutions mediate livelihoods responses in situations of change including conflict induced.

3.5.1 Sustainable Livelihoods Framework

The Sustainable Livelihoods Framework encapsulates the idea that people have or can develop multiple survival strategies when faced with uncertainties and threats to their livelihoods (Ellis, 2000; Nunan, 2015; Scoones, 2015). Relevant to this study and emerging from the literature on fisheries livelihoods, is the fundamental element that institutions mediate livelihood responses in situations of external environmental changes (Acheson, 2006; Agrawal and Gibson, 1999; Levine, 2014; Nunan, 2010; Pretty and Ward, 2001; Scoones, 2015). Such situations may include conflict-induced disturbances that fisherfolk survive through coping and adapting strategies (Béné, 2004; Berkes, 2015; Ellis 1998). Therefore, focusing on institutions is appropriate for an analysis that uses the SLF to understand how in situations of adverse change, they create an environment of opportunities and constraints that impact on survival strategies of fisheries communities and their livelihoods. One of the SLF's central foci has been poverty reduction in rural communities relative to the wider context of their vulnerability to external shocks and disturbances. This resonates well with the situations of most if not all fisherfolk in developing countries.

Using this theory, the livelihoods approach is looked at through responses to vulnerability factors (Allison and Ellis, 2001), where assets or activities of individuals and households are used as a coping strategy when faced with disturbing shocks and stresses. In this context, the 'household' is treated as the unit of analysis.

3.5.2 Critical institutionalism

To analyse fisherfolk's coping strategies within the context of vulnerability due to conflict induced situations under the SLF, this research makes use of a dynamic institutional

approach (Cleaver, 2002). Critical institutionalism perspectives are applied to the analysis of bureaucratic and socially-embedded institutions and processes in the SLF's section under Policy, Institutions and Processes (PIP) as pertaining to small-scale fisheries facing disturbances to their livelihoods.

Critical institutionalism is conceptualised through the process by which actions of fisherfolk are influenced by the institutional arrangements emerging from conflict-related conditions. Institutional bureaucratic and socially-embedded institutions here consist of institutions, used either from local fisheries management government mechanisms, local cultural norms, or any other types of institutions in place that are used to create an institutional environment enabling fisherfolk more access and uses of their available assets in situations of adverse change.

3.5.3 Integrated conceptual model of the research

Using both the livelihoods framework and Critical institutionalism approach, the study refers to coping strategies by fisherfolk as different activities and capabilities that are associated with livelihoods responses to survive situations of adverse changes. Such narrowing of the focus is justified by the fact that the research concentrated on how i) the concept of vulnerability in situations of adverse changes could be applied to the context vulnerability in the SLF and ii) the Critical institutionalism perspective could be applied to the analysis of mixed institutional contexts in the 'PIP' section.

Fig.3.1 Conceptual model representing the analytical framework integrating these two theories in the research.

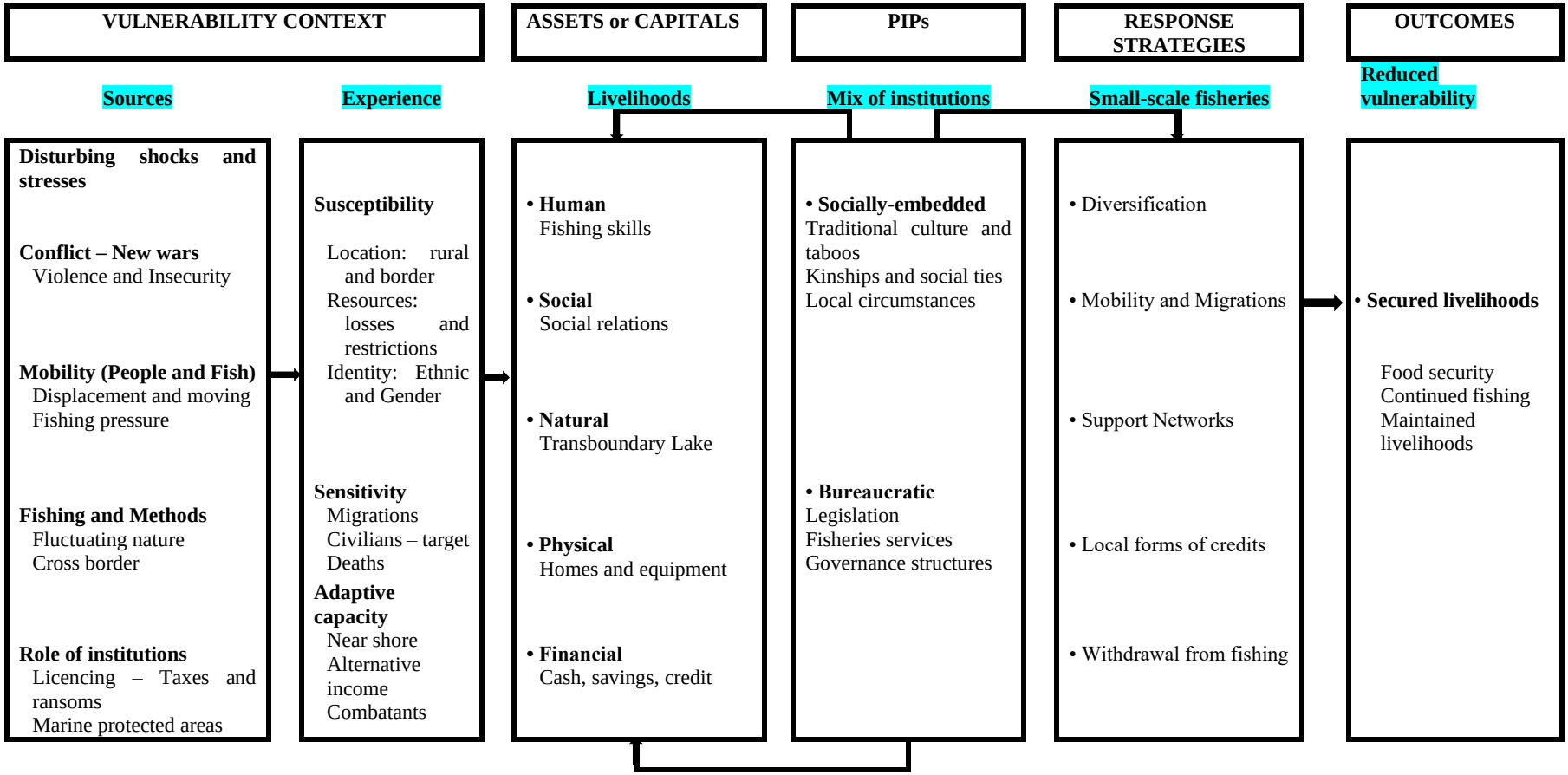


Fig. 1. Source: Adapted from DFID' Sustainable Livelihoods

3.6 Conclusion

This literature review discussed key theories, concepts and findings related to the research question of '*how do small-scale fisherfolk secure livelihoods in situations of change?*' in the context of vulnerability generated by situations of conflict and the transboundary nature of inland lakes fisheries resources. In particular, bodies of existing literature were explored on how fishers are affected by, and respond to changes from conflicts and from fishing on a transboundary lake, as well as the roles played by institutions in shaping their livelihoods and livelihoods strategies. Furthermore, the theoretical frameworks, approaches and key principles as related to SLF and CI, were also examined.

As a result, four key points, concepts, issues and gaps identified from this review of literature can be summarized as following: First, most of the previous studies seem to have concentrated extensively on the effects of wars and changing forms of violence in a variety of contexts. The key observation is the little reflection on the mechanism of vulnerability generation within fisheries by these new wars when they are linked to resources and actors other than fisheries livelihoods assets and fishers. Second, based on the reviewed literature, there seems to be little reference on the roles that multiple institutions, can play in mediating response strategies with the potential of exacerbating vulnerability. This is different from cases of well-intended policies that, rather than benefiting fisheries, turned out to be disturbing to fisherfolk. Third, while some of the multiple gender issues in fisheries appeared to be covered in the literature, there is paucity of studies on how men and women respond differently to same sources of vulnerability. Four, on cross-border conflict spillover effects in fisheries, it appears that most of previous studies seem to have concentrated extensively on territorial boundaries at the country level. However, forms and impacts at

local communities' livelihoods still need to be researched, particularly in the context of maritime boundaries.

Chapter 4

RESEARCH DESIGN AND METHODS

4.1 Introduction

This chapter presents the philosophical assumptions underpinning the research, the design approach as well as the paradigms which governed this study. In this chapter, the rationale for the choice of the research design embodied in this study and of the underlying research methodology are explained. Their appropriateness within the existing research tradition as related to the scope and the field of the study are justified. This chapter also sets out instruments and tools used for data collection and analysis, while providing details for the selection of case study sites, key informants and data sources, as well as the units of analysis of the study. In this chapter, the ethical principles, procedures and concerns considered in the study are also discussed. This chapter also explains the approach taken for data collection in the DRC. These two dimensions of the study as entwined in the research question investigated, determined the choice of the methodology adopted that was dominated by qualitative approaches.

This chapter is divided into five sections. The chapter begins by focussing on the research philosophy, describing the interpretive position chosen based on the research question. Then, the concentrates on research design and the rational for using the case study design with cross-sectional elements. The section that follows is devoted to fieldwork justifying the choice of Lake Tanganyika as the case study and elaborating on the rational for selecting the research sites. The fourth section focuses on methods elaborating on the selection of sampling and sources of data as well as data collection and analysis methods. The section

also deals with the strategy of comparing the study sites and explains the suitability of the researcher. The third section identifies the relevant ethical considerations and at the same time expands on the issues and processes of addressing them in relation to the study. Finally, the sixth section elaborates in detail on my experience conducting fieldwork in a conflict zone.

4.2 Research philosophy

The research used the qualitative approach which can be categorised under the philosophical root of interpretive research characterised by the integration of more subjective human experiences rather than purely objects of the external reality. The interpretive approach adopted in this study falls within a research tradition that consists in seeing the situation through the eyes of participants (Cohen et al., 2013). This interpretive approach stands on the social constructivist ontology, which believes that reality is socially constructed and as such seeks the meaning of the phenomenon from participants' understanding (Gray, 2013; Hollway and Jefferson, 2000).

With such an ontological position, this research adopted a subjectivist epistemology which can gather, explore, and interpret communities' insights and meanings (Gray, 2013; Saunders et al., 2011), to understand the processes of livelihood responses to conflict-induced disturbances. Furthermore, according to Saunders and Tosey (2012, p. 58), using the epistemological orientation of subjectivism is appropriate in studies "where the researcher is more concerned with gathering rich insights into subjective meanings than providing law-like generalisations". Therefore, considering the tradition of the qualitative research approach chosen (Robson and McCartan, 2016), such an epistemological orientation is inductive.

According to Gray (2013, p. 37), “interpretive studies are typically inductive in nature and seek to explore peoples’ experiences and their views or perspectives of these experiences”. In the inductive approach, procedures of data collection and analysis are guided by specific research questions and defined objectives (Thomas, 2006), an approach which was in congruence with this research. The inductive approach of this research was also demonstrated in the choice of exploring data through two existing theories to answer the research question developed from the literature, rather than being developed out of any theory with hypothesis to be tested (Braun and Clarke, 2013).

Adopting an inductive approach, this research embraced the methodological perspective of phenomenology (Blaikie, 2007; Gray, 2013). The phenomenology paradigm builds on the idea that approaches to data collection and analysis are intentionally focussed on participants’ meanings, beliefs and value within their experience lived in their natural settings (Thomas, 2006). As Blaikie (2007, p. 124) puts it, “social worlds are already interpreted before the social scientists arrive”. Therefore, using the interpretive perspective through a case study design and the cross-sectional approach which are discussed in the following section, allowed the generation of an in-depth understanding of the fisheries livelihoods dynamics in relation to institutional factors as captured in the research question.

Furthermore, recognising the importance of qualitative analysis is one consequence of the recognition of complex system phenomena for natural resource management and the nature of their nonlinearity (Berkes et al., 2008). Therefore, details of data collection and analysis acknowledged the social complexities and nonlinear nature of fisheries in study areas. Phenomenology, as the approach used in this study, was reflected in the sampling procedures

and in the chosen data collection techniques involving dialogue with people living their real-life experiences which are major points of focus of this study.

4.3 Research design

An appropriate choice of a study design is vital to ensure that researchers obtain evidence that will enable them to answer research questions as unambiguously as possible (De Vaus, 2001), and to minimise biased results (Levin, 2006). According to Gray (2013), the knowledge of research philosophy helps researchers to recognise which designs would work to carry out the study, and therefore in the choice of the appropriate design. 'Design' here is more than just designing research tools, rather it "means the overarching structure of the research including the kind of evidence that is being gathered, from where, and how it is going to be interpreted" (Gray, 2013, p. 20). Therefore, based on the interpretivist philosophy adopted in this research and the type of the research question considered, which was implemented through qualitative research approach, the appropriate research designs for this study was a descriptive case study design involving cross-sectional approach. These design methods targeted mainly non-numerical data typically in forms of words that were collected and analysed mostly through qualitative methods and tools. The design of this study considered the methods that could be used in conditions of uncertainties in the research sites. There are other types of research designs that are also relevant to studies addressing complex phenomena and involving fieldwork, but which were not chosen for this study. Some of these other types of research designs include experiment, longitudinal and ethnography.

4.3.1 Experimental design

Experimental research is often referred to as "gold standard" on the basis of its rigorous, robust or scientific evidence obtained using techniques such as randomised controlled trials (RCTs) and measurements. These techniques are concerned with establishing a causal relationship between two types of variables, namely independent or intervention and the dependent or outcome (De Vaus, 2001; Drew et al., 1996). One prominent feature in experimental design is the involvement of manipulation of any independent variables or the factor under study (De Vaus, 2001; Drew et al., 1996). In this way, the researcher has a certain amount of control that can be imposed to establish causality and provide evidence (Drew et al., 1996). Some types of experimental design can also be used in studies that address the "how" types of question (Rowley, 2002). However, some of its key features such as interventions, treatments, measurements, pre-test/post-test, representative sampling, control and manipulation of variables, would hardly be applicable to this research. Along with the above reasons goes the weakness of experimental design in studies where the researcher seeks an in-depth learning of complex naturally occurring events (Drew et al., 1996). For all these reasons, the experimental design appeared not appropriate for this study of complex fisheries phenomena.

4.3.2 Longitudinal

Longitudinal design refers to a strategy of collecting data at multiple points in time (Hartley, 2004). It therefore allows the issue of time to be taken into account and enables one to observe change and development of the phenomena to study over an extended period of time (Gray, 2013). As such, longitudinal research usually aims to describe, examine or even explain change of a particular phenomenon (or phenomena). In addition, longitudinal

research can offer the possibility of involving some comparison of data between or among periods (Gray, 2013; Menard, 2008). One of the common problems with longitudinal design is that it is very time-consuming. While the longitudinal design shows the potential of being used in a research project that seeks an in-depth understanding of a particular phenomenon, for this research it would require having multiple and repeated observations, which are not possible given the time constraints and other restrictions such as those imposed by the security context in the study region. Therefore, a longitudinal design was not appropriate for this study.

4.3.3 Ethnography

Ethnography, which has roots in anthropology, provides a description and interpretation of the cultural and structure of a social group (Robson and McCartan, 2016), is known to offer means of getting closer to the reality under study than other research designs (Eisenhart, 1988; Murchison, 2010; Thomas, 2006). A central feature of ethnography is that people are studied for a long time period in their own natural environment (Robson and McCartan, 2016). While theoretically, ethnography research uses multiple data collection methods, its primary method is participant observation (Goetz and LeCompte, 1981; Murchison, 2010). Generally, ethnography tends to employ more long-term fieldwork requiring a personal involvement of a researcher to learn about complex dimensions of a particular society and culture (Harvey and Myers 1995; Murchison, 2010; Robson and McCartan 2016). One major limitation of ethnography is the time factor as doing ethnography takes a great deal of time (Harvey and Myers, 1995). Moreover, ethnography is not well suited for studies in which the researcher's active role can only be minimal (Eisenhart, 1988). Therefore, ethnographic design would poorly fit this research.

4.3.4 Case-study

As said previously, given the interpretive stance adopted in this research and the type of the research question related to understanding how institutions mediate fisheries livelihoods responses in situations of conflict. The term 'case study' refers to an in-depth study of one situation or case in its natural, real-life context (Drew et al., 1996; Yin, 2014), distinguishes three types of case study; namely i) exploratory, ii) causal and ii) descriptive case studies. For him, the primary distinction is that for the exploratory case studies, data are collected without a theory or research question beforehand, whereas, for the descriptive case study, theory and research questions guide the process of data collection. For the causal case study, it is more about cause-and-effect relationships that need to be established (Yin, 2014).

The case study is viewed as appropriate in studies that explore complex issues (Drew et al., 1996) and in research seeking to learn more about the complexity of naturally occurring events (Drew et al., 1996). Also, recognising social complexities and the nonlinear nature of fisheries, as well as the "how" research question that entails the detailed exploration of one case (Bryman, 2005), the choice of the case study design appears appropriate (Yin, 2014). An additional advantage of the descriptive case study approach is that the research does not always need to adhere to criteria of representativeness of the population being studied (Cohen et al., 2000).

Therefore, with flexible methods of data collection and analysis, a case study design can facilitate detailed descriptions and in-depth understanding of fisherfolk attached to one lake. This approach supports the idea that a case study involves in-depth research into one case (Thomas, 2006). Case studies can take many forms in the way that they seek to explain complex phenomena and how they go about trying to achieve causal explanations (De Vaus

and de Vaus, 2001). As a consequence, a theoretical dimension is of great value in case studies particularly when existing theories are used to understand a case (De Vaus and de Vaus, 2001).

Additionally, among many considerations before embarking on a case study, Zucker (2009) suggests that factors such as time in the field, lengths of interviews, transcriptions and analysis, have to be thought out well in advance. Because experience across time is an important feature of this research, a case study approach would establish aspects of change in people's livelihood patterns and strategies over a relatively long period through hearing people's accounts rather than observing such changes by staying in the field for a long period of time as in the case of ethnography. This feature of exploring change over time is referred to as 'diachronic' (Thomas, 2006).

However, distinct disadvantages of 'case studies' include concerns about the generalisability of case studies, because any one case probably does not typify all cases and the fact that a case to be studied is often selected on the basis of convenience and is not selected at random (Drew et al., 1996). Notwithstanding these weaknesses of the case study approach, the choice of the case study approach in this instance is justified by the 'how' type of the research question, which requires a descriptive approach for the detailed examination of one case to study (Bryman, 2005) along with its flexible methods of data collection and analysis, which can still maintain the ability to demonstrate validity and reliability of the study (Cohen et al., 2000).

A 'case study' approach appeared to be a suitable choice for this research and the case study was Lake Tanganyika in the DRC. The initial choice to undertake this case study relative

only to the DRC, was extended to include Tanzania following the difficulty of obtaining the required ethical clearance to conduct fieldwork directly in the DRC after seven months of concerted efforts to have the submitted application and associated materials processed. These materials included the Risk Assessment Analysis document, as well as the Emergency Evacuation Plan, for the purpose of demonstrating that it was possible to undertake this research fieldwork in the DRC with good knowledge of potential risks and appropriate mitigation measures. Thus, Lake Tanganyika as the case study of this research was looked at from both eastern DRC and western Tanzania. As stated earlier, with flexible methods of data collection and analysis, the use of case study design facilitated detailed descriptions and in-depth understanding of fisherfolk attached to 'Lake Tanganyika', and the mechanisms with which institutions mediate their responses in situations of conflict in the DRC and those of stability in Tanzania.

Fig. 4.1. Fieldwork site locations on both sides of the lake.

Source: Adapted from https://www.globalnature.org/en/living-Lakes/threatened-Lake-2017

4.3.5 The cross-sectional design

Given the short-term scale of time and resources linked to the academic calendar, a cross-sectional design was appropriate for this study (Gray, 2013; Saunders and Tosey, 2012). With such a design, data are collected at a single point in time to provide more than one group's qualitative information (Bryman, 2005). Theoretically, a cross-sectional fixed design is known to be appropriate for a descriptive and explanatory study (Babbie, 1998; De Vaus and de Vaus, 2001). As such, it allows the description of a community with respect to the prevalence of a given outcome in relation to a set of characteristics (Gorard, 2013; Levin, 2006). The appropriateness of a cross-sectional design is also justified by the use of different villages when collecting data from key informants, which can provide socioeconomic patterns of individuals and households and their livelihoods' descriptions as related to their levels of dependence on Lake Tanganyika through fisheries activities (De Vaus and de Vaus, 2001).

In a cross-sectional design, such information can be obtained through means such as existing household surveys that can generate vast quantities of data which can help with the understanding of fishing activities nested within a livelihood's context (Allison et al., 2002). However, given the general context of the protracted conflict and state fragility, such information turned out to be non-existent in the DRC and for the research locations, but particularly difficult to find in Tanzania for reasons that might be linked to possible political protection. Therefore, this cross-sectional feature could not be used in this research. But, considering the limited time and resources linked to this research, as in most research projects undertaken for academic courses (Saunders et al., 2009), adopting the cross-sectional's feature of a snapshot study as opposed to a longitudinal study, was appropriate to this case study (Gray, 2013; Thomas, 2006). In other words, the adopted cross-sectional

approach, which was initially good for collecting all the data needed for the research at one point in time (Levin, 2006; Thomas, 2006) during one round of fieldwork, was backed up by a second round of fieldwork facilitated by funding from National Geographic USA and at the same time allowed for filling the gaps in the data collected during the first round of fieldwork.

During both rounds of fieldwork, RAs were involved to help with fieldwork data collection activities. Their recruitments relied on local institutions endorsing the research to recommend suitable and qualified candidate in the consideration for these Terms of Reference (See **Appendix** 4.2) which I prepared beforehand. The institutions involvement in the recruitment of RAs included 'Tuungane Project' and TAFIRI for Tanzania, and the Evangelical University of Africa (UEA) and Uvira Hydrobiology Centre for DRC. Details on the requirement as well as a sample of the interview for potential candidates in the **Appendix** 4.3.

Furthermore, a cross-sectional field study approach allows comparison across groups (Lillis and Mundy, 2005). Making meaningful comparisons between groups is a core element of drawing causal differences (De Vaus and de Vaus, 2001). In this type of design, the comparator groups can be pre-existing villages formed in a non-random way or natural clustering (Gorard, 2013). This cross-sectional comparative approach is excellent for descriptive work intending to establish a difference or similarity between two groups (Gorard, 2013; Thomas, 2006). In this research, the cross-sectional design helped to compare the influence of different forms of institutional arrangements, individually or collectively, across various villages on both sides of Lake Tanganyika concerning fisherfolk's livelihoods/livelihood strategies to survive conflict-inducted disturbances. In

this way, the research design allowed the generation of the most convincing ultimate research claims (Gorard, 2013) of heterogeneity within the researched groups including types of fishing related activities, fishing methods used, and types of fish targeted. Such heterogeneity is recognised in the critical institutionalism perspective (Hall et al., 2014; Nunan et al., 2015), justifying the relevance of comparison across individuals, households, and groups within and between villages selected for the fieldwork, including in terms of susceptibility to vulnerability and response strategies adopted.

4.3.6 Case study design with cross-sectional approach.

The themes of interest in this case study research seemed to overlap with those that can also be explored in cross-sectional studies (Lillis and Mundy, 2005). In fact, the themes are concerned with investigating and understanding a possible association between institutional arrangements and conditions of vulnerability of Lake Tanganyika dependent people in coping with adverse situations including those induced by conflict and state fragility in the DRC, and by spillover effects in Tanzania. Both the case study and cross-sectional designs appeared appropriate for descriptive, explanatory and field-based research. In particular, while a case study design can offer a more in-depth understanding of the topic under study, at the same time a cross-sectional design brings the comparison feature between groups together with the time element needed to capture the livelihoods' contexts of change, making the two designs compatible and jointly applicable to this research. In effect, the above-mentioned cross-sectional design features added to a case study design made a good combination that will benefit this research.

Therefore, with Lake Tanganyika being the case study, three villages in each of the two opposite shoreline regions in the DRC and in Tanzania, were used for data collection using

interviews, field notes and PRA techniques. The second round of fieldwork offered the possibility of repeating some interviews as a way to follow up on key points as well as to conduct PRA techniques including focus groups, observation visits, transect walks, trends analysis, and seasonal calendar. Collecting data from multiple sources, helped to provide triangulation for validity and reliability of the research's results. Using these two research designs in the study, namely case study and cross-sectional, allowed the best focus on the interpretation of key institutional factors that could likely lead to an improved understanding of the mechanisms by which people living from fishing Lake Tanganyika both from eastern DRC and western Tanzania survive adverse changes in their real-life conditions.

4.4 Fieldwork sites

4.4.1 Location choice

For this study, Lake Tanganyika in the eastern DRC's region of Uvira and in the western Tanzanian's region of Kigoma, was selected as the case study. The pragmatic choice of Lake Tanganyika in the two regions, the DRC and Tanzania, is justified by the need to understand how similar people fishing the same lake from two different environments, experience conditions of vulnerability and how they manage to survive them. Several elements and factors outlined below were considered to justify the choice of Lake Tanganyika as the case study with focus on the DRC and Tanzania locations:

1) Numerous studies report that regions around Lake Tanganyika face recurrently many threats from conflict situations and state fragility in the DRC that result in a wide range of effects on the livelihoods of millions of people dwelling inside and outside of its basin

and who are believed to be extremely vulnerable since they depend on its fisheries resources for food and cash income (Gilbert, 2008; Thorpe et al., 2009).

2) Given the situations of protracted DRC conflicts, many Congolese fishers from the Uvira region cross Lake Tanganyika and flee to Tanzania in the Kigoma region, where some of them live in camps and many others have settled within local communities carrying on with their fishing activities on Lake Tanganyika (Betts, 2013). In addition, the peaceful and safe environment coupled with the large part of the lake along with active fisheries management, offer livelihood opportunities that are pulling factors of immigrants in the western region of Tanzania (Landau, 2004).

3) It is recognized that, similar to many rural areas in developing countries, the access and use of fisheries resources like Lake Tanganyika are determined by socio-cultural rules, customs or norms (Béné et al., 2004), which in the context of this study are referred to as 'institutions', and whose nature and function are key in influencing fishing communities' livelihoods and livelihood strategies (Lewins, 2004) in both the regions of Uvira (DRC) and Kigoma (Tanzania).

4) Countless reports suggest that people in the eastern DRC territories including those living in the Uvira region bore the brunt of the Congolese protracted conflict troubles and violence as all involved factions competing to control large areas, committing human rights violations and abuses including killing, rape, sexual exploitation, abduction, forcible recruitment of children, plundering of crops, looting, illegal taxation and general harassment of civilians (IDMC, 2009; Steiner et al., 2009; Coghlan, 2006; VOA News, 2016).

5) There is a paucity of literature about the livelihoods of small-scale fisherfolk of Lake Tanganyika. This was evidenced by few accounts collected during the pilot exercise of this study which consisted of a questionnaire survey to officials whose activities are connected to Lake Tanganyika fisheries. As well initial personal research showed that there is a definite lack of existing research documentation or public policy documents pertaining to small-scale fisheries on Lake Tanganyika.

6) The eastern DRC's region of Uvira and the Westtern Tanzanian region of Kigoma, bordering Lake Tanganyika are both readily accessible. Their littoral regions on the shores of Lake Tanganyika have good conditions of access and security in addition to the intensity of fishing activities predominantly by small-scale fisherfolk.

7) A further noteworthy factor in the choice of the DRC and Tanzanian regions of Lake Tanganyika is because, among the four countries that border the case study lake, they are the two ones that appeared to have their litoral communities sharing several features including socio-cultural ties, ethnic identities, tribal groups, customary patterns, and the Swahili language. Besides, the majority of the lake is located along the DRC and Tanzania, with DRC having the largest share 45% followed by Tanzania with 41% (NCU, 2011; Kolding et al., 2019).

Therefore, for all these reasons Lake Tanganyika in the DRC and Tanzania regions provided an appropriate setting to gain an in-depth understanding of coping strategies that fishing communities draw on to survive and maintain their livelihoods in situations of change. And at the same time, the case study was an excellent opportunity to learn about and understand

the mechanisms of how institutions' mediate livelihood responses adopted by fisherfolk in adverse situations.

4.4.2 Study site selection

With the choice of the two country locations deemed suitable to undertake the case study research, attention was turned toward selecting villages within the Uvira and Kigoma regions for data collection activities. As pointed out previously, based on the cross-sectional approach which calls for greater consideration of resources and times' constraints, choosing three villages and four months of fieldwork was deemed manageable for such a study.

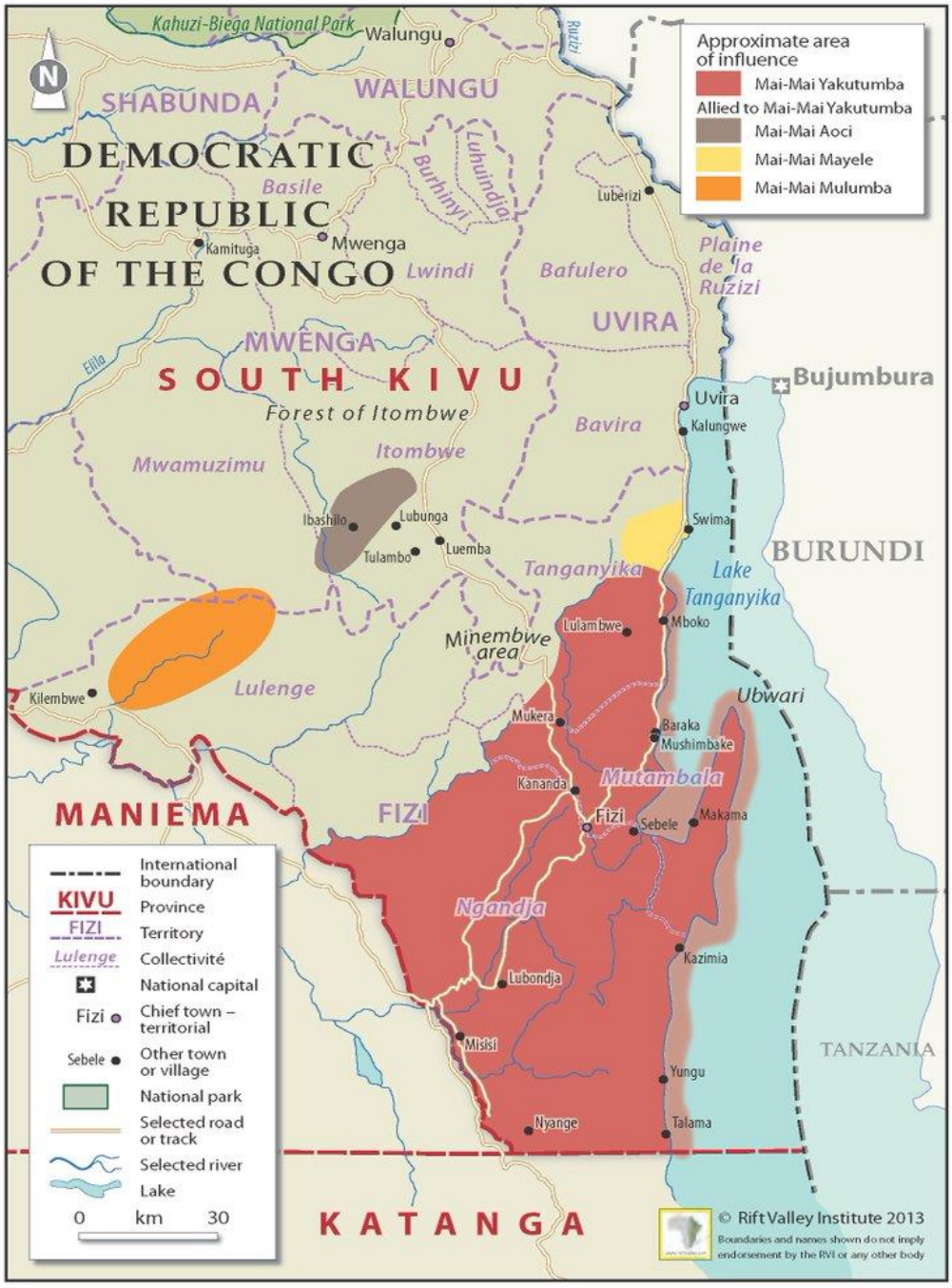
Three villages in the region of Fizi, namely Makobola, Swima and Mboko, with intensive small-scale fisheries, and located on the shores of Lake Tanganyika between the towns of Uvira and Baraka, were initially selected for the fieldwork in the DRC. However, they were replaced by peri-urban landing sites of Kalundu, Mulongwe and Kilomoni, in the region of Uvira, after being affected by fierce fighting between Mai-Mai[10] Yakutumba militia and DRC government forces in September 2017, the time the fieldwork was scheduled to start had the ethical clearance approval been received. The heavy fighting which also used Lake Tanganyika spread close to the city of Uvira, where it was fended off with help of DRC's U.N. peacekeeping troops. It managed in a week's time to retake all the villages including Makobola, Swima and Mboko, which had been occupied earlier by the militia. **Fig** 4.1 shows the areas that have been under the control of Yakutumba militia.

[10] The term 'Mai-Mai', which means water-water from the Kiswahili language, is used by many community-based self-defence militias believing to have traditional power that allows them to survive guns' bullets.

On the Tanzanian side, three villages, namely Kibirizi, Ujiji and Katonga were purposively selected for the fieldwork of this study. In addition of having intensive small-scale fisheries and being located in the Kigoma district on the shores of Lake Tanganyika, these three villages as stated in Chapter 2, were known to be among attractive destinations of immigrants from the opposite shoreline communities in eastern DRC known for their native dependence on fisheries for livelihood.

Uvira has nine fishing sites/villages in total, namely Kilomoni, Mulongwe, Kalundu, Kalungwe, Kasenga, Kivovo, Kabimba, Katongo and Makobola. Kigoma has four fishing sites/villages, namely Kibirizi, Katonga, Ujiji, and Shede (URT, 2010). Thus, the choice of three study sites/villages in each of the two country locations, of Uvira and Kigoma, was based on their i) being accessible by road from either Uvira or Kigoma, ii) being entirely rural or peri-urban, and iii) having populations heavily relying on Lake Tanganyika with fishing as their primary livelihoods occupation. This last criterion was of significant importance given that the focus of the study was on livelihoods.

Fig. 4.2. Approximate area under the influence of Mai-Mai Yakutumba and allies



Map 2. *Approximate area of influence of Mai-Mai Yakutumba and allies*

Source: Rift Valley Institute on https://twitter.com/RVInews/status/918815802832441344 [Accessed 2 January 2020]

Mai-Mai Yakutumba are believed to have formed in 2007 by William Amuri Yakutumba, who was said to oppose integration in Congo's national army accusing the government of mismanagement of the country's natural resources (Ross, 2017).

4.4.3 Study sites profiles

A. Study sites in the DRC's region of Uvira.

All the three study sites, namely Kalundu, Mulongwe and Kilomoni, are along the littoral zone of the territory of Uvira (03°28'S, 29°17'E), and represent the highest contribution of fish production in the fish flow of the DRC (Cirhuza et al., 2015). These three sites, which are the three main landing sites for fisherfolk communities of Uvira, are inhabited by several bantou tribes such as Bafuliro, Bavira, Bebembe, Bashi, Barenga, and Barundi. As in other parts of Uvira, fishing, farming, animal rearing, and small trades, represent the key livelihood activities (Cirhuza et al., 2015). Cassava, corn, sweet potato and peanuts are the main agricultural commodities. **Table** 4.1 shows the population composition of the study sites in Uvira.

Table 4.1. Population composition of the three study sites in Uvira

Study Village	Total population 2018 (estimated)
Kalundu	9,805
Mulongwe	51,041
Kilomoni	3,755

Source: Uvira territory, Annual report, 2018

B. Study sites in the Tanzanian region of Kigoma.

The study covered the fishing sites/villages of Kibirizi, Katonga and Ujiji. The lake on the shoreline of Ujiji has a high fish production potential, and fishing is carried out by artisanal fisherfolk contributing with about 30% to the Kigoma Ujiji urban economy annually (URT,

2016. Fishing in Ujiji provides employment opportunities to youth and women in fishing, processing and marketing of the fish products (URT, 2016). In Katonga and Kibirizi, agriculture has been historically an important source of the food supply, but it is not effective, due to the increase in the population of Kigoma, has been reported to reduce the availability of cultivating lands (Bulengela et al., 2019). In Kigoma, there are people of various tribes and ethnicity, who live in relative peace and stability. This peaceful and safe environment coupled with the extensive access to the lake fisheries resources offers livelihood opportunities that pull immigrants to Kigoma (Landau, 2004).

Table 4.2. Population composition of the three study sites in Kigoma.

Study Village	Total population in 2012
Kibirizi	8,806
Livingstone in reference to Ujiji	1,032
Katonga	5,604

Source: excerpted from 2012 Population and Housing Census, United Republic of Tanzania. (p311 -313)

4.5 Research methods

4.5.1 Data collection

A. Methods of data collection

Interviews

Given the DRC context of state fragility and prolonged conflict influencing the choice of data collection methods, most data were drawn from interviews with key informants. These were essentially semi-structured interviews, which involved visits to informants' homes or workplaces for the purpose of gaining information on the phenomenon concerned in the study (Cavestro, 2003; Welman and Kruger, 2001). The same semi-structured interviews were also conducted in Tanzania. Most of these interviews were informal in forms of

conversations but carefully managed, characterising a methodological awareness of question forms and dialogical dynamics between interviewer and interviewees (Kvale, 1996). These interviews used interview guides (see Appendix 4.1), which were developed with tools including sets of open-ended questions with some prompting as well as probing possibilities determined by the flow of interviews. In addition, field notes recording observations, thoughts, and insights were taken and helped to contextualise, interpret and understand data collected from interviews, at the same time allowed to triangulate them for validation and credibility of empirical findings (Saunders, 2016). As well, four group interviews involving two to four people who have already been individually interviewed (or in household interviews) were carried out as a way of 'repeat interviews' to follow up on key points and provide more triangulation, as mentioned previously. There were four repeat interviews in total, interviewing one official and one fisherfolk in each of the two study locations.

These methods were deemed appropriate since the study was concerned with small-scale fisherfolk's lived experience in their natural environments, which fell within the adopted interpretivist philosophy. With an interpretivist tradition, by paying close attention to participants' views and experiences, it was possible to understand how they are affected by situations of prolonged DRC conflict and how/why they respond as well as how/which/why institutions influence their responses. Also, it was possible to understand the vulnerability context within the Tanzanian fisheries, beyond the DRC conflict. The qualitative data that were collected from in-depth semi-structured interviews provided this study with the rich description of fisherfolk experience needed to achieve a deep analysis of the influence of institutions on livelihoods responses in situations of change. The records from these interviews along with field notes generated a large amount of qualitative information that allowed generation of an in-depth understanding, through this case under study, about the

complexity of the fisheries livelihoods and their institutional dimensions as framed in the research question and conceptual framework.

Table 4.3. Numbers of interviews/focus groups and other data collection activities

Country	Site	Key informants	No Interviews	Focus Groups	Narrative life stories	Observation visits	Transect walk
DRC	Bukavu	official	8				
	Uvira	official	9				
	Kalundu	Individual & Household	15	3	4	2	2
		Lower level officer	3				
		Women only		1			
	Mulongwe	Individual & Household	15	3	2	2	2
		Lower level officer	3				
		Women only		1			
	Kilomoni	Individual & Household	15	3	4	2	2
		Lower level officer	3				
		Women only		1			
S/Total			**71**	**12**	**10**	**6**	**6**
TANZANIA	Kigoma	Official	10				
	Katonga	Individual & Household	17	3	3	2	2
		Lower level fisheries officer	3				
		Women only		1			
	Kibirizi	Individual & Household	17	3	2	2	2
		Lower level fisheries officer	2				
		Women only		1			
	Ujiji	Individual & Household	17	3	2	2	2
		Lower level fisheries officer	1				
		Women only		1			
S/Total			**67**	**12**	**7**	**6**	**6**
Grand Total			**138**	**24**	**17**	**12**	**12**

During the first round of fieldwork, I was physically present in Tanzania but given that I did not have the required research permit, data collection activities were undertaken solely by a RA working under TAFIRI, which is a local accredited institution of fisheries research. The research permit for which I applied two months prior to setting out to Tanzania with an

endorsement letter from the University of Dar Es Salaam, was delayed as COSTECH[11], the research permit issuing body was undergoing some changes. The decision to head out to Tanzania was made with the hope that the permit would be issued at arrival since all the requirements were fulfilled. The permit was held up throughout the entire duration of the first round of fieldwork in Tanzania. (See **Appendix** 4.9 - Tanzanian research permit)

As to the DRC, given the context of state fragility and prolonged conflict, data collection activities were conducted remotely through recruited a locally hired male RA, with help of a local university 'UEA-Panzi'[12]. The RAs presence and phones enabled me to personally conduct all the interviews in either Swahili or French language. In both Uvira and Kigoma, all interviews were audio recorded and sent to me for evidence and information quality assurance. At the end of this chapter, a section dedicated on 'fieldwork in a conflict-affected area' explains in a bit more detail the approach and process used for collecting data in the DRC as well as how I identified UEA-Panzi and Uvira Hydrobiology Centre, and secured their agreements to help.

Focus groups

Focus groups is technique predominantly used in participatory research methods which provide scope and space for outsiders and local people to interact and facilitate mutual learning (Narayanasamy, 2009). PRA enables local people to express, share and describe their knowledge of life and conditions; to plan and to act (Chambers, 1994b). In the context of this study, PRA techniques such as focus groups were used to capture issues of institutional arrangements that pertain to cultural traditions such as taboos and beliefs that

[11] Tanzania Commission for Science and Technology
[12] Evangelical University of Africa

in parts of Africa can influence people's attitudes and practices in fishery activities. The initial plan was not to undertake PRA activities in the DRC given the conflict-ridden environment of the entire region.

PRA group activities appeared unsafe and alerting for a number of reasons that include: i) attracting curiosity of by-passers not involved in research activities who can spread rumors in the village that can make participants fear that people may think that they were paid to participate in suspicious focus group activities and therefore put them in danger, ii) hesitation to share some useful information thinking that other people within the group may misinterpret what they say and alter the meaning of their responses; and iii) expectation for compensation in terms of per diems, meals, or some other kinds of payments for having used time that could have been spent otherwise on activities that provide them means of living. Having consulted people who had recently conducted their research in eastern DRC, it turned out that they did not do any group interviews or focus groups as much as they wanted, given the circumstances described above.

However, PRA activities were reconsidered with the second round of fieldwork as they were deemed possible in the DRC with the involvement of the Research Assistants recruited by the Uvira Hydrobiology Research Center. The second round, which concentrated on PRA approach, was enabled by funding provided by National Geographic USA. During the second round, a female and male field research staff of the Uvira Hydrobiological Centre, were hired as RAs for data collection activities in Uvira, given their familiarity with the region. Under my guidance, these were executed, audio recorded and received as data quality evidence for analysis.

Similarly, in Kigoma, two RAs, a female and a male, were hired through TAFIRI, and along with myself we conducted all the PRA data collection activities given that this time around I had a research permit in hand, issued after more than a year of processing time. Also, the funding received enabled weekly meetings with two local collaborators Dr Sweke of TAFIRI in person and Dr Nshombo of the Uvira Hydrobiology Centre over the phone, who offered invaluable guidance as to local best practice for fieldwork activities. At same time, during both fieldwork rounds, weekly email contact was maintained with both of supervisors, Dr Fiona and Dr Danielle, for further guidance and updates.

Three focus group sessions were conducted in each of the fishing communities of Kigoma, namely Kibirizi (Aug. 2, 2018), Katonga and Ujiji (Aug. 16, 2018), and of Uvira, namely Kalundu (Aug. 25, 2018), Mulongwe (Aug. 10, 2018) and Kilomoni (Sept. 7, 2018), using Trends Analysis and the Seasonal Calendar. The objectives of the Trends Analysis were to obtain perceptions about the lake ecosystem change trends, key drivers of change, how they affect fishers' livelihoods, and how small-scale fishers respond to survive them. As to the Seasonal Calendar, the aim was to identify seasonal variations in lake fisheries ecosystem health and services, and relative livelihoods strategies. These sessions were followed by other focus group interviews on both sides of the lake in Kibirizi (Aug. 24, 2018), Katonga (Aug. 27, 2018), Ujiji (Aug. 24. 2018), Kalundu (Sept. 14, 2018), Mulongwe (Sept. 13, 2018) and Kilomoni (Sept. 15, 2018), working on trends matrix exercises and seasonal calendar analysis ranking and scoring key factors of changes considered from various fishing related and human activities affecting the lake's fisheries ecosystem's health and services.

Furthermore, separate focus group interviews were organised in Kigoma research sites of Kibirizi (Aug. 2, 2018), Katonga (Aug. 9, 2018) and Ujiji (Aug. 16, 2018), and also at the

Uvira's sites of Kalundu (Aug. 25, 2018), Mulongwe (Aug. 10, 2018), and Kilomoni (Sept. 7, 2018), involving women participants only, to get their perspectives on how they experience changes in the fisheries and what impact these changes have on their social lives. These women only sessions, which were handled by the female RAs, were opportunities to allow more expression by woman participants who are often reserved due to cultural barriers. Unlike in Uvira, while these women only focus group took place in Kigoma, the male RA and I took the opportunity to having informal conversations with several fisheries officers and fishers, and recorded key information on the lake's fishing situations as part of field notes to triangulate interview data.

Fig. 4.3 Focus group sessions at Mulongwe in Uvira (left) and at Ujiji in Kigoma (right)

Source: Author's work August 1, 2018

Observation

Observations are among the most common methods of data collection used in research involving fieldwork such as case study research (Cohen et al., 2000). According to Robson (2011, p. 315), "given that actions and behaviour of people are central to the study, a natural and obvious technique is to watch, record and interpret what they do and then analyse and

interpret what has been observed". The advantage of observation as Robson notes is in its directness rather than asking people their views, feelings and attitudes. This kind of research method is often associated with ethnography which is also within the interpretivist philosophy (Gray 2013; Saunders, 2016), particularly when using participant observation (Bryman, 2005; Murchison, 2010). However, one major constraint with observation is that it requires a considerable amount of time to be spent in the field to be able to collect the more quality information (Murchison, 2010; Robson and McCartan, 2016). Moreover, another problem is that there are issues on researchers' own safety while collecting data (Saunders, 2016). Therefore, considering the circumstances of uncertainty and violent conflict in the research site, only four months have been planned for the fieldwork with precautions of being with participants only during daytime. For these seasons, formal observations as data collection methods were not included in this study. However, some kind of non-participant observation emerged via the fieldwork diary and particularly with PRA activities during the second round of fieldwork.

In each fishing community of the two geographic areas, two-day observation visits were conducted first in Kigoma covering Kibirizi (Jul. 31-Aug.1, 2018), Katonga (Aug. 7-8, 2018) and Ujiji (Aug. 14-15, 2018), and in Uvira by the RAs covering Kalundu (Aug. 23-24, 2018), Mulongwe (Aug. 8-9, 2028) and Kilomoni (Sept. 5-6, 2018). The objective of these visits was to observe fishers as they were landing from their fishing trips and to record information including estimations of their total fish catches, species composition and diversities of their catches, as well as the sizes, maturities, quantities, and values of their catches including the types of their fishing methods. During these visits, a total of 61 boats in Kigoma and 43 boats in Uvira were observed. Apart from these observations of landing

fishing boats, the behaviours of fisherfolk at official landing areas where fishing rules appeared to be more enforced, were also observed.

Fig. 4.4 Observation visits at Ujiji in Kigoma (left) and at Kalundu in Uvira (right)


Source: Author's work August 1, 2018

Fig. 4.5 Fisheries officers in Uvira (left) and in Kigoma (right) before interviews


Source: Author's work August 1, 2018

Transect walks

Two groups made up with participants and researchers walked over three 200 meter transects in opposite directions along Lake Tanganyika shoreline areas in each of the six fishing communities on both sides of the lake, in Kibirizi (Aug. 6, 2018), Katonga (Aug. 13, 2018)

and Ujiji (Aug. 20, 2018), as well as in Kalundu (Aug. 26, 2018), Mulongwe (Aug. 15, 2018) and Kilomoni (Sept. 10, 2018). These transect walk activities allowed one to observe and record the lake ecosystem health from visual pollution features and to identify how healthy the lake's ecosystem was for fish and fishing livelihood-based activities. Efforts were made to have at least four to six participants in each group and from the two gender identities even though most fishers/boat owners were male, and most fish processors/traders were female.

Fig. 4.6 Farming by the lake in Ujiji (left) and sand collection by the lake in Uvira (right) observed during transect walks

Source: Author's work

Fig. 4.7 Farming by the lake in Ujiji (left) & and trash landfill in Uvira (right) during transect walks

Source: Author's work

B. Phases of data collection

The collection of data occurred in two rounds of field visits of two months each. The total duration of the fieldwork was 17 weeks split in two phases of at least eight weeks each. The first phase occurred from 16 September to 17 November 2017, and the second phase from 22 July 22 to 19 September 2018. Prior to both rounds of field work, in addition to the RA training sessions, fieldwork plans were prepared and distributed to all RAs, as a guide of scheduled tasks to be undertaken in the field, for effective time-management and productivity. (See **Appendix** 4.4 for a sample of the fieldwork plan). In addition, preliminary visits to the selected landing sites/villages were undertaken to have a sense of the lay of the land; acquaint ourselves with the customs, norms and attitudes of the local peoples and establish initial contact with the relevant research subjects, officials and fisherfolk, alike, from whom primary data would later be collected. During the first round of fieldwork, data from relevant research subjects, including officials from local and international institutions, as well as household/individual fisherfolk, were collected for both the DRC (remotely, only through the use of hired and trained RAs) and Tanzania (in-person, alongside hired and trained RAs). The second visit, which happened a year later, concentrated on the collection of additional data, including that needed to fill data gaps from the first round of fieldwork.

C. Key informants

Sampling

The process of sampling was undertaken with the purpose of gathering data from a sample of persons who were selected by choice or at random depending on the category of participants (Bryman, 2005; Rapley and Jenkings, 2010). As Robson (2002) suggests, these participants were drawn from the ‘population of interest' in relation to the case study. A

judgment or convenience sampling, which is acceptable, was encouraged by the fact that samples in qualitative case studies need not always to adhere to criteria of representativeness (Johnson, 1984; Cohen et al., 2000; Oppenheim, 1992). Especially when there is a lack of a clear sense of the total population from which the samples is drawn, justifying the option for purposive sampling which was deemed appropriate (Bryman, 2005, Oppenheim, 2000).

For this study, convenience sampling concerned households and individuals, and purposive selection concerned concern officials. The initial strategy to select households and individuals' participants was through direct contacts mainly at landing sites based on their availability, fishing-related activities and diversity representation. At landing sites, the selection was also based on the willingness of informant to be interviewed. Key fisherfolk informants were then drawn within different categories of sex, age, marital status, ethnic/tribal group, religion, and residence status for the purpose of stratified sampling and representation of various groups existing in small-scale fisherfolk communities on both sides of Lake Tanganyika, namely Uvira and Kigoma.

Participants' categories

These participants were primarily individuals and households whose fishing on Lake Tanganyika was their primary livelihood activity. It is important to note that households were separate to individuals. Households were intended to be a sort of group interview that involved at the time available household members. They could consist of father, mother, children and any relative living under the same roof. This did not happen given that all the participants were only available during the days and at their respective landing sites. For this reason, all the participant fisherfolk were interviewed alone independently of their families but answered the question on the size of their households and whether they were all

living together. As to officials' participants, they were people connected or engaged with fisherfolk and their livelihoods associated with Lake Tanganyika through local institutions such as research centres, universities, NGOs and government structures. **Appendix** 4.5 provides a chart illustrating the breakdown of the actual research participant categories.

4.5.2 Data Analysis

An important aspect of data analysis in the qualitative case study is the search for meaning through the interpretation of what has been generated from various data collected directly from participants. Bogdan and Biklen (2003) note that qualitative data analysis refers to working with the data, organising them, breaking them into manageable units, coding them, synthesising them, and searching for patterns. For Yin (2014) in a case study research, the analysis needs to find patterns through the data which may help to identify some possible causal links.

A. Phases of data analysis

For this study, data analysis consisted of three phases. For the first phase, a coding process was undertaken to organise collected data meaningfully into categories of identified themes for the preliminary analysis and empirical interpretation (Robson, 2011). **Appendix** 4.11 shows the coding structure generated for the analysis. For the second stage of data analysis, the process concentrated on the description, based on the data already organised and identified in following three themes; namely, i) vulnerability context, ii) institutions, and iii) livelihoods strategies. Secondly, a search for patterns characterising the three sites/villages from each of the two sides of the lake were undertaken to develop a strong body of evidence. As Ritchie and Lewis (2003) explain, with such information, it is possible to uncover the reasons for relationships as well as patterns and outcomes found in collected data. In the

third phase of the analysis, collected data already organised and thematically described in relevance to the research questions were used in reference to the conceptual framework integrating elements of sustainable livelihoods and of critical institutionalism.

The conceptual framework contributed to guiding the analysis process (Yin, 2014). In doing so, experiences across individuals and households within and between the sites/villages from both countries were compared. The comparison referred to their coping strategies in terms of livelihood responses through activities and capabilities as mediated by institutions to survive adverse changes in their fisheries livelihoods including those induced by the DRC conflict situations and its spillover effects in Tanzania.

B. Variables and themes

The concept of 'variable' is a fundamental part of fixed design studies which include traditional cross-sectional studies in which it refers to characteristics of individuals, groups or things that can vary and thus be measured and compared (Robson, 2002). The variables included in the study were those needed to answer the research question (Robson, 2002). While in the cross-sectional design, the focus is on fixed variables from a broader sample (e.g. six villages), in this case study research, variables can be seen in relevant themes identified in collected data, as shown in **Table** 4.4 below, for the analysis and empirical interpretation. These themes derived from responses to key research elements including what fisherfolk turn to in situations of disturbances, what are the main threats to their fisheries livelihoods, under what conditions do they have access to the lake for fishing activities if they have memberships with any fisherfolk groups and the existing institutional processes. Other themes were more related to people's responses to institutional

arrangements. In the framework, themes and presumed relationships amongst and within the sites/villages are highlighted.

Table 4.4. Analysis themes

Themes	Vulnerability Sources	Vulnerability Experience	Livelihood assets affected and/or used
Vulnerability context	Conflict – New wars -	Susceptibility, sensitivity,	Social, human, financial, physical, natural
	Mobility (People & Fish),	Susceptibility, sensitivity,	Social, human, financial, physical, natural
	Fishing & Methods,	Susceptibility, sensitivity,	Social, human, financial, physical, natural
	Role of institutions,	Susceptibility, sensitivity,	Social, human, financial, physical, natural
Institutions	Socially-embedded, local norms	Susceptibility, sensitivity, Adaptive capacity	Social, human, financial, physical, natural
	Bureaucratic, Governance structures	Susceptibility, sensitivity, Adaptive capacity (behaviour)	Social, human, financial, physical, natural
Transboundary Lake – Response strategy	Coping mechanism choices	Adaptive capacity (behaviour)	Social, human, financial, physical, natural

C. Other analysis

Some descriptive statistical analysis such as frequencies and cross-tabulations were used as appropriate to establish links between informant responses and their characteristics including social and fishing characteristics as well as their adaptive behaviours, to establish the situations of disturbances experienced and their perception of adverse changes considered critical to their livelihoods. These social and fishing characteristics included income status, types of fishing activities, types of fish targeted, membership in any fishing related organisation, knowledge of existing fishing regulation, and stances of faith/local tradition involved in fishing on Lake Tanganyika. Appropriate descriptive statistic tables also helped to characterise any variations in livelihoods' assets caused by the nature of adopted response strategies that were influenced by existing institutional arrangements at the community level.

D. Using comparative methods

A comparative approach, which typifies a cross-sectional design, was used given that more than one geographic environment with different contexts of fisheries of Lake Tanganyika were selected for the study. Making meaningful comparisons between groups is a core element of drawing causal differences and similarities (De Vaus and de Vaus, 2001). According to Durkheim (1894), the comparative method is the means by which one can demonstrate that one phenomenon is the cause of another. The cross-sectional comparative approach is excellent for such descriptive work intended to establish difference or similarity between groups (Gorard, 2013; Thomas, 2006). In this study, the comparator groups are pre-existing sites/villages located in two countries which were formed in a non-random way such as natural clustering (Gorard, 2013).

The comparison included which disturbing factors where most affecting fisherfolk in their environments and whether their effects changed with the context locations or with social and fishing characteristics of fisherfolk. The comparisons were between fisherfolk households/individuals' responses within and between site/villages selected in the two countries for the study. Given the heterogeneity recognised in the critical institutionalism perspective, the comparison approach appeared well suited. The roles of institutions in the selected three villages were compared to discuss the similarities and differences between and among them.

Table 4.5. Overarching structure of the research

Feature	Choice
Research philosophy	Interpretivism
Ontology	Relativism – Social constructivism
Epistemology	Subjectivism
Research approach	Inductive – starting from research question to defined objectives
Research design	Qualitative

Feature (Continued)	Choice (Continued)
Methodology	Phenomenological research
Research strategy	Descriptive case study using a cross-sectional strategy
Data collection methods	In-depth semi-structured interviews and field notes
Sampling	Random for households and individuals, and purposive for officials
Data type	Words, text and few numbers – Will be triangulated
Conceptual framework for data analysis	Integrated Sustainable Livelihoods Approach and critical institutionalism
Units of Analysis	Individual and household fisherfolk
Data collection timeline	First phase: September – October 2017 Second phase: Mid July – Mid September 2018
Ethical issues	Human participant – Harmless, Confidentiality, Anonymity, Prior consent and possible withdrawal, politically correct tune. Safety precautions taken including measures and procedures for emergency and evacuation.
Case study sites	Kalundu, Mulongwe and Kilomoni on the DRC's side Katonga, Kibirizi and Ujiji and the Tanzanian side

4.6 Ethical considerations

A fundamental principle which underpins all ethical codes in research involving human participants is that their welfare must always be considered in the sense that they must be protected from being harmed by the research process (Robson, 2002). Within this principle, for instance, there is an emphasis on ensuring that confidentiality and anonymity of participants are guaranteed otherwise they have to be warned before being involved in the study (Robson, 2002). Details on this principle are in the University's Code of Practice for Research (University of Birmingham, 2016). One relevant aspect of the code is the requirement that all those undertaking and/or contributing to research involving human participants must obtain necessary ethical approvals from the appropriate bodies and comply with all applicable requirements such as:

> i) Respecting the rights and reputation of participants; ii) following procedures designed to prevent unreasonable risk or harm to the participants; iii) maintaining confidentiality to achieve protection of intellectual property rights where appropriate; and iv) ensuring that research participants participate in a voluntary way, free from any coercion and are properly informed of any risks, including explaining the broad objectives of the research (University of Birmingham, 2016, p.4).

All necessary precautions were taken to comply with applicable ethical guidelines through working towards having proposed research activities compatible with all applicable Ethical Principles required for conducting research in developing countries; particularly as they involved extensive interaction with a great variety of human participants. All these principles and virtues such as courage, respectfulness, resoluteness, sincerity, humility, and flexibility (Macfarlane, 2009), were observed during the two rounds of fieldwork.

In addition, it should be noted that while all activities under this research were assumed to be harmless for both participants and the researcher, depending on the conditions that were found in the field, adjustments were made to certain methods initially anticipated for collecting data, as noted earlier. In summary, the following precautions were taken:

1) Names and identities of all participants were kept confidential s as codes were assigned to notes and transcripts.

2) Information provided through interviews were kept confidential, and generated results were reported anonymously. The recording and field notes were referred to by codes in the analysis rather than by name or position. This was be made clear to participants each time before the interview.

3) Data, which were recorded in text format, were saved electronically. Electronic files containing them were securely stored using available university services in a location accessible through a secure password and a log-in identifier.

4) Necessary consent was obtained before interviewing any of the intended participants as required by the ethic procedures. The purpose of the research was explained using a 'participant information sheet' (see **Appendix** 4.10) and oral consent were audio

recorded and in writing by the researcher. An interview consent form was prepared and used as a guide for this purpose.

5) Participants were, beforehand, informed about the purpose and the context of this study and details of the results would be shared with them in the form of a paper brief. This paper brief would be prepared in French and Swahili languages before making it available to the NGOs that work closely with them as well as to officials who participated in the study to disseminate within their respective entities.

6) Before the interview, participants were informed verbally of their right not to participate if they wished. They were informed of their ability to withdraw their information provided for the research within two weeks after the interview and of their possibility to stop the interview at any time and withdraw their consent.

7) There were informed that there was no consequence for any participant who decided to withdraw their consent and information given that this was a voluntary participation. In the event of withdrawal, participant information would have been permanently deleted. And if needed, replacement participants would have been found.

8) There were no risks in people participating in this study. In addition to the fact that the study did not address any sensitive issues both culturally and politically, its activities were authorised by necessary authorities in both countries and endorsed by a well-regarded local universities, namely the University of Dar es Salaam in Tanzania and the Evangelical University of Africa in the DRC.

9) Before setting out for fieldwork trips, the relevant ethical approval was obtained for all data collection activities involved in the research as most participants will be humans. (See **Appendix** 4.8 for the ethical approval letter)

4.7 Suitability of the researcher, safety and enabling environments

Due to the various aspects of risk that a foreign researcher may likely face while carrying out fieldwork in the DRC, the British and Canadian governments, as well as the University of Birmingham Working and Travelling Abroad Guidance, strongly advised against travel to the DRC, especially to those conducting and involved in research. Despite my training on safety in conflict zones, my submission of risk assessment (See **Appendix** 4.6) and of my emergency evacuation plan (See **Appendix** 4.7), I was still not approved for travel to DRC to conduct my research fieldwork, a consequence, the current plan that added Tanzania as the country in the study was submitted and approved. With this plan, all data pertaining to the DRC was to be collected via telephone interviews facilitated by a local Research Assistants (RAs) who would not be directly exposed to the same threats foreigners would be exposed to, due to their perceived wealth.

No barriers or problems relating my identity, tribe, gender, race, culture, or religion, were encountered in Tanzania over the course of my fieldwork research. Being a native of Bukavu (DRC) and fluent in the Swahili language were valuable assets for the fieldwork. I was welcome in the local milieu and used ethical methods to introduce myself in a culturally acceptable manner. It should also be noted that, as a Canadian citizen, I registered with the Canadian Embassy in Tanzania to notify them of my field research dates in the country. I always travelled with local RAs as they knew the region areas well and would be helpful in ensuring safety and the maintenance of the appropriate cultural attitudes whilst in the field and conducting fieldwork activities.

The RAs, all local, two on the first round and four on the second round, were hired from local institutions from local institutions. They assisted with and carried out fieldwork

activities in both countries as they were familiar with the research sites, peoples and cultures. While there were no issues or particular safety concerns for the RAs in the DRC, all required and necessary measures were taken to ensure their safe access to research sites for data collection activities. These measures entailed exercising a higher degree of caution throughout the data collection process in the field, such as avoiding being in rural areas and on the road after dark when most gang robbery or militia attacks occurred; seeking travel advice from the security coordination mechanism of the international NGOs that are present on the ground before all travel and intimating same on our research itinerary. In addition, the RAs were given support from their respective local institutions, which were well connected to locally-based international agencies and local authorities. Furthermore, it was decided that should there arise any safety or security issues of note, endangering the RAs that the data collection activities in the DRC would immediately stop. At any rate, from our risk assessment, we determined that activities under this research were relatively harmless in the context of the local environment prevalent in the DRC, and as such low risk for both the locally recruited RAs and informant participants.

Whereas, in Tanzania due to its prevailing stability, all fieldwork activities were deemed largely risk-free relative to the DRC, for all field personnel and specifically for the local RAs and myself, the foreign researcher. However, as in most developing countries, possible risks such as street banditry, night theft, and road accidents, which were likely to occur, were mitigated by observing safety procedures, including keeping a low profile to curtail potential risks. As to local travel and transportation safety, we only used reliable carriers, vehicles or motorbikes whose drivers were known for their knowledge and respect for safe driving guidelines, recommended to us by the local institutions that endorsed our research work.

4.8 Fieldwork in a conflict-affected area – My experience in the DRC

4.8.1 Perceptions of a conflict-affected area and ethical questions

In the existing literature on conducting research in conflict zones there is particular focus on ethical questions, and how best they can be addressed, specifically those related to safety of researchers and participants as well as of data security. According to Campbell (2017), a consensus on standards is not always possible, rather a flexible ethical approach is generally considered as suitable and practical. Campbell (2017) defines a conflict-affected environment as a geographic location, within a given area, which is experiencing or emerging from a period of violent political or civil conflict. As discussed in the literature review, in places experiencing protracted violence which are characterised as 'new wars', there is often no clear start and end point to the conflict. This definition of 'conflict-affected' therefore also includes nominally post-conflict zones that continue to experience sporadic, but frequent events of violence inflicted by rebel/militia agencies and even government forces, like the eastern DRC.

My initial intention was to conduct research solely in eastern DRC, as I wanted to use Lake Tanganyika as a case study to investigate factors that maintain communities living on its shores in abject poverty. I knew that fieldwork was crucial to better respond to my research question through hearing directly from participants with firsthand lived experience of prolonged situations of DRC conflict. However, when ethical approval was not obtained for conducting fieldwork in the DRC, after a seven-month long process, I began to explore alternative options for collecting the necessary data.

The failure to obtain ethical approval stemmed from the position of the UK's FCO[13] designation of Eastern DRC as a conflict zone with 'red zone' classification, meaning a zone with extreme and imminent danger to which all travel was advised against. Areas considered as zones of danger are mostly understood in reference to western travellers, including researchers (Peter and Strazzari, 2017), which to a certain degree would not have applied in my case. Thus, the perceived impossibility of carrying out research safely in such a high security risks zone eventually resulted in the denial of my approval for the Congo. In this regard, Peter and Strazzari (2017) emphasised the danger of preventing individual researchers the liberty to assess what is possible and what is too dangerous in view of developments in the field. Their explanation is that standardised protocols developed outside and often poorly connected to these zones of danger determine the boundaries of research work. They go on to conclude that this happens because research is increasingly framed by security concerns that influence decisions and choices made at a distance, by ethics and 'security and safety' committees on behalf of researchers in the name of their protection.

There is no doubt as to the necessity for fieldwork even in conflict environments as it offers knowledge that the researcher could not otherwise obtain. Fieldwork can uncover the untold realities of individuals, groups, and organisations, whether victim, perpetrator, or peacebuilder, in conflict environments (Campbell 2017). For these reasons, I did not give up my ambitions of conducting research in eastern DRC. With the interpretivist research philosophy that I chose for my case study as leading methodology, fieldwork was needed so that close attention could be paid to participants' views and lived experiences in their natural

[13] British Foreign and Commonwealth Office

setting. I knew that fieldwork was crucial to better respond to my research question through hearing directly from participants with firsthand lived experience of prolonged situations of the DRC conflict. I was mindful that this fieldwork would be undertaken in a conflict zone but was assured when contacting people on the ground both from local research institutions, universities and international NGOs and doing the necessary risk assessments, that the risks could be contained. For example, UEA-Panzi is the university where I completed my BSc degree along with its current Rector Professor Mushagalusa. After talking to him, my lead supervisor wrote to him and a formal endorsement was obtained to receive all needed help through their department, Agriculture and Environmental Sciences, headed by Professor Katcho. As to the Uvira Hydrobiology Centre (UHC), the connection was facilitated by my former teacher at UEA, Ir. Kakisingi, reaching out to Professor Nshombo, a former director of UHC, who kindly helped by responding to my needs through his institution.

There is a conventional wisdom that while conducting research in highly and risky security areas is possible, the risks to researcher and participants can outweigh the benefits. Vlassenroot (2006), using the case of the DRC, contends that possibility and success can be attributed to the position of the researcher and good contact with local actors, which I worked hard to develop in my case. His position also builds on Goodhand's (2000) observation on the value of having good context-specific knowledge of the risks, rather than assuming automatically the danger in areas where people live. I considered myself to have contextual knowledge that would enable me to better understand the potential benefits and harms associated with fieldwork in eastern DRC. I had prior fieldwork experience working in the same region, added to the advantage of my being a native of eastern DRC and fluent in the Swahili language. In looking for a solution to the inability to gain ethical approval to conduct the research myself in this area I sought to draw on this experience and skills.

4.8.2 Arrangement for fieldwork in the DRC

I only obtained the ethical approval when I changed my initial plan adding Tanzania alongside DRC in the study and developing a plan to work with research assistants (RAs) to remotely gather data in DRC. The change allowed me to research two different contexts on opposite sides of Lake Tanganyika, one of conflict and the other of relative stability, while being physically present in Tanzania only. The cross-sectional elements in the Lake Tanganyika case study design, strengthened the study by offering the possibility of comparing the experience of people from two countries depending on the same lake and sharing similar cultural features including the Swahili language. The change included the arrangement that for the DRC I would use local connections, including research and academic local institutions, to help recruit RAs through whom I would personally interview participants over the phone to remotely collect data. The institutions also helped obtain the necessary permits the RAs needed for accessing the research sites. These permits, in addition to their workplace IDs, included Travel Authorisation letters issued by their respective institutions and stamped by the 1) Provincial Department of Agriculture and Fisheries, 2) Territorial Administrator, and 3) Customary Chiefs. Within this arrangement, the RAs' role was to travel to and walk around research sites to identify and meet targeted participants for telephone interviews, negotiate the interview, and facilitate the administration of research information including obtaining verbal consent. Telephone interviews were conducted solely by myself speaking to interviewees using the RAs mobile phones. During interviews, the RAs also had the responsibility of repeating/explaining my questions to informants, if clarification was needed.

My research partners in the DRC were carefully chosen, in that they were local institutions and staff already conducting research in the same areas, equipped with the knowledge of

safety procedures and emergency action plans in case of any safety risks. This suggested that the RAs, as well as their institutions, were well known to the local authorities and fisherfolk alike, demonstrating clear trust and confidence that no wrongdoing nor harm would be suffered by the people for participating in the research. Such an arrangement, which allowed me to successfully conduct fieldwork while not being on the ground, appears not to be the norm in the literature and may represent an integrative method worth developing concerning research in conflict zones.

Furthermore, my personal connections with the leadership at both the Evangelical University of Africa and the Uvira Hydrobiology Centre appeared to be a strong asset in the strategy. It is important to highlight that no payment was made to these institutions in exchange for their help, otherwise as Cronin-Furman and Lake (2018) note, it would have raised an ethical issue. As part of deliberate best practices, the hired local RAs were paid for the work they were assigned at the rates that matched the respective policies of the institutions they were attached to. During the research, they reported no sign of being surveyed or spied on by any security services.

Given that the research methodology adopted was flexible and adaptable to the local reality I expected to encounter in the field based on the information I received from my local partners in the research I decided to restrict the data collection methods to interviews only. These were deemed to be practical and appropriate, particularly individual interviews. While a pragmatic choice of the types of activities in dangerous locations was essential, it still reflected the requirements for collecting quality information worth producing scholarly knowledge (Peter and Strazzari, 2017).

Cronin-Furman and Lake (2018) note the effects of fragile and violent contexts on relationships with elites and organisations, recording that researchers they spoke with reported (with chagrin) securing appointments with high-level officials simply by showing up at government offices. It was interesting that in the DRC, officials whom I managed to interview over the phone by means of the RAs were senior personnel in public service who were all receptive and supportive of the research. This to me was a great success as they included people such as the Uvira Territorial Administrator, the Provincial Inspector of Agriculture and Fisheries, and the Acting Customary Chief of Uvira. They seemed both grateful and relieved that a native of the region was conducting the research. This is predominantly contrary to what has been reported in the literature, where assumptions are made based on race and nationality and academics working in sub-Saharan Africa know that white skin or a Western passport opens doors. At times of interviews, when introducing myself, informants were happy that 'a son of theirs' from abroad was preoccupied with understanding their worries in relation to the lake. They also appreciated hearing of my past service to the people, when I was working for Christian Aid UK, under the program funded by the European Union, to restore the agricultural capability of people after the first Congolese war that was mainly fought in the region of Uvira and Fizi. This strategy appeared effective and offered good quality data that allowed this research to attain its objectives.

4.8.3 Concluding thoughts

I was able to conduct my research with ethically sound practices in a conflict prone region because I understood that successful ethical research in conflict regions is possible and is not conditioned by the level of the perceived insecurity. My ability to adapt to the conflict environment using local actors and partners, and benefit from their understanding of the

conflict context was very useful. The flexibility in the methodological tools, the relationship between the researcher and research subject and the autonomy of the researcher (Vlassenroot, 2006) were of utmost importance in the success of my fieldwork.

Chapter 5.

SUSTAINING FISHERFOLK LIVELIHOODS IN DRC

5.1 Introduction

Chapter 5 uses the research analytical framework to analyse vulnerability and coping/adaptation strategies of Lake Tanganyika's fishers in eastern DRC to sustain their livelihoods in conflict situations. In relation to the research question '*how do small-scale fisherfolk secure livelihoods in situations of change*?' the chapter analyses data from 71 semi-structured interviews, 9 focus groups, ten narrative life stories, Six direct observation visits, and six transect walk activities. These data were collected between September and November, 2017 and between July and September, 2018. The chapter has three main sections. The first section presents the general information of key informants and their socioeconomic characteristics. The second section identifies and analyses i) sources, the extent and implications of vulnerability of small-scale fisherfolk, ii) responses/strategies to different types of disturbances that fisherfolk pursue to maintain their livelihoods. The final section concludes the chapter.

5.2 General information and characteristics of participants

5.2.1 Officials

Officials who participated in the research were people whose activities are connected to Lake Tanganyika fisheries from local and international institutions. They were interviewed because of their connections with fisherfolk and their livelihoods. **Table** 5.1 groups them according to their general information and characteristics. **Table** 5.1 also shows that

officials interviewed were all males, suggesting male dominance in the relevant public and civil society services.

Table 5.1 General information and characteristics of participant officials

General information and characteristics		Frequency	Percent (%)
1st fieldwork round		**N=17**	**100**
Gender	Male	17	100
	Female	0	0
Location	Bukavu	8	47
	Uvira	9	53
Affiliation	Government Offices/Services	5	29
	Research centres/Universities	7	41
	NGOs and Local Associations	3	18
	Traditional and Religious Authority	2	12
Position	Administrator/Director/Manager/ Inspector/Coordinator	8	47
	Traditional/ Religious Chief	2	12
	University Professor and Researcher	7	41
Experience	1 – 10 years	8	47
	11 – 20 years	5	29
	21 + years	4	24
2nd fieldwork round		**N=9**	**100**
Gender	Male	9	100
	Female	0	0
Location	Bukavu	0	0
	Uvira	9	100
Affiliation	Government Offices/Services	9	100
	Other	0	0
Position	Fisheries officer	4	44
	Fisheries guard	5	56
Experience	1 – 10 years	3	33
	11 – 20 years	2	22
	21 + years	4	44

5.2.2 Individual/household participants

Given that individual/household participants fish on the lake from more than one location, they were interviewed during the day at landing sites and/or fish markets where they were found. Their characteristics are provided in **Table** 5.2 drawn from semi-structured interviews during the first round of fieldwork and in **Table** 5.3 relative to focus groups' activities undertaken during the second round of fieldwork. Life story narratives within fisheries were also collected from participants whose characteristics are presented in **Table** 5.4.

Table 5.2 below shows, in relation to individual semi-structured interviews held at the first round of fieldwork, that the majority of individual/household participants were male (91%), and between the ages of 26 and 35 years old (33%). In terms of their family sizes, a small portion in the grouping (16%) was made up of people living alone while the largest group (40%) consisted of families of six to 11 people. Almost three quarters of fisherfolk (73%) indicated belonging to the Christian religion. As to the length of residence, 60% were native to the areas where the interviews took place.

Table 5.2 General information and characteristics of Individual/household participants

General information and characteristics		Frequency	Percent (%)
Individual Semi structured interviews (1st fieldwork round)		**45**	**100**
Gender	Male	41	91
	Female	4	9
Location	Kalundu Village	15	33
	Mulongwe Village	15	33
	Kilomoni Village	15	33
Age category	15 to 25 Years	12	27
	26 - 35 Years	15	33
	36 - 45 Years	6	13
	46 + Year	14	31
Marital status	Married (Living with a spouse)	34	76
	Single	10	22
	Widowed	1	2
Family size (households)	1 person	7	16
	2 - 6 people	10	22
	7 - 11 people	18	40
	12 + people	10	22
Experience	1 – 10 years	13	29
	11 – 20 years	16	36
	21 - 30 years	8	18
	31 + years	8	18
Type of activity	Fish trader / Processor	5	11
	Fisher / Crew member	33	73
	Boat owner	7	16
Family Category	Household	35	78
	Individual	10	22
Tribe	Bembe	20	44
	Fuliiru	13	29
	Vira	8	18
	No answer	4	9

General information and characteristics		Frequency	Percent (%)
Individual Semi structured interviews (1st fieldwork round)		**45**	**100**
Religion	Christian	33	73
	Muslim	6	13
	No religion	3	7
	No answer	3	7
Residence	Native autochthonous	27	60
	Migrant (from other villages/countries)	18	40
Length of residence	Whole life	27	60
	1 – 10 years	7	16
	11 – 20 years	7	16
	21 + years	4	9
Self-identified	Poor	35	78
Income category	Middle	7	16
	Rich	1	2
	No answer	2	4

In relation to fisherfolk participants' income status, most of them (78%) identified themselves as '*poor'* and only 2% considered themselves as rich. For one participant, a person living in poverty lacks means to secure any loan: '*I am a poor and no one can lend me. You have to have a house or a land to give to secure the loan. I don't have them'* (CD24, Section 6). As to fishing activities, the majority (73%) were fishers and crew members while just a small portion were fish processors/traders (11%), and who were mostly female. Also, there was a small number of boat owners (16%) who are locally referred to as "boss fishers".

As shown in **Table** 5.3, the numbers of informants varied in different focus group interviews that were conducted. The discussions on Seasonal Calendars and Trend Analysis were attended by a total of 24 informants, while discussions on Calendar analysis and Matrix exercise were attended by 12 informants. The rational for having focus groups of six to eight participants was because they appeared to be the ideal group size in the sense that between six to eight people were easy to host, manageable and a comfortable number of participants to all share their experiences. The third category of focus group interviews were

attended by women only purposefully to address the preponderance of male interviewees during the first round of fieldwork and because female voices were so rarely heard in mixed gender groups. Of the total of 24 female participants, the majority (75%) were in the age category of 36 and over. In addition, 75 percent were not heads of their households, and only 21 percent of them were widows against an overwhelming 79% who were married. None of them was single from separation or divorce.

Table 5.4 presents the group of ten informants who provided their life stories' narratives. Among them, 60 percent were 46 years and older and the majority (40%) reported to have been in the fisheries for a relatively long period of time, between 21 and 30 years.

Table 5.3 General information and characteristics of focus groups' participants

General information and characteristics		**Frequency**	**Percent (%)**
Focus groups (2nd fieldwork round) - SEASONAL CALENDAR and TRENDS ANALYSIS		**N=24**	**100**
Location	Kalundu Village	8	33
	Mulongwe Village	8	33
	Kilomoni Village	8	33
Gender	Male	12	50
	Female	12	50
Type of activity	Fish trader / Processor	12	50
	Fisher / Crew member	7	29
	Boat owner	3	13
	Other (Porter, Net repairer)	2	8
Focus groups (2nd fieldwork round) - CALENDAR ANALYSIS, MATRIX EXERCISE		**N=12**	**100**
Location	Kalundu Village	4	33
	Mulongwe Village	4	33
	Kilomoni Village	4	33
Gender	Male	9	75
	Female	3	25
Type of activity	Fish trader / Processor	3	25
	Fisher / Crew member	7	58
	Boat owner	2	17

General information and characteristics (Continued)		Frequency	Percent (%)
Focus groups (2nd fieldwork round) - WOMEN ONLY		**N=24**	**100**
Location	Kalundu Village	8	33
	Mulongwe Village	8	33
	Kilomoni Village	8	33
Marital status	Married (Living with a spouse)	19	79
	Single	0	0
	Widowed	5	21
Household Head	Yes	6	25
	No	18	75
Type of activity	Fish trader / Processor	24	100
	Fisher / Crew member	0	0
	Boat owner	0	0
Age category	15 to 25 Years	0	0
	26 - 35 Years	6	25
	36 - 45 Years	9	38
	46 + Year	9	38

Table 5.4. General information and characteristics of life stories narratives' participants

General information and characteristics		Frequency	Percent (%)
Focus groups (2nd fieldwork round) - NARRATIVE LIFE STORIES		**N=10**	**100**
Location	Kalundu Village	4	40
	Mulongwe Village	2	20
	Kilomoni Village	4	40
Gender	Male	4	40
	Female	6	60
Age category	15 to 25 Years	0	0
	26 - 35 Years	1	10
	36 - 45 Years	3	30
	46 + Year	6	60
Type of activity	Fish trader / Processor	6	60
	Fisher / Crew member	4	40
Experience	1 – 10 years	2	20
	11 – 20 years	2	20
	21 - 30 years	4	40
	31 + years	2	20
Home ownership	Owns a home	5	50
	Renting	5	50

5.3 Vulnerability context of fisherfolk

As stated in Chapter 3, many scholars support the idea that conflict generates conditions of widespread unpredictability, which negatively impacts on people's livelihoods resulting in situations of vulnerability (Alinovi et al., 2007; Collinson, 2003; Goodhand, 2001; Keen, 2008; Steiner et al., 2009). Therefore, this section focuses on the analysis of conditions that

give a sense of what vulnerability fishers experience in their daily lives in the context of conflict in the DRC. It aims to examine how adverse conditions affect lives and the fisheries of small-scale fishers in their communities to generate their vulnerability (Objective 1).

To do so, this section explores the results of 62 semi-structured interviews conducted in three fishing communities of the Uvira region in the DRC. The analysis uses the first section of the adapted SLA to capture, describe and interpret participants' views with regards to the extent and nature of factors in forms of shocks, stresses, trends and seasonality that affect fishing communities in eastern DRC.

Four broader categories of factors emerged during individual and focus group interviews that informants reported causing changes in their livelihoods that increase their vulnerability. The findings are presented in terms of these identified important factors including nature and extent of conflict, mobility, type of fishing, and institutions.

5.3.1 Congo conflict

The context of 'DRC conflict' is complex, occurring over the last 20 years and involving a wide range of actors including local, national and regional state and non-state actors. These actors are said to be engaged in conflicts for several overt purposes including the pursuit of economic benefits (Keen, 2008), through mineral plundering (Laudati, 2013; Montague, 2002; Reyntjens, 2001), pillage of forests, looting, illegal taxation and general harassment of civilians (IDMC, 2009). The occurrence of conflict events was raised by all participants including individuals/households and officials. A very high percentage 42 (93%) of individual/household participants from the three villages of Kalundu, Mulongwe and Kilomoni felt that they were living in areas that had been affected many times by conflicts.

In particular, one informant reported that '*our community is very much affected by the conflict and it still is until today'* (CD021, Section 6).

In addition, recorded interview data from these three villages indicated that the most recent conflict events occurred about three weeks prior to the interviews of September 2017. These informants' perceptions are corroborated by the conflict activity reports on Uvira in ACLED dataset outputs (ACLED, 2018), listing 151 conflict events that occurred in the period of 1997 to 2018, of which the highest count (38 conflict events) were concentrated in the year 2018. From such consistent evidence, it is possible to see how conflict event occurrences have been part of people lives in the three study villages.

Active conflict events are manifested differently over space and time, generally involving battles which span over a couple of days before either or both sides retract. Informants reported that these battles could involve the army and rebels, or the army and militia groups, or militia groups and rebels, or even rival militia groups, depending on a variety of causes that trigger the various fights, including accessing and extracting valuable natural resources such as gold, diamonds, and coltan, with impacts on the fisheries and fishing communities.

Describing a recent conflict event, one fisher indicated '*recently when Uvira was attacked, some people were killed, and others had their equipment confiscated by armed groups*' (CD037). At the same time, one official remarked '*People have their own memories of the conflict, of the brutalities of either the rebel or the armed forces, the rapes, the killings, etc.* (CD047). Another official indicated that '*Fishers go fishing anyway but with a lot of fear as they encounter armed groups in the waters that either can confiscate their fishing equipment, their fish caught, or just kill them'* (CD060)

Looking at these quotes through the lenses of the SLF, one can see how such conflict situations can induce shocks and stresses which can result in adverse changes in fisherfolk's lives and livelihood assets (Béné, 2004; Berkes, 2015; Ellis, 1998). More specifically, as laid out in the literature review, conflicts in any given location create an environment in which all forms of insecurity and violence are possible (Dunne, 2012). Thus, it is possible to identify elements associated with the cited conflict induced shocks and stresses and establish how their disturbances exacerbate the vulnerability of Lake Tanganyika dependent fishing communities in DRC's region of Uvira. **Table** 5.5 gives a frequency distribution of fisherfolk participants' multiple responses to the question of how conflicts in DRC affected their lives and fisheries.

Table 5.5. Conflict induced disturbances to small-scale fisherfolk

No	Conflict-induced disturbances	Fishing community Landing site			Total	%
		Kalundu	Mulongwe	Kilomoni		
1	Insecurity / Fear of harm / Restricted mobility	4	6	6	16	25
2	Lost/Destroyed Fishing Equipment & Properties	8	3	6	17	27
3	Forced displacement	4	5	5	14	22
4	Killed / Lost lives	5	2	2	9	14
5	Raped / Sexual abuses	1	1	2	4	6
6	Fishing interruption	1	1	2	4	6
Total		**23**	**18**	**23**	**64**	**100**

Table 5.5 shows considerable emphasis on three conflict related elements, namely '*insecurity*' 16 (25%), '*lives and equipment loss/destruction*' 17 (27%), and '*forced displacement'* 14 (22%). These results would thus indicate that these three elements represent the key stresses and shocks from which fisherfolk have suffered the most in their communities relative to conflict situations. The vast majority of informants described these conflict related elements in association with continuous and widespread conditions that had direct negative effects/impacts on fisherfolk lives and livelihood assets, causing their vulnerability. So, while the two most cited factors are discussed here, the third one which

is relative to displacement is discussed in the next section, given its close association with mobility.

Describing past and recent conflict events, and discussing a variety of ways their lives were affected, informants reported the following: '*recently when Uvira was attacked, some people were killed, and others had their equipment confiscated by armed groups*' (CD037, Section 6); We *are suffering a lot since the conflict'* (CD021, Section 6); '*People have their own memories of the conflict, of the brutalities of either the rebel or the armed forces, the rapes, the killings, etc.* (CD047, Section 2); '*In conflict times, fisherfolk equipment are destroyed, and their homes looted constantly. Rebels take whatever they find in their way'* (CD055, Section 2);

It seems from these quotes that participants experience conflict mainly through insecurity and violence, which they regarded as the most important conflict-induced disturbances, and which could respectively stand for *stress* and *shock* in the perspective of SLF. In addition, household and individual participants reported that insecurity and violence have direct effect on their lives and to their properties. In relation to insecurity, one official participant observed that '*insecurity is prevalent and widespread during conflict*' and added that '*Most militia use the lake sometimes in their operations*' (CD059). Another reported that *'during insecure moments, which can take up to a month or so, many fisherfolk families are seen suffering a lot of malnutrition and poverty'* (CD051).

Given the importance informants gave to direct forms of violence which they experience each time when conflict breaks out, and given their effects on key livelihoods assets on which their lives depend, which make them more vulnerable, it can, thus, be established that

violence and insecurity represent the key disturbances through which conflict events affect fisherfolk lives and livelihoods. These qualitative results confirm the findings of previous studies conducted in South-Kivu by Vlassenroot (2013) that associated conflict-induced disturbances sparked by tension between communities with scenes of violence, including those such as reported by participants. The scenes of conflict-related violence reported by household/individual participants, which are also reflected in **Table** 5.5, include recurrent gun battles, abductions and shooting fishers on the lake and resulting in loss of lives and properties.

Not surprisingly, informants asserted that the majority of perpetrators were rebel or renegade soldiers, armed forces and a variety of militia groups. According to both official and fisherfolk informants, rebels tend to have political agendas including liberation from what they regard as the government's corrupted regime, whereas militia groups are generally multiple and divided along ethnic and tribal lines using few weapons and superstitious beliefs to protect their communities from what they consider to be foreign invaders. **Table** 5.6 draws on participants' experience to illustrate the extent to which conflict events have increased the vulnerability of fisherfolk from their responses to the question of how they were affected by the DRC conflict.

Table 5.6 Impacts of conflict induced disturbances to small-scale fisherfolk

No	Impacts of conflict induced disturbances to small-scale fisherfolk	Fishing community Landing site			No of Counts	Percent (%)
		Kalundu	Mulongwe	Kilomoni		
1	Drop in fishing income / Increased hunger and poverty/ Unemployment	24	23	22	69	40
2	Reduced fish catch/Lack of fish /(fish stock decline)/ longer fishing hours	20	14	17	51	30
3	Inability to enter the lake, reduced access to the lake, due to insecurity and fear of harm	7	11	12	30	17
4	Forced to stay at home' / Inability to fish during battles	6	8	8	22	13
	TOTAL				**174**	**100**

Disaggregating responses by fishing communities, **Table 5.6** also reveals variations in how fishers consider the importance of these impacts. Especially in the three sites, the impacts '*Drop in fishing income / Increased hunger and poverty/ Unemployment*' cited 24 times, the impacts '*Reduced fish catch/Lack of fish / (fish stock decline)/ longer fishing hours*' cited 20 times, are the most mentioned by participants. Emerging from these data highlights, these results suggest that conflict effects and impacts are mainly on the natural and financial capitals of fisherfolk livelihoods, essentially drawn from Lake Tanganyika. These results indicate that informants are convinced that their two key livelihood capitals suffer from continuous and widespread conditions of insecurity and violence. Such conditions have devastating impacts on their social capital, making it difficult for fishers to forge social stability and cohesion, which are necessary for conducive livelihoods activities. For instance, many fisherfolk indicated that they enter the lake using borrowed fuel, motors and batteries, which they must pay back by means of their fish catches or return when they land. Otherwise, due to possible reduced catches as result of insecurity in the waters, fisherfolk may progressively sink into debts which lead to disputes and broken partnership relations with their lenders, which then may hinder their ability of further fishing activities. Considering the recognised fisherfolk position of a lack of alternatives to do anything else

or be anywhere else, it can thus be inferred from these findings that conflict to a large extent is a major source of vulnerability.

It is important to highlight here, that no responses from participants during interviews in the three study villages suggested any occurrence of conflicts over fisheries resources or involving fishing communities as participants, contrary to most relevant literature on conflict and natural resources. Even arguments that conflicts may originate outside the fishery, but can evolve into low-level, nonviolent conflicts such as those between fishery resource user groups (Glaser et al, 2019), did not seem to apply in this case of Lake Tanganyika's basin of Uvira.

5.3.2 Mobility

Another key factor that was notable in the conflict context as a source of fisherfolk vulnerability was mobility by both fisherfolk and fish. Hence, the mobility of fisherfolk, as pointed out in Chapter 3, while it can be an important livelihood strategy, it can also limit people's ability to pursue sustainable livelihoods (Cleaver, 2012). And, the high mobility of fish can also contribute to the vulnerability of fisherfolk (Nunan, 2010). As such, mobility in the three study areas can be considered a major source of vulnerability through its patterns of in-migrations of people and out-migrations of fish as identified during interviews. The participants' views on these two mobility patterns appeared contrary to the dominant perspective in the livelihood framework, where mobility is looked at mainly as an adaptation strategy used intentionally by fishers in search of higher catches to increase their income (Allison et al., 2001; Nunan, 2010). Related to this is the idea within the relevant literature that fishers move towards safer places with fishing possibilities when fleeing conflicts in their villages.

It emerged clearly from the informants that fisherfolk are affected by mobility of fishers and fish in two specific ways: i) through the patterns of in-migrations of people bringing increasing influx of newcomers in fishing, and ii) through the patterns of out-migration of fish causing catch decline.

A. Mobility of people

Firstly, when forced to move away from their native villages, people tend to converge to fewer locations leading to increased pressure on resources and infrastructure in hosting communities. Thus, observing the composition of interviewed fisherfolk in their respective landing sites, one can see the change in the fishing population of the three study villages due to the in-migration movements bringing newcomers into fishing as well as contributing to the general population growth. **Table** 5.7 provides a distribution of semi structured interview participants in terms of their resident status and tribal identities.

Table 5.7. Distribution of participant fisherfolk per residence status and tribal identities

No	Residence status and tribal distribution of participants	Landing site village			No of Counts	%
		Kalundu	Mulongwe	Kilomoni		
	Residence status					
1	Native / Autochthonous resident	07	10	10	27	60
2	Migrant resident (national)	08	03	04	15	33
3	Migrant resident (Transnational)	00	02	01	03	07
	Total	**15**	**15**	**15**	**45**	**100**
	Tribes					
1	Bembe	11	04	05	**20**	**44**
2	Fuliru	03	06	04	**13**	**29**
3	Bavira	01	03	04	**08**	**18**
4	No answer	00	02	02	**04**	**09**
	Total	**15**	**15**	**15**	**45**	**100**

As shown in **Table** 5.7 individual/household participants across all the three villages were mainly autochthonous residents (60%) and of Bembe tribe (44%). The number of migrant residents differing between the villages with Kalundu having more migrant 8 (53%) and

native 7 (47%) fishers out of 15 (100%) participants in each of the three villages. Likewise, for the tribal composition, the majority of fisherfolk participants were Bembe in Kalundu 11 (73%) and in Kilomoni 5 (33%), and Fuliru in Mulongwe 6 (40%). Furthermore, all the participants were of the Bantu ethnic group, suggesting the absence of representation of the Banyamulenge ethnic group. Such findings reflect earlier studies which showed that Uvira region and areas around it have historically been shaped by ethnic divisions (Mampilly, 2015; Vlassenroot, 2013).

It can be noted that given the existing tension between ethnic groups recognised as one of the key drivers of the DRC's unending conflict, people would seem not encouraged to further movements towards communities before whom they may appear as enemies and therefore risk mistreatment. Thus, more vulnerability was due to reduced income, with the consequence of limiting their mobility in cases of need to move to areas where more sustainable livelihoods might be available.

Secondly, in light of these data, one can note that this aspect of mobility occurring precisely in the form of in-migration of people concerned mainly people from Fizi to the Uvira territory. According to informants, these incoming migrants generally entered fishing due to lack of other livelihood alternatives and facilitated by the open access to Lake Tanganyika. Also, participants highlighted that Fizi is traditionally inhabited by Bembe and has been characterised by recurring ethnic tension that led to the proliferation and activities of armed groups associated with conflict shocks and stresses that people attempt to survive through means that include out-migration from their villages. This ties in with the fisheries function of a safety net in helping people to survive uncertain situations that threaten their living and their livelihoods (Béné et al., 2010; Coomes et al., 2010; Nunan, 2014).

Thus, one reported compound disadvantage brought on by this mobility was that the lake was increasingly fished by people who lacked knowledge of traditional local fisheries resources protection, with which autochthonous residents were familiar. As a consequence, many native resident fishers, fearing to see their income reducing if they attempted to fish sustainably while others (newcomers) were not doing so, were also pulled into destructive fishing practices. According to one official, '*the key strategy of these newcomers in fishing, is to catch as much fish as possible every day given that their survival depends on their being on the lake for food first and then for income*'(CD046). Another official indicated that '*the majority of these newcomers had no resource conservation mind-set as they were trying to catch as much fish as possible, leading to fish stock decline*' (CD047).

In addition, participants reported that having too many newcomers entering fishing had the consequence of increasing the fishing pressure on the lake leading to the decline of their fishing income. The explanation provided by participant fishers and officials was that since the conflict broke out, the number of fishers has increased, causing the fish stock to drop as everyone turned to the lake as the only option for survival. There are a number of studies that have corroborated these fish stock decrease accounts in Uvira waters in periods of conflict events. For instance, a study conducted by Van der Knaap et al (2014) confirmed that the number of fishers trebled in Uvira, based on recorded numbers in 1995 and in 2011, of 1762 and 5725 fishers respectively. Studies by Cirhuza et al. (2015) corroborate the decrease trends in the total annual fish catches in Uvira waters of Lake Tanganyika since 1992 due to several factors including overfishing.

Concurring with this view, officials also pointed to the increased fishing pressure during relatively peaceful moments as many people tend to enter fisheries for fast food and a quick

income. As illustrated earlier in **Table** 5.6, a large group of fishers (40%) mentioned that their livelihoods were being affected by this '*drop in fishing income*' causing poverty and hunger given that, as shown earlier in **Table** 5.2, over 65% of participants have been fishing for 20 years or less, which coincides with the time when the conflict broke out in 1996. So, in other words, this can imply that the fishers have always known conflict in their fishing-lives, suggesting that newcomers once they enter fishing related activities, tend to stay in them for the remainder of their lives.

B. Mobility of fish

Interestingly, there were consistent references to the '*lack of fish*' in the waters from individual and group interviews in the three study communities. **Table** 5.8 shows multiple responses provided by participants to the question of whether there has been any changes and which type in fishing over time.

Table 5.8. Participant fisherfolk responses on whether fishing has changed over time

No	Changes in fishing over time	Landing site village			No of Counts	%
		Kalundu	Mulongwe	Kilomoni		
	Whether fishing has changed					
1	Yes, there have been changes	12	9	12	33	73
2	No changes	3	6	3	12	27
	Total	**15**	**15**	**15**	**45**	**100**
	Types of changes					
1	Lack of fish in the waters	13	8	10	**31**	**97**
2	Reduced access to the lake	0	1	0	**1**	**3**
	Total	**13**	**9**	**10**	**32**	**100**

As shown in **Table** 5.8, for the majority of participant fisherfolk (73%), there have been changes in fishing income over time and among those changes the '*lack of fish*' was viewed as the most important change. This was cited by an overwhelming majority of informants (97%). The results in **Table** 5.8 show clearly that access to the lake was not an issue of great concern but instead it is the lack of fish in the waters, which is mainly associated with

fish mobility. One focus group participant noted that *'changes in the levels of catches do not affect the way we access the lake for fishing*' (Focus group 2). Another added that '*We fish all the time throughout the year except in the one week of each month when the lake is closed and we can use this time to rest*'. (Focus group 2). In the three villages of Kalundu, Mulongwe and Kilomoni, coded respectively as '1', '2', and '3', shown in the seasonal calendar provided in **Table** 5.9, that same idea of fishing and accessing the lake the same way emerged.

All other conditions being equal, these findings suggest that although fisherfolk can access the lake, they are faced by the absence of fish which are thought to be migrating out of areas where they can catch them. This indicates the likelihood that absence of fish in the waters is at the forefront of fisherfolk sources of vulnerability impeding their fishing on which they depend for living.

Table 5.9. Participant fisherfolk responses on fishing seasonal calendar

TOPICS	Conditions	October	November	December	January	February	March
Weather conditions	Rainfall	1, 2, 3	1, 2, 3	1, 2, 3	1,2, 3	1, 2, 3	1, 2, 3
	Dry days						
	Cold days	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Warm days						
	Low winds	1, 2, 3	1, 2, 3	2, 3	1, 2, 3	2, 3,	1, 2,
	Heavy winds			1		1	3
	Moon	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Full moon						
Lake's access	Same way	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Every day	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Changed						
	Low catch				1, 3	1, 2, 3	1, 2,3
	High cost	1, 2				1, 2	1, 2,
	Loan needs				2	2	2
	Market lacking	3					
	Excess taxes	1, 2, 3	1, 3	1, 3			
	Losses	1, 3	1	1			

Table 5.9. Participant fisherfolk responses on fishing seasonal calendar (Continued)

TOPICS	Conditions	April	May	June	July	August	Sept.
Weather conditions	Rainfall	1, 2, 3	2,	2			
	Dry days		1, 3	1, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Cold days	1					
	Warm days	2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Low winds	1, 2	1, 2, 3	1, 2,		1, 3	3
	Heavy winds	3		3	1, 2, 3	2	1, 2
	Moon	1, 2, 3	1, 2, 3	1			
	Full moon			2, 3	1, 2, 3	1, 2, 3	1, 2, 3
Lake's access	Same way	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Every day	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Changed						
Adverse changes or problems	Water piracy	1,	1	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Low catch	1, 2, 3	2, 3				
	High cost				1, 2	1, 2	1, 2
	Loan needs	2	2	2			
	Fish price fall			2	2	2,	2,
	Market lacking				3	3,	3
	Excess taxes			1, 2, 3	2	2	2
	Losses			1, 2	1, 2, 3	1, 2, 3	1, 2, 3

Source: Focus group discussions in the three villages (September 2018)

To illustrate this lack of fish in the waters associated with fish mobility through outmigration, some examples of informants' quotes are provided below:

'*Fish have been fleeing the littoral zones because of the beach seine and the so-called tam-tam fishing*' (Focus Group 2)

'*We think that the beach seine is causing this as it pushes the fish to migrate to Burundian waters because in Burundi the use of beach seines and gillnets is prohibited'* (Focus Group 2)

'*Many believe that there are still fish in the waters, but they are moving to deep areas that cannot be reached by the types of equipment they are using*' (CD004)

'*Also, there has been lots of anarchic constructions of houses by the lake and even some buildings have reached the lake. We believe this situation has caused fish to move away to distant and deep areas that fishers are not able to reach given their inadequate equipment*' (CD060).

'*These human activities bringing erosion sediments that stock along the littoral areas. Populations have destroyed the vegetation that was protecting the reproduction areas and which may have caused fish to move away'* (CD049)

'*We nowadays fish for increased hours and are obligated go further at sea, and far away from our shoreline villages in the attempt to increase the fish catches*. (Focus Group 2)

All these quotes demonstrate to some extent the varying scales and patterns of perceived fish mobility, which appeared to be amongst the most important sources of vulnerability of fisherfolk in the three study villages. Several informants indicated that they have to chase the fish as they move far away from shores exposing them to risk their lives and their equipment, within the broader context of conflict and the transboundary nature of the lake. In other words, as earlier research works have demonstrated, the movements of fish mostly determine the movements of fishers (Lungu and Hüsken, 2008). Although in some literature, situations of drop in fish catches are also linked to climate change, mainly through the rising water temperatures, among several other causes (Cohen et al., 2016; O'Reilly et al., 2003), no responses from participants seemed to emphasize this relation during the interviews.

In addition, it has been demonstrated that increased nutrient levels from effects of anthropogenic eutrophication can lead to widespread migration of fish out of the affected area (Hylland et al., 2016; Parrett, 1998). These features were confirmed during the transect walks by the lake in the three villages. It was evident through visual signs that human activities including deforestation, farming, constructions, bathing, and sand collecting were taking place at the lake. According to one official participant '*in Uvira, the littoral zones are affected erosions and human activities through anarchic house constructions as well as cutting trees and shrubs that have deposits of sediments, dirt, and gravels in spawning areas. As a result, fish move away, and they become less visible in the Congolese water around Uvira and more visible in the water elsewhere such as Burundi, and Tanzania'* (CD049).

Fig 5.1. Visual signs that human activities by the lake in Kigoma (left) and Uvira (right)

Source: Author's work

In sum, from informants' views, it would thus appear that both the mobility of people and that of fish were important factors of vulnerability of fisherfolk, and their implications were concomitantly associated with the lack of fish the waters affecting fisherfolk living. Furthermore, one cannot disregard issues raised concerning the role and importance of the context of conflict that compels people to turn to the lake due to the lack of other livelihood alternatives with effects including destructive fishing and disturbing the ecology of the lake.

5.3.3 Fishing and Methods of fishing

Much of the relevant literature makes it clear that fishing in developing countries, which is mainly of small-scale nature, uses diverse types of methods and targets a wide range of fish (de la Torre-Castro et al., 2014; Salas et al., 2007). This appeared to be the case in the context of the three DRC study villages. But given the context of conflict, this study's investigation sought to ascertain whether this importance of fishing on the lake had changed and in what ways certain types of fishing were linked to fisherfolk vulnerability.

Concerning the importance of fishing on the lake to fishing communities, a dominant view emerged in the officials' responses indicating that the importance of fishing on the lake *'has changed very much'* given the continued decline in benefits people were getting from the lake. This view was held by officials mainly from Bukavu (88%) but also those from Uvira (56%). Informants attributed the causes of this change to the effects of conflict through factors that render fishers vulnerable, mainly in reducing their benefits from fishing on the lake.

Some of these factors as cited by official participants included '*chronic insecurity*' (CD017; CD037; CD016), '*excessive and disorderly fishing with massive influxes of new fishers*' (CD053, Section 1), '*drops in people's fishing income*' (CD046), '*collapse of public services and failure in the lake management*' (CD006), as well as the '*displacement of many peoples settling on the shoreline of the lake with lake destructive activities'* (CD056; CD050). However, a small percentage of officials (11%) held the opposite view that the '*importance of fishing on the lake'* has not changed. For them, active conflict had a more positive impact on the lake by sending fishers away from the waters thereby contributing from time to time to reduced fishing pressure on the lake (CD048; CD055; CD057).

The vulnerability of fishers was also identified in relation to the types of fish targeted in fishing activities. Responding to a multiple response question of which types of fish fishers target when fishing, the number of fishers targeting *Dagaa* (34%) and *Mukeke* (20%) was significantly high (**Table** 5.10).

Table 5.10 Types of fish targeted by small-scale fisherfolk on Lake Tanganyika

No	Types of fish targeted by fisherfolk	Frequency (N=95 responses)				Percent (%)
		Kalundu	Mulongwe	Kilomoni	Total	
1	Dagaa (or Marumbu, Lumbu, Mbiya)	7	10	15	32	34
2	Any fish	7	11	8	26	27
3	Mukeke (or Nonzi, Capitaine,)	6	5	8	19	20
4	Kahuzu (Babies Dagaa)	3	3	4	10	11
5	Nyamunyamu (Babies Mukeke)	2	2	1	5	5
6	Kuhe (or Boulengerochromis microlepis)	0	1	0	1	1
7	Tilapia	0	1	0	1	1
8	Sangara (or Lates mariae)	0	0	1	1	1
					95	**100**

Clearly, as shown in **Table** 5.10, most fishers reported that while they can catch any fish that they find, they have preferences for Dagaa ('sardines' clupeids of Limnothrissa miodon and Stolothrissa tanganicae) and Mukeke (Lates stappersii), which they said '*sell fast and well*'. One fish trader held the belief that that '*those who sell Dagaa, they do very well*' (CD010). Some informants reported that because fishing both Dagaa and Mukeke happens during the night and requires fishers to use lights, they can be seen easily on the lake by whoever wants to find and harm them. The result here suggests that the type of fishing used to catch Dagaa and Mukeke is conducted in ways that appeared to have more susceptibility of harming fisherfolk in the context of conflict.

Tied to the preceding, in relation to fishing methods, two methods were cited by most participants, namely ring net (33%) and liftnet (30%), both together totalling 63% and sharing the common characteristic of using light attraction to catch fish (**Table** 5.11).

Table 5.11 Fishing methods used by types of fish targeted on Lake Tanganyika

No	Types of fishing method used	Frequency (N=40 responses)							Percent (%)
		Dagaa	Mukeke	Nonzi	Marumbu	Nyamu-nyamu	Any fish	Total	
1	Ring net	0	5	1	0	2	5	13	**33**
2	Liftnet	5	3	0	0	1	3	12	**30**
3	Trap	0	1	1	1	1	2	6	**15**
4	Line	1	1	1	1	1	1	6	**15**
5	Gillnet	0	1	0	0	0	0	2	**5**
6	Beach seine	0	0	0	0	0	1	1	**3**
								40	**100**

Results shown in **Table** 5.11 reveal that the higher proportions of fishing methods that prevail are ring net (33%) and liftnet (30%), which both need lights. The second higher groups are the trap (15%) and line (15%) fishing methods, which do not use lights. These proportions appear higher in comparison to those provided in the 2011 Frame Survey (Van der Knaap et al., 2014), which showed 19% of liftnet and 1% of ring net, against 34% of long-line and 0% of trap fishing methods. These differences between the two groups could occur, as fishers' informants reported, because in situations of conflict, liftnet and ring net fishers may either temporarily stop fishing or shift to non-light attraction fishing methods in the event that they do not migrate to areas that are not affected by conflict events.

With such a choice, fishers' vulnerability in times of conflict will also be increased due to the likely drop in fishing income (*financial capital*) given that these other fishing methods which do not use lights are not very effective in catching the highly demanded fish, namely Dagaa and Mukeke. Substantiated evidence concerning this vulnerability linked with the avoidance of trouble whilst fishing at night was implied in some participant responses. More specifically, some informants referred to the negative outcome of not fishing at night. Examples hereof are: '*Fishing is normally done during the night. But due to insecurity brought by the conflict, people are afraid to fish during the night. Most fishing is therefore*

done during the days when catches are lower than during the night' (CD037). '*During the conflict, there was hardly any fishing going on because it was too insecure. Only very brave fishermen went out on the lake*' (CD047). *'Most militia operate during the night and sometimes use the lake. Because Dagaa fishing is often done at night and because due to insecurity, no one knows who is who on the lake, some fishers refrain fishing at night*' (CD059).

Thus, from such views and perceptions, it can be inferred that in Uvira the types of fishing that are favoured by most of fisherfolk contribute to their own vulnerability due to the context of particular conflicts. Moreover, the techniques using beach seines and monofilament gillnets are practised both at night and day and more often in hiding given that these two fishing methods are illegal due to their harmful nature as they are not selective and catch a wide range of fish species including immature Dagaa. This fact of fishing in hiding may be a possible explanation of the lower count of these two techniques in **Table** 5.11 with catches under reported.

5.3.4 Role of institutions

In Chapter 3, the literature review looked at institutions mainly as structures and arrangements, which are known to shape livelihoods and livelihood strategies of people (Levine, 2014; Scoones, 2015). In situations of conflict, institutions can be weak and ineffective and impede or enable people's livelihoods. In this section, the analysis focuses on how the existing institutional environment affected by the situation of conflict, mediate fisherfolk livelihoods in the context of vulnerability.

*A. **Bureaucratic institutions***

The results relating to the role of existing formal institutional environments were obtained from participants' responses suggesting that there are management arrangements that draw on different policies and legislation at national and regional levels over fishing activities on Lake Tanganyika, as discussed in Chapter 2. One prominent example that appeared to be known by all the informants, and which is explicitly under both national and the regional mechanisms, was that *'Fishers are required to have fishing permits to access the lake'* (CD054). Further participants' accounts suggested that '*Many fishers do not like to pay for the permit as they find it very expensive'* (CD061), and that '*fishers know that they are exposed to trouble such as confiscation or destruction of fishing equipment, and of fish caught, or even put in jail by officers or armed groups in control of their fishing areas if found fishing without permits'* (CD055).

So, it can be noted that such regulations may stop fishers from using the lake as needed, resulting in the loss of fishing income, with the consequence of limiting their ability to meet their living demands, thus making them more vulnerability. In addition, from the perspective of informants, the situations of conflict have affected fisheries policy decisions and implementation mechanisms. As one informant noted, '*because of the situations of conflict and instability people are dealing with in the DRC, fisheries issues are not of primary interest at the national policy level'* (CD047).

As a result, challenges and frustrations have been encountered by fishers when interacting with people in charge of managing the fisheries given their perceived detrimental effects on their fishing-related activities from which they make a living. In this regard, one official reported that '*While there are different state fisheries servicing at each landing site, people*

do not like their presence as they see them more abusive than helpful' (CD053). Another informant reported that '*they just need money'* (CD047) and another went on to say that '*they have the reputation of ransoming the fishers instead of helping them to cope with conflict-induced shocks and stresses'* (CD046).

One typical example of what could be referred to as ransom or bribe payments was provided by fishers, who reported paying $30 to $40 for an annual fishing permit, in addition to daily taxes each time when they land with catches, sometimes causing them losses (CD015). Elaborating a bit more on this, the fishers indicated that their regular fishing tax payments include either $30, $35 or $40 of annual fishing permit, and $25 to $55 for annual maritime permit for boat motors in terms of $1 per one motor's horsepower. There is also a payment of $20 to $25 per boat captain, valid for a period varying from one to five years. Most importantly, at every landing, depending on where they land, they have to pay to state agents on duty: $0.5 per box of fish caught for the territorial tax if landing in the territory of Uvira, $1 per box of fish caught for the customary chieftaincy tax if landing in rural/village areas, and $2 per box of fish caught if landing in rebel/militia controlled areas. To fish in rebel/militia controlled areas, fishers are required by rebels in charge to have ID documents to confirm that they are Congolese. Rebel controlled areas are reported to have higher catches as very few people can afford to take the risks of going there to fish and being safe.

The preceding example demonstrates that the presence of any institutionalised structures either by rebel/militia groups or local government services on fishing landing sites meant, as informant fishers said, imposed payments of multiple taxes and ransoms, and which they consider excessive and abusing and which have considerable impacts on their lives and livelihoods, and thus exacerbate their vulnerability. For instance, talking about the local government services' officers present at landing sites, one official suggested that '*while*

they take away portions of fishers' capture, they do not provide any help either technical or materials to the fishers in return' (CD061). Tied to this view, one fisher reported that '*When there are not state agents collecting taxes, we have more income. But when they are present, we suffer a lot'* (CD021). From these responses, it could probably be deduced, as suggested by one official, that '*most of these state agents are not paid much salary and this may be the reasons why they depend on the fishers to survive*' (CD061).

The following story illustrates further how fisheries officers and other state services personnel based on landing sites, constitute a significant factor of fisherfolk's vulnerability:

> I have been selling fish since 2012 due to lack of other jobs. I was attracted to it as I was seeing fish traders able to feed their families. To carry out my fish sales, I am required to possess an annual state authorisation for which I pay $5. However, there are some fish traders who can just enter the market and start selling fish without this authorisation. In my case, in spite of this $5 annual payment, which is supposed to be the only one I must pay, state officers pass by to collect daily tax payments of $0.5. My entire capital is $20. I buy a bucket of fish directly from fishers at $18 to $20, and sell it at $20 to $22. I save a portion of my profit in the amount of $1 every day. So, this daily payment is beyond what I can afford. We are suffering with these excessive tax payments. We are being looted while we do not get anything. Sometimes I buy and sell in one location and other times I move around to other landing sites and markets to buy and sell fish. (CD015, September 2017).

CD015's story illustrates some of the disturbing factors affecting to her livelihood and impacting on her living conditions. She lives from buying and selling fish with a small financial capital asset but with which she strives to feed her family. She is constantly faced with an additional challenge of what participants claimed to be excessive payments to state officers to collecting daily taxes. For informants, most of these were not legal and implied that the fisheries officers pocketed the bulk of payments collected. These officers belong to different state structures such as environment services, agricultural inspection and fisheries divisions, that are present in fishing communities to enforce regulations and laws on fishing related activities (As mentioned in Chapter 3). And thus, in accordance with the perspective of SLF, they are part of the existing formal institutional mechanisms at local level. CD015

is constantly suffering from the loss of money and struggling to carry on her activities from more than one location.

Fig. 5.2 Women fish traders in the fish market near the landing site of Mulongwe in Uvira

Source: Author's work August 1, 2018

CD015's experience provides us with a concrete example of how the institutional environment in which people operate their livelihoods can be stressors, setting up adverse conditions that make and keep people poor (Allison et al., 2006; Béné, 2003; Brown, 2016). In most literature on institutions such occurrences have been observed in situations of resource conservation objectives, but which in the case of this study have shown to have collateral damage to people's livelihoods and livelihood strategies. In this example, the

behaviours of states agents extracting wealth from people when they claim unable to afford payments can be one indicator that formal institutions may be weak and ineffective, perhaps because they are operating in a challenging conflict-ridden environment.

In other words, the heavy impact of conflict in the destruction of state services, and consequently its institutions which become sources of people's vulnerability. This implies the reduction of the benefit which fishers draw from fishing activities they depend on for a living. In this regard, most fishers reported that when they were fishing without many laws such as when the officers have fled the conflict, they had higher revenues compared to the time they were imposed fishing rules to observe.

This vulnerability which relates to the financial capital, everything being considered, was given a very strong emphasis by participants among factors that can generate multiple benefits and enable them to withstand conflict disturbances. The dominant trend in participants' answers was that their financial capital is what is most affected and what they need the most to secure their livelihoods.

B. Socially-embedded institutions

Results here focus on aspects such as traditional culture and taboos as well as kinship and social ties, in the context of vulnerability, showing how these socially-embedded institutions can be barriers for entering fishing that fisherfolk need to secure their living.

Traditional culture and taboos

Participants highlighted that other major entry barriers into fishing outside of fishing formal regulations (as discussed in the previous section) were related to local cultural norms, taboos and beliefs. In the fisheries literature, local norms, taboos and beliefs are primarily

recognised as traditional fisheries management tools (Johannes, 1978), and their strength is determined by the number of people who obey them in any society (Fershtman et al., 2011).

In this regard, officials stressed that people fishing in Lake Tanganyika from Uvira areas are generally very superstitious, and as such they are more afraid of God and spirits than of the state laws. According to them, people are afraid of dying and will not want to take any risks with taboos and religious beliefs because they will die. For this reason, they will avoid fishing in areas and at times where and when they believe the spirit can get them and harm them. Some informants referred to having seen and heard of lives lost in the lake when people attempted to disregard local traditions and beliefs.

However, the experience with the newcomers brought on by the conflict has demonstrated a different reality. The newcomers, who are not members of local tribal groups and unaware of particular fishing taboos and beliefs, were reported to be fishing everywhere without any harm happening to them. The majority of participant fisherfolk recognised this as setbacks inflicted by conflict conditions to traditional rules, people started to discover their ineffectiveness and thus started to lose faith in them. This is an important finding as it illustrates that these taboo setbacks are considered to be the source of vulnerability of the lake by exposing it to overfishing and overexploitation. Those consequences include the depletion of fish stock in the lake and more vulnerability of fisherfolk who draw most of their livelihoods from this natural asset.

In addition, examples of existing taboos, beliefs and traditional rules in fishing communities of Lake Tanganyika provided by both officials and individuals/households' participants, appeared to be more directed to women, as shown below: a) '*Women should not take bath*

in the lake' (CD051); '*Woman in menstruation period should not approach the lake'* (CD057); c) '*Woman should not step into a fishing boat'* (CD003); d) '*Woman should not cross any net rope. If this happens, she will get sick until someone goes back to see the witch doctor to get a remedy for her' (*CD024).

An observation of the list above excludes implicitly women from fishing labour and confine them to fish trading/processing only. Observing such beliefs, which appear to be informed by gender norms, will be detrimental to families that have higher numbers of women, and therefore will impact on their livelihood choices, suggesting more vulnerability to them.

Kinships and social ties,

One additional consideration of the influence of socially-embedded institutions in the fisheries identified in participants' responses was the notion of social relations, which are observed in the different social arrangements involved in accessing Lake Tanganyika fisheries resources by fisherfolk to secure their livelihoods. In the literature, it is recognised that through these arrangements, access mechanisms to fisheries resources are permitted (Hall et al., 2014; Nunan, 2010).

Informants indicated that most people entered fishing-related activities on the Lake through family ties. At the same time, they also highlighted the role of these same family ties in keeping most people in fishing activities despite the decline in fishing income, which render them vulnerable. Some of the examples that emerged from participant responses in relation to kinship and family ties included the informal education in fishing skills and informal access to financial resources.

Firstly, '*learning how to fish'* was most mentioned by informants from both categories of officials and fisherfolk in the three study communities as a condition to enter fishing. It thus was found that people belonging to fishing families had more opportunities of entering fishing than those who do not. For example, some fishers reported that '*My dad taught me how to fish"* (CD002); and '*I got in fisheries to follow the footsteps of my family members. They are the ones who trained me'* (CD006; CD042). It can be implied from these quotes that kinship is a social asset that when lacking can be a source of vulnerability.

Secondly, responding to the question of whom they can turn to in situations of difficulties, '*to family members*' was the most mentioned. Thus, not having a family was a factor that affected fisherfolk's ability to overcome barriers to benefit from fisheries resources in the presence of various mechanisms restricting entering fisheries. This implies that having a possibility of obtaining monetary resources can offer the ability to acquire necessary equipment one needs to undertake fishing activities on the lake. Thus, in this sense, those with insufficient financial resources will not be able to acquire needed equipment and thus will typically not enter the fisheries. This will appear evident based on their low-income status, which they confirmed in identifying themselves as poor.

To summarise, **Table** 5.12 below recapitulates the elements that emerge to capture mediating diverse and fluid institutions in the context of participant fishers:

Table 5.12 Mediating diverse and fluid institutions in the context of participant fishers

Elements	Mediating institutions	Mechanism	Type of vulnerability
• Accessing fisheries	• Kinship	• Informal education in fishing skills	• Inability to enter fishing .
	• Family ties	• Financial help	• Inability to access loans to acquire fishing equipment
	• Formal sate structures	• Fishing permit	• Inability to enter the lake

Elements (Cont'd)	Mediating institutions	Mechanism	Type of vulnerability
• Fishing on the lake	• Cultural norms, taboos and beliefs	• Fear of God and Spirits when fishing	• Limited fishing areas and reduced fishing income
	• Gender norms and marriages	• Gender bias towards women	• Women excluded from active fishing roles • Limited choices to families with higher number of females
	• Regional regulation mechanism and national border limits	• Negotiate with maritime guards	• Inability to fish across national boundaries
• Staying in fisheries	• Religious faith	• Reliance on God for better catches ahead • Giving tithes and offering	• Reduced fishing times (Off Sundays and Fridays) • Reduced catches and income
	• Families ties	• Encouragement and mutual help in fishing	• Stay in fishing even when it is unproductive
	• Fish clients-fishers relation and Self-help groups	• Access to informal credit	• Unpaid loans due to low catches and potential quarrels

5.4 Responses to vulnerability and outcome

The research question aims to identify fisherfolk coping and adapting strategies that may explain the continuing extensive fishing-related activities on the lake despite the conflict-induced disturbances that have all along affected their communities and causing their vulnerability. As mentioned earlier (Chapter 3), the literature on livelihoods suggests that when faced with conflict induced vulnerability through destruction and reduction of their key livelihood assets such as fisheries resources (Natural), family ties (Social), fishing income (Financial), their various coping responses are drawn from resources and factors that are available to them and applicable to their context (Collinson, 2003; Ellis, 1998; Morse et al., 2009). Some of these strategies may include diversification, mobility/migration, and switching asset reliance (Allison and Ellis, 2001; Goodhand, 2003; Nunan, 2010; Nunan, 2015). **Appendix** 5.1 lists coping and adapting strategies that informants reported as being pursued by people involved in fishing-related activities to survive conflict-induced disturbances.

Looking closely at strategies to reduce vulnerability provided by official and fisherfolk participants in response to identified key sources as shown in **Appendix** 5.1, four types of responses emerge to capture the essence of coping strategies in relevance to the research question and on which the following section will concentrate. They include: i) types of fishing, ii) bribery/payment to state agents/armed groups, iii) mobility, and iv) local forms of credit.

5.4.1 Fishing and fishing techniques

Both official and fisher informants mentioned that coping responses in relation to fishing were among key responses that people use to reduce the conflict-induced vulnerability affecting their fisheries-based livelihoods. An analysis of the fishing and fishing techniques employed as coping and adapting strategies pursued by people is presented from several perspectives that were found to be relevant in the three study villages, depending on the nature and extent of disturbances involved.

First of all, '*Stop fishing momentarily'* was mentioned by the interviewees as a primary response to conflict shocks and stresses, particularly in response to violence and insecurity. This suggests a certain level of increased awareness by fishers that in the event of a rampage by militias or armed groups, people found in the waters may be killed, houses looted, and property including fishing equipment destroyed or robbed. Thus, they are safer in staying away from the waters temporarily and hiding in their homes until it is safe to go out again and resume fishing. Most informants indicated that these rampages do not usually last long, just about a week or less, before one side will retreat and life comes back to normal again.

Then, '*withdrawing from fishing'* as a coping strategy was also considerably recognised by both officials (20%) and fisherfolk (27%). It implied shifting to other sources of income and food in response to the trends of increased population in the fisheries and in their fishing communities, with the associated drop in fishing income. One fisher reported that '*Before we had few people in our communities. Now we are overcrowded. Many people have been having larger families which were joined by many other people displaced by the conflict'* (CD022). Thus, these two factors of vulnerability affecting the lake through massive influxes of new fishers are often explained by the functions of '*safety-net'* (temporary) and '*labour buffer*' (on-going), through which fisheries absorb displaced people, surplus and unskilled labor forces in need of finding livelihoods, as suggested in the fisheries literature (Coomes et al., 2010; Béné et al., 2010; Nunan, 2014).

Examples of non-fishing-related sources of food and income cited by informants include undertaking small-scale businesses, finding casual manual handling jobs, sand selling, and farming. This particular strategy of '*withdrawing from fishing'* appeared to some degree a culmination of an adapting mechanism from the initial strategy of '*stop fishing momentarily'* to cope with conflict-induced shocks and stresses. In a sense, such a change implies a progression in the approach towards livelihood enhancements. It is nevertheless no longer dependent on specific disturbing factors given the protracted nature of the DRC's conflict.

In addition, those fishers who continued fishing, their strategy in response to the above-mentioned stresses and trends was reported as '*seeking the highest possible fish catches'* when conditions were allowing them to fish. In this regard, given the population increase trend, and faced with many mouths to feed in their communities, the general response strategy, as officials indicated, was to increase fish catches, through adopting destructive

and illegal fishing methods. Taking a closer look at the destructive fishing practices involved when fishers are seeking highest possible catches, one official stated '*in this situation fisherfolk use different types of nets including prohibited ones that can allow them to catch more fish so that they can have survival means in times when they will have limited access to the lake*" (CD052). Some officials indicated seeing fishers using '*magnetic nets'* which catches everything including small fish. According to participants, these nets are illegal in the four countries sharing the lake.

Along similar lines, fishers also reported to have been fishing in near-shore areas where most spawning habitats are located. They indicated doing this after realising that the farther they go out in the lake, the fewer chances they have of catching fish and the more risk they will run to cross national water boundaries. Also, catching small fish appeared intentional for most fishers, as one fisher indicated, because they sell fast since people like them. With such an attitude, it can be said that, for most fishers, catching small fish means higher sales which also means more income resulting in greater saving ability and disposable cash to better afford different living expenses (rent, food, healthcare, education) as well as various payments to either state agents and/or armed groups so that they are not stopped from fishing or do not harm them when fishing. This seems to suggest that catching prohibited small fish is encouraged by a high propensity of their consumption by people, which may be an indication that people's eating habits were valued more than conservation objectives by different formal and informal regulation mechanisms.

As some officials noted, '*fishers manage to go around regulation mechanisms by using clandestine fishing which can involve prohibited types of nets and fishing but with legal fishing technique such as liftnet and ring net, and which allow them more fish catches than*

if they were using recommended mesh sizes and in offshore areas' (CD046; CD058; CD052). Based on the existing fisheries rules (covered in Chapter 2), these response strategies entail illegal fishing practices, which have been reported to be increasing since 1995 in the Uvira region (Vander Knaap, 2014; Petit and Shipton, 2012).

5.4.2 Negotiations

Negotiation ability through bribe payments is another strategy that was identified as being pursued by several fisherfolk in response to conflict-induced disturbances that impede their fisheries resource-based livelihoods which impact their lives. Some official informants (3%) mentioned the strategy of '*paying ransom to /negotiate with armed groups / fisheries officers'* allowed fisherfolk to carry on their fishing activities rather than fleeing in times of conflict or staying home when lacking fishing permits. One official reported that '*Many armed groups as well as governments forces consider fishers as sources of income and therefore avoid disturbing them. Even recently there was fighting up to Uvira but the fishers carried on with their fishing activities on the lake'* (CD039). Another official participant indicated that '*fishers bribe the marine military and other officers in order to use the prohibited materials include, gillnets and monofilament nets, when fishing on the lake'* (CD049).

This negotiation and bribery ability seems to have been developed to the extent of making it possible to fish beyond national water boundaries taking advantage of the transboundary nature of the lake. As one official observed '*fishers negotiate with neighboring countries guards so that they can fish in their waters without being harmed"* (CD046). Another official added that '*when the lake is closed for fishing in the DRC, Congolese fishers go*

fishing into waters of other riparian countries, which will now experience increased fishing intensity (CD047).

Prospects of this strategy, as illustrated in the preceding quotes, highlight complexities in the management effort of the lake resources. Its significance is that fishers' attempts to survive conflict-induced difficulties in one country have spill over ramifications beyond national borders. In the perspective, this strategy consists in the negotiation skills of fishers and ransom payments' ability to guards/officers in fish or cash money after fishing trips. With such arrangements, the lake is fished on either side with the same fishers in pursuit of higher catches without much fear of being harmed. Also, this particular strategy of allowing fishers to cross and fish beyond their national water boundaries appeared to be eased by the closeness in terms of distances between the waters of concerned neighbouring countries sharing the lake, with the lake's mean width of 50 km (Coulter, 1991).

From the preceding, it can be said that rather than observing fishing rules, which they consider detrimental to their fishing-based livelihoods and that are already undermined by the conflict situation, fishers manage through negotiation/payments to evade existing regulation structures to benefit and survive from them.

5.4.3 Mobility

Sixty two percent of participant fisherfolk in individual interviews were natives of the communities where the interviews took place. It was found that such a lengthy residency in one place does not necessarily suggest that they do not move but rather indicates their strong ties to their native villages where they stay, leave and return regardless of the conflict disturbances affecting their communities. This feature of mobility was identified as a

survival strategy used by people involved in fishing-related activities. In the fisheries literature, mobility has long been part of livelihood strategies and known to involve patterns of movements of people due to pressure in their fisheries livelihoods such as degradation of either fish stocks or of security conditions by offering opportunities of fishing in new areas with increased income and safety (Ellis, 2003; Nunan, 2010). While mobility has long been a traditional coping strategy for people living in fragile environments, it has also shown to vary depending on factors of vulnerability affecting the people using it (Tacoli, 2011).

Applying this theoretical view of mobility to the context of DRC conflicts, and considering the coping responses which involve 'fleeing back and forth to safer areas', as provided by the data obtained from most of the interview informants, the constant '*come back home*' appears to be preferred as opposed to going and settling for good elsewhere. In other words, the essence of the approach appeared to be more than just going for higher catches elsewhere, but rather maintained on the basis of whether or not security has been restored at home.

In this perspective, mobility seemed not to be used as a means to a permanent relocation but rather a temporary safety measure in situations of security threats by armed groups. Supporting this observation, one official stated that '*in conflict situations, people will just flee carrying whatever they can as a way to protect their lives and possessions and return home when it is safe*' (CD047). Thus, all being considered, we can note from this quote that resettlement for better fishing possibilities or other livelihoods alternatives do not constitute primary motivation for people's mobility in the context of the DRC. Moreover, as one officer noted, mobility also is seen '*When control visits are conducted, some fishers move*

or temporarily migrate to fish in other areas that are far away to avoid being caught' (CD052).

With respect to the factors that help fishers in the decision of whether to flee or not, where to go and for how long, some participants reported that the availability of the financial capital was a key determinant allowing payments of transport fares, food and ransoms to armed groups they may encounter in their way when fleeing. The dominant trend in the participants' answers was that money is what they lack, or they need the most to achieve any livelihood objectives.

It might be in connection with the lack of the financial capital that the choices of '*outmigration other territories within or outside of DRC,*' as survival strategy under mobility appeared to be mentioned by fewer informants (See **Appendix** 5.1). The fewer fishers (5%) choosing '*out-migration*' as a strategy could be interpreted together with their lower responses (1%) about '*moving around to other areas for better life opportunities*'. One possible interpretation of this could be that fishers consider abandoning their native lands and communities as their last resort of coping that they would pursue when all other alternatives are lacking.

For participant fishers, strategies involving out-migration may imply going elsewhere to start life over again in safe environments but with other uncertainties that could make them more vulnerable than before. From this reason, it can be understood why a large number of fishers indicated that they fled within and outside of the DRC, but returned to their native lands, despite the conditions of relative peace and stability found in refuge areas/countries.

Some of them reported that they have returned from Tanzania where they migrated to flee the conflict.

5.4.4 Local forms of credit

To the question of what resources would fishers choose if they had to be given help to support their fisheries-based livelihoods, '*loan*' topped the list of their responses (68%). Ultimately, they believed loans can give the ability to cope with adverse seasonal factors. One fisher said: "*loan is what I will need the most. This can help to get back into fishing after losses of or damage to our equipment loss*" (CD031). Furthermore, participant fishers reported the absence of any type of NGO at their landing sites, which could have helped them in many aspects including providing formal financial loans that fishers needed when faced with uncertainties.

In relation to this, some officials (17%) and fisherfolk (2%) mentioned that those fishers who choose not to migrate, organize themselves into self-help associations, as their coping strategy. According to one fisher, '*these are groups with people in fisheries who associate based on a common goal and membership conditions including the payments of monthly monetary contributions. They are supportive and can give small loans to their members in need'* (CD021). This was confirmed by the configuration of the 45 interviewed informants among which 44% declared being members of such associations. In relation to this, one fish trader stated: *"We have associations and they are very useful. I am a member. If a problem arises, they can help to solve it*" (CD019).

Also, participants indicated that while formal credit institutions do not exist in fishing communities, people in fisheries rely on other informal credit arrangements, among which the following ones were reported.

In the first arrangement, fish traders who are clients and considered as patrons of boat owners, may lend them fuel and/or money, which will be repaid in fish caught at a lower price, leaving room for reasonable profit to fish traders after sales in the market. For example, one fisher explained that they give a box of fish that can be sold in the market at CDF[14]200,000[$120US][15] to fish traders in exchange of a loan of CDF 160,000 [$96US].

The second arrangement concerns boat crew members who generally do not have access to loans due to lack of required collateral and given their non-permanent fishing employment as well as their lack of fixed addresses. However, fish traders can lend them money with their bosses' endorsement guaranteeing payments after each fishing income up to completion. The lenders here will be paid through boat owners because crew members are not involved in fish sales.

In the third arrangement, boat crew members in need after experiencing conflict-induced disturbances can be given loans by their bosses. One crew member said: "*Outside my boss, I have no one I can turn to if I am faced with difficulties. The boss can give a loan payable with interest*". Another participant crew member added: "*For example, if we borrow*

[14] Congolese Franc

[15] Conversion (May 2019)

CDF10,000 [$6USD], we will reimburse CDT15,000 [$9]. Crew members showed to be frustrated with the lack of other lending opportunities when they experience difficulties.

A fourth local loan arrangement concerns boat owners who can borrow from small cooperatives in the city to repair, and upgrade or replace their fishing equipment and repay with interest. They qualify for such loans because they have collateral (homes, boats, etc.) that can be taken the event of default. As one boat owner explained: "…*I will turn to a local credit cooperative (COOCEK) to borrow money. Their obligation is that I repay with interest and that I provide my plot or house's titles to secure the loan"* (CD012). Another one added: *"We can borrow against our house and the loan is to be given with a 10% actual monthly interest. For example, a loan of US$1000 will require paying US$100 interest every month"* (CD006).

A fifth loan arrangement that informants reported concerned those of the fishers who do not have their own boat engines. They can turn to other fishers who own them and can offer them to be used for fishing trips on credit. The payment will be made after selling the fish caught.

The sixth and the final loan arrangement mentioned by informants seemed more structured under small groups in kinds of networks of mutual support. Under this arrangement, people in fishing-related activities regroup themselves in small self-help associations within which monthly contributions are collected from each member and which are used in forms of loans available to members facing problems. As one participant observed: "*Such loans are mostly sought for difficulties that are faced at the family level, such as those requiring money for school fees, medical treatments, burying deceased family members, etc*." (CD053).

A further aspect that came to the fore from interviews was that participants made it very clear that with the conflict, all loan arrangements are considered very risky and have been curtailed significantly. In reference to this, one official said: "*In the past we used to borrow money from the state agencies and buy fishing units and then pay them back progressively. But today with insecurity, no one can predict the fishing outcomes and the ability to pay back loans if they were available"* (CD060)

To summarise, **Table** 5.13 below in essence recapitulates the elements that emerge to capture key coping and adapting strategies that help fisherfolk to withstand conflict-induced disturbing factors.

Table 5.13 Key coping and adapting strategies use to withstand conflict-induced disturbances

Conflict induced disturbing factors	Coping and adapting strategy	Factors influencing the choices
• Reduced lake access • Reduced fish catches	• Switch to alternative sources of income and food • Withdrawal from fishing	• Savings, alternative livelihoods basis
• Armed group rampage and gun battles	• Temporary stop of fishing • Flee to safe areas	• Safety and livelihood possibilities • Financial resources
• Chronic insecurity and violence	• Switch fishing technique • Out migration to other areas	• Awareness of danger • Family and friend network
• Drop in fishing income problems	• Self-help association • Negotiate with armed groups • Have larger families living together • Use destructive gears and illegal fishing	• Possibility of loans • State fragility and incentive for corruption • Pay ransoms
• Excessive hassle with multiple tax payments and ransoms	• Fish in hiding • Bribe officers • Fish in distant areas	• Financial resources

5. 5 Concluding summary

In conclusion, it can be said that the extensive fishing-related activities seen continuing to take place on Lake Tanganyika is to a substantial degree indication of the fishers' survival, and their refusal to give up their fisheries' livelihoods shows their attachment to the lake to which they owe their overall survival. As established in the analysis of causes of and

responses to vulnerability in fishing communities of Lake Tanganyika, fisherfolk have survived repetitive conflict-related disturbances owing to their coping strategies that allowed them to withstand adverse changes and to benefit from existing institutional structures also affected by the conflict context. The conflict in eastern DRC involved various forms of violence that undermined Lake Tanganyika fisheries resources, its management mechanisms and livelihoods assets of fishing communities.

Findings in this chapter show that in times of conflict, chronic insecurity and violence were reported as the most prevailing conflict-induced stress that affected the fisheries livelihoods. The conflict prompted people's coping and adapting strategies through fishing practices and mobility that have also impacted the lake. Resources that appeared the most important to enable fishers to cope with conflict-induced changes were essentially those that fisherfolk lacked the most, including the financial assets in forms of loans and the government ability to provide fisheries services. The mobility of people and their ability to shift their traditional fisheries-based livelihoods to other sources of food and income have given them the capacity to carry on with their living even with relatively reduced income and/or changed geographic locations from which they access the same lake.

It is important to note that multiple institutional processes, state and traditional, mediate the choices of strategies they use through differing access arrangements to the lake resources. Thus, fisheries livelihoods and livelihoods strategies drew from various institutional factors and diverse relational dynamics identified in the ways fishers were enabled or constrained in their pursuits to sustain their living. This implies fundamental elements that suggest the idea that institutions mediate access to the lake's resources and influence fishing activities on Lake Tanganyika in the context of conflict.

One highlighted observation is that prominent beliefs, in either traditional customs or in God, appeared to have a considerable impact on how most fishers interpret key challenges in conducting their activities and lives. This social attitude, constructed around local beliefs and which was reported to have a positive role in efforts towards conserving lake resources, experienced significant setbacks due to the dynamics of conflict, which brought newcomers into fishing in areas that are not native to them.

Chapter 6.

SUSTAINING FISHERFOLK LIVELIHOODS IN TANZANIA

6.1 Introduction

Chapter 6 takes the analysis to the western Tanzanian context, where Lake Tanganyika is fished by communities of people that include migrants from the conflict-ridden eastern DRC attracted by the relative peace and stability of Tanzania. The transboundary nature of Lake Tanganyika, particularly on borderlines with the DRC, brings additional challenges to situations of change in the fisheries to which fisherfolk respond to secure livelihoods. The chapter presents the analysis of qualitative data drawn from 66 semi-structured interviews, nine focus groups, six direct observation visits, six transect walks, and five narrative life stories. The adapted Sustainable Livelihoods Framework (SLF), which is linked to critical institutionalism, is once again used in relation to the research question '*how do small-scale fisherfolk secure livelihoods in situations of change*?'

The chapter begins with a description of key informants' general characteristics. It is followed by the identification and analysis of i) sources, the extent and implications of vulnerability of small-scale fisherfolk, ii) responses/strategies to different types of disturbances that fisherfolk pursue to maintain their livelihoods. It further applies the concept of coping mechanism to understand coping strategies used by fisherfolk to maintain their livelihoods. The final section concludes the chapter.

6.2 General information and characteristics of participants

6.2.1 Officials

The data collected from officials were mainly through ten semi-structured interviews which were conducted in their offices or at landing sites. It was mainly male officials who participated in these interviews, which suggests a gender inequity in the relevant public and civil society services. **Table** 6.1 below groups official participants according to their general information and characteristics. In the first round of fieldwork, they included staff with prominent positions in institutions including government offices (20%), research centres/universities (30%), NGOs/local associations (30%) and also religious leaders (20%). For the second round of fieldwork, official participants were essentially lower level fisheries officers with responsibilities at landing sites, so as to fill the gap from the first round of fieldwork that covered only higher up officials.

Table 6.1 General information and characteristics of participant officials in Tanzania

GENERAL INFORMATION AND CHARACTERISTICS - OFFICIALS		**FREQUENCY**	**PERCENTAGE**
Individual semi-structured interviews (1st fieldwork round)		N = 10	% = 100
Gender	Male	9	90
	Female	1	10
Location	Kigoma	9	90
	Elsewhere	1	10
Affiliation	Government Offices/Services	2	20
	Research centres/Universities	3	30
	NGOs, regional and Local Associations	3	30
	Religious Authority	2	20
Position	Administrator/Director/Manager/ Inspector	5	50
	Traditional/ Religious Chief	2	20
	University Professor and Researcher	3	30
Experience	1 – 10 years	5	50
	11 – 20 years	1	10
	21 + years	4	40

GENERAL INFORMATION AND CHARACTERISTICS - OFFICIALS (Cont'd)		FREQUENCY	PERCENTAGE
Individual semi-structured interviews (2nd fieldwork round)		N = 5	% = 100
Gender	Male	4	80
	Female	1	20
Location	Kibirizi	2	40
	Katonga / Ujiji	3	60
Affiliation	Government Offices/Services	5	100
	Other	0	0
Position	Fisheries officer	5	100
	Other	0	0
Experience	1 – 10 years	4	80
	11 – 20 years	1	20
	21 + years	0	0

Officials who participated in the research included senior managers, researchers and lower level fisheries officers as shown in **Table** 6.1, which groups them according to their general information and characteristics.

6.2.2 Individual/household participants

A total of 123 participants under the categories of individual/household took part in the various data collection activities that were undertaken during two rounds of fieldwork. They included 51 participants in the semi-structured interviews (see **Table** 6.2), 65 participants in several focus groups activities (see **Table** 6.3), and seven participants in narrative life stories (see **Table** 6.4). **Tables** 6.2, 6.3 and 6.4 present the information of the participants related to their characteristics, which are used in this cross-sectional study as appropriate to indicate living situations of people involved in fishing-related activities.

Table 6.2. Characteristics of individual/household interviews' participants

GENERAL INFORMATION AND CHARACTERISTICS - INDIVIDUAL/HOUSEHOLD PARTICIPANTS		FREQUENCY	PERCENTAGE
Individual Semi structured interviews (1st fieldwork round)		N = 51	% = 100
Gender	Male	46	90
	Female	5	10
Location	Katonga Fishing Village	17	33
	Kibirizi Fishing Village	17	33
	Ujiji Fishing Village	17	33
Age category	15 - 25 Years	2	4
	26 - 35 Years	7	14
	36 - 45 Years	18	35
	46 + Year	24	47
Marital status	Married (Living with a spouse)	44	84
	Single (Never married)	4	8
	Separated / Divorced	2	4
	Widowed	2	4
Household head	Yes	49	96
	No	2	4
Family size (households)	1 person	1	2
	2 - 6 people	15	29
	7 - 11 people	30	59
	12 + people	5	10
Experience	1 – 10 years	11	22
	11 – 20 years	15	29
	21 - 30 years	15	29
	31 + years	10	20
Type of activity	Fish trader / Processor	6	12
	Fisher / Crew member	22	43
	Boat owner	23	45
Tribe	No answer (Not applicable)	51	100
Religion	Christian	13	25
	Muslim	3	6
	No religion	1	2
	No answer	34	67
Residence	Native autochthonous	33	65
	Migrant from other villages of Tanzania	8	16
	Migrant from DRC	9	18
	Migrant from other countries (Burundi)	1	2
Length of residence	Whole life	33	65
	1 – 10 years	4	8
	11 – 20 years	7	14
	21 + years	7	14

GENERAL INFORMATION AND CHARACTERISTICS - INDIVIDUAL/HOUSEHOLD PARTICIPANTS (Cont'd)		FREQUENCY	PERCENTAGE
Individual Semi structured interviews (1st fieldwork round)		N = 51	% = 100
Self-identified Income category	Poor	42	82
	Middle	9	18
	Rich	0	0
	No answer	0	0

As shown in **Table** 6.2, the majority (90%) of participants in individual interviews were male. Most participants were aged 46 years and over (47%) comprised the most participants. Fish traders/processors constituted the minority of participants (14%), compared to Fishers/Crew members (43%) and Boat owners (43%). The majority (86%) of the participants were married. Almost all of the informants (96%) lived in households of least two family members. In addition, in terms of income category, the majority of participants (82%) identified themselves as poor. The table also shows that 37% participants were migrants.

Table 6.3 lists participants in several focus groups sessions, of which one covered only female participants in each of the three villages. Out of a total of 65 participants, female participants represented 58% (38). Out of 20 women in the women session, only 5 (25%) reported being married and 15 (75%) not married. In relation to types of fishing activities, only one female was a boat owner and the rest were fish processor/traders (67%). None of females were fisher/crew members, suggesting possible social restriction favouring men in this particular activity. In terms of age, the majority (45%) of participants in the women only sessions were 46 and older while the minority were in the age categories of 15 to 25 years (15%) and of 36 to 45 years (15%).

Table 6.3. Characteristics of Focus Groups' participants in Tanzania

GENERAL INFORMATION AND CHARACTERISTICS OF FOCUS GROUPS' PARTICIPANTS		FREQUENCY	PERCENTAGE
Focus groups: Seasonal Calendar and Trends Analysis - (2nd fieldwork)		**N = 23**	**% = 100**
Location	Katonga Village	8	35
	Kibirizi Village	9	39
	Ujiji Village	6	26
Gender	Male	14	61
	Female	9	39
Type of activity	Fish trader / Processor	10	43
	Fisher / Crew member	10	43
	Boat owner	3	13
	Other (Porter, Net repairer)	0	0
Focus groups: Calendar Analysis and Matrix Exercise - (2nd fieldwork)		**N = 22**	**% = 100**
Location	Katonga Village	7	32
	Kibirizi Village	8	36
	Ujiji Village	7	32
Gender	Male	13	59
	Female	9	41
Type of activity	Fish trader / Processor	14	64
	Fisher / Crew member	3	14
	Boat owner	4	18
	Other (Fisheries officer)	1	5
Focus groups: Women in fisheries - (2nd fieldwork round)		**N = 20**	**% = 100**
Location	Katonga Village	8	40
	Kibirizi Village	7	35
	Ujiji Village	5	25
Marital status	Married (Living with a spouse)	5	25
	Single (Never married)	3	15
	Separated / Divorced	9	45
	Widowed	3	15
Household Head	Yes	15	75
	No	5	25
Type of activity	Fish trader / Processor	19	95
	Fisher / Crew member	0	0
	Boat owner	1	5
Age category	15 to 25 Years	3	15
	26 - 35 Years	5	25
	36 - 45 Years	3	15
	46 + Year	9	45

Table 6.4 Characteristics of narrative life stories' participants

Narrative life stories - 2nd fieldwork round		N = 7	Percent = 100
Location	Katonga Village	3	43
	Kibirizi Village	2	29
	Ujiji Village	2	29
Gender	Male	0	0
	Female	7	100
Age category	15 to 25 Years	0	0
	26 - 35 Years	1	14
	36 - 45 Years	3	43
	46 + Year	3	43
Types of activities	Fish trader / Processor	7	100
	Fisher / Crew member	0	0
	Boat owner	0	0
Experience	1 – 10 years	2	29
	11 – 20 years	4	57
	21 - 30 years	1	14
	31 + years	0	0
Home ownership	Owns a home	4	57
	Renting	3	43

As **Table** 6.4 shows, more than half of narrative stories participants (57%) owned their homes. All of them were females with the majority being in the groups of 36 to 45 years old (43%) and that of over 46 years (43%), and of 11 to 20 years of experience in fish sales activities (57%). All of them (100%) were female fish traders/processors. The choice of only recording the life stories of women was mainly due to their availability but at the same time gave opportunities for getting interesting data given their marginalisation both at homes and landing sites. This resonates with positions and perceptions on women in developing countries' fishing communities regarding their roles which been acknowledged but rarely valued compared with those of men, reflecting gender hierarchies in these societies (Bennett, 2005; Harper et al., 2013).

6.3 Vulnerability context of fisherfolk

As stated in Chapter 3 and Chapter 5, the vulnerability context of households and individuals can result from either external or internal disturbances in forms of shocks, stresses, trends and seasonality impacting their livelihoods resources (Carney 1998; Scoones, 1998). Thus, the vulnerability analysis focuses on identifying and understanding its sources and how they affect fisherfolk' lives and livelihoods in the context of western Tanzania. Using the first section of the adapted SLF, the analysis captures, describes and interprets the factors that affect fishing communities from data generated from participants' views.

The analysis specifically focuses on factors that impact on fisherfolk' livelihoods generating vulnerability considering the recognised relative peace and stability of Tanzania and the associated transboundary effects of the DRC conflict. Similarly, as in Chapter 5, the vulnerability analysis is presented in terms of four identified factors which emerged from the data given that they appeared most mentioned in participant responses. These factors are: nature and extent of conflict, mobility, and type of fishing, and institutions.

6.3.1 Congo conflict

In order to identify and explain the extent and how the Congo conflict has affected fishing communities on the Tanzanian shoreline villages exposing fisherfolk to vulnerability, the analysis uses participants' responses to interview questions. The vulnerability assessment concentrates on the transboundary effects of the DRC conflict, induced insecurity on the lake, and on the importance of fishing on the lake, among the causes that increase Lake Tanganyika fisherfolk vulnerability.

To the question of whether their communities were affected by the DRC conflict, responses provided by participant households/individuals show a variation between the three locations. First, despite the recognised relative peace and stability that characterises Tanzania, results from interviews indicate that a considerable number of fisherfolk in shoreline villages have been affected by transboundary effects of the DRC conflict. For example, one fisher reported that '*a good number of people in the Congo's conflict zone have guns, which they use to get income they need to live. This has caused a lot of banditries on the lake which has been affecting us a lot*' (TZ022). Accordingly, a high percentage of household/individual participants (47%) felt that they were affected by the DRC conflict of which 11 (45%), the largest group, were in the Kibirizi village and the smallest 5 (20%) were in the Ujiji village. 17 (33%) out of 51 (100%) in the three villages reported to have never been affected by the DRC conflict, within which the largest group 12 (70%) were in Ujiji Village against the smallest, group of 2 (12%), in the Kibirizi village. Part of the reason may be that Ujiji is mostly inhabited by Muslim compared to the two other Tanzanian study sites where Congolese migrants and most being Christians were reported to resettle.

Furthermore, about 4 (8%) of household/individual participants reported to have been affected by the DRC conflict only in the past and that they have no current experience of DRC conflict related disturbance. For example, one fisher informant reported that '*DRC conflict did affect us before but now things are better'* (TZ009). Another informant reiterated that problems faced in relation to the DRC conflict were in the past. '*Before we were affected by the conflict in the Congo. Fisherfolk used to be captured by Congolese pirates'* (TZ029).

The following responses give an idea of how different individuals/households' lives and fisheries livelihoods on the Tanzanian side of Lake Tanganyika were affected by the DRC conflict. One fisher indicated '*conflict in the DRC, had increased the intensity of fishing on the lake from this side. As people were fleeing conflict zones of the DRC, crossed into Tanzania along with their fishing practices*' (TZ001). Another fisher added '*We are affected by the conflict in the Congo as we cannot go far at sea for fishing. Many of us have seen their equipment stolen while on fishing trips. Congolese soldiers and armed rebels who are in the forest by lack of living provision attack fisherfolk on the lake'* (TZ008). On a different aspect, one fisher reported that *'It has affected us in the sense that people who fled the conflict from Congo brought with them banditry. We started experiencing theft and gang robberies of our fishing materials'* (TZ011). At the same time, one official remarked *'In previous years, there were influx of people coming from the DRC. Some of them were armed and even were terrorising the local people in this side. Most of these guys were militia, and it was quite unfriendly'* (TZ053). Another official indicated that '*with the coming of migrants, the gillnet fishing was considered to allow them more catch that appeared to be beyond the subsistence fishing. So, many Tanzania embraced this practice, which attracted more fisherfolk that led to overfishing on the lake*' (TZ055)

Looking at these quotes through the lens of the SLF, one can see how the DRC conflict generates shocks and stresses as well as trends affecting fisherfolk's lives and livelihood assets (Béné, 2004; Berkes, 2015; Ellis, 1998) residing on the Tanzanian side of Lake Tanganyika. In this regard, the problem of armed banditry in Tanzania has been recognized as having spilled across borders from the wars in the Great Lakes region, which includes the DRC (Dick, 2002; Geiβ, 2009; Prunier, 2008). Conflict literature would categorise such conflict as external to locations impacted by its spillover effects (Dunne 2013). Within this

category, most studies have focussed on territorial spillover effects on the economy of neighbouring countries sharing a border with the country in conflict (Geiβ, 2009; Sandler, 2002). In addition, the work by Dunne and Tian (2014), considered these spillover effects not as isolated events with singular shocks on economic growth, but rather as having prolonged impacts on factors including physical and human capital assets, as well as institutions.

Thus, it is possible, focussing on the transboundary nature of Lake Tanganyika, to identify the factors and ways through which the Congo conflict has cross-border impacts on fisherfolk's lives and fisheries livelihoods in western Tanzania, predisposing them to more vulnerability. **Table** 6.5 draws from participants' experience on different ways in which the DRC conflict-induced disturbances had affected their livelihoods in the Kigoma region shoreline villages and increased their vulnerability. It gives a frequency distribution of fisherfolk participants' multiple responses to the question of how conflicts in DRC affected their lives and fisheries.

Table 6.5 DRC conflict transboundary disturbances to small-scale fisherfolk of Tanzania

No	DRC Conflict-induced disturbances to small-scale fisherfolk in Kigoma/ TZ	Frequency (N= 45 responses)				Percent (%)
		Katonga	Kibirizi	Ujiji	Total	
2	Insecurity in distant waters due to due to piracy/banditry	10	12	7	29	34
3	Losses in the waters of equipment by pirates	10	9	6	25	29
1	Many migrants entering fishing / increased fishing intensity	7	6	3	16	19
4	Forced fleeing/ resettlement in a foreign peaceful country	4	5	5	14	16
5	Increased thefts, prostitutions, broken marriages	1	1	0	2	2
	Total	**32**	**33**	**21**	**86**	**100**

The responses provided by household/individual participants were grouped into five categories indicating how they were affected by the DRC conflict. As can be seen in **Table**

6.5, DRC conflict-induced disturbances are reported to affect fisherfolk mainly through '*Insecurity in the waters*' 29 (34%), '*Increased number of migrant fisherfolk* ' 16 (19%), and '*Losses of equipment'* 25 (29%). It can, therefore, be established that these three categories of factors represent the key sources of vulnerability of Tanzanian Lake Tanganyika fisherfolk. So, similar to Chapter 5, disturbances related to increased number of migrants given the connection with displacement will be discussed in the next section on mobility.

Therefore, concerning '*insecurity in the waters*' associated with piracy occurrences, many fisherfolk reported water pirates' activities in terms of attacks targeting essentially the physical capital assets of fisherfolk including boat engines, lights and batteries. According to these fisherfolk, and considering the types of assets seized by pirates, in most cases of water pirates' attacks, interestingly fishing boats were left and crew members left unharmed. In this respect, one fisher indicated '*the war in the Congo encouraged many water pirates that stole many fishing engines of those they found in the water*' (TZ016). Another informant reported that '*Sometimes Congolese pirates seize our boats, engines, nets, and lights when run into them in the waters*' (TZ023). And one official added that '*piracy is a real problem on Lake Tanganyika. Fisherfolk can be attacked by the pirates and their equipment is confiscated and their lives not secure* (TZ056).

In the fisheries livelihoods' literature, physical assets are considered to be of critical importance for fishing households including boats, boat motors and gears (Allison and Horemans 2006; Diedrich et al., 2018; Nunan, 2010). These quotes imply that any fisherfolk faced with the problem of equipment taken away by pirates will no longer be able to fish and as a consequence will be exposed to vulnerable conditions of life. As many informants

pointed out, their conditions will likely be worse if the lost equipment was borrowed, since they will have no way of paying back their equipment lenders given the absence of formal mechanisms or structures to which they can turn for financial help to resume fishing.

So, given that fisherfolk do not always own these physical assets, rather they rent them from other community members in their fishing, friends and family networks, which represents social capitals available to them. Losing their fishing equipment could lead to social capital disruptions through social relations within fishing related activities such as friendships and/or partnership or cooperation ties between them, which could be jeopardised. Also, the ability to help each other in the face of future needs, shocks or stresses can compromise their community solidarity. Connected to the preceding, in relation to their fishing equipment, fisherfolk' participants clearly explained that what they fear the most in losing them is the fact that they are very difficult to replace given their high prices. Which poor fisherfolk cannot afford.

On more concrete terms, considering impacts from such disturbances generated by the above-mentioned Congo conflict spillover effects on the fisheries-based livelihoods, the already vulnerable fisherfolk could become more vulnerable. **Table** 6.6 draws on participants' experience to illustrate the extent to which impacts from Congo conflict spillover effects have increased the vulnerability of fisherfolk in the Tanzanian shorelines villages.

Table 6.6 Impacts of conflict induced disturbances to small-scale fisherfolk

No	Impacts of conflict induced disturbances to small-scale fisherfolk of Tanzania	Fishing community Landing site			No of Counts	Percent (%)
		Katonga	Kibirizi	Ujiji		
1	Reduced fishing distances/ afraid to go far	10	12	11	69	46
2	Reduced fish catch/ Income drop	8	4	4	16	23
3	Inability to fish peacefully/ impediments to migrants / fish in hiding	6	4	0	10	14

4	Changed fishing practices / destructive imported by migrants	3	3	1	7	10
5	Inability to fish by lack of equipment	4	0	1	5	7
	TOTAL	**31**	**23**	**17**	**71**	**100**

Disaggregating responses by fishing communities, one can see in **Table** 6.6, that the impact No.1 is by far the most cited one across the three villages, which may suggest that '*reduced fishing distance'* stands out as the prominent impact of Congo conflict spillover shocks and stresses Tanzanian fishing on the lake. **Table** 6.6 also reveals variations in how fisherfolk consider the importance of the impact No 2 '*Reduced fish catch/ Income drop*'. Especially in Kibirizi and in Ujiji, it is equally mentioned (4 times), which is half in importance compared to Katonga (8 times), but overall remains the second largest impact in the three fishing communities. There is also the impact No 3 '*inability to fish peacefully'*, which seems to relate to migrant fisherfolk given various impediments they face leading them to fish in hiding. The fact that this impact is the third highest cited, may be an indication confirming the influx of Congolese fisherfolk in Tanzania as result of the conflict.

From these results, it seems that informants are convinced that their three key livelihood capital assets, namely natural capital (Lake Tanganyika), financial capital (fishing income), and physical capital (fishing equipment), suffer the most from the spillover effects of the Congo conflict. According to one boat owner, '*We are afraid of going very far in the waters when fishing. That is a big problem that we face quite often' (*TZ02). Another added: '*We cannot go over a distance of three hours in the water as before, we are limited to go as farther as for thirty minutes, and what we can catch is not what we really would like*'(TZ016). And, a fisher reported 'w*hen they capture us, they seize everything. We fall behind in life as we have to borrow money to try recover our fishing equipment*' (TZ023).

The tone of these particular responses signified a frustration by fisherfolk about the inability to access areas where they know they can catch more fish, which can suggest that they are unable to fully utilise the natural capital available to them. Such factors limiting fishing ability, on which they depend heavily for livelihoods, provide evidence of sources of vulnerability from DRC conflict induced insecurity associated with particular forms of violence, seen mainly in relation to piracy, robbery and banditry occurrences on the lake.

In addition, with situations of insecurity in the waters for fear of falling into the hands of pirates, fisherfolk appear to be encouraged into nearshore fishing practices and attempting to increase catches through adopting destructive fishing such as that of using gillnet with prohibited sized meshes. For example, one fisher reported 'the *gillnet fishing was not known in Tanzania before the arrival of Congolese refugees. These of types of nets were prohibited in the DRC when they come to Tanzania, they brought them*' (TZ001). Consequently, informants reported, a widespread depletion of fish depletion of stocks and reduction in catches, leading to the drop in their fishing income. Such conditions of reduced fishing income appeared to have devastating impacts on their living conditions, making it difficult for fisherfolk to dispose with financial resources.

To summarise, the results in this section indicate that due to the DRC conflict, the generally peaceful and stable environments prevailing in the three fishing villages of Tanzania, did not apply to conditions experienced in the waters. In other words, when fishing activities reach water areas that are far away from those Lakeshore villages, insecurity fear sets in and becomes an impediment to fishing on the lake, fisherfolk's main natural livelihood capital, and thus exposing them to vulnerability. It can thus be inferred from these findings that

the DRC conflict to a large extent is a major source of vulnerability of fisherfolk livelihoods in western Tanzania.

6.3.2 Mobility

Another key factor that appeared significant in the transboundary nature of Lake Tanganyika linking the context of Congo conflict and fisherfolk vulnerability across the lake on the Tanzanian side was the mobility by both fisherfolk and fish. Literature on conflict underlines that conflict in a country can lead to the destruction of livelihoods and influence displacements, including an outflow of refugees migrating in neighbouring countries, which will suffer from the effects of an external conflict (Dunne and Tian, 2013; Glaser et al., 2019). Hence, such a mobility of fisherfolk, as pointed out in Chapter 3 and in Chapter 5, while it can be an important livelihood strategy, can also limit people's ability to pursue sustainable livelihoods (Cleaver, 2012). And, the high mobility of fish, can also contribute to the vulnerability of fisherfolk (Nunan, 2010), given the impact on fish availability and prices varying between locations at different points in time, which can encourage fishers' mobility. It has been established that many fish can move to distances that are greater than 8 km with some moving further than 40 km (Furniss, et al., 2006).

Thus, as identified during interviews, mobility in the three Tanzania study areas appeared to be considered a major source of vulnerability through its patterns of in-migrations of people and out-migrations of fish. The participants' views on these two mobility patterns appeared contrary to the dominant perspective in the livelihood framework, where mobility is looked at mainly as an adaptation strategy used intentionally by fisherfolk in search of higher catches to increase their income (Allison et al., 2001; Nunan, 2010). Most Congolese fisherfolk did not like leaving their native communities but at least fleeing the conflict

appeared to give them the choice of safer resettlement places with fishing possibilities that they depend on for living.

A. Mobility of people

The mobility of fisherfolk was seen consistently in the three Tanzanian study villages, essentially through in-migration of people from within and outside Kigoma towards areas around Lake Tanganyika. While those moving from within Tanzania appeared to be motivated by the search of fishing-based livelihood opportunities, those primarily coming from the DRC were fleeing violence events in the conflict zones for safe areas. Using the composition of fisherfolk informants to get a sense of the extent of change in the fishing population of the three villages, due to people movements, one can observe that nearly half of them are migrants. **Table** 6.7 provide a distribution of fisherfolk informants based on their residential status.

Table 6.7 Distribution of participant fisherfolk per residential status

No	Residential status distribution of participants	Landing site village			No of Counts	%
		Katonga	Kibirizi	Ujiji		
1	Native / Autochthonous resident	7	14	12	33	65
2	Migrant residents (National)	5	2	1	8	16
3	Migrant residents (Transnational)	5	1	4	10	20
	Total	**17**	**17**	**17**	**51**	**100**

As shown in **Table** 6.7 individual/household participants across all the three villages were mainly autochthonous residents 33 (65%) out of 51 (100%), within which the village of Kibirizi having the highest number 14 (42%) out of 33 (100%) of native fisherfolk. As to the number of migrant residents, both from within and outside of Tanzania, they differed between the villages. The village of Katonga has more migrant residents altogether 10 (56%) out of 15 (100%). This confirms a 2016 report by Hess et al. (2016) under the

Tuungane Project that about half the local population of Kigoma came as migrants in the 1980s and 1990s from neighbouring countries bordered by Lake Tanganyika.

Furthermore, in the Tanzanian context, tribal identities seemed to be of little relevance as no one during the whole time of interviews appeared to refer to any division of people or villages along tribal or ethnic lines. A contributing factor of this lack of overt tribal/ethnic identities could be that according to informants, there are no recognized traditional chiefs, given Nyerere's legacy of familyhood, also known as Ujamaa, to which most informants were proudly referring in association with their peaceful communities, attractive to migrants.

So, referring to shocks and stresses linked to the Congo conflict spillover effects mentioned in the previous section, mobility in the form of influxes of migrants into Tanzania was reported by a relatively large number of informants (10%) as the second factor impeding fishing-related activities (See **Table** 6.6). According to informants, this in-migration of people has led to an increased number of fisherfolk, and an increased fishing pressure that consequently caused fish catches to decrease. One fisher reported that '*we are too many fisherfolk on the lake due to migrants fleeing the DRC conflict. There is a significant drop in our income*' (TZ017; TZ032). Corroborating statistics given by an official indicated that '*the census of 2005/6 showed about 25,000 registered fisherfolk with licences. Today (2017), their number has increased and could reach approximately 50,000 fisherfolk'* (TZ059). This result confirms the study by Cohen and colleagues (2016) that demonstrated the impact of overfishing on the decline of fish catches on Lake Tanganyika following a significant increase of migrants in the 1990s, as refugees from numerous regional conflicts poured into the areas around the lake.

Consequently, as one official reported, '*fisherfolk are making losses as they don't get enough revenue to cover their fishing expenses. It happens that they go for two to three days without any catch*' (TZ058). Thus, peoples' reduced income can relate to the financial capital for which access is curtailed. An example of such effect was given by a fisher who went on to say: '*Before the war in the DRC my income was over 2,000,000 TSh [$87US][16]. After the war broke out this income reduced to 30,000 TSh [$13US]. This because of the limitation in my fishing'* (TZ025). From these findings it could be concluded that the mobility of people, particularly through massive influx of migrant fisherfolk has a considerable impact on fisherfolk vulnerability in reducing their fishing income and affecting their ability to respond to shocks and stresses. Also, influxes of migrant fisherfolk not only increase the fishing pressure but also introduce destructive fishing practices. The latter will be discussed in the next section.

B. Mobility of fish

The '*lack of fish*' in the waters was voiced during interviews in the three study communities, in terms of inability to identify areas where to fish and the scarcity of fish in the water, which were viewed by most informants in association with the constant movements of fish. In this regard, it would appear that such reported perceptions of fish movements affected the catches reported as declining, and thus deteriorating fisherfolk's income. **Table** 6.8 shows multiple responses provided by participants to the question of whether there have been any changes and which type in their fishing activities over time.

[16] Conversion (May 2019)

Table 6.8 Participant fisherfolk responses on whether fishing has changed over time

No	Changes in fishing over time	Landing site village			No of Counts	%
		Katonga	Kibirizi	Ujiji		
	Whether fishing has changed					
1	Yes, there have been changes	9	7	6	22	50
2	No changes	6	7	9	22	50
	Total	**15**	**14**	**15**	**44**	**100**
	Types of changes					
1	Lack of fish in the waters	8	7	4	19	100
2	Reduced access to the Lake	0	0	0	0	0
	Total	**8**	**7**	**4**	**19**	**100**

As shown in **Table** 6.8, there is an equal distribution between informants' responses 22 (50%) of 44 (50%) regarding the changes in fishing over time and those responses 22 (50%) holding the view that there were no changes in fishing over time. Focussing on the changes in fishing over time, all the responses (100%) implied the '*lack of fish*'. The results in **Table** 6.9 show clearly that access to the lake was not an issue but rather finding fish in the waters was an issue given their mobility, which some informants associated with changing weather conditions.

Some particularly striking views regarding fish mobility and its effects on their fishing livelihoods, contributing to their vulnerability, were provided by both individual and group interview informants, whose selected quotes are provided in what follows. Some fisherfolk remarked that the *'Lack of fish is mostly due to cold weather 'Kilimia' as fish often go to deep waters leading to low catches and consequently low income. This problem occurs mainly during the seasons of May to July*' (FG.SC.V1; TZ022). Other views reiterated the challenges faced by fisherfolk with the mobility of fish along with the difficulty of reaching/finding them. One fisher reported the *'lack of equipment that can help us to know where to find fish before setting out for fishing*' (TZ017). In addition, the following excerpt illustrates the extent to which people are affected by the movement of fish:

> We have realised that when we allow small fish to grow by not fishing for three days or so, those same fish move to the other side and get fished by Congolese. They earn profit and we lose. By observing this rule, our families get poorer and the people on the other side get richer. We leave them because of trying to observe the laws, but we end up losing. The two countries don't have the same laws, and they don't enforce their laws the same way. Those small fish, are fished in abundance in the DRC and sometimes brought back to be sold in Tanzania. The market is such a way that when there are fish here, they are taken to be sold in the Congo. And when Congo has more, they are brought to Tanzania to be sold here. (TZ003, Fieldwork, September 2017)

Despite the lack of fish reported by informants in association with their movements in the waters, fisherfolk of the three study villages of Tanzania insisted that they enter the lake every day. This is shown in the seasonal calendar provided in **Table** 6.9 below in which the villages of Katonga, Kibirizi and Ujiji, are coded respectively as '1', '2', and '3'. The idea of fishing and accessing the lake the same way and everyday emerged as highlighted in **Table** 6.9. This suggests that the lack of fish in addition to other problems that fisherfolk are faced with, including lack of proper equipment, piracy, etc. do not prevent fisherfolk from entering the water for fishing. It can be said from this that fishing activity is not maintained by the pursuits of higher income, but rather by a sense of satisfaction including relational ties that have to be considered, as explained in the wellbeing literature (Coulthard, McGregor, and White, 2018; Jentoft and Chuenpagdee, 2018; McGregor, 2018).

Table 6.9. Participant fisherfolk responses on fishing seasonal calendar

TOPICS	Conditions	Aug.	Sept.	Oct.	Nov.	Dec	Jan.	Febr.	Mar.	Apr.
		Season 1			Season 2					
Weather Conditions	Rainfall			1	1, 2	1, 2	1, 2, 3	2	1, 2, 3	1, 2
	Dry days	1								
	Cold days									
	Warm days	2	2	2						
	Hot	3	1, 3	1	1					
	Low winds			2, 3		1, 2	1, 3	1, 3		1
	Heavy winds				2	2, 3	2,	2	2	2, 3
	Moon	1	1	1	1					
	Fog	3								
	Full moon	3	3	3	3					
Lake's access	Same way	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Every day	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
	Changed									
Adverse changes or problems	Water piracy	1, 2, 3	1 2	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2	1, 2
	Low catch							3	3	
	High cost									
	Loan needs									
	Fish price fall									
	Lack market	1, 2	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	2, 3	2, 3	2, 3	
	Excess taxes	2	2	2						
	Losses									

Source: Focus group discussions in the three villages (September 2018)

Table 6.9 Participant fisherfolk responses on fishing seasonal calendar (Continued)

TOPICS	Conditions	May	June	July
		Season 3		
Weather Conditions	Rainfall			
	Dry days	1	1,	1
	Cold days	1, 2	1, 2, 3	1, 2
	Warm days			
	Hot			
	Low winds	2	2,	2, 3
	Heavy winds		3	3
	Moon			
	Fog			3
	Full moon	1, 2	1, 2, 3	1, 2, 3
Lake's access	Same way	1, 2, 3	1, 2, 3	1, 2, 3
	Every day	1, 2, 3	1, 2, 3	1, 2, 3
	Changed			

TOPICS	Conditions	May	June	July
		Season 3		
Adverse changes or problems	Water piracy	1, 2	1, 2	1, 2
	Low catch	1, 2, 3	2	1, 2
	High cost			
	Loan needs			
	Fish price fall			
	Lack market			
	Excess taxes			
	Losses			

Source: Focus group discussions in the three villages (September 2018)

To further illustrate this lack of fish in the waters associated with fish mobility in their out-migrations, some examples of informants' quotes are provided below:

'*With time, things are kind of deteriorating as fish is becoming scarcer*' (TZ035).

'*Mostly our engines got stolen and then we were not able to make more profit due to decline in the fish stock*' (TZ016).

'*From May to July, fishing hours have increased, mainly as in cold and windy periods, fish are not seen much and they go deeper in the waters*' (FG.TA.V2).

'*The season of lack of fish in May, June and July when there is a lot of wind, we suffer a lot*' (FG.WF.V3)

'We *cannot reach fish where they are due to the lack of better equipment, we cannot monitor their movement and also we are unable to go too far in the waters where they may have moved. This problem happens during all seasons*' (FG.SC.V3).

'*From May to July – there are fierce winds, and from June to September – the dry season; the water is cold pushing fish to go in deep areas, leading to low catches that affect us'* (FG.SC.V1; FG.SC.V3).

All these quotes clearly demonstrate the varying scales and patterns of fish mobility in relation to weather conditions and associated problems, which affect fisherfolk lives and livelihoods in the three study villages of Tanzania, and which could be considered as important sources of their vulnerability. As outlined previously, the experience lived by several informants as reported during interviews suggested that while fisherfolk strive to chase the fish as they move far away from shores, they are faced by two important dilemmas.

First, those who operate motorised boats, the further they can go away from their shorelines the more likelihood they will fall into the hands of water pirates and run the risk of losing their equipment. Second, as a consequence of the fear of going far out into the lake when fishing, fisherfolk are compelled to fish in the nearshore waters and use prohibited smaller sized mesh nets (e.g. mosquito nets) resulting in juvenile fish catches, and destroying the fish population that they would have caught later with higher income value. At the same time, those of the fisherfolk who can fish without any danger of being targeted by water pirates because of not using attractive equipment such as motors, batteries and lights, have no ability of getting far out in the waters during their fishing trips. In either way, these are situations they experience throughout the year, impact their fishing incomes and exacerbate their vulnerability.

Fig. 6.1 Fisherfolk landing with no catches at Katonga site in Kigoma.

Source: Author's work August 2018

In summary, drawing on these findings it can be said that mobility through both the influx movements of migrants into fisheries and fish movements out of nearshore areas to deep waters, have shown to be among the major sources of vulnerability of fisherfolk on the Tanzanian shorelines villages. In the first place, they are generated by multiple factors that are external to fisherfolk and over which they have no control given the nature of their sources, such the DRC conflict and the weather conditions. Secondly, they affect the availability of fish reducing catches and deteriorating the fishing income adding the challenge of the inability to deal with other problems related to living and fishing, i.e. meeting the needs of food, and education.

6.3.3 Fishing and methods of fishing

As mentioned previously, fishing is important for the livelihoods of people living in shoreline villages of inland lakes, providing employment, food and cash for households (Part, 2000). Similarly, fishing on Lake Tanganyika, which concerns mainly two types of fish, namely Dagaa and Mikebuka, which make a major contribution to the living and financial well-being of fisherfolk families of western Tanzania. It is evident that different fishing methods are used by fisherfolk to access the fish on which their households and other communities involved in fishing related activities depend on heavily for living. However, given the transboundary nature of Lake Tanganyika and the context of DRC conflicts and other local adverse changes, this study's investigation sought to ascertain whether the importance of fishing on the lake has changed on the Tanzanian side of the lake and in what ways certain fishing methods could be linked to fisherfolk vulnerability.

A. ***Fishing on the lake***

Informants of the fishing communities of Kigoma were asked to give their opinions regarding the importance of fishing on the lake. All the official informants were unanimous (100%) in their opinion that '*fishing on the lake is a very important livelihood for people living around the lake and in the lake basin'*. One official stressed that '*As far as food security is concerned, you cannot exclude fishing activities in the livelihoods of people living around the lake and in the lake basin*' (TZ056). Another official remarked that '*Because Kigoma has a large population but there aren't many companies that can give employments to people, many people turn to fishing to make a living'* (TZ055). A third official reiterated the weight that fishing on the lake has in terms of livelihoods of people in the region of Kigoma. '*It is estimated that of all the incomes recorded by Tuungane project, about 53% comes from fishing-related activities, and only about 33%, comes from agriculture'* (TZ053).

However, it must be noted that responses from official informants also captured some factors that appeared to impede the importance of fishing on the lake which could generate more vulnerability for fisherfolk. Some of these factors as cited by official included '*declining fish catches/ drop in fishing income*' (TZ053; TZ058; TZ059), '*poverty / lack of financial capital*' (TZ061; TZ057), '*low consideration of fisherfolk in the society*' (TZ057), changes in fishing methods, poverty, '*inflow of refugees in fishing/Increased fishing population*' (TZ056; TZ053; TZ057), '*climate and weather conditions change/ change in the ecology of the lake*' (TZ053), and '*spillover effects of DRC conflicts*' (TZ059; TZ060; TZ057). In relation to poverty, one official said, '*whoever fisher you ask, they will say that they are poor and have the lowest of living standard in the community'* (TZ057). Adding to this, one official indicated that given '*fisherfolk' poverty status, low fishing income, and lack of*

access to funds, they cannot purchase proper fishing gears they need to increase their fish catches' (TZ056).

From the preceding, it appears that the vulnerability of fisherfolk of Lake Tanganyika from western Tanzanian increases as their fishing ability is undermined by the above-mentioned constraints most of which is associated with the DRC conflicts spillover effects. In other words, as many informants reported, fisherfolk will run into lots of problem with impacts on their lives and relations if they come back on shores without any catch given that they entered the waters depending on loans for engine fuel, engine and batteries rental charges, all of which they will have difficulty in paying back.

Furthermore, the factor related to the types of fish targeted by fisherfolk was also identified as contributing to the vulnerability of fisherfolk. **Table** 6.10 indicates responses provided by participants to the question of which fish do they catch, trade or process.

Table 6.10 Types of fish targeted by small-scale fisherfolk on Lake Tanganyika

No	Types of fish targeted by fisherfolk	Frequency (N=95 responses)				Percent (%)
		Katonga	Kibirizi	Ujiji	Total	
1	Mikebuka (or Nonzi)	12	14	7	33	34
2	Dagaa (Marumbu)	12	8	3	23	23
3	Sangara (or Lates mariae)	3	1	9	13	13
4	Any fish	3	1	4	8	8
5	Nyamunyamu (Babies Mukeke)	2	2	1	5	5
6	Kuhe (or Boulengerochromis microlepis)	1	0	4	5	5
7	Kavungwe	1	0	4	5	5
8	Inongo	0	0	2	2	2
9	Singa	0	0	2	2	2
10	Kahuzo (young Dagaa)	1	0	0	1	1
11	Mabanga	0	0	1	1	1
					98	**100**

As shown in **Table** 6.10, most fisherfolk reported that while they catch any fish that they find, they have shown to mainly target Mikebuka (Lates stappersii) 34% and Dagaa ('sardines' clupeids of Limnothrissa miodon and Stolothrissa tanganicae) 23%. Fisherfolk reported problems related to the types of fish they target when fishing for Dagaa and Mikebuka, which are the most abundant fish species in Lake Tanganyika.

According to them, fishing these two species expose people to particular problems that render them vulnerable. First, these two species can be fished both during day and night although nighttime is said to be more productive. So, many fisherfolk choose night fishing which can lead them into trouble with bandits. When fisherfolk fall into the hands of bandits they run the risk of losing their equipment and sometimes their lives, although the latter is not common on the Tanzanian side of the lake. Informants assumed that since all those fishing on the Tanzanian side know each other no one can steal something and still stay on the Tanzanian side. Thus, in their view bandits must be coming from the Congo side (TZ057; TZ055). Furthermore, to a multi-response question on fishing methods, the responses given by fisherfolk participants indicated using 'liftnet fishing' (47%) and 'gillnet fishing' (29%), as shown in **Table** 6.11 below.

Table 6.11 Fishing methods used by types of fish targeted on Lake Tanganyika

No	Types of fishing method used	Frequency (N=76 responses)								Percent (%)
		Dagaa	Mukeke	Sangara	Kuhe	Nyamu-nyamu	Kavun gwe	Any fish	Total	
1	Liftnet (Kipe)	14	14	2	0	4	0	2	36	**47**
2	Gillnet (Makila)	3	3	8	3	0	5	0	22	**29**
3	Line fishing (Kachinga)	1	8	5	2	2	0	0	18	**24**
4	Ring net (Mukwabo)	0	0	0	0	0	0	0	0	**0**
5	Beach seine (Kokoro)	0	0	0	0	0	0	0	0	**0**
6	Trap Fishing	0	0	0	0	0	0	0	0	**0**
									76	**100**

Results shown in **Table** 6.11 reveal that the higher proportions of fishing methods that prevail use net and are mostly used to catch Dagaa and Mukeke. The third most cited fishing method is 'line fishing', which uses hooks. However, is not particularly used in fishing for Dagaa and Mikebuka. Interestingly, Ring net and Beach seines are not cited. Omission of these two techniques might be deliberate, given that they are mainly blamed for destroying the lake and hence are prohibited.

In relation to fishing for Dagaa, fisherfolk mostly use nets particularly with techniques such as 'liftnet', 'gillnet', 'ring net' and 'beach seine', which can expose them to problems that may generate some vulnerability. The unavoidable problem comes particularly when targeting Dagaa, and at the same time the fisherfolk accidently catch juvenile Mikebuka (Nyamunyamu) given that the adult Dagaa is the size of the juvenile Mikebuka, whose catch is prohibited, and which they are supposed to release, but often they do not intentionally because they might have only a small catch of Dagaa while in dire need of income. The unintended catch of Nyamunyamu can be very problematic as their catch may occur even when the legal gears are used and often surpass the acceptable percentage of the Nyamunyamu that is allowed to be caught. For instance, as one fisher reported '*we use hooks and nets which do not select fish to catch. It they catch small fish we don't return them in the water. But if we are caught, we will face the consequence*' (TZ042).

Fig. 6.2 Adult dagaa (legal) and juvenile Mukebuka (illegal) caught together in Kigoma

Source: Author's work August 1, 2018

Additionally, as another fisher indicated '*there is a time that we can only find small fish. We suffer from this fishing when we are banned to have fish that is available. Fisheries officers should know the periods of fish reproduction and focus on them, not just ban fishing that catch small fish*' (TZ013). In order to find fish, some fisherfolk reported to travel for over three hours from the shores and fish in the Congolese waters, but they don't understand why once they back in Tanzania, they get arrested by Tanzanian officers. As one fisher indicated '*We try to explain that the fish we are bringing are not from Tanzania. Likewise, people from the Congo come to fish on this side and take their catches to Congo where no one will arrest them*' (TZ023).

As a result, in either situation, the fisherfolk will get caught by the fisheries officers or they will go to hiding when landing. This situation also affects fish processors/traders as the only way they can get fish to sell will be to find the fisherfolk where they landed during the night, which can sometimes interfere with marriage relationships, as women participants reported in focus groups interviews. It might be for this reason that single women appeared to be

more compatible to the current situation of fish trade than those in marriage. As an illustration, it was observed that 21 (68%) out of 28 (100%) women who participated in focus group interviews in the three villages were single and household heads, suggesting a possible preference of singleness for the ability to access fish and attend the living needs of the family.

6.3.4 Role of institutions

As discussed in Chapter 3 and Chapter 5, the literature on institutions consider them mainly as 'rules of games', which are known to set the context that shape people's livelihoods and mediate their livelihood strategies (Levine, 2014; Nunan, 2015; Scoones, 2015). In such a position, and in relation to fisheries resources, it is argued that the role of institutions can include formal and informal regulation mechanisms and their associated enforcement measures which affect access to resources, while at the same time having the potential of impeding or enabling people livelihoods (Allison et al., 2001; Barrett et al., 2001; Béné et al., 2003; Krantz, 2001. In this section, the analysis focuses on how the existing institutional environments mediate, through various ways, fisherfolk livelihoods and livelihood activities in the context of vulnerability.

A. Bureaucratic institutions

In Tanzania, the overall mechanism of access to fisheries resources often takes the form of what Cleaver (2002) calls bureaucratic institutions. In coherence with the literature overview, informants' responses indicated the existence and differing awareness of rules, policies or regulations overfishing activities on Lake Tanganyika, including the role of

formal institutional environments, however, some were not aware of the specifics in relation to migrant fisherfolk.

One core law that appeared to be mentioned repeatedly by all the fisheries officers was the law No22 of 1923, which according to them aims to protect the fisheries resources. One officer stressed this as '*the law regulating fishing activities, which in addition to protecting lake resources and its sustainable management, also concerns fish catch and the welfare of the fish including possibilities of undertaking aquaculture*' (TZ113). A prominent component of the rules under this law, as reported most by officers, seemed to be the one that '*requires a permit in order to fish on the lake*' (TZ112, TZ115). Thus, all the officers indicated their role was to enforce this law ensuring that '*no fishing takes place without permit and that any fisher that is fishing without a permit can be caught*' (TZ115).

As to fisherfolk, all the responses indicated about their knowledge of the existing rules regulating fishing activities on the lake. Some of the rules they cited included:1) '*No fishing without permit (TZ016; TZ017); no fish young fish, no fishing in spawning areas*' (TZ002; TZ032; TZ050); 2) '*not using deteriorated boats, wear a life jacket all the time*'(TZ032); 3) '*Don't fish in areas that the government is protecting (TZ050); people should not fish within 20 metres from the shores*' (TZ050); '*Fisherfolk are required to use nets with 8 cm [or 3"] mesh size when fishing*' (TZ049; TZ017).

Most fisherfolk stated that observing these rules negatively impacts their livelihoods, particularly their fishing income. One fisher reported that '*these rules are affecting us a lot as for us to live we need to catch fish everyday*' (TZ017). In other words, as one fisher remarked '*while we all accept these rules, respecting them is starving ourselves*' (TZ049).

Thus, '*for us living from fishing, we see these rules as detrimental to our lives*' (TZ017). Consequently, another fisher expressed his fear that '*these rules compel us to find ways to keep fishing*' (TZ001), including '*turning to using nets with prohibited mesh sizes*' (TZ032). With respect to fishing permits, while the law requires the fisherfolk to have permits to access the lake, one fisher reported that '*the permit is too expensive for us to afford given our low income*' (TZ021). Another added that '*for a migrant the permit is even more expensive*' (TZ013). In terms of costs, different numbers were provided by informants, which may support the suspicion by fisherfolk when saying that they do not believe payments collected from them reach the government treasury. For instance, one fisher reported that '*for one boat, we are required to pay 96,000TSh [$42US][17] for the annual fishing permit*' (TZ026), and '*for migrants they have to pay $2,500US, which they cannot afford leading them to fish clandestinely*' (TZ027). Another fisher indicated '*The fishing permit is approximately $300US. I am not sure, but it comes to around 80,000TSh [$35US]*' (TZ017). A confusing statement but also an indication of the ignorance of some fisherfolk about values of different payments that they make to comply with fishing regulations.

Participants also reported that '*Illegal fishing is less costly and seems to provide more income than legal fishing, which does not catch more fish'* (FG.TA.V1). This seemed to be encouraged by people's cultural perception as a focus group participant remarked that '*buyers buy any fish that are caught and can sell without problems. The consideration that all fish that are caught are God given does not help fisherfolk to spare small and young fish*' (FG.TA.V1).

[17] Conversion (May 2019)

Recognised as relatively stable and peaceful, Tanzanian regulations systems appeared to be functional and as such government services present at landing sites include fisheries officers and patrol personnel both who appeared to be effectively at work in enforcing fisheries regulations. More specifically, in relation to fishing licences, it was heard and observed that '*fisherfolk were running away from fisheries officers'* (TZ058), whom they consider as '*only making money from them*' (TZ057). As a result, '*many fisherfolk rather than paying for permit, fish in hiding and are prepared to pay more than the cost of permit when they get caught*' (TZ058). According to one official, '*fisheries officers prefer to have people who do not have permits so that they can have excuses to ransom them. While the annual permit costs only 40,000TSh [$17US] per year, fisheries officers take 10,000TSh [$4US] today, 20,000TSh [$9US] tomorrow, and so on, rather than encouraging fisherfolk to just obtain the fishing permits*' (TZ05). In this same regard, a fisher reported that '*When we land with boxes of mixed fish worth 100,000TSh each, the officer takes 20,000TSh per each box. We see this as abusing us*' (TZ029). And a migrant fisher added that the '*fishing income that one gets, is all used up in expenditure and lots of payments on taxes and other state services*' (TZ032). Another migrant echoed that '*here is a sense of a peaceful environment in terms of social life, but we do not fish peacefully because of lots of laws. Most fisherfolk when caught fishing illegally, are unable to pay the required fines, then they get their fishing equipment confiscated, which result in the deterioration of their lives*' (TZ001)

Thus, it is clear from the above-mentioned fisherfolk concerns, that the bureaucratic institutional structures and services on landing sites mean, as informant fisherfolk said, abuses with imposed differing payments for not complying with certain rules, mainly the one related to having a fishing permit. For informants, these multiple payments have

considerable impacts on fisherfolk lives and livelihoods, and thus exacerbate their vulnerability.

It should be noted that, in the views of participant fisherfolk, these formal regulation mechanisms are impediments to the lives of fisherfolk and, in a number of ways, they end up reducing their family's overall income from fishing-related activities, with the consequence of limiting their ability of meeting their living needs and thus making them more vulnerable.

The following two stories further illustrate how bureaucratic institutions can be considered as factors of both migrant and resident fisherfolk's vulnerability. They come from two boat owners, one a female migrant and the other a male native.

> I live in Kigoma for now over ten years. I fled the war in the DRC. I entered fishing about seven years ago because I needed money. I started from the lowest level and moved up to this stage of owning liftnet fishing units. I live from fishing, which pays my kids' school fees, food and savings. Whatever is fished by my team is what I sell. In Tanzania, there is relative peace, but we cannot fish peacefully. We face many rules and laws never experienced back at home. Using large mesh size nets results in lower income but are trouble free with government services. We sometimes fish in prohibited areas or use prohibited nets to get some income to pay our loans. Mostly we are unable to pay the fines if the officers catch us. Then our lives deteriorate. Likewise, following the rule of not fishing within 100 or 200 m from the shores, has the risk of fishing in other countries' waters. Also, fishing permits are required to enter the waters, in addition to residency documents, which migrants don't get easily. It is not easy to go around these rules, which impact negatively on our lives. (TZ001, Fieldwork, September 2017)

> 'I live here in Kibirizi since birth along with my family. I am boat owner, fishing for 11 years catching Mikebuka with line-fishing on the Tanzanian side. I have no other occupation besides fishing. Life is difficult. Our main problem is poverty and lack of help from the government. Fishing is not profitable. We enter the waters for many hours, and we don't always get fish. The lake is vital to us, but due to lack of alternatives, we are unable to support the law aimed at protecting it. Some officers look after fishing rules, which are same for both residents and migrants. Mostly concerning fishing permits, we get arrested many times, and our lives disturbed. The permit is expensive for us to afford given our low income. Because mostly we lack catches, what is the benefit of paying for the permit? Fisheries officers inform us

> about fishing laws and rules. Because these rules are written in English and many fisherfolk cannot read English, they discover them after being arrested. We are suffering a lot from these rules. Those who make them lack empathy of our situations and problems. Our lives are not good at all.' (TZ021, Fieldwork, September 2017)

TZ001's story provided above narrates how migrant fisherfolk are faced with disturbing factors related to existing bureaucratic institutional environments and how they mediate choices that lead to the fisher's vulnerability. The story indicates that she came from Congo, and as a migrant she had no other employment alternative for income outside of fishing on the lake, whose regulations include conditions that she cannot afford to meet. While she can live in a peaceful environment, she cannot fish peacefully in the face of fishing rules and enforcement mechanisms. Any attempt to comply with these rules, will lead to income loss and deterioration of her living conditions. At the same time, the penalties she will be charged to pay if caught are too expensive for her, thus her increased vulnerability.

The second story is from the native fisher TZ021 who is already vulnerable due to lack of catches and associated low income. The existing bureaucratic institutional arrangements governing fishing on the lake do not consider the lack of catches fisherfolk are suffering from. Among the rules is the requirement of fishing permits, whose cost is seen as too expensive. Thus, the choice is of not having it and the possibility of recurrent arrests with fines' payments. As indicated earlier by one official, some fisheries officers like it this way as it gives them income.

B. Socially-embedded institutions

As discussed in Chapter 3 and Chapter 5, the perspective of critical institutionalism makes a distinction between bureaucratic institutions and socially-embedded institutions in the management of natural resources. (Cleaver, 2012). Socially embedded institutions are

recognised to be associated with social and cultural identities in relation to aspects of bricolage processes in mediating local livelihoods based on available natural resources (Cleaver, 2002; De Koning and Cleaver, 2012). The literature on critical institutionalism considers that outcomes of socially-embedded institutions in contexts and time can be either part of the problem or part of the solution to community livelihood concerns.

Therefore, the analysis here will focus on the existing socially-embedded arrangements within the context of vulnerability of western Tanzanian fisherfolk. In other words, socially-embedded arrangements will concentrate on key aspects such as local norms, social ties and cultural beliefs to explore how they can negatively impact on fisherfolk's ability to pursue their livelihoods including access to fishing to secure their living.

Traditional culture and taboos

In the livelihoods framework, culture can influence the extent to which livelihood assets are accessed and in the event of being reduced can create conditions of vulnerability. It was acknowledged in the interviews that the traditional culture in forms of local cultural norms, taboos and beliefs had a unique influence in people's fishing behavior that appeared to work against their livelihoods. As stated previously, in the fisheries literature, these socio-cultural features are recognised as traditional fisheries management tools (Johannes, 1978), their effectiveness depended on the number of people observing them in any society (Fershtman et al., 2011).

For most informants it seemed impossible to think of fishing on the lake without involving faith either in God or in traditional rituals. The following excerpt is illustrative of the

importance of the local culture in the aspects of faith that is attached to fishing activities on Lake Tanganyika:

> We come across mysterious phenomena that we cannot explain sometimes in forms of winds, noises, lights, etc. In this situation, we only seek God's help. I fish with fear. I saw this personally. I saw the cloud moving, with noise, and winds. It was in the direction of Congo. Then a big rain fell down from it. We had big wind that lasted for about 6 hours. I ran fast towards liftnet fisherfolk who luckily had larger boats. (TZ040, Fieldwork, September 2017).

In this regard, one official participant highlighted that '*most fisherfolk were living as in pure rural and traditional societies in which education in the modern sense did not exist*' (TZ061). Thus, as others remarked '*cultural beliefs and traditional rituals are part of lives of people*' (TZ061; TZ052; TZ059). According to another official, '*fisherfolk perform traditional rituals on their boats and other fishing gears to help them get more fish when they use them*' (TZ055). Another official indicated that '*almost 80% of fisherfolk still believe in witchdoctors for better fishing outcomes*' (TZ058), elaborating fisherfolk's thinking that there are spirits that can help them to get more fish (TZ058). For instance, as one official reported that '*women are not allowed to go fishing mostly when they are in their menstruation periods. They observe these taboos strictly and that is why the majority of fisherfolk are males*' (TZ055).

In addition, with reference to religious beliefs, one official noted that '*churches have been encouraging people to stay away from traditional rituals, which they associated with the decline of fish catches*' (TZ052) His view was that the lack of fish was due to the attitude of people not obeying God through staying away from sins and as a consequence God makes it so that they can't catch any fish. Another official remarked that '*Christians believe that God is the one who has put fish in the lake and can command them to go towards the fishing net of those who have faith in God when they pray*' (TZ060). According to one official,

'*beliefs in witchcrafts on which most fisherfolk depend was acquired since childhood and as they become adults, they cannot change easily what they have believed in since they were kids*' (TZ057).

The preceding responses from official informants offer a clear representation of how traditional beliefs influence fishing practices in the Tanzanian context. So, in this regard, either traditional beliefs or Christian faith, seem to be very much embedded in people's culture regardless of whether or not they have proof of them producing results. This finding is of particular significance as it suggests that reduced catches will affect fisherfolk for a long time as long they will focus mainly on the perspective that might be far from the reality. Such an attitude may explain why some fisherfolk seem unable to withdraw from fishing and embrace a different source of livelihoods that might provide perhaps better opportunities for income which they need for living.

Social ties and relations

The influence of socially-embedded institutions in the fisheries was also identified through patterns of social ties and relations in various forms including kinship and family ties, which from participants' responses were reported in the different family and community arrangements through which people access Lake Tanganyika fisheries resources for making a living. The literature on fisheries resources management has largely recognised that through these arrangements, access mechanisms to fisheries resources are permitted (Hall et al., 2014; Nunan, 2010). It was noted, however, that social ties and relations can have negative, as well as positive effects on people's livelihoods. Given the focus on the vulnerability context, this section will concentrate on their negative effects, through which they can be looked at as sources of vulnerability. The vulnerability context, therefore, will

be considered in situations associated with patterns of social ties and relations causing the fall in the level of livelihood assets needed by an individual or household for survival (Ellis, 2003; Nunan, 2010).

The following example illustrates the context of vulnerability through patterns of kinship and family ties:

> I sell fish primarily to provide for my 11-member family. But given its large size, my family's living needs exceed my income. My capital is 500,000TSh [$217US][18], which daily allows me a profit of 10,000TSh [$4US] against spending at least 10,000TSh for household needs and 300TSh [$0.13US] for tax. Consequently, bearing 95% of the household costs, I cannot improve my life and that of my family as my capital keeps on getting less. As women fish traders, we talk about these family size difficulties, as most husbands have no income. Men, who could help us, depend on us, posing a huge challenge to our families. Here having a husband gives respect. With a reducing capital, my peers look down on me if and when I do not have enough money at the time of purchasing fish as a group. If I show up without money, I will risk humiliation if they refuse to include me in the purchase. Because we fear God, I cannot turn to immorality to get the needed fish. Some do and can get fish to sell. I cannot go to the lake on Sundays even if the catches are said to be better because it will appear that I value money more than God. Lacking fish is a trial to our faith. People are watching us, and if they see us at the lake on Sundays, they will make fun of us and look down on us. (TZ071, Fieldwork, August 2018)

This narrative describes aspects of TZ071's life, illustrating several socially-embedded institutions in forms of social ties and relations that one rural fish trader woman lives with and how they generate her vulnerability. In this story one can identify multiple factors affecting this participant's life and livelihoods including kinship, family ties and social relations that result in the decline of her financial assets she needs to support her household. Although she considers her household as her primary objective of her fish trade activities, she also acknowledges that these same household's needs are beyond her income ability given its size over which she has no control. For example, when she makes a profit of

[18] Conversion - May 2019

10,000TSh a day, she has no other choice but to spend it all for the survival of her family. She bears at least 95% of the living costs of her family given that her husband has no income due to lack of employment, which seems like a common trend in her community. In turn, being married provided respect and that appears to be a great importance more than the income loss from her family structure. In addition, available options that seems to work for others in terms of accessing fish in situations of reduced money including prospects of fish for sex, is out of question for her because of the belief in God. To this, one can add the fact of giving up possibilities of working on Sundays fearing what people will say about her with likelihood of looking down on her. As this story suggests, this participant's livelihood is impeded by a complex socially-embedded institutional settings of kinships, family ties and community ties that exacerbate her vulnerability.

The livelihoods literature acknowledges that institutional environments in which people live can play a fundamental role in enabling or hindering people's ability to access available livelihood assets as well as various livelihood strategies, each resulting in different outcomes, when responding to stresses and shocks (Levine, 2014; Nunan, 2010; Pretty and Ward, 2001; Scoones, 2015). Within such a context, the livelihoods appear to include collective action and constraints that are known to be mediated through informal socially-embedded institutions such as kinship, family and community ties (Goulden et al., 2013). Thus, as seen in the story in point, these aspects of collective action and constraints are seen in situations such as buying fish together as a group, sticking to the community sense of self-worth and respect that a life in family provides as well as observance of collective beliefs, etc.

In particular, the marriage relation' constraints and social pressure associated with it, appears on its own as a source of vulnerability impacting on her ability to improve her and her family living conditions. She cannot either walk away from her marriage despite the apparent negative effects of living with an unemployed husband, but who is said to still have control and authority over her. Most studies in fishing communities look at detrimental effects of marriage in situations of men's absence going for fishing opportunities and leaving unattended families behind for a long period of time. The findings here is quite different as men do not necessarily choose to leave home. They stay home with hope that God will provide, the choice that seems to be accepted by the entire household enduring vulnerably on the basis of maintaining a good and respectful image in the community.

Other examples confirming these social ties were collected from the following quotes and stories related to access to entering and staying in fisheries in the context of vulnerability. i) '*I started fishing as a child as it was a family activity. I followed my parent legacy*' (TZ017); ii) '*When I realised no other jobs were available for me to obtain, I thought about my parents' activities. I then followed their fishing activities*' (TZ002); iii) '*I got into fishing 20 years ago, I was very young. My parents were unable to afford my education costs. Life was difficult and I could not find another job while I wanted to improve my life. I was following friends who were fisherfolk helping them to the point that I learned how to fish. These friends are the ones who later helped me to start my own fishing team*' (TZ049).

A common trend in these quotes is the condition of poverty making entering fisheries the option for living, but in a process, which is facilitated by family ties and friendships. At the same time, they also highlighted the role of these same family ties in keeping most people in fishing activities despite the decline in fishing income, which render them vulnerable.

To summarise, **Table** 6.12 below recapitulates the elements that emerge to capture mediating diverse and fluid institutions in the context of participant fisherfolk:

Table 6.12 Mediating diverse and fluid institutions in the context of participant fisherfolk

Elements	Mediating institutions	Mechanism	Type of vulnerability
• Accessing fisheries	• Kinship	• Fishing skills • Marriage relations	• Inability to enter fishing • Household unbearable burden
	• Family ties	• Financial capital • Support household	• Lack of sufficient financial capital • lack of fishing equipment
	• State structures	• Fishing permit	• Inability to enter the lake
• Fishing on the lake	• Cultural norms, taboos and beliefs	• Fear of God and Spirits when fishing	• Limited fishing areas and activities • Reduced fishing income
	• Gender norms and marriages	• Gender bias towards women	• Women exclusion in fishing roles. • Limited choices by families with higher number of females
	• Regulation mechanism and national borders.	• Transboundary fishing	• Inability to fish across national boundaries
Elements	**Mediating institutions**	**Mechanism**	**Type of vulnerability**
• Staying in fisheries	• Religious faith	• Reliance on God for better catches ahead • Giving tithes and offering	• Reduced fishing times (Off Sundays and Fridays) • Reduced catches and income
	• Families ties	• Encouragements and mutual help in fishing	• Stay in fishing even when it is unproductive
	• Fish clients-fishers relation and Self-help groups	• Access to informal credit	• Unpaid loans due to low catches and potential quarrels

6.4 Responses to vulnerability

As outlined in the preceding sections, the research question aims to identify fisherfolk coping and adapting strategies which may explain the extensive continuing fishing-related activities on the lake despite the vulnerability context of the fisheries from various factors that have been affecting Lake Tanganyika's fisherfolk of western Tanzanian region of Kigoma. As highlighted in Chapter 3, which explored the literature on livelihoods and livelihood strategies, when faced with disturbing factors generating vulnerability, individuals or households will adopt coping and adapting strategies, which are drawn from resources and factors that are available to the fisherfolk to reduce their vulnerability (Allison

et al., 2011; Berkes, 2015; Ellis, 1998; Nunan et al., 2015). This goes along with the understanding that different people have different assets, different access to fisheries resources and different opportunities in fisheries livelihood strategies (Ellis, 2000; Nunan et al., 2015). Considering the diversity and complexity of the challenges to fisherfolk's lives and livelihoods, some of their most documented livelihood strategies in the literature include diversification, mobility/migration, and switching assets reliance (Allison and Ellis, 2001; Goodhand, 2003; Nunan, 2010; Nunan, 2015).

In addition, the concept of livelihood strategies is also viewed in connection to livelihoods coping mechanism. In other words, the outcome of these strategies, which respond to various factors and sources of vulnerability, demonstrate coping mechanism of individuals and households allowing them to sustain their lives and livelihoods on a daily basis (Berkes, 2015; Brown, 2016; Scoones, 2015). Coping and adapting strategies that informants reported as being pursued by people involved in fishing-related activities to survive disturbances appeared to capture the diversity of vulnerability sources in the context of western Tanzania.

Thus, to focus the discussion on response strategies adopted by fisherfolk in response to the vulnerability context of fisherfolk lives and livelihoods in western Tanzania, this section will concentrate to four key categories that deemed corresponding to the previously identified main sources of vulnerability as shown in **Appendix** 6.1. In relevance to the research question, these strategies can be categorised as: i) Fishing and fishing techniques, ii) Negotiations through bribery/payments, iii) mobility, and iv) local forms of credit. They constitute the four areas on which the analysis will focus.

6.4.1 Fishing and fishing techniques

In terms of coping strategies related to fishing and fishing techniques, the strategies that appeared to be of utmost importance for fisherfolk were mentioned as '*temporarily stop fishing, withdrawing from fishing and switching to other livelihoods'*. Regarding '*temporarily stop fishing*', which, although little mentioned by fisherfolk informants 10 (17%), emerged surprisingly strongly mentioned by official informants 8 (50%) as the primary strategy of fisherfolk when faced with fishing related stresses and shocks. This may suggest two things: the strong attachment fisherfolk have to the lake on which they most depend for living and the relatively little importance they give to other livelihood alternatives.

Furthermore, 'temporarily stop fishing' as a strategy appeared obvious in response to shocks and stresses, particularly to coping with water piracy and associated insecurity when attempting to fish far out in the lake. For both categories of informants, these shocks and stresses, were specifically attributed to spillover effects from the Congo conflicts affecting catches of fisherfolk from Kigoma given the transboundary nature of Lake Tanganyika separating the two countries. One fisher reported that '*the war in the Congo was causing us to temporarily stop fishing. Not at our liking*' (TZ036). In the same breath, one official indicated '*when the catch goes down, fisherfolk temporarily stop fishing and go to other activities*' (TZ058). However, relying continuously on the lake which in case of many occurrences of such shocks and stresses make this '*temporarily stop fishing*' strategy not a good long term one. In this instance, fisherfolk will likely temporarily stop fishing far out in the waters, and turn to fishing in nearshore areas, either have no or small catches with a possibility of being caught by the officers resulting in their arrests, confiscation of fish

caught and fine payments in amounts between 500,000TSh [$216US][19] and 1,000,000TSh [$434US], amounts that they said cannot afford (TZ001). Consequently, some fisherfolk were reported to prefer withdrawing from fishing and switching to alternative livelihood sources.

This second strategy related to fishing and fishing techniques '*withdrawing from fishing and switching to other livelihoods*', appeared also to be a difficult strategy for fisherfolk. As one official remarked '*It is very difficult for fisherfolk to change their livelihood basis. They are used to water, and just want to go into the water. Otherwise, they tend to find their best livelihood alternative beside the water, like farming*' (TZ054). From the interviews, it was established that withdrawing from fishing could also occur because of situations that reduce fisherfolk abilities to find fish. Another official added '*when they get nothing from the lake or when fishing is closed, most of them move to doing some small casual labor, and others get into farming'* (TZ057). It is important to note that on the Tanzanian side, there is no lake closure season, but rather it is the nature conditions of the half and full moon seasons (See seasonal calendar **Table** 6.9) during which night fishing is impossible, particularly for liftnet fisherfolk , and thus forcing them to close fishing (not by fisheries authorities).

As stated previously, when fisherfolk are unable to fish or to catch fish, they lack the income they need for living, and compel them to seek loans. As one fisher said: '*Fishing is sinking many people into debts when catches are low. Those who are not realising this are losing more and more'* (TZ028). Thus, the strategy of '*withdrawing from fishing and switching*

[19] Conversion (May 2019)

to other alternative livelihood sources', as one official pointed out, tends to have '*farming come first, and fisherfolk cannot only farm, they also go into small businesses like selling pieces of clothes or driving moto taxi'* (TZ055).

Then, as discussed in the Vulnerability section, beside the DRC conflicts several local factors including fishing regulations through bureaucratic and socially-embedded institutions, were said to affect fisheries-based livelihoods, leading fisherfolk to consider other fishing related strategies. As shown in **Appendix** 6.1, these include '*Keep fishing / Stay in fish trade / Perseverance*', mentioned by 7 (44%) officials and 36 (61%) fisherfolk, and '*maximise catches / Fish sales / Turn to illegal gears and techniques / clandestine fishing*', mentioned by 7 (17%) officials and 34 (18%) fisherfolk. While a small proportion of fisherfolk manage to withdraw from fishing, the majority continue fishing with some relying on perseverance and others attempting to increase catches by all means including resorting to illegal fishing practices. One fisheries officer stressed that the illegal fishing practices that have been often apprehended on the lake were specifically related to the use of prohibited nets that catch young fish (TZ113). As an illustration, another officer reported that '*fisherfolk have changed behavior to embrace illegal fishing, e.g. using mosquito net to catch fish. Also, before they used to fish farther out in the waters, now they are fishing in nearshore areas in attempt to catch more fish*' (TZ115).

It should be noted that resorting to illegal fishing tends to be practised over time by the majority of fisherfolk given their lack of financial resources that could have allowed them to carry out other alternative income generating activities. Tied to the preceding, in relation to the choice of people to stay in fishing, one fisher indicated that '*most people are able to enter small businesses and support their lives with additional income but they don't have*

what it takes to start with. They lack starting capital' (TZ028). This particular strategy of deliberately carrying on with fishing through planned initiatives including illegal fishing can be linked up with the adaptive capacity of fisherfolk at the local level. Here, adaptation, implies a planned approach allowing people to survive adverse socio-economic and ecological situations impacting their livelihoods (Brown, 2016; Scoones, 2016), and which may include some levels of transformative capacity (Berkes, 2015). However, these practices are said to have potentially serious consequences on the fisheries resources.

6.4.2 Negotiations

The context of vulnerability of people fishing the lake from the Tanzanian shoreline villages was found to be linked to many factors. More specifically, fisherfolk's lives and livelihoods were acknowledged to be in difficult situations of no or low fishing income, which according to informants were generated by fishing rules and enforcement officers whom fisherfolk considered to be stringent and disturbing. In response to this, fisherfolk developed the ability of '*negotiations*', a strategy that appeared to allow them to carry on with their fishing livelihood activities.

Informants referred to different ways in which 'negotiation' worked as an important coping strategy to deal effectively with disturbing situations fisherfolk were facing. Examples are:

- '*When kids are sent away from school for no fee payment, we go and negotiate with the school to allow them some time as we are looking for money. They are allowed to stay and we manage to pay as soon as we find money'* (TZ051). This fisher's comment illustrates one perturbation that occurs in fisherfolk lives when fishing income is lacking due to disturbing factors that affect their fisheries resources. This may be related to the

drop of catches due to the observance of fisheries rules. For example, if they use the required larger mesh size of 8 cm [3"], they won't catch juvenile fish, which have a market in Kigoma, and thus the fisherfolk will have little or no income. Rather than watching their children chased from school for no fees payment, their negotiation skill will give them the advantage. Thus, in times of no income, their children will still be able to attend school, and payments will be made as soon as they have income.

- '*There are times when we are caught with small fish, we can negotiate with fisheries so that they can let us go. That is the way they help us*' (TZ049). The negotiation strategy involved here was reported to help fisherfolk cope with unfortunate situations when they are caught breaking fisheries laws. While this appeared to be a contentious issue for most fisherfolk with patrol and fisheries officers opposing them and sometimes also BMU (Beach Management Unit) members, no occurrences of paying ransoms to or bribing the officers were mentioned by both official and fisherfolk informants in exchanged of letting fisherfolk go. This is clearly, as suggested by informants, a type of help fisherfolk get from officers, perhaps by the officers feeling bad for them and then warning them if caught again, there will be no tolerance. It was quite curious that a handful of fisherfolk were unaware of those in charge of fisheries laws at their landing sites.

- '*Fishing laws that are imposed on us, cause problems to us. The officers insist that we have to pay 60,000TSh [$26USS][20] for the permit. But we are offering 20,000 TSh [$9US], which they don't accept. We suspect that the real price might be lower than what they ask us*' (TZ030). Negotiation here seems to attempt bargaining about the costs of fishing

[20] Conversion (May 2019)

permit by offering lower money values below what is asked by officers. Some fishers were said to make offers of paying their annual permit fees in installments, which was also declined by officers. However, when asking about the costs of the fishing permits, different values were provided suggesting possible unequal treatments of people by the law which is supposed to be equal for all and a possibility of negotiated rates for which conditions may remain undisclosed. Some of the values for the annual fishing licences indicated by fishers; 40,000 TSh (TZ055), 60,000TSh (TZ030), 96,000 TSh (TZ025), 80,000TSh (TZ017), and 200,000Tsh (TZ002)

- '*Migrants cannot fish without proper documents which are obtained in dollar payment. Because of that we go around that, to fish using local people who will get the licence in their names and we can use it*. (TZ016). Legally, migrants cannot obtain the fishing licence or be employed as a fisher before obtaining proper residence documents (TZ052, TZ050; TZ016; TZ019), which they said are very difficult to obtain (TZ005; TZ002) expensive in the order of US$ 2,500 (TZ027). In this situation, the negotiation skill is needed and used to get into fishing under the cover of local people whose names will be on these fishing permits. Once again, no informant took the liberty of revealing the negotiated specifics that allow most migrants to make their living in the fisheries mainly by the fear that they might be reported and be in trouble.

6.4.3 Mobility

In fisheries literature, mobility is known as a general trend for fisherfolk and has influenced the fishing sector for centuries (Njock and Westlund, 2008). Acknowledged as one of the strategies that fisherfolk often use to secure their livelihoods in situations of pressures including decline in fish stocks, mobility is said to involve patterns of people's movements

from their fishing communities to other areas not native to them with better livelihood opportunities (Ellis, 2003; Njock and Westlund, 2008; Nunan, 2010).

By looking at participant fisherfolk in individual interviews from the three study villages, the majority of them were autochthonous residents of the communities where the interviews took place, 33 (65%) out of 51 (100%). It would appear that this relatively high proportion of autochthonous residents live in their fishing communities alongside other fishing people who migrated from other villages from within Tanzania and from across Lake Tanganyika, mainly from the DRC. Also, by looking at the native groups and their lengthy residency in one place, one can ultimately say that there is a strong tie between these people and their native villages through which they feel attached to Lake Tanganyika, and which to a large extent constitutes their identity. From the interviews, none of the identified disturbing factors, be it either the decline in fish catches, the spillover effects of Congo, or the perceived hassles by fisheries regulation mechanisms, seem to affect the attachment people have to the lake. As one fisher reported '*I was born and raised by this lake. I cannot go anywhere. I live from this lake and it is enough*' (TZ043). Such a statement is an indication that most people would choose to stay regardless of the disturbances affecting their communities. Tied to this one official remarked '*The proof is that they never moved for better living conditions*' (TZ061). In other words, a lot of fisherfolk have appeared to have no intention of leaving their fishing communities to settle elsewhere away from the lake for better opportunities, but which did not seem to exist somewhere else.

Thus, the form of peoples' mobility to which most informants referred to within the context of Kigoma concerned mainly movements between landing sites and villages along the lake waters according to the mobility of fish. One official indicated '*When they get nothing*

from the lake or when fishing is closed, most of them move around to do some small casual labor, and others get to do some farming' (TZ057). Another official added '*fisherfolk move around and across for many years, and fish the same way*' (TZ055). Informant fisherfolk also held the same view. One fisher remarked as follows: '*we keep fishing and in different areas as much as we can* (TZ017). Another fisher reported that 'We *move to different areas depending on where we think we can get fish* (TZ016). These preceding views reveal a fundamental element suggesting movements of people, over and above fishing pursuits, between different livelihood activities, which do not necessarily suggest movements between geographic locations. However, one official expressed his disbelief regarding the current lack of education in most fisherfolk that can impede their movements' ability by saying: '*to be able to move out to other areas, one has to have information and to get information one has to look for it. But you have to have a certain intellectual level to find the information. Therefore, most fishermen resign themselves by creating small shops here and there*' (TZ061). And another official added 'when *trying to get into alternatives livelihoods, they start out with motorbike and then move to small shops. Usually they don't go back to fishing*'. (TZ055).

All these views are to some extent are in accordance with the perspective of multiple identities that can be seen in these movements of fisherfolk for alternative livelihoods. This particular characteristic seems to have some similarities with the example of Usangu people in Tanzania, who to maintain themselves economically, move between pastoralist and agriculturalist identities, sometimes investing their farming surplus into cattle, and other times into gold mines, etc. (Cleaver, 2002).

6.4.4 Local forms of credit

Interview data through focus groups, individuals and life stories indicated that most people in the fishing-related activities were disadvantaged at higher levels by the lack of financial capitals making their choices of livelihood strategies very limited. The choice of different opportunities in fisheries livelihood strategies depends on the livelihood assets including financial capital that fisherfolk have or to which they can have access (Ellis, 2000; Goulden et al., 2013; Nunan et al., 2015). Financial capital being the financial resources that people can use to achieve their livelihood objectives (DFID, 1999). Thus, both official and fisher informants, highlighted that fisherfolk are in dire need of money in times of shocks and stresses to ensure that their living needs are attended to including food, education, housing and health. Otherwise, their lives will be particularly devastated when their fishing income is jeopardised.

To the question of what resources fisherfolk would choose if they had to be given help to support their fisheries-based livelihoods, '*loan*' was mostly mentioned in the responses provided (64%). For these fisher informants, if they can access financial resources in the form of loans, these can give them the ability to cope with adverse factors in carrying out livelihood strategies and achieving their outcome. As an example, one fisher indicated: "*When our boats, engines, nets, and lights are seized by Congolese pirates in the waters, we fall behind in life and we have to borrow money to try recover our fishing equipment to be able to continue fishing*" (TZ023). For this participant when the fishing equipment are lost, the fisher cannot afford to recover them unless they get help in form of loans. Thus, the loss of fishing equipment not only drastically deprive fishing income and increase vulnerability, but it also impedes significantly the whole family life whose needs will be hard to meet.

Furthermore, many of the informants lamented the absence within their communities of formalised financial associations that can help them with loans outside of banks, for which they will unlikely qualify for loans (TZ016; TZ002), and which require proof of income and collateral that they lack such as a house that can secure that loan in case of non-payment (TZ032; TZ002; TZ055). As part of the coping mechanism in response to stress and shocks, fishing communities tend to turn to other local and informal mechanisms in forms of networks of support that include borrowing from family members, friends and self-help groups. In relation to this, to a multiple response question as to where they can get the loans they need, out of 29 (100%) responses, the most cited were self-help groups 10 (34%) and family members 8 (28%). This suggests the existence of various local forms of lending arrangements that many fisherfolk use as a coping strategy.

In a fisheries context, more specifically several forms of local credits/loans arrangements were mentioned in the interviews among the following examples.

The first form of loan arrangement which appeared to be the most prominent was referred to as self-help groups. As described, people involved in fishing-related activities formed a group after several weekly meetings for the purpose of saving collectively and raising funds for mutual help (TZ002). These groups were used by any members in case of an unfortunate event as illustrated in the following story from a fish processor.

> I was processing fish on racks that I owned. A time arrived when the state ordered their removal as they were selling those areas. While I was sick and bedridden, my racks were removed and thrown away. It was a great tragedy to me. I got to the point of lacking everything in life. It was a great loss since I was depending on them for living including paying my kids' school needs. I then joined a women group from which I got a loan of 30,000TSh [$13US][21] worth 3 Kg of fish, and payable in 12 months with 10% interest. This loan allowed me to start trading fish. Although life remained difficult for me, I was able to pay school fees for six children. Now

[21] Conversion (May 2019)

> my capital has increased to 10Kg of fish worth. (TZ106, Fieldwork, September 2017)

This woman's story hints at challenges people in fisheries face in daily life. A state initiative results in losses of her livelihoods given her failure to remove her racks due to sickness. In the context of Kigoma, such shocks (loss of her racks) and ensued stresses (income loss), highlight adverse conditions that poor people may deal with to survive. Considering the challenges in accessing financial capital to secure alternative livelihoods options for most people, this woman was able to get a loan through a self-help group where she was a member.

The second form of local loan arrangements involves reliance on family members which had the second highest number of responses (28%). As one fish trader who survived a threat in her livelihood, explained:

> I entered the fish selling business in 2005 with a capital of 15,000TSh [$6.5US]. One day, an unfortunate situation hit me as the rain fell on the fish I had just bought and wet them. I lost everything. I called my mother for help. She advanced me 40,000TSh [$17US] to me. This was a significant boost as it allowed me to resume my business. At this time my capital has increased to 1,000,000TSh [$434US]. Also, I managed to acquire a small space where I erected four fish drying racks that I rent to people. They pay me 12,000TSh [$5US] to dry a box of fish. Overall, selling fish is good for living. I was able to build a home and support the educations of my children who are now in high school. (TZ107, Fieldwork, September 2017)

This fish trader had faced a disturbing external shock caused by rainfall, which destroyed all the fish she was selling and from which she was living. As she describes, this loss was devastating. But she was lucky enough to find help from her mother who advanced her a financial capital that allowed her to resume her fish trade business. Other participants mentioned receiving help from their family members in situations when no one else could help them.

Fig. 6.3 Fish drying racks at Kibirizi landing site in Kigoma.

Source: Author's work August 2018.

A third form of loan arrangements was said to engage fisherfolk with other merchants outside of the fisheries. In one focus group interview, participants indicated '*We seek loans from other merchants who can give loans against our properties. For example, a loan of 200,000 TSh [$87US][22] will be paid back with 250,000 TSh'* [$108US] (Focus group, Village 1, September 2018). As one fisher explained '*these loans are mainly by merchants selling engine oil that fishers need for their boat engine and pay when they come back from fishing trips. But if they come out of the water without fish, it is a serious problem. It becomes a loan to be paid later and that creates uncertainties*' (TZ002). This form of loan seems to concern people who, in addition to the lack of access to formal lenders, are

[22] Conversion May 2019

unable to borrow from within the fisheries and are thus left with the option of resorting to merchants who can grant high interest daily loans. In some cases of no catches, fisherfolk will negotiate for payment extension or additional loans until when they will manage to have catches and repay the owed amounts.

The fourth loan arrangement involves banks and formal lending institutions. As one officer remarked, '*While bank loans can be more helpful to fisherfolk, banks require that to qualify for borrowing they need to have a "dhamana" or deposit in nature such as a house that can secure that loan in case of non-payment, meaning that deposit can be taken as repayment. But you will see that most fisherfolk have not such deposit in nature that can allow them to qualify for the bank loan'*. (TZ055, Fieldwork, September 2018).

The fifth form of loan is reported to occur mainly during the dry seasons when catches are low, and at a time when self-help groups' funds are all lent to members and not yet repaid. In this situation, those in dire need of financial resources will group and borrow from the bank using the group as 'dhamana'[23] or required security. As one participant indicated, '*it had happened to our group that all the members needed money to carry on with fishing their activities when we did not have enough money for everyone. We turned to the bank and borrowed as a group*' (TZ106)

[23] Swahili word that means collateral

Fig. 6.4 Women fish traders in the fish market near the landing site of Kibirizi in Uvira

Source: Author's work August 2018.

Hence, looking at these above-mentioned forms of loans, it appears that the fisherfolk who do not have membership in self-help groups will not qualify for other forms of loans as they may not have the required security deposits. This might be a situation that can impact their lives mostly as they cannot change it easily unless they join or form a group. But some fisherfolk seemed reluctant arguing that they cannot afford those daily, weekly or monthly contributions that set-help groups set as a core condition for membership. Another reason that was mentioned for not joining the self-help groups was provided by one fisher saying that '*we hear about quarrels among these groups suing each other to the court because of missed payments are usually counted as additional loans, which they end up not able to pay'* (TZ011). Another fisher added '*To be in the group, you have to have a regular income while*

fishing does not have a regular income. That is why many people stay away from self-help groups' (TZ035).

To summarise, **Table** 6.13 below recapitulates the elements that emerge to capture key coping and adapting strategies which help fisherfolk to withstand disturbing factors.

Table 6.13 Key coping and adapting strategies to withstand disturbances.

Disturbing factors	Coping and adapting strategy	Factors influencing the choices
• Water piracy and banditry	• Temporarily stop fishing • Nearshore fishing	• Safety and livelihood possibilities • Financial resources
• Insecurity in the waters	• Switch fishing techniques • Out migration to other areas	• Awareness of danger • Family and friends network
• Reduced fishing distance • Reduced fish catches	• Switch to alternative livelihoods • Withdrawal from fishing	• Savings, alternative livelihoods basis
• Drop in fishing income	• Self-help associations • Negotiate with armed groups • Have larger families living together • Use destructive gears and illegal fishing	• Possibility of loans • State fragility and incentive for corruption • Pay ransoms
• Excessive hassle with multiple tax payments and ransoms	• Fish in hiding • Bribe officers • Fish in distant areas	• Financial resources

6.5 Concluding summary

In conclusion, the chapter has presented an analysis of the primary research data collected in Tanzania in relation to the sources of vulnerability of fisherfolk and their coping and adapting responses to secure their livelihoods. The vulnerability context of people involved in fishing related activities, was analysed highlighting the role of key factors including the Congo conflict, the type of fishing, mobility and the role of institutions. The analyses used accounts of both official and individual household participants from their actual lived experience to establish how fisherfolk vulnerability was generated and/or increased following adverse effects on their livelihood assets, and how they responded to survive.

The results indicate that fisherfolk are more vulnerable from any factor that impedes their ability to fish. The identified key factors included losses of their fishing equipment due to

water piracy and drop in their fish catches due to stringent fishing regulations, all of which impact their income and reduce their ability to sustain their lives and livelihoods. Given their limited access to financial resources that can allow fisherfolk to pursue more alternative livelihoods, as well as their attachment to the lake, they are compelled to resort to illegal fishing practices, which are considered to impact further on their catches.

It was uncovered that as much as existing institutional arrangements mediate fisherfolk livelihoods and livelihoods strategies, they also play a huge role in driving choices of response strategies that lead to further vulnerability. Findings from this chapter also indicate that there were many different institutional arrangements and structures including bureaucratic and socially-embedded ones at the local level that mediate the choices of strategies of fisherfolk fishing the lake from the Tanzanian shoreline villages. These arrangements have different sets of rules from which they draw in their pursuits to sustain their living. This implies fundamental elements that imply the existence of social embedded institutions that mediate access to the lake's resources and influences fishing activities on Lake Tanganyika in the context of conflict.

It should be noted in the Tanzanian context, the fishing communities comprise migrants who were reported to be subject of the same regulations as national fisherfolk but who were reported to be fishing more clandestinely compared to their local counterparts. The results highlight the way in which they choose strategies responses managed to reduce their vulnerability in most part. Among the response strategies, the ones that most fisherfolk appeared to adopt due to their perceived effectiveness, included 'adding side activities' within or outside of fisheries including farming, porterage, casual manual jobs, and small businesses, which generated additional income they needed to address their living needs.

One highlighted observation has been prominent beliefs, in either traditional customs or a faith in God that appeared to have a considerable impact on how most fisherfolk interpret key faced challenges and persevere in conducting their livelihood activities to sustain their lives. Such dynamics embodied in social attitudes and habits were reported to have positive roles in efforts towards conserving lake resources despite their significant curtailment over time due to reasons including recurrent influxes of migrants.

Chapter 7

SUSTAINING FISHERFOLK LIVELIHOODS: DISCUSSION

7.1 Introduction

Chapter 7 provides a discussion of the main research findings and interprets them in light of the literature review. As discussed here, several key themes capture the factors and responses to vulnerability. This chapter focuses on conflict and vulnerability; mobility and transboundary waters; and institutions and vulnerability. In this chapter, comparative and cumulative results are identified between and from the two countries, the DRC and Tanzania. This chapter explicitly reviews the core concepts and elements of vulnerability experienced by fisherfolk, specifically susceptibility, sensitivity, and adaptive capacity, to interpret the key findings and insights from Chapters 5 and 6. Drawing on these themes, this chapter also discusses the implications of the key findings for fisherfolk livelihoods in relation to vulnerability and associated roles of institutions, as well as its contribution to knowledge. At the same time, the conceptual framework is utilised in relation to the research question, '*how do small-scale fisherfolk secure livelihoods in situations of change*?'

The chapter is presented in four sections. The first provides a deeper analysis of vulnerability with a focus on conflict-induced sources, experience and responses. The second concentrates on how mobility and the transboundary nature of the lake affects the behaviour and practices of fisherfolk, focusing on management and overfishing issues. The third deals with institutions and vulnerability, identifying how they work in their current arrangements in each country in relation to mediating fisherfolk response strategies to vulnerability. The fourth section ends the chapter with a concluding summary.

7.2 Conflict and Vulnerability

Key finding 1: The DRC's conflict creates a climate of insecurity affecting fisherfolk by reducing their ability to fish, thus generating vulnerability in both countries.

Diverse experiences of vulnerability

This finding, as noted above, underscores the considerable nature of the DRC conflict and its associated vulnerability context that affects fisheries on both sides of Lake Tanganyika. Within this context, fisherfolk from different lakeside locations were found to have diverse experiences both in terms of sources and extent of vulnerability as well as in their adaptive capacities. Differences in vulnerability were found between the Congolese and the Tanzanian fisherfolk across LT, and among fisherfolk, groups and individuals, within each of the two countries.

As suggested in the literature, vulnerability here is looked at in terms of adverse effects to which fishing communities are exposed, sensitive to and less adaptive of (Kuol, 2014; Adger et al., 2005). Unlike most armed conflicts, happening mainly in the forms of either old wars or new wars, and involving battle fights between belligerent groups (Keen, 2008; Smith, 2004), the finding here highlights the fact that the DRC conflict is protracted and occurs through sporadic violent events. This nature of the DRC conflict is in line with new wars theory in situations of blurring boundaries of peace/war. Thus, fieldwork data indicates that these sporadic acts of violence are carried out by different groups either on the lake's waters, or/and in homeland DRC communities, targeting lootable assets. According to informants, these lootable fisheries assets include fishing equipment such as boat engines, batteries, lights and in some cases fish catches or cash from fish sales.

When sporadic violent events occur, they result in consequences that include physical and human casualties generating vulnerability to civilians particularly fisherfolk, who experience it differently among them. Results presented in Chapter 5 and Chapter 6 show that conflict events create conditions of insecurity constituting the most prevailing source of shocks and stresses affecting fisherfolk on both sides of LT, and to which they are especially vulnerable. In conditions of insecurity, fisherfolk are exposed to losing their lives and mainly their fishing equipment, which is targeted by armed groups. While in TZ conditions of insecurity happen only in distant waters, in the DRC it is experienced both within their communities and in the waters, due to piracy and banditry.

Therefore, while everyone fishing in distant LT waters are exposed to vulnerability from insecurity, only those using 'liftnet' and 'ring net', both equipped with engines, batteries, and lights, are especially sensitive to losing their fishing equipment targeted by pirates. This risk represents a high level of sensitivity because the higher proportions of fisherfolk depend on ring net 13 (33%) and liftnet 12 (30%) in the DRC, and on liftnet 36 (47%) in TZ to catch Dagaa and Mukeke. The idea of distant waters considered prone to greater risks of piracy is determined by varying factors that are also important in defining differences in fisherfolk vulnerability. While for most Tanzanian fishing communities, distant waters are in areas approaching the DRC waters that are also far away from the Uvira region, for the DRC fishing communities these distant waters are more towards militia-controlled villages. Consequently, Congolese fisherfolk have lower sensitivity and higher adaptive capacity given their ability to quickly approach the Congolese coastal areas as opposed to the Tanzanian counterparts who will find themselves to be far out from their landing sites.

In addition, unlike the Tanzanian fisherfolk, a remarkably high percentage of Congolese fisherfolk 42 (93%) reported living in areas that have been and continue to be affected by conflict events. Thus, there is a higher vulnerability exposure for the Congolese from direct violence and brutalities of either the rebel or the armed forces, that includes looting, rape, and killing, while the Tanzanians have no such exposure in their communities. Within these Congolese communities, groups of fishers having visible physical assets such as property, homes, motorbikes and valuable fishing equipment, will be sensitive to looting attacks by armed groups in their sporadic raids.

Thus, this finding shows that given the nature of the DRC conflict, fisherfolk are differently exposed to associated vulnerability depending on whether they are living and fishing from the DRC's side of the lake or the Tanzanian side. The finding, therefore, identifies and suggests that fisherfolk living in and fishing the lake from different contexts have varying experiences of effects from the insecurity threats that generate their vulnerability. As such, they will be differently susceptible, sensitive and adaptive to the conflict-induced insecurity, the most prevailing source of vulnerability. Similar results were found in a study by Mills et al. (2011) that demonstrated the relationship between the source and intensity of vulnerability with the main livelihood activities of concerned people. This means that those living mainly from fishing, will be more vulnerable if they lose their fishing equipment that enable them to fish.

Diverse abilities to respond and adaptive capacities

This finding also illustrates how abilities to respond and capacities to adapt to adverse effects of violent events brought on by conflict-induced insecurity vary between the two countries

and among fisherfolk within the same country. The results show that to reduce vulnerability to adverse effects of chronic insecurity induced by the DRC's conflict fisherfolk in the DRC respond by measures including i) '*Stop fishing momentarily*', ii) '*flee temporarily to safe areas*', and iii) '*out-migration*' across the lake. In Tanzania, with insecurity only being feared in distant waters where catches are believed high but prone to piracy risks, fisherfolk resort to key strategies that include i) '*nearshore fishing*', ii) '*switch fishing techniques*', and iii) '*resort to alternative livelihoods*'. In both countries, factors identified as enabling cited adaptation measures include i) '*awareness of danger*', ii) '*available financial resources'*, and iii) existing '*ties to social networks*' that include families, friends, and self-help groups, which offer loan possibilities.

Therefore, these above-mentioned variables appeared to be components in the adaptive capacity of fisherfolk and, as discussed in Chapter 5 and 6, they were found to enable fisherfolk to reduce to varying degrees their level of vulnerability from the conflict-induced insecurity. Because these variables affect fisherfolk both within and between livelihood settings and contexts, fisherfolk with more of these variables were found to be able to respond more effectively to insecurity threats than others with fewer of them, consequently reducing vulnerability will not be the same to all the fishers. For example, '*awareness of danger*' is an important factor for reducing vulnerability of fisherfolk in the face of insecurity. In situations of violence, the militia and rebels use the DRC's lake waters to carry out their attacks. Fishers knows that if violent events occur when they are fishing, they run the risk of losing their lives or/and equipment, which could be devastating. Thus, vulnerability to insecurity will be reduced significantly by refraining from fishing momentarily and staying hidden in their homes.

Such an adaptive capacity will be possible for those having some financial resources to purchase food and cover other needs when they cannot access the lake. Additionally, already being in hiding in their homes, they will be able to escape faster if insecurity intensifies and they are forced to flee for their lives either into Tanzania or within DRC to other safer shoreline areas. Inversely, families without savings will be at more risk of being affected by insecurity with the likelihood of losing fishing equipment which they have borrowed in most cases. The impact of losing their equipment will be greater to those with no savings or no membership in self-help groups. In Tanzania fisherfolk who are aware of possible piracy risks will turn to nearshore fishing or switch to using gears that are not attractive to militia if they attempt to fish in distant waters. Such a change in fishing technique will likely lead to a drop in fishing income given that fishing methods which do not use lights are not highly effective in catching the highly demanded fish, namely Dagaa and Mukeke.

So, while the '*awareness of danger*' and '*disposal of financial resources*' make for the two key aspects of sensitivity and adaptive capacity to insecurity in both contexts, they enable choices for some fisherfolk to respond in ways that reduce their vulnerability while for others this may not be the case. Unlike Tanzanian fisherfolk, data on the DRC noted that some fisherfolk with limited resources rather than starving in their homes, go fishing putting their lives and properties at risk. But those found fishing in distant water will face greater threats and risks of being killed or losing their fishing equipment. In this case, fisherfolk with savings or access to loans mainly through self-help groups or family will adapt more easily than those without personal savings or links with social networks. In the DRC 20 (44%) of interviewed were members of self-help groups, while 35 (78%) identified themselves as 'poor', meaning that they cannot secure any loan, since they appear not to members of any self-help group thus having no means for loans.

Relation to other fisherfolk vulnerability in the literature.

This finding identified patterns that accounted for differences among fisherfolk in ways they experience vulnerability and their adaptive capacity in the context of conflict-induced insecurity. Within these patterns, the importance of the types of lootable fishing assets used/owned by fisherfolk was highlighted in relation to various levels of exposure to insecurity in the two contexts. Insecurity was found as observed by Vlassenroot (2013) as representing the key disturbances through which conflict events affect fisherfolk lives and livelihoods in eastern DRC. Most literature establish that insecurity affecting fisheries derived from conflicts over fisheries resources which tend to involve fishing communities as participants. However, the literature such as by Smith (2004) and Kuol (2014), recognises other contexts of insecurity not associated with direct violent events or conflicts that can generate fisherfolk vulnerability and which are worth exploring in terms of how they relate to patterns of vulnerability and adaptive capacity of conflict context. Useful examples include the contexts of identity (Rigterink, 2012; Smith, 2004) and climate change (Kuol, 2014; Macusi, et al., 2020; Muringai et al., 2020), which can be among those that can relate to fisheries settings.

According to Smith (2004), identity can make people vulnerable by generating insecurity through discrimination over ethnicity within their communities. Smith views ethnicity as a central component of identity and a powerful component of prejudice in communities, including fishing communities. As noted by Rigterink (2012), insecurity over ethnicity can motivate displacement and avoidance of given territories given the constant fear of individuals with a different ethnicity. As noted by Omasombo (2014), ethnic differences constitute the biggest dividing line between and among populations in the DRC.

Therefore, in the DRC's fisheries, by avoiding some fishing areas or some territories dominated by people of different ethnicity, vulnerable fisherfolk will have limited fishing possibilities and reduced income which will adversely affect their capacity to cope and adapt to situations of change. Additionally, given that most people enter fishing-related activities on the lake through family ties (DRC interview informants), certain groups of people will have limited access if they are of a different ethnicity or are hostile to those already living in the concerned fisheries areas. This ethnic element ties in with different social arrangements suggested in the literature by which fisherfolk can access fisheries to secure their livelihoods (Hall et al., 2014; Nunan, 2010).

In the DRC, fisherfolk who could be considered to be more vulnerable to insecurity due to the identity element would be mainly those who are part of ethnic minority groups. According to Minority Rights Group International (2018) and shown in the composition of participants, Bashi and Barega, are considered as minority groups in the Uvira region. Other minorities include the Banyamulenge, but whose status is said to be difficult to resolve given the association to Banyarwanda (Minority Rights Group International, 2018). No fisherfolk of Banyamulenge ethnic group were found at any landing site in the Uvira region. This could be taken to mean that being aware of possible hostile environment, they chose not to integrate into fishing related activities. Thus, the degree of vulnerability to insecurity in the waters appear to have been reduced by their awareness of the ethnicity danger, and the ability to move to other locations to live from non-fishing related activities.

In Tanzania, while communities are of different ethnic groups, they did not appear to be divided along the ethnic lines. Instead, the divide was mainly under the nationality status making it difficult for non-Tanzanians to fish legally. The degree of vulnerability of migrant

fisherfolk to insecurity will be lower in Tanzanian communities given the relative stability prevailing in the country. However, they will be vulnerable to some discrimination given the conditions of fishing legally as migrant fishers. They would lower their vulnerability when associating with local fishers sharing the same ethnic identities with them through whom they can enter the Tanzanian fisheries. One migrant fisherfolk reported that while they live in a peaceful environment, they cannot fish peacefully (TZ001). In other words, they are in livelihood insecurity. Thus, those without shared ethnic backgrounds with those who moved earlier will be more vulnerable than others to livelihood insecurity from their identity.

Another context of particular attention in the literature on fisheries vulnerability is related to climate change with risks and disturbances that can inflict harm to people's livelihoods (Kuol, 2014). Adverse effects of climate change can be measured through exposure, sensitivity, and adaptive capacity (Adger et al., 2005; Allison et al., 2009). Effects of climate change can also be associated with climate variability and extreme adverse weather conditions that may reduce fishing activities. Some of these include the fear of being in the waters while severe winds blow exposing them to the risk of losing their lives and equipment. Sarch and Birkett (2000), working on Lake Chad, established the climate change risk of water fluctuating causing floods that affect more the fisherfolk living on the shorelines and prompting people's response of fleeing to other areas deemed safe.

Key finding 2: The DRC conflict is generally contained within the DRC – despite its occurrences at border locations.

This finding identifies the border location context of the protracted DRC conflict that has not spread across borders and the elements limiting its spillover effects to only people's recurrent crossings across the lake into Tanzania. These elements include the role of shared social ties of fisherfolk between the DRC and Tanzania across the lake, as well as a strengthened state characterising Tanzania with better functioning capacities and abilities to deliver public services including better control of its borders. As per this finding, although happening at border locations on the DRC's side, this study demonstrate that the DRC conflict's hostilities never spread across the border into Tanzania. In other words, rather than spreading hostilities, the context of the DRC conflict generates refugee/migrants' movements leading to interrelated but different disturbances between the two countries, in the types and extent of induced vulnerability experienced by fisherfolk.

The main example is that within Congolese borders, fisherfolk can experience direct violent acts by militia through recurrent rampages and gun battles in their communities creating shocks and stresses to fisherfolk. Such direct violent events were never reported occurring in Tanzania suggesting the strengthened state services and more effective border control measures. Influx of refugees into Tanzania represented the most common spillovers of the conflict in addition to piracy disturbances in the waters. The influx of refugees was reported to increase the pressure on the lake through the increased number of fishers leading to the reduced catches and fishing income thus rendering Tanzania fisherfolk vulnerable.

The dominant view in the literature has been that given the transnational factors including ethnic ties, massive flows of refugees caused by violent conflicts can result in a cross-border contagion of such conflicts ((Dunne and Tian, 2014; Gleditsch, 2007). Previous studies have established massive movements of people into Tanzania due to conflicts in the eastern DRC destroying people livelihoods, especially among local communities and particularly the people sharing ethnicity with combatant groups (Mampilly, 2015; Vlassenroot, 2013). Evidence collected on vulnerability and coping strategies of fisherfolk, showed that those of Bembe groups were often affected the most, depending on their locations of their homes and their types of fishing. The Bembe, who were reported as traditional inhabitants of the Fizi conflict-ridden region, represented the majority 20 (44%) of the fisherfolk participants across the three DRC villages. As a consequence of the DRC conflict, the Bembe people are among a few bantu tribes are found living on the Tanzanian side of the lake in Kigoma and known to have originated from the DRC fleeing the protracted conflict (UTR, 1998). While the data did not reveal any involvement of fisheries or fisherfolk in the DRC conflict, it showed that Lake Tanganyika offered a faster escape into Tanzania to fishing communities when affected by the conflict disturbances.

While in earlier studies and existing conflict literature, these vulnerability elements based on transnational ties are captured and confirmed by this finding, the interesting variations in types of effects including spillovers between the two countries are less apparent. Based on the context of this study and concerning vulnerability, it can be concluded that while all fisherfolk are exposed, those of Bembe tribes are more sensitive or more at risk from armed groups' violence, because the majority of rebels/militia appears to be Bembe. They also represent the category of fisherfolk that have high potential of adaptive capacity as they can

easily flee into Tanzania facilitated by existing ethnic ties with some Bembe already living in Kigoma, Tanzania.

In the literature, as suggested in the view of Gleditsch (2007), the transnational ties shared by people on both sides of a border location, present an increased risk of conflict spreading into the neighbouring state. In the context of new wars, the essential element in the argument relating to the issue of near border locations of conflicts, is that the shared ethnic transnational ties between people living across borders can facilitate the transfer of violence between neighbouring countries (Dunne and Tian, 2014). Conflict literature would categorise the DRC conflict as external to locations impacted by its spillover effects (Carmignani and Kler, 2016; Dunne and Tian, 2014). In other words, as noted in Chapter 3, within the people who are susceptible to vulnerability because they live in these cross border locations, are those of them who will have a higher sensitivity to effects of conflict occurrences than others, particularly those found to have ties with conflict actors, resulting in greater vulnerability (Carmignani and Kler, 2016). Some of these effects, as recognised in the conflict literature, are associated with spillover effects impacting peoples' livelihood capital assets, including human and physical ones (Dunne and Tian, 2014).

The finding did not identify any form of contagion effect from the DRC conflict in Tanzania, contrary to what one would anticipate considering the literature on civil wars. One explanation could be that the effects of the DRC conflict have been experienced in Tanzanian fishing communities living on the shores of Lake Tanganyika, but without contagion effects, reflected by the degree to which Tanzania has been able to maintain stability and peace throughout its territory. In contrast to this widespread perception in the literature, this study found that transnational ties while exposing people living on both

sides of the borders to vulnerability, did not transfer violence in communities across the lake, despite their being not far from locations that are considered to be have abundant valuable mining resources, which are generally more susceptible to conflict disturbances (Straus, 2012). The findings reveal a rather different situation given that in these locations, while being in cross border areas and reported to have been affected by conflict occurrences, none of the concerned communities were found to have a rebel or militia presence, which should have been an indication of their active participation or of some of their inhabitants in conflict activities. Some participation in the conflict by local communities would have been expected to be found as suggested in the perspective of new wars, where sources of vulnerability would include forced enrolment of youth and men in armed groups and sexual violence against women and girls would have been mentioned. However, it is not realistic to expect people to have raised these issues if they have not directly lived them or perhaps if they do not feel able to share these experiences.

For instance, the findings show that the DRC participants reported three elements, namely '*insecurity*' 16 (25%), '*equipment loss/destruction*' 17 (27%), and '*forced displacement*' 14 (22%), which they considered as key disturbing stresses and shocks from which fisherfolk suffer the most in their communities, causing their vulnerability, whereas the Tanzanian participants reported that the disturbing elements associated with the DRC conflict are mainly '*Insecurity in the waters*' 29 (34%), '*Increased number of migrant fisherfolk*' 16 (19%), and '*Losses of people and equipment'* 25 (29%).

The reality that insecurity is a central factor of vulnerability affecting fisherfolk in both contexts, in relation to the DRC conflict, is demonstrated in the views of participants from both countries. Thus, the DRC conflict mainly generated recurrent moments of insecurity,

but which were said to have been differently experienced in the two contexts. Susceptibility to insecurity in the DRC was reported to happen within fishing communities and on Lake Tanganyika's waters, whereas in Tanzania, insecurity was mentioned to only happen on the lake, thereby impeding fishing activities. In this respect, as one official from the DRC observed '*insecurity was prevalent and widespread during conflict*', and that *'insecure moments could take up to a month or so'* (CD051). Concerning the DRC, a possible explanation is that rebels seem to have neither the interest nor the ability to control the susceptible fishing communities who are very close to urban centres over a prolonged period. Thus, their absence in fishing communities may be attributed to the choice they make to remain in remote areas from where they can carry on with their activities including recurrent incursions to perpetrate violence without much interference.

Focussing on '*insecurity*', it was found to manifest itself in varying forms of direct violence in the two contexts, leading to continuous and widespread conditions that had direct negative effects/impacts on fisherfolk lives and livelihood assets, thus increasing vulnerability. In this regard, fisherfolk from the DRC were found to be susceptible to insecurity within their communities and on the lake during conflict events, whereas Tanzanian fisherfolk were found to be impacted by insecurity only on the lake from spillover effects of the DRC conflict.

Key finding 3: <u>In both contexts, losing fishing physical assets, usually not owned, impacts on social capital assets, which enable most fishing activities to take place.</u>

The literature recognizes that conflict events inflict damages or losses to physical properties and infrastructure causing people to suffer (ACLED, 2018; Raleigh & Dowd, 2017). These

physical properties and infrastructures, which are referred to as physical assets in the livelihoods' literature, are of critical importance for fishing households particularly those including boats, boat motors and gears (Allison and Horemans 2006; Diedrich et al., 2018; Nunan, 2010). As suggested in the literature, conflict affecting fisheries livelihoods can increase vulnerability of fisherfolk in several ways including through loss of physical assets forcing people to migrate away from their traditional fishing grounds (CEMARE, 2002).

This study confirms the above-mentioned literature on the aspects of loss or damage to fisherfolk's physical assets as most DRC informants described past and recent conflict events as involving gun battles, abduction and brutalities by armed groups resulting in losses including of properties. Gun battles were mainly reported in the villages, while abductions and confiscation of equipment occurred mainly in the waters. Thus, the variation here is that '*insecurity*' in the DRC implies that fishing communities are susceptible to loss of life and property/fishing equipment, while in fishing communities in Tanzania, fisherfolk are only susceptible to loss of fishing equipment. In both contexts, the intensity of threats by armed groups that can be referred as '*sensitivity*', predominantly occurred to peoples entering the waters for active fishing activities and exclusively those fishing with motorised boats. Tanzanian fisherfolk reported that 'water pirate' activities were experienced in terms of attacks targeting essentially the physical capital assets of fisherfolk including boat engines, lights and batteries.

This implies that fisherfolk faced with the problem of their equipment being taken away by pirates would no longer be able to fish, and consequently, be susceptible to vulnerable conditions of life. In this regard, 'liftnet', and 'ring net' fisherfolk were found to be

especially sensitive to vulnerability from insecurity in the waters, being at greater risk of loss of both fishing equipment and life, when fishing in distant waters.

As many informants pointed out, their living conditions would most likely be worse if lost equipment was borrowed, as they would have no way of acquiring replacements due to the lack of personal financial capital and loan possibilities, exacerbated by the absence of available formal financial mechanisms or structures to turn to, enabling the resumption of fishing. Thus, losing physical assets such as fishing equipment, owned or not, would have the serious implication of disrupting fisherfolk social capital assets through social relations, including friendships and/or partnerships, which enable most fishing activities. Furthermore, when the ability to help one another in the face of future needs, shocks or stresses is compromised, their community solidarity may be jeopardised.

The fisherfolk's adaptive capacity, when faced with such vulnerability risks, indicate that in the DRC's context immediate responses depended on the intensity of violent acts. In the event of atrocities such as gun battles, they either fled or stayed inside their homes. If they were forced to stay inside their homes, they would temporarily stop fishing or be restricted to only fishing in nearshore areas. For Tanzania's fisherfolk, reducing fishing distance was by far the most cited response strategy to insecurity in the waters linked to the DRC conflict spillover shocks and stresses. According to one boat owner, '*We cannot go over a distance of three hours in the waters as before, we are limited to going only as far as thirty minutes and what we can catch at that distance is not what we really would like*'(TZ016). The tone of such a response implies fisherfolk frustration at their inability to access areas where they know they can catch more fish, suggesting their forced inability to fully utilise the natural capital asset available to them. Additionally, this response strategy of '*stop fishing far out*

in the waters' appears to influence fisherfolk to turn to prohibited nearshore fishing, with the possibility of being caught by the fisheries officers, resulting in arrests, confiscation of caught fish and fine payments. Even if they evade capture, their behaviours may cause overfishing, or social costs of broken marriages, as a result of fish traders, predominantly women, being forced to collect fish at uncommon times (night) and locations.

So, in both contexts, the key findings imply a link between fisherfolk vulnerability and their dependence on fisheries livelihoods, which are more susceptible to vulnerable conditions generated by the DRC conflict-induced insecurity. Details on such nature of conflict with insecurity through sporadic acts of violence/ransoming and the extent of their impediment to fishing ability have been neglected in previous fisheries livelihoods research. Investigations that target unpacking vulnerability factors associated with sporadic acts of violence/ransoming, have the potential to expand the scope of vulnerability in the context of new wars.

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7.3 Mobility and Transboundary waters

Key finding 4: Lake Tanganyika and its fisheries resources are not a '*source of the conflict*' affecting fisherfolk.

On the issue of sources of conflicts, the literature recognises the importance of control over resources, suggesting that conflict is generated and sustained by patterns of profit seeking (Keen, 2008). As well, conflict can emerge from other causes apart from profit seeking and be sustained by other dynamics that develop over the course of the conflict (Keen, 2008; UNECA, 2015). For example, Roessler and Verhoeven (2016) showed that economic gains in accessing and extracting valuable natural resources were the consequences of the civil war in Congo and not its source. Profits here are generally related to the extraction of resources which basically determine the intensity of the conflict. In the event of mineral resources, which in the view of Welsch (2008) are lootable resources, their size and value are directly connected to the profitability of armed conflicts allowing to obtain them (Welsch, 2008). The view of UNECA (2015) is that the causes of the DRC conflict are not in natural resources, but rather in the absence of strong institutions making the exploitation of mineral resources to become both an incentive for rebellion against the state as well as a fuel of the war machinery.

The findings show that none of the occurrences of conflicts in any of the villages affected have been over fisheries resources or involving fishing communities as participants, contrary to the reviewed literature linking new wars to natural resources. Even arguments that conflicts may originate outside the fisheries and can evolve into low-level, nonviolent conflicts such as those between fishery resource user groups (Glaser et al., 2019), did not seem to apply to this particular context of Lake Tanganyika's basins on both sides, Uvira

and Kigoma. The literature suggests that living in rural territories which are on border locations, and which are endowed with natural resources desired by warring factions, will expose people to the susceptibility of armed conflict occurrences and thus to greater vulnerability.

The susceptibility to conflict-induced vulnerability was seen in areas which were not endowed with scarce and lootable natural resources as in the cases of these three fishing communities on the shores of Lake Tanganyika in the Uvira region. As mentioned earlier, people in the Uvira region of the DRC have only Lake Tanganyika as their endowed valuable resource. The findings did not identify any factors which would appear to suggest that Lake Tanganyika or the exploitation of its fisheries resources could have been a sources or cause of the rebel/militia attacks on its fisherfolk.

One possible explanation could be that susceptibility of these fishing communities to conflict events is because they appear to be in areas that are readily accessible through the lake by rebel/militia from their far-out mineral rich location of Fizi territory when in need of income from fisherfolk lootable assets/ransom. In the South-Kivu province, the territory of Fizi is known to have abundant mineral resources and has hosted a succession of rebel/militia groups since the start of the post-colonial period (Stearns and Verweijen, 2013). Added to this, is the unending tension between communities with scenes of violence (Vlassenroot, 2013), including those which were reported by participants. Furthermore, rebel/militia attacks on these communities are generally short and infrequent, and seem to be for other reasons, including seeking to be recognised by the local community and at the same time looking for food supplies and weapons from fleeing soldiers. The occurrences of conflicts

are experienced despite the absence of lootable mineral resources within the affected communities and without any direct participation of local communities in the conflicts.

Authors such as Welsch (2008) argued that the intensity of conflict would vary depending on the types of natural resources with which the affected rural areas are endowed. For instance, Welsch (2008) demonstrated that the abundance of lootable resources, such as mineral resources tended to increase the incidence of armed conflicts as opposed to renewable resources such as agricultural lands, which may raise labor productivity. Thus, conflicts would emerge as a struggle between groups with the aim of asserting claims over the valuable resources (Goodhand, 1999), and will be sustained by particular patterns of profit seeking (Kaldor, 2012; Keen, 2008). This study's findings do not support these positions as it was highlighted during interviews that neither local communities nor participant fisherfolk have shown to have any history of occurrences of or involvements in any conflict over fisheries resources.

Key finding 5: The '*ties between peoples*' from both countries across Lake Tanganyika serve mainly as avenues for escaping conflict events through migrations rather than for transferring conflict.

On the issue of ties between people/nations, the literature on new wars mostly concentrates on the dynamics of transnational boundary migration in respect of what facilitates the transfer of conflict or non-actor-specific spillover effects across borders (Gleditsch, 2007; Straus, 2012). In view of this, it is suggested that most rebel groups involved in new wars have strong transnational links, allowing them to move fluidly between states (Straus, 2012). Some of the most cited of these transnational links include shared ethnic ties between people

living across borders that can facilitate the transfer of violence between neighbouring countries (Dunne 2013). Such transnational ties may make people susceptible to vulnerability on both sides of borders (Dunne 2013). It should be noted that unlike what most literature has suggested, transnational ties were found to be a source of increasing fishing pressure through cross border fishing rather than a vector for insecurity or conflict from one country to another.

This study throw light on transnational ties found in people's mobility concerning DRC and Tanzania, which have been more on migration and cross-border fishing, facilitated by several common traits including the Swahili language and ethnical/tribal identities. At the same time different conditions were found to motivate Tanzanian fisherfolk cross-border activities including little enforcement characterising the fisheries regulations in the DRC.

On both sides of the lake, no identity-based vulnerability linked to conflict violence was found within the fishing households on both sides despite their ethnic ties. It is important to highlight the fact that Lake Tanganyika fisheries resources attract an increased number of newcomers into fishing for survival purposes while fleeing conflict zone areas. Earlier studies showed that the Uvira region and areas around it have historically been shaped by ethnic divisions (Mampilly, 2015; Vlassenroot, 2013). The implication of this identity element of conflict in relation to vulnerability could be that rivalries along ethnic lines would seem not to encourage fisherfolk to flee towards communities, perceived as enemies, fearing risks of mistreatment. This might explain why the DRC fishing communities showed an identity element which was reflected in the absence of the representation of people from the Banyamulenge ethnic group, who are mostly known as herders (Stearns and Verweijen, 2013).

As stated earlier, authors in the new wars' literature have observed that armed conflicts' goals are about identity elements including those based on ethnic lines rather than about geopolitical interests or ideological pursuits (Beswick and Jackson, 2013; Kaldor, 2012; Rigterink, 2012). Relevant to this work, most of them have focussed on the ethnic dimension of people's identity in the context of transnational ties in terms of facilitating the transfer of violence between neighbouring countries (Dunne 2013; Vlassenroot, 2013). While some of this has been noted between the DRC and Rwanda as documented in the studies by Vlassenroot (2013), none of such ties were observed between Tanzania and the DRC, the two contexts concerned in this study.

In the literature, identity is linked to vulnerability in several ways, including ethnic discrimination, exposing different groups to varying susceptibilities and sensitivities including to rejection and abuse risks in destination communities when forced to flee for their lives. This ties in with earlier research which has demonstrated that ethnic identity can play a role in facilitating migrations out of conflict zones for people linked through inter-ethnic networks as migrants can find refuge with people of similar ethnic groups settled earlier in destination communities (Schlee, 2004).

The literature also recognises that disturbing factors which lead to forced displacements can be generated by situations of conflict and vulnerability for fleeing people and can translate into the disruptions of socio-cultural ties with consequences on the destruction of structural sources of livelihoods at household levels (Muhwezi et al., 2011). For most migrant fisherfolk found in Tanzania, said disruptions of family ties was inaccurate, as they had their family members living with them. The data revealed that only 1 (2%) of the total participant fisherfolk in Tanzania were found to be living alone. Almost all of the informants 50 (98%)

lived in households of at least two family members, of which 18 (36%) were migrants. This confirms that the change of territories following displacements caused by conflict, usually undertaken at the detriment of social capital that goes beyond the household, did not occur in this particular context. One possible explanation might be that given the long term and unending nature of the conflict, people might have learned suitable approaches to dislocation and relocation along with their families, every time they resorted to displacements in response to vulnerability.

As to the effects on people from such conflicts, the literature identifies that civilians are often targeted suffering heavy tolls from extreme levels of violence inflicted to them (Jeong, 2000), and losing their livelihoods assets including decreasing income, and disruption of social relationships (Mallett and Slater, 2012; Mayadunne and Phillips, 2016). These adverse effects of the conflict on people and their livelihoods were reported by participants as causes of displacements within the borders and migrations across the lake into Tanzania. On the DRC's side, conflict-related forms of violence reported by household/individual participants included recurrent gun battles, abductions and shooting fisherfolk on the lake resulting in loss of life and property. The data highlighted that the effects and impacts were mainly on the natural and financial capitals of fisherfolk livelihoods, essentially those drawn from Lake Tanganyika, which also appeared to be affected by the increased number of newcomers into fishing resulting in increased fishing pressure and reduced fish catches. Related to this is the idea within the relevant literature on the fisheries function of safety net in helping people survive uncertain situations that threaten their living and their livelihoods (Béné et al., 2010; Coomes et al., 2010; Nunan, 2014).

Key finding 6: A conflict unrelated to fisheries in the DRC causes a '*transboundary*' fish stock depletion in Tanzania.

What the literature on transboundary waters often focuses on is the point that what happens to the waters in one country has implications to other countries sharing the resources. This can create collective action problems across the borders of states involved (Schmeier, 2010), which may include transboundary impacts on fisheries. Such transboundary problems have often been recognised as sources of conflict mainly due to competition for resource exploitation (Lubovich, 2009; Martin et al., 2011), including 'mobile' fish. However, it may also have wider implications including that of food security for people in riparian nations (Duda and La Roche, 1997).

Relevant to this study, is the issue documented in the literature on the effects of migrating fish, irrespective of national borders, which some fishers in search of increasing their catches will pursue beyond their national water boundaries (Allison et al., 2001; Lungu and Hüsken, 2008; Nunan, 2010). In other words, as earlier research work has demonstrated, the movements of fish influence the movements of fishers (Lungu and Hüsken, 2008). Some of the effects of these mobilities include overfishing, which leads to fish stock reductions (Servos et al., 2013). According to Lubovich (2009), overfishing is a major problem that can significantly affect the livelihood security of people.

On the contrary, the perceptions of this study's participants [31 (97%) in the DRC and 19 (100%) in Tanzania] is that the lack of fish in the waters is more a result of fish mobility than of overfishing. Given the recognition that fisherfolk vulnerability may be generated

by multiple factors relative to fishing, this idea of lack of fish in the waters was predominantly mentioned as one source of their vulnerability in both the DRC and Tanzania.

Understanding this perception of vulnerability in association of 'fish mobility' rather than overfishing could provide an indication of what could be considered as the most important change that led to the drop in catches affecting fisherfolk livelihoods. For example, participant fisherfolk often mentioned lacking fish in the waters because of fish out-migrations towards far out areas that where they could not catch them easily, resulting in the drop of their catches. This perception associating the lack of fish with fish mobility in varying scale and patterns weas demonstrated in participants responses quoted in Chapter 5 and Chapter 6. The literature's acknowledgment of the high mobility of fish, can also contribute to the vulnerability of fisherfolk (Nunan, 2010), it is mainly with the argument that out-movements of fish lead to intentional movements of fishers chasing them in search of higher catches to increase their income (Allison et al., 2001; Nunan, 2010).

Thus, although already established that the movements of fish mostly determine the movements of fishers (Lungu and Hüsken, 2008), the broader context of conflict appeared to limit how far fisherfolk could go in the waters without risking to fall in pirate hands. Such an impediment could be a reflection as to why the majority of fisherfolk in this context adapted to fishing in nearshore areas and fewer ones were fishing in the offshore distant waters. Additionally, as a consequence of the transboundary nature of the lake, in both contexts, the lack of fish was also associated with overfishing linked to extensive increase in the number of fisherfolk, which increases fishing pressure that consequently causes fish catches to decrease.

Examining the issue of overfishing in fisherfolk perceptions is consistent with both the data and the literature to demonstrate its importance as the cause behind the lack of fish in the waters of Lake Tanganyika. For example, there are elements reported on the Congolese side saying that since the conflict started in 1996 the lake was increasingly fished by too many people including newcomers in fishing whose '*the majority of these newcomers had no resource conservation mind-set as they were trying to catch as much fish as possible, leading to fish stock decline*' (CD047). And in Tanzania, informant fishers' said '*we are too many fisherfolk on the lake due to migrants fleeing the DRC conflict*' (TZ017; TZ032).

Aligned with such statements, are a number of studies and official reports corroborating the idea of fish stock decline in relation to the increase in the number of fishers as more people appeared to be people turning to fishing the lake as a quick and easy option for survival (Cohen et al., 2016). For instance, there are several reports confirming that that number of fishers trebled in the Uvira region (DRC) between 1995 and 2011 (Cirhuza et al., 2015; Van der Knaap et al., 2014). The official Tanzanian statistics suggested that the number of registered fisherfolk increased from 25,000 in 2006/7 to 50,000 in 2017 (TZ059). Another study conducted by Cohen et al. (2016) identified the decline in fish catches in association with overfishing following a significant increase of migrant fishers since the 1990s.

Taking in consideration altogether, these above-mentioned elements appear to be closely tied to the overall perceptions regarding the lack of fish in the waters. Furthermore, other concerns can be identified over the transboundary nature of Lake Tanganyika in permitting the lake to serve both people and fish mobility between the two countries, without association of people entering fishing or chasing the fish as they move far away across water border lines, mainly due to conflict. Thus, the transboundary nature of the lake appears also

and most often linked to the mobility of migrating fisherfolk as result of the DRC conflict. Thus, the transboundary nature of the lake appears also and most often linked to the mobility of migrating fisherfolk as result of the DRC conflict.

Thus, in relation to changes including those induced by the DRC conflict, people moving from one side of the lake to the other side due to conflict, often carry on with their fishing activities affecting the fishing resources availability for fisherfolk already living there. In addition, data analysis revealed that the DRC fisherfolk moving across the water borders as a result of conflict events, transfer their destructive fishing practices, which impact fisheries livelihoods, in areas where they resettle in Tanzania. This is the perception of Tanzanian participants over the transboundary issue of Lake Tanganyika caused by incoming migrant fishers from the DRC's side of the lake.

The key finding here as related to the transboundary nature of Lake Tanganyika suggests that a conflict unrelated to fisheries in one country can lead to a fisheries transboundary issue in the other country. In particular, instances of transferring destructive fishing practices from one country into the other were reported by most informants from both sides, with the consequence of fish stock depletion. Tied to this, is the apparent negotiation and bribery ability developed by fisherfolk, which has made it possible for them to fish beyond national water boundaries, thus taking advantage of the transboundary nature of the lake. This finding can count as part of fisherfolk adaptive capacity to vulnerability which appears to have been favoured by fisherfolk due to several key reasons that are discussed in what follows and in the light of the literature.

Firstly, fisherfolk were found to be dynamic in adapting to the externally imposed changes. They appeared to be fleeing back and forth to safer areas in response to situations of security threats by armed groups in the DRC. Secondly, given the strong ties to the lake and to communities across the lake with whom they share similar ethnic identity and given the possibility of carrying on with their fishing from out of these communities, most fisherfolk were likely to flee to Tanzania. As stated earlier, this ties in with what was noted previously about the role of people's ethnic identity in directing the choice of where to go when escaping conflict zones. This supports the idea of joining communities with groups of similar ethnic factions already living in those areas (Schlee, 2004). Thirdly, in such a context, fisherfolk when moving across the lake, they would also take along their fishing skills and methods to their temporary safe relocation with the plan to return home once security is restored in their place of origin.

DRC informants indicated that the gillnet method is prohibited in their home country, but that fisherfolk continue to use because of the high catches it yields. Researchers refer to the gillnet, "as a rectangular fishing gear made from 4 or 6 ply twine and has a mesh size designed to catch fish of a specific size range" (Limuwa, et. al., 2018, p. 7). It is documented that gillnets are found everywhere and while they can be used with different mesh sizes, many fisherfolk seeking to maximize their catches and to generate enough income, use prohibited smaller sizes (Limuwa, et. al., 2018).

There were several challenges found to be associated with using this prohibited gillnet fishing technique, including clandestine fishing in areas where fisherfolk cannot be seen and caught. For the fisherfolk in Tanzania, gillnet fishing is legal and DRC fisherfolk are aware of this. Therefore, Congolese migrant fisherfolk who managed to flee to Tanzania from

conflict events in the DRC were blamed by Tanzanian fisherfolk for having brought the gillnet fishing with them, said to be destroying their lake fisheries resources even though it is legal and used in Tanzania. For example, one Tanzanian fisher reported 'the *gillnet fishing was not known in Tanzania before the arrival of Congolese refugees. These types of nets were prohibited in the DRC when they come to Tanzania, they brought them*' (TZ001). In light of informants' data, the result has been the current widespread adoption of gillnet fishing with reported devastating consequences of fish stock depletion and reduction in catches, leading to a decline in fishing income, thus increasing the fisherfolk' vulnerability. The 2011 frame survey report seems to corroborate this situation, in terms of the total number of gillnets in use on the lake which were found to be higher in Tanzania (31,806 nets) compared to the DRC with only 1,859 recorded nets (Van der Knaap et al., 2014).

Thus, a forced migration into Tanzania, the primary motivation, which was reported to be safety, turned out to be not only an opportunity for increased fishing possibilities, but also ended up by DRC fisherfolk transferring a destructive fishing method to Tanzanian. A key observation is that the feature of mobility through out-migration across Lake Tanganyika appeared to be mentioned by few fisherfolk as a survival strategy (**Appendices** 5.1 and 6.1). In most literature, however, such a mobility is considered as a traditional coping strategy for people living in fragile and conflict environments (Ellis, 2003; Nunan, 2010; Tacoli, 2011). One possible interpretation of this could be that fisherfolk consider abandoning their native lands and communities as a last resort, to pursue it only when all other alternatives are lacking. Thus, everything being considered, it was found that resettlement for better fishing possibilities or better livelihood alternatives do not constitute the primary motivation for fisherfolk mobility from DRC across the lake into Tanzania.

Furthermore, fleeing across the border into Tanzania requires capital assets, both the financial asset, to pay transport fares and food, and the physical asset, such as having a personal boat, with or without an engine. For this reason, migrating across the lake was not possible for many DRC fisherfolk as most of them 35 (78%) identified themselves as 'poor'. This widespread poverty of fisherfolk is consistent with the fisheries literature, which attributes its cause to the fluctuating nature of the fisheries resources and the institutional factors (Allison et al., 2006; Béné, 2003; Brown, 2016). Thus, the compelling choice of many DRC fisherfolk to flee within the DRC rather than out of the DRC in times of conflict events.

Key finding 7: The negotiation and bribery ability developed by DRC fisherfolk makes '*cross-border fishing*' possible, given the transboundary nature of the lake.

On this point, the literature acknowledges that people living in near-border locations are susceptible and sensitive to losses of or reduced access to livelihood capitals that can be disastrous for their living (Ramsbotham, 2005; Straus, 2012). It should be noted as highlighted previously and in Chapter 3, that the logic of transboundary lakes issues, as covered in the literature, is based on the idea that the exploitation of the waters in one country can have important negative effects on the same shared waters in other countries, creating collective problems across the borders of nation states (Schmeier, 2010; Winemiller et al., 2016), which can be sources of conflict mainly due to competition for resource exploitation (Lubovich, 2009; Martin et al., 2011). Most literature on transboundary spillover effects from conflict situations seems to have concentrated extensively on territorial borders considering them as sources of conflicts due to reasons including the competition for resources exploitations between countries (Lubovich, 2009; Martin et al.,

2011), and the population displacement across borders mainly from conflict-ridden sides to more peaceful sides (Dunne and Tian, 2014; Muhwezi et al., 2011).

But this is not what this study found in the case of Lake Tanganyika. There did not appear to be any issues of resource exploitation on a sufficiently competitive scale that could cause conflicts between the neighbouring countries, the DRC and Tanzania. Demonstrated by the data and observations, no findings suggested any type of exploitation taking place on one side of the lake that would have any impact on the exploitation of the lake water resources on the other side, or would likely create conflict between the two countries.

As already documented in the transboundary waters research literature, the management of transboundary Lake Tanganyika waters in relation to fisheries was reported to be quite challenging due to several factors including mismatches between policies and approaches to resources conservation, including fisheries, of the two concerned riparian countries. Informants from the DRC reported two restrictive mechanisms that they feel adversely affect them and justify their cross-border fishing attempts into Tanzanian waters. One official noted that '*the lake is closed for one week each month throughout the year*' to compel fisherfolk to rest in their homes and at the same time address the issue of overfishing. Yet, on the Tanzanian side, fisherfolk reported that there is no formal lake closure period except during difficult conditions imposed by nature during moon seasons, particularly for those using light attraction for fishing.

Moreover, considering the regulation mechanisms on the Congolese side, as mentioned earlier, gillnet fishing (locally referred to as filet maillant) is illegal and prohibited while on the Tanzanian side it is legal. Gillnet fishing is used without light attractions when fishing

both at night and day and could be presented as an alternative to light attraction fishing methods, which are considered dangerous. According to fisherfolk, using lights despite being effective at night when fishing for 'Dagaa' and 'Mukeke' was found to expose them to the susceptibility of being easily seen on the lake by whoever wants to find and harm them. Therefore, using their negotiation skills in situations of lake closure in the DRC, fisherfolk attempt cross-border fishing in Tanzanian waters with the adverse effect of increasing the pressure on the lake. This combination, in turn, can lead to overfishing, with the debilitating consequence of reducing catches on the Tanzanian side of the lake, rendering its fisherfolk more vulnerable, due to a drop in their fishing income.

Given the stringent regulations and better enforcement mechanisms on the Tanzanian side, fisherfolk reported their susceptibility to problems of accidentally catching juvenile Mikebuka while targeting Dagaa even when using legal gears, because the adult Dagaa is the same size as the juvenile Mikebuka. Rather than return the fish to the waters, as prescribed by law, they admit to crossing the border and selling their catches to Congolese markets. **Table** 7.1 captures some relevant differences and similarities between DRC and Tanzania and their transboundary outcomes.

Table 7.1 Relative management and fishing conditions with transboundary outcomes

Management mechanisms	Congo (DRC)	Tanzania (TZ)	Transboundary outcomes
State fisheries structures	Ineffective and Dysfunctional	Effective and Functional	Cross border fishing into DRC
Rules and Laws	Few and not enforced	Many and enforced	Cross border fishing into DRC
Interactions with fisheries officers	Excessive taxes, ransoms, bribe	Multiple taxes	None
Lake closure	One week each month	Never closed	Cross border fishing into Tanzania
Lake access conditions	Relatively easy	Mostly difficult	Cross border fishing into DRC
Fish market	High value	Low value	Selling in the DRC
Gillnet fishing	Illegal	Legal	Cross border fishing into Tanzania

As shown in **Table** 7.1, two key mechanisms stand out that differentiate fisheries regulations in the two countries. The first is the law of closing the lake for one week each month and the prohibition of gillnet fishing in the DRC, intended to allow rest and family time to fisherfolk as well as the conservation of fisheries resources, but instead, it triggers the transboundary issue of overfishing (Focus Group 2). The second mechanism is the law prohibiting fishing with gillnets, claimed to be responsible for the catching of juvenile fish leading to the gradual destruction of the lake's resources, prompting the other transboundary issue of overfishing on the other side, and cross-border selling with the likelihood of price dropping consequences.

7.4 Institutions and vulnerability

Key finding 8: Institutions that mediate coping strategies can also exacerbate vulnerability

In the fisheries sector, it is known that institutional processes and governance structures of lake resources impact the livelihoods of communities that depend on them (Doulman, 2004; Mwima, 2014; Levine, 2014; Nunan, 2010), in their roles of determining the state and use of lake resources to sustain their living (Lewins, 2004; Morse et al., 2009). However, as Scoones (1998) has noted, these institutions are subject to multiple interpretations by different actors in the fisheries. This goes along with how they constrain and/or enable the behaviours of fishing communities (Nee, 1998; North, 1990) in their choices of survival strategies. Evidence from earlier studies indicates that institutional environments can mediate adoption of alternative livelihoods, provide access to different technologies, fishing locations and people to work with (Ajuwon, 2004; CEMARE, 2002; Grzybowski, 2012; Pretty and Ward, 2001; Reed et al., 2013).

In this research, it was found that the nature and function of institutions seen through their structures and actors depend on the socio-political environment within which they operate. This finding is interesting in relation to critical institutionalism as it features in some way the importance of existing various institutions and multiple levels of power as well as their implementation practices, which are not always in line with known formal 'rules in use' in large part given the social conditions of their actors such as fisheries officers.

Additionally, the identified dynamics involving formal rules and informal practices are interesting because although the governance is said to be weak or strong depending on the non-stable institutional environments (DRC) or the stable institutional environments (Tanzania), fisheries officers and other involved 'state' or 'non state' actors appear to have power which they often use erratically when interacting with powerless fisherfolk. For example, as mentioned in Chapter 5, dynamic and multiple institutions environments, operating differently in taking payments from fisherfolk often at the same time to access fisheries. These include payments for fishing permits to fisheries officers, payments of daily taxes to maritime officers each time at landing for boat motors, payments of territorial taxes for fish caught if landing in the territory of Uvira, payments daily taxes to customary chieftaincy for fish caught if landing in rural areas, and payments of ransoms/bribes to rebels/militia if fishing in their controlled areas. Whereas in Tanzania, as demonstrated in Chapter 6, fisherfolk were constantly faced with different regulations including restrictions of fishing without permits, of catching juvenile fish, of fishing in nearshore protected and spawning areas, and of fishing without wearing life jackets. Thus, fisherfolk navigate these existing changing multiple institutions at different levels and in ways, organisations and arrangements that can be referred to as bricolage processes, to which they resort to sustain their livelihoods.

The idea of bricolage is referred to in Chapter 3 in the views of scholars including Cleaver (2015), Wang et al. (2018), as well as Khan and Gray (2006), as a strategy of dealing with weak governance arrangements, which are generally found in conflict-ridden societies or fragile states such as the DRC, where these multiple existing institutions can overlap or change to new setups (Cleaver, 2002). Therefore, bricolage can happen in situations where actors choose how to piece together their livelihoods in selectively engaging with institutions which align with their interests and dynamically adapt others (Cleaver et al., 2013). This appeared to be the case in both countries in relation of LT fisheries resources as informants reported ways by which they cope with these multiple existing institutions, which have been around for many years, inferring that they have never seen them being changed. Thus, through informal arrangements, fisherfolk come up with forming self-help saving groups to cope with the lack of sufficient financial resources and increase their ability to adapt to authority or power exercised to them by existing multiple regulating structures. At the same time, fisherfolk avoid engaging institutions which have effects that impede their livelihoods. This will include their choices including fishing without a permit, night landing in hidden, bribing officers, and entering le lake on religious holy days. These two examples demonstrate the idea of piecing together institutions that can be both 'formal' (fisheries rules) and 'informal' (religious demands) at the same time. Thus, in relevance to this study, it can be said that bricolage appears to occur when fisherfolk need accessing the lake for fishing and must engage with a range of state structures and actors present on landing sites.

More specifically, considering the situation of the weak governance prevailing in the DRC, the implementation of formal regulations gives the state officers present on landing sites and fish markets, opportunities of collecting income they desire for their survival. According to informants, state officers impose on them multiples payments including taxes, bribes, and

ransoms, which reduce levels of their living revenues. In order to keep going, fisherfolk negotiate these payments, leading to inequalities in their outcomes depending on the levels of their financial capital and the demand of funds wanted by those state agents in charge of implementing the regulations in effect. This was evidenced by the fact that people have reported various amounts collected by officers when landing or selling fish. In Tanzania, fisherfolk faced by situations of low or no catches usually happening when using legal gears imposed by formal regulations, resort through their self-help groups for small loans arrangements that help them to pay back funds they have borrowed. Self-help groups have rules that members negotiate when establishing the groups, joining them and when in need of getting their support to enhance the ability to cope with difficulties. It was clear from interviews that fisherfolk have various knowledge of any of these existing institutional rules which hinder their abilities to adhere to self-help groups, thus keeping them in conditions of vulnerability.

Also, in both country contexts, fisherfolk were found to rely on other loan/credit arrangements, which sometimes can include negotiation with self-help groups, bosses, friends, and family members, even fisheries officers in relation to permits to undertake fishing-related activities. Often, these negotiations involve some kinds of payment/repayment agreements based on trust and relationship. In other words, loans or fishing/selling fish first and later paying for permits are negotiated outside of formal institutional mechanisms. Given the context of low or no catches, all loans and other arrangements were reported to be highly unpredictable since commitment payments could become difficult, leading those owing, and those in need of loans or other forms of credits with local officers vulnerable, and compelled to resort to bricolage.

Therefore, various examples of institutional bricolage were found to take place in situations that do not necessarily concern introductions of new institutions or involving defined bureaucratic structures. So, in the DRC with its non-stable environment given the context of conflict, bricolage happens as fisherfolk try to respond to changing circumstances navigating inadequate formal institutions that impact their financial resources and inabilities to secure loans they need from their bureaucratised informal institutions (Self-help groups), as well as from the socially-embedded institutions such as family structures. In Tanzania, with its stable environment, bricolage occurs as fisherfolk navigate effective formal institutions which are believed to affect catch levels, thereby reducing their ability of obtain needed fishing income, compelling them to turn to self-help groups for loan provisions, and to negotiate the combination of family and friends through kinship arrangements which might offer loan opportunities. Thus, the use of the concept of bricolage in this particular context refers to how fisherfolk navigate, through various processes including social relations, negotiations, and improvisation, these complex fisheries institutional environments that overlap or change with different layers of governance and power dynamic power structures having implications on fisherfolk livelihoods. This implies that fisherfolk were found to adapt to multiple and changing institutions when using them in either formal or informal arrangements, however, with possible unequal outcomes because of their different levels of their socio-economic status. Furthering this view, as Gebremedhin et al. (2002) argue, any institutional arrangements that set resources to be exploited unequally can exacerbate existing inequalities in the distribution of benefits to users.

This finding #8 also correlates with what Carstensen (2015) and Cleaver and De Koning (2015) have observed that voids in the context of governance provide space for institutional arrangements that emerge to fit the local circumstances with varying degrees of effects on

different actors. Additionally, Cleaver and De Koning (2015) have also observed that in rural communities, there are often strong association between institutional processes and social realities influencing institutions making them deeply embedded in local livelihoods.

In this regard, this finding may be considered as the description of fisherfolk's interpretation of the state institutions that are present and active on landing sites acting as formal regulating structures mediating fisherfolk coping strategies related to access to fisheries resources on which they depend through fishing-related activities. Thus, in carrying out their livelihood activities, different fisherfolk were found to navigate these institutions in various ways driven by different experiences of their effects leading to diverse livelihoods' outcomes. What matters more is the type of outcomes seen through the socioeconomic situations of concerned fisherfolk.

For example, considering the level of reliance on the lake for living as an indicator of exposure to vulnerability, the ability to fish the lake is key for securing the livelihoods of most fisherfolk. Thus, the DRC fisherfolk appeared to be the most reliant on the lake and the most affected by the context of conflict. So, implementing any regulation that restricts lake access will likely be viewed by fisherfolk as an impediment to their livelihoods because of their lack of livelihood alternatives. Therefore, restrictions of access to the lake brought by the existing institutional environments can become a factor generating vulnerability of fisherfolk at different scales given the inequalities in their adaptive capacities, which are determined by their socioeconomic status.

Those who are members of self-help groups can borrow money so that they can access the lake for fishing through purchasing the fishing permits, renting boat motors, buying fuel,

etc. Even when these restrictions have not been enforced, as is the case in the DRC due to the context of conflict and fragility of public services, some fisherfolk will turn to illegalities as coping mechanism, which will still require money that they may not have. Consequently, their vulnerability will be exacerbated. Levine (2014) and Nunan et al. (2015) refer to support networks to mean what is identified in this study as self-help groups, recognising their assistance to fisherfolk relative to the nature of access to fisheries resources. However, access to fisheries resources in situations of low or no catches will render fisherfolk vulnerable following their inabilities of paying back what they have borrowed.

More specifically, the finding that institutions mediating coping strategies can also exacerbate vulnerability suggests that existing institutions, when changing in ways that are subtle to fisherfolk, can influence choices which can have adverse effects on their livelihoods. For fisherfolk these institutions remain the same, costly and impediments to their livelihoods. Thus, in either DRC or Tanzania case, fisherfolk held the view that their livelihoods have always been impacted by regulations when observing them. As well, unlike Tanzania, institutions in the DRC have not been amended and upgraded over time. Changes in the institutions appear to have been more on the implementation than on the rules themselves leading to similar effects but differently experienced by heterogenous fisherfolk. As mentioned earlier, in the DRC, the implementation of various institutions implied largely collecting income through multiple payments including bribes from fisherfolk, while in Tanzania it meant confiscating illegal gears, arresting rules offenders, and collecting fines.

In other words, institutional effects on fisherfolk' livelihoods are comparable in both countries despite the differences in the context, one being of conflict with dysfunctional institutions and the other being peaceful and stable. There were no differences between

fisherfolk from either country regarding their perceived impediments of these institutions to their lives. This may explain why participants showed to have largely negative perceptions about the impacts and effects of these institutions, because of their various arrangements and environments. However, a fundamental element in the finding here is that fisherfolk from both countries considered that their incomes from fishing-related activities were reduced due to state fisheries regulating structures. Consequently, these regulating structures appeared to be additional factors of vulnerability for fisherfolk, constraining, rather than enabling fisherfolk's ability to sustain their living in both countries.

This kind of perception suggests that when faced with these multiple regulating structures in pursuing their fishing livelihoods, the fisherfolk navigate them by making several choices that they believe can secure their livelihoods. This implies that some choices would likely secure their livelihoods, while others could result in adverse outcomes. For example, in the DRC fisherfolk see institutions through State Agents present on landing sites who coerce them by asking for multiple payments to carry on with their fishing related activities. Whereas in Tanzania, fisherfolk are faced with these institutions through stringent rules that they must observe to be able to maintain their livelihoods. The evident key nuance to observe is linked to conditions characterising the two contexts, on one side having generally unpaid State Agents with poor and weak services delivery (Betts, 2010) due to conditions of state fragility, on the other side having relatively well paid State Agents showing better performance in conducting their duties in more functional public services (Landau, 2004). Therefore, the nuance between the two contexts is that in the DRC, fisherfolk are affected by multiple forced payments by people including state agents, militia, and rebels, while in Tanzania they are affected by multiple and stringently enforced rules.

The main point here is that the way fisherfolk experience institutions depends on the conditions within which these institutions are operating, suggesting different fisheries contexts of the two countries. For example, Congolese fisherfolk reported institutions as additional factors of vulnerability largely in relation to payments of various fees imposed on them both at landing sites and in marketplaces to be able to carry on with their fishing-related activities. As reported by one fisherfolk about fisheries agents, '*When there are no state agents collecting taxes, we have more income. But when they are present, we suffer a lot'* (CD021), suggesting extensive coercion behaviours of fisheries officers. In other words, the fisherfolk would have had more income without these institutions, which they fundamentally consider as taking away an important portion of their income and restricting their catches. Tanzanian fisherfolk, on their side, demonstrated reasonable knowledge of most fisheries rules, but which they resent having to observe. As one Tanzanian fisher remarked '*while we all accept these rules, respecting them is starving ourselves*' (TZ049), a position that appeared to compel them to resort to illegal fishing, which while giving them more income, exposes them to risks of being caught by fisheries patrols.

The observed differences in perception could also be attributed to other potential factors influencing fisherfolk opinions about their experiences with existing institutions. In the case of the DRC, the extent of navigation through different institutions could be facilitated by available financial resources enabling fisherfolk to better respond to the multiple demands of State Agents. Fisherfolk with such capacity will likely have more positive perceptions on the role of the institutions. Whereas, in Tanzania the fisherfolk with better knowledge of rules due to their level of literacy and English language abilities are more aware of relevant regulation structures and rules that they can afford to observe or to go around such as paying fishing permits. With permits and available finances, they can fish almost

everywhere without fearing any trouble from fisheries regulating structures officers. Consequently, they tend to have more positive views on institutions.

In both situations , this category of fisherfolk with both the money and knowledge, appeared to be in minority (13% - Tanzania and 13% - DRC during Focus Groups) and was made up by people who are locally referred to as 'boss fishers'. Fishers in this category included those having their own fishing units (boat owners) and have decent financial resources. In addition, from the perspective of official informants, this category of fishers can easily navigate fisheries livelihoods through various institutions in either of these two country contexts. However, it should be noted that the conflict-ridden environment in which these institutions operate in the DRC is what affects the way they function, but it is not the institutions in themselves that are particularly negative, it is their agents who mistreat and bribe the fisherfolk.

In addition, drawing on the socioeconomic characteristics of fisherfolk participants, the majority 35 (78%) in the DRC and 42 (82%) in Tanzania, are those who self identify as poor and thus make up another category of fisherfolk considered less well-off. This category included mainly boat crews, fish processors, and fish traders. Thus, fisherfolk holding the negative view on institutions were mainly in this category who showed a particularly higher dependence on the lake. Their heightened survival concerns were perceptible whenever they reported on the reduction of income in their fishing-related activities from which they make their living. This is especially important given the positions attributing poverty in fisheries to institutional causes and fisheries resources depletion due to poor management practices (Béné, 2004, p. 78, Lewins, 2004; Ellis and Freeman, 2004, p. 3), and in line with the earlier view that fisheries institutions can help or hinder fisherfolk's livelihoods (Davies, 1997).

Ultimately, understanding the differences of these perceptions between the two country contexts from the factors above, recognised as influencing various negative roles, cautions against generalisations in the context of this study. It should be recognised that there is a category of fisherfolk that, given their higher fishing income, more diversified livelihoods, and lower dependence on the lake, held slightly more nuanced perceptions on the role and outcomes of local institutions in relation to their livelihoods. Furthermore, despite the type of environments, lack of peace or conditions of stability, institutions may lead to improved fisherfolk livelihoods for certain groups of fisherfolk. This is a more positive impact that is also undoubtedly recognised in the literature about institutions on fisheries resources and their users (Thorpe et al., 2009; Bene et al., 2004; Onyango and Jentoft, 2010; Ellis and Freeman, 2004; Nunan, 2006). This nuanced view by official participants referred mainly to the impact of bureaucratic institutions on fisheries livelihoods. For official regulations of fishing activities on the lake by protecting fisheries resources will in turn allow increased value catches by, for example, preserving young fish enabling them to grow into large fish that can be sold for more money, and more importantly into fish that will have reproduced.

Therefore, it can be said that the perception by fisherfolk that institutions maintain vulnerability is to be nuanced as their roles are related to factors including the conditions in which they operate and the categories of concerned fisherfolk. Thus, in both contexts the conditions in which institutions operate determine the type of role they can play towards the people who are directly concerned by institutional structures.

Key finding 9: Fisherfolk live from catching fish every day and are more vulnerable from any institutional factor that impedes their '*ability to fish*'**.**

On the issue of institutional contexts and observing regulations, literature documents the existence of various formal legal instruments and their enforcement mechanisms introduced for resource conservation purposes (Allison et al., 2001). It is noted that institutional factors that can impinge upon people's livelihoods at the local level may be outcomes of larger policies and processes at the macro level (Krantz, 2001). The literature on state failure indicates that in cases of government failure, state agents will not generate effective management of rules (Acheson, 2006), given their behaviours which might be opposed to the expectation of the public at large (Lemarchand, 1997). In addition, the literature on critical institutionalism explains the possibility that people from different socio-economic status may experience both the formal rules and the social norms differently (Cleaver and De Koning, 2015). According to Cleaver and De Koning (2015), people who are poor and marginalized in the community would often experience higher costs and lower benefits of institutional functioning compared to more powerful people. This situation can limit the ability of certain people to pursue sustainable livelihoods (Cleaver, 2012).

In most cases, institutions of various kinds were found to act concomitantly in impacting fisherfolk livelihoods and in some instances through contrasting influences on fisherfolk. Concerning state fishing rules and their enforcement mechanisms, in both countries, most fisherfolk complained about their detrimental effect on their fish catches. In Tanzania, fisherfolk explicitly reported that while they were living in a peaceful environment, they could not fish peacefully due to stringent laws that were affecting their livelihoods. For example, one fisherfolk reported that '*these rules are affecting us a lot as for us to live we*

need to catch fish everyday' (TZ017). Another fisher remarked '*while we all accept these rules, respecting them is starving ourselves*' (TZ049). Thus, '*for us living from fishing, we see these rules as detrimental to our lives*' (TZ017). As a consequence, another fisher expressed his fear that '*these rules compel us to find ways to keep fishing*' (TZ001), including '*turning to using nets with prohibited mesh sizes*' (TZ032).

It was found that those fisherfolk who attempted to observe fishing rules were susceptible to vulnerability considering their negative impacts on fisherfolk livelihoods, particularly in reducing their fishing income. As a consequence, those who lost their fishing income found they have a limited ability of meeting their living needs, making them even more vulnerable. In response, fisherfolk adaptive capacity includes rule avoidance by illegal fishing, and clandestine landing, usually at night, which in turn interferes with family social life, rendering the already vulnerable fisherfolk even more so. At the same time, the penalties imposed, if caught are an additional punitive burden incapable of being borne. The implication is that state regulations negatively impact the livelihoods of fisherfolk observing them.

As to socially-embedded institutions, one important aspect identified as generating vulnerability of fisherfolk, was the strong consideration of beliefs in religion and cultural norms or social ties which appeared to trap them in disadvantageous positions hindering their adoption of more effective coping strategies. The implication here is that because of the dogged emphasis that fisherfolk seem to put on their socially-embedded beliefs, they demonstrate reluctance to adequately respect state laws regulating fisheries activities. As a consequence, informants reported the negative impact on fisheries livelihoods including for example refraining from fishing on religious holidays and from going at night and

uncommon places to collect fish for married fish traders. This implies that fisherfolk's prominent beliefs, in either traditional customs or in God, may have a considerable impact on how fisherfolk livelihoods are impeded by these informal institutional settings ties, further exacerbating their vulnerability.

It was interesting to find situations where institutions of different natures are exerting contrasting influences on fisherfolk, in both contexts. For instance, while catching juvenile fish is prohibited by state regulations, religious fisherfolk consider any fish found in the waters as God given. As a consequence, the catch of juvenile fish is justified despite the penalties, including payment of fines and/or confiscation of fish caught.

What follows is an intriguing illustration of how a mix of both formal and informal institutions involving state regulation mechanisms and local cultural norms demonstrate similarities and differences between the two countries in their effects on fisherfolk and in mediating their response behaviours, which generate further vulnerability. This situation shows how a mix of institutions can play a role that works against fisherfolk livelihoods. **Figure** 7.1 shows the situation of women in the fisheries and how their household headships are impacted in association with the roles of fisheries regulations.

Fig. 7.1 Comparison of women involved in fisheries between the two countries

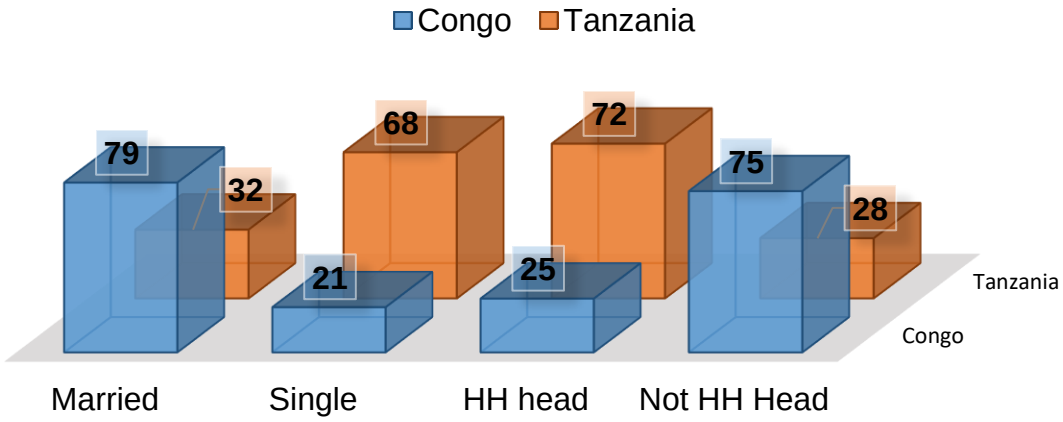


Fig. 7.1 shows that there are more single women in Tanzania 17 (68%) than in the DRC 6 (21%) but also there are more women heading households in Tanzania 18 (72%) compared to the Congo 7 (25%). In the above environment, DRC women fish traders could effectively access the fish they need without having to meet fisherfolk outside of common landing locations and hours. Therefore, women fish traders may not be susceptible to jeopardising their marriages. This may explain the prevalence of more married women in the DRC research areas 22 (79%) and fewer female household heads 6 (21%). In Tanzania, however, women fish trader participants appear to face a double jeopardy from fisheries regulations affecting fisherfolk from whom they get their fish to sell and from kinship ties in the form of the marriage associated with the social norm of being subservient to husbands. Most Tanzanian fisherfolk are forced to fish in hiding, land at night and at distant locations away from the known landing sites to escape the surveillance of the fisheries officers, because of the stringent fishing regulations and fairly effective enforcement mechanisms. In addition, Tanzanian husbands would not allow their fish trader wives leave the house at night to collect fish. It might be for this reason that single women fish traders appear to be more compatible to the situation imposed by regulations than married women. This tendency,

under vulnerable conditions, to value income above marriage may be what accounted for the distribution of fish trader participant women in Tanzania, being predominantly single and household heads. The above data chart in **Fig.** 7.1 illustrates the apparently marital cost that Tanzanian women have had to pay to continue in their fisheries livelihoods.

In the DRC, there are fisheries laws, but in a very weak institutional environment, they are ineffective, due to the context of conflict. In addition, during every conflict event, everyone flees including fisheries officers, leaving a vacuum in enforcement services. Thus, in the absence of fisheries officers, fisherfolk's fishing income will be much higher as they would fish at their liking and without needing to pay taxes and ransoms. For most DRC informants, this is the only time they fish in conditions that benefit them as they do not have to worry about observing rules in the absence of enforcement agents. Furthermore, officers not being paid, another effect of the conflict context, depend on fisherfolk for their survival and are thus susceptible to bribery, resulting in blatant officers' disregard for regulation enforcement allowing fisherfolk to fish, irrespective of regulations.

The key implication of this finding in relation to marital issues in the fisheries, where response strategies to vulnerability lead to marriage breakups and singleness, are possibly the resulting social pressures of women living without husbands, which in the local context has a high sensitivity of vulnerability, mainly due to the general diminished value given to unmarried women in society. It appears that the choice to survive is acceptable to women, even at the expense of losing a perceived good and respectful image in the community. Thus, in relation to kinship and family ties, as a source of vulnerability, being female and married, with its attendant social respectability, pales at the perceived gains of securing livelihood.

Key finding 10: Other forms of institutionalised structures involving rebels/militia found in the DRC allow fishing possibilities in areas where catches are believed higher.

Most literature on armed conflict and fisheries suggests that conditions of insecurity, as Korf (2004) notes, often lead to the establishment of security areas, with some considered as cleared (state-controlled) and others as uncleared (rebel/militia-controlled). The bigger problem for fisheries is that in rebel-controlled areas, small-scale fisherfolk's fishing is substantially reduced given the restriction of fishing mobility, due to insecurity and safety risks.

This makes another interesting element that this study findings have revealed when comparing the DRC and Tanzania. Thus, unlike Tanzania, the DRC appears to have other forms of institutionalised structures offering possibilities of fishing in rebel/militia-controlled areas with imposed payments of taxes and ransoms. Rebel controlled areas were reported to have higher catches as the dangers to do so act as effective deterrence. To fish in rebel/militia-controlled areas, fisherfolk are required by rebels in charge to have identification documents confirming Congolese nationality. Despite the higher yield in fish, many informants reported they would not go to these areas to fish, even when catches are low in other parts of the lake. Such violent restrictions, limiting fisherfolk fishing areas was found to have considerable impact on their lives and livelihoods, further exacerbating their vulnerability.

7.5 Summarising the findings in the framework and theoretical contribution

Developing the analytical framework of the study considered in the way that it would capture the three key themes addressed drawing from SLF to apply the concept of vulnerability and

from CI to apply the context of mixed institutional arrangements. Thus, **Fig.** 7.2 and **Fig.** 7.3, summarise the findings, respectively in the context of DRC and of Tanzania, in the analytical framework. In other words, the two tables attempt to replace the 'theory' with the 'practice' in areas such as the sources of vulnerability, the experiences of vulnerability, the assets affected, the existing institutions, the response strategies and the livelihood outcome.

Fig. 7.2 Conceptual/ theoretical framework summarizing the DRC's context.

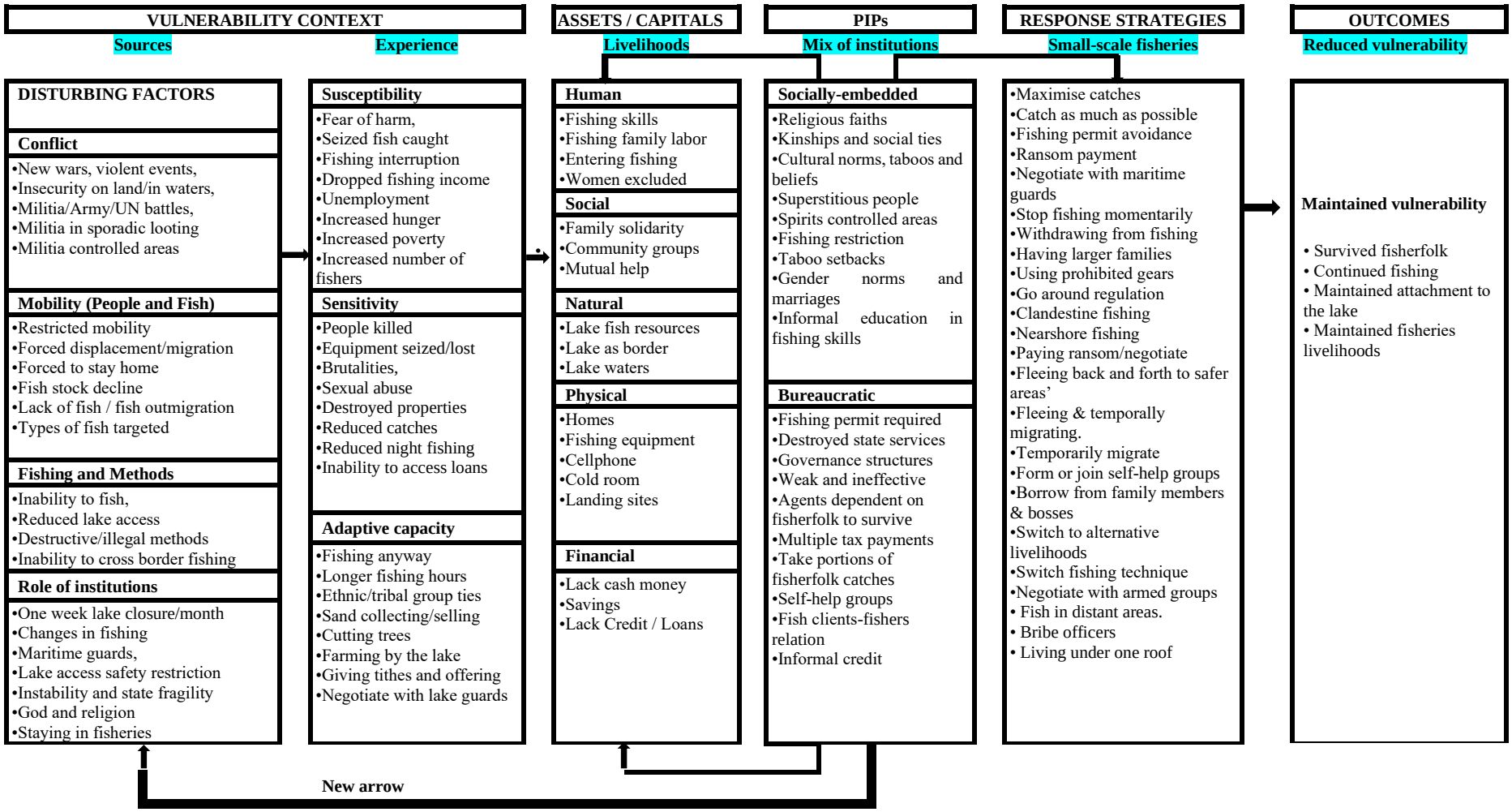
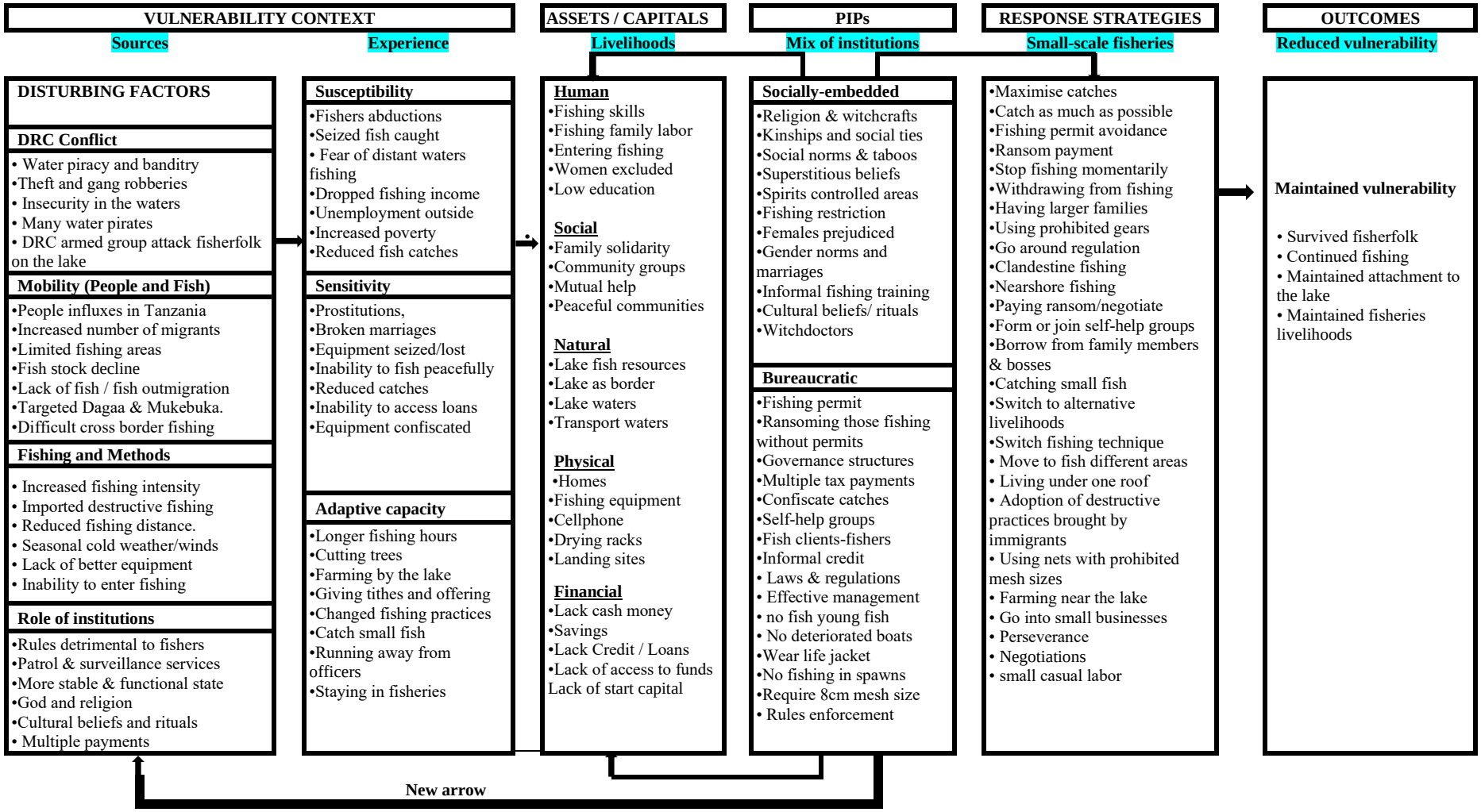


Fig. 7.3 Conceptual/ theoretical framework summarizing the Tanzanian context.



Looking at the two figures, it can be said that, in the context of Lake Tanganyika fisheries based livelihoods in DRC and Tanzania, the livelihood analytical frameworks (Scoones, 1998; DFID, 1999) could be slightly expanded to offer a complete guide to analyse and understand such complex livelihoods' changes from multiple complex long-term factors. The case of Lake Tanganyika demonstrates how existing institutions do not change rapidly and thus seem to be perennial or mainly unchanged in the perception of fisherfolk experiencing their effects. Similarly, critical institutionalism (Cleaver, 2012; Nunan et al., 2015; Scialabba, 1998), which sees institutions beyond those designed for natural resource management, allowed to identify other institutions emerging from within local social contexts. In the context of Lake Tanganyika, newcomers in fishing and migrant fisherfolk may disrupt, challenge or accept socially-embedded institutions given that they may be unaware of existing institutions. Additionally, they may bring with them different institutions that could replace or be combined with socially-embedded institutions. It was obvious that in this context, the details of both state and socially-embedded institutions, and the way they are employed could change. They appeared subject to multiple interpretations in their roles (Scoones, 1998) by different fisheries actors.

Thus, what is added to knowledge is that in the situation of Lake Tanganyika, institutions are not only mediators of livelihood strategies, but also and more importantly as sources of vulnerability, as demonstrated in this study. They appeared to be multiple and more of a mix of fluid institutions in several arrangements, but apparently with continuing impacts on people.

7.6 Concluding summary

A concluding point emerging from the discussion above is the linkage between existing institutional mechanisms, their varied characteristics in each of the two countries and their transboundary outcomes. It can be concluded that several management mechanisms, both formal and informal and their associated vulnerabilities, added to the vulnerability factors generated by the DRC conflict and its spillover effects in Tanzania, prompt fisherfolk's fishing behaviours and coping strategies that reproduce vulnerability for fisherfolk in both countries.

Chapter 8

CONCLUSION

8.1 Introduction

This chapter draws conclusions reflecting on how and how far the research question and objectives have been addressed, at the same time it identifies and justifies the main contributions made by the thesis, as well as the areas for future research while stating the limitations of the research. In doing so, the implications of the overall result found in the study are set out. The chapter is organized into four main sections. It begins with a concluding summary followed by the responses to the research question and its associated objectives. The third section explains the contributions to knowledge brought by this thesis and subsequently summarises the research findings in the theoretical framework. In this section, theoretical contributions are discussed as applicable to the three key theories used in this research. It is followed by a section on the limitations of the research. Finally, recommendations for future research ends the chapter.

8.2 Answering the research question

The study's central research question was *'How do small-scale fisherfolk secure livelihoods in situations of change?'* Attached to this research question was the purpose of investigating how institutions mediate livelihoods in response to vulnerability through the following specific objectives:

i) to describe factors and mechanisms of livelihoods changes in small-scale fisheries;

ii) to identify which institutions are important and how they interact to enable people to maintain their fisheries livelihoods;

iii) to investigate how institutions can be helpful or unhelpful to small-scale fisherfolk in navigating their access to and use of fisheries resources; and

iv) to determine how fisherfolk use institutions in their coping mechanisms to survive/adapt to changes affecting their livelihoods

The qualitative research findings which are presented in Chapters 5 and 6 and discussed in Chapter 7, focussing on key findings and guided by the theoretical framework in the light of the reviewed literature in Chapter 3, are used to determine how far the research question and objectives have been addressed.

Objective 1. Factors and mechanisms of livelihoods change in small-scale fisheries

Considering the discussion in Chapter 7, the primary factors of livelihoods changes identified appeared to be generated by the DRC conflict. In the context of this study, what is referred to as change is linked to vulnerability. As discussed in Chapter 7, insecurity is a central factor of vulnerability affecting fisherfolk in both country contexts in relation to the DRC conflict. Additional factors reported impacting fisherfolk livelihoods suggest some similarities and variations between the two country contexts. The DRC informants reported '*insecurity both in their communities and in the waters*', '*equipment loss/destruction*', and '*forced displacement'*, whereas Tanzanian participants reported, '*insecurity in the waters*', '*increased number of migrant fisherfolk'*, and '*losses of people and equipment'*. Fieldwork results show that the DRC conflict, which appeared to be of a different nature compared to old wars, involves sporadic acts of violence targeting lootable assets concentrated in rural areas, making it the major source of vulnerability of Lake

Tanganyika fisherfolk. As to the mechanisms of livelihoods changes, it was found that in times of conflict events, insecurity through sporadic acts of violence with the cross-border effects led to hindrances of fisherfolk's ability to carry out fishing activities through several forms of disturbances. The key disturbances that were identified include reduced fishing distances due to safety threats to fisherfolk lives and equipment; increased fishing pressure because of the many new-comers entering fishing activities, reduced income due to reduced catches, and disrupting social relations in cases of inability to replace borrowed fishing equipment if looted. The most impacted livelihood assets were financial (income losses), natural (reduced access), physical (losses of equipment), human (loss of life), and social (disruption of social relations).

Objective 2. Important institutions and how they interact to enable fisherfolk to maintain their fisheries livelihoods

Given the dearth of formal structures in the fisheries settings to which fisherfolk can turn when faced with disturbing factors, several institutions were found to influence response strategies to vulnerability, although not always with positive outcomes. These existing institutions include formal ones with bureaucratic institutional arrangements and informal ones with socially-embedded institutional organisations. As discussed in Chapter 7 under Key finding #8, existing institutions, which were found to be diverse and fluid, were a mix of formal lake resources management structures and informal socially-embedded environments.

The most important institutions were found to be those which relate to fishing practices of fisherfolk and as such relate to their livelihood activities. Under the categories of bureaucratic institutions were lake resources management regulation mechanisms,

consisting of state rules and enforcement structures, while under categories of socially imbedded institutions were mainly local beliefs, tradition and religion, and social norms that relate to fisherfolk ways of living. Unlike what is suggested in the literature, these institutions, both formal and informal, were found to interact seamlessly and perennially together in ways that were not readily noticeable by most fisherfolk, as explained in Key finding #9 in reference to the situation of women in fisheries. That example demonstrates how multiple institutions influence women's livelihoods and livelihood strategies, resulting in situations that appear to generate their vulnerability. The case in point relates to how institutions keep fisherfolk attached to, and relying on, the lake which appears to be declining in productivity and which is the livelihood resource base for fisherfolk including women fish traders and processors.

Objective 3. How institutions can be helpful and/or unhelpful to small-scale fisherfolk in navigating their access to and use of fisheries resources

Fisherfolk appeared divided between those fishing from the DRC and those fishing from Tanzania in terms of their access to, and use of, Lake Tanganyika fisheries resources for fishing activities within environments set by existing institutions. For the majority of the DRC fisherfolk, state rules were unhelpful as they implied multiple payments including what fishers consider as excessive such as taxes, rules violation fines, fishing permits, and bribes/ransom. These state rules and structures were obstacles to their lives because they have considerable impacts in reducing their daily access to and use of the lake resources, in addition to the imposed closure of the lake each month for one week. Such restrictions affect their lives and livelihoods and thus exacerbate their vulnerability. Furthermore, existing taboos, beliefs and traditional rules in fishing communities of Lake Tanganyika appeared also to be reinforced by gender norms, with prejudice generally directed towards women.

Such local rules excluding women from direct fishing activities, result in significant detrimental effect on families that have higher numbers of women, thus impacting on their livelihood choices and reflecting greater vulnerability in most cases. In Tanzania, using the accounts of women fish traders, state rules were said to be stringent and thus unhelpful as fisherfolk were constrained to resort to clandestine fishing in order to access the lake and then landing in areas and times that were not fully accessible for those with marriage ties. As a result, most Tanzanian women fish traders tend to be single, unmarried and household heads as explained in Chapter 7 under Key result #9. Regarding the issue of gender division of labor in the fisheries, it is not peculiar in the fisheries or specific to Lake Tanganyika, that women do not participate in direct fishing activities. As the literature shows, in most fishing communities such as those of Lakes Victoria or Malawi, the same experience of labor differentiation between men and women makes women differently vulnerable. Such an experience leads to social and behavior differences, which characterize unequal social relations between men and women (Scott, 1986). However, women dominate fish trading activities as in most developing countries' fisheries.

In both countries, fisherfolk appeared to stay in fishing for a long period of time due to the influence of socially-embedded institutions, particularly those related to family ties and religious faith. Regarding family ties, many fisherfolk appeared to carry on with fishing despite the declining catches because of their belief stance considering fishing as a family activity to which they seemed strongly attached. As to religious faith, most fisherfolk, appeared convinced of a better future with the keenly awaited restoration of the lake's productivity, while at the same time the lake showed conditions of being continuously on the decline.

Objective 4. How fisherfolk use institutions in their coping mechanisms to survive/adapt to changes affecting their livelihoods

The DRC fisherfolk appear to have developed the ability to negotiate with and pay ransoms to guards/officers at landing sites, either with fish or money, enabling them continue to fish on either side of the lake's water borders without fear of being harmed when pursuing higher catches. Also, the use of bribery as a negotiating tool offers them the possibility of evading existing state regulation structures rather than having to observe them and suffer detrimental effects to their fishing-based livelihoods, already undermined by the DRC conflict situation. Data indicate that state officers on the DRC's side of the lake, are frequently not paid their salaries due to the DRC conflict, and depending on fisherfolk for their survival, make them susceptible to bribery allowing fishers fish, irrespective of regulations.

As to socially-embedded institutions, the majority of fisherfolk in both countries were found to use family relations and self-help groups for loan possibilities, resources that are needed the most because they can give fisherfolk the ability to cope with uncertainties. Also, formal credit institutions do not exist in fishing communities, people in fisheries rely on other informal credit arrangements. Loans are needed for fishing equipment such as engine and batteries rental charges, buying supplies such as engine fuel, as well as replacing borrowed or personal equipment in cases of loss. However, it came to the forefront from interviews that in both country contexts, all loan arrangements are considered very risky and opportunities of loans using above-mentioned informal avenues have been curtailed significantly.

In view of the responses to the four objectives, and considering the research question, it can be said that fisherfolk do not have secure livelihoods. This is particularly true of the fishing

communities in the eastern DRC's region of Uvira and the western Tanzanian region of Kigoma. What is interesting to note is that despite conflict disturbances in the DRC, fishing communities in its region of Uvira are no different from their Tanzanian counterparts who live in relative stability. As discussed in Chapter 7, it appears that as much as fisherfolk in Uvira are affected by conflict-induced instability, the fisherfolk of Tanzania are affected by stringent fisheries laws enabled by the relative political stability in the country. In other words, as one participant said, "If they live in peace in Tanzania, they do not fish peacefully, whereas, in the DRC, if they generally lack peace, they do fish quite peacefully."

8.3 Contribution

This thesis has answered the question *'How do small-scale fisherfolk secure livelihoods in situations of change?* To this question four key objectives were attached. The adapted conceptual framework, combining elements of both the SLF and the CI, was used to guide and inform the analysis so as to identify the factors that generate fisherfolk vulnerability, the ways vulnerability factors are experienced, and the roles institutions play in mediating livelihood responses to situations of change in the context of conflict in the DRC and transboundary spillover effects in Tanzania. In particular, three themes were established from the collected data and in relation to relevant elements in the reviewed literature, including the context of vulnerability, fishing on a transboundary lake, and the institutions.

The adapted conceptual framework of the research integrating livelihood perspectives and the critical institutionalism approach, was based on the assumption that people have or can develop multiple survival strategies when faced with uncertainties and threats to their livelihoods (Ellis, 2000; Nunan, 2015; Scoones, 2015). With this assumption is the fundamental element that the multiple survival strategies adopted in response to adverse

changes are mediated by institutions (Acheson, 2006; Agrawal and Gibson, 1999; Levine, 2014; Nunan, 2010; Pretty and Ward, 2001; Scoones, 2015).

Accordingly, using the fisheries settings, it was assumed that in situations of changes, institutions create an environment of opportunities and/or constraints that impact their fisherfolk livelihoods on which they depend for their living. This was part of the rationale for adopting and combining the two existing theories as a research instrument to answer the research question. Thus, with this conceptual framework guiding the analysis, experiences across individuals and households within and between the study villages in the two country contexts were compared to understand what could explain the extensive fishing-related activities seen continuing to take place on Lake Tanganyika despite all the disturbing changes.

For the research question, the fundamental element in the key findings is that multiple institutions interact and act together in mediating fisherfolk behaviours that maintain vulnerability. In this case, institutions appear to function as sources of vulnerability by creating constraints that impact fisherfolk and their livelihoods. In other words, fisherfolk do not seem to secure their livelihoods nor break out of their vulnerable conditions with any of the strategies they take. All their responses to adverse situations affecting their livelihoods seem to be for coping purposes only. Therefore, three contributions to knowledge can be highlighted from responding to the research question.

Contribution 1: The DRC conflict affecting Lake Tanganyika fisherfolk is mainly experienced within the DRC borders through recurrent sporadic acts of violence targeting lootable assets.

Most literature on violent conflict including those affecting fisheries has tended to focus on warfare, and in particular, civil war, (Humphreys, 2003; Li et al., 2017). Civil wars have been considered as the most common forms of conflict in developing countries since the end of the Cold War (Gleditsch, 2007). While civil wars would fall under the category of what the literature refers to as old wars, considerable attention has also been given newer forms of wars. The literature on new wars recognise that they affect mainly civilians who are deliberately targeted in conflict violent activities (Kaldor, 1999), because of transnational ethnical ties shared between civilians and belligerent combatants. Such conflicts are said to have no limits in time and space (Münkler, 2005), suggesting that they can also affect fishing communities and fisheries livelihoods. The contagion effects between neighbouring states, make an important feature that is captured in the literature on types of conflicts referred to as 'new wars', which occur in near border locations, generally fuelled by valuable natural resources pursuits and exploiting transnational ethnic ties (Kaldor, 2012; Keen, 2008).

This study highlights the difference in the nature and characteristics of the DRC conflict in its occurrences and in how these conflict occurrences affect people living in affected areas. This contribution adds an important focus on the nature of conflicts unfolding through sporadic events, targeting only people's lootable assets. Also, the sporadic nature of violence – it's unpredictable in terms of location, intensity and timing. This suggests that in this context, the conflicts are not contagiously transferred across the borders into a neighbouring country. With such characteristics of conflict events, the struggle between

armed groups with the aim of asserting claims over the valuable natural resources particularly through targeting civilians (Kaldor, 2012; Keen, 2008), did not appear to apply. Even arguments that conflicts may originate outside the fishery, but can evolve into low-level, nonviolent conflicts between fishery resource user groups (Glaser et al., 2019), also did not seem to apply to the particular context of Lake Tanganyika's basins on both sides, Uvira and Kigoma. The nature of the conflict in this study entailed essentially other forms of violence. Unlike the ones commonly mentioned in most other protracted conflict-ridden areas, violent events occurring in these fishing communities are often sporadic and not necessarily with sustained suffering or losses to the whole population, only to specific targets within it. In this case, the motor fishers, were the most reported targets.

Some aspects that are interesting and new in this contribution, include the facts that a) both rebels and fisheries officers demand payments and b) the rebels don't take too much so that they can keep demanding payments. As such, conflicts become part of the lives of fisherfolk fishing the lake from both countries' shoreline villages.

Lootable resources in the perspective of new wars are valuable mineral resources, which when in abundance increase the incidence of armed conflicts because they attract small groups of individuals including militias and bandits (Welsch, 2008). No mineral resources were reported found in any of the fishing communities in the study, but fishing equipment such as boat motors, batteries and even fish caught are often overlooked when considering lootable resources in conflict research. In addition, this research finding offers valuable insights on sporadic acts of violence that characterise conflict events within which armed groups use the lake to both carry out attacks and loot fisherfolk equipment and fish. In this

way, while they are permanent in areas that are close to mining sites, these armed groups also survive from piracy activities on the lake.

Contribution 2: In the conflict context and given the danger of fishing across transnational boundaries, fisherfolk use their negotiation skills allowing cross border fishing.

This component of contribution to knowledge adds to the literature on transboundary waters, a dimension that moves beyond the more common issues of mismatches between management approaches (Song et al., 2016) and the differing or competing exploitation (Lubovich, 2009; Martin et al., 2011), which can lead to tension and conflict over water resources between riparian countries. This thesis contribution provides in-depth knowledge on how skills which people develop to survive disturbing factors through cross border fishing, which have the potential to cause transboundary issues of overfishing and eventually leading to the decline in fish stocks. Thus, fishing on a transboundary lake seems to capture a new dimension of how in responding to vulnerability factors including risks of being arrested or shot at during cross-border fishing in foreign waters, fisherfolk appear to have found creative responses using negotiation skills for cross-border fishing possibilities. Considering that factors that are often identified as causes of transboundary waters' issues come from other levels and types of waters exploitation than the activities of small-scale fisherfolk. The small-scale fisherfolk's mobility back and forth across the lake has not been sufficiently covered in transboundary waters research in the context of conflicts and livelihood choices they make in responding to vulnerability.

Furthermore, bearing in mind that the regulation mismatches between riparian countries, as explained in Chapter 7, provide additional motivation for resorting to cross-border fishing

activities for fisherfolk attempting to survive impacts of conflict-induced difficulties from one end and stringent regulation impediments from the other. This is an interesting dynamic in maritime transboundary situations. Thus, cross-border fishing can increase the fishing pressure that can result in overfishing and the decline of fish catches.

This seems to be a contribution to knowledge in the above-discussed two ways, which seems to have not been sufficiently covered in transboundary waters research in the context of conflict and livelihood choices in response to vulnerability. This pertinent highlight on the differences and complexities in the management efforts of Lake Tanganyika between the two countries added to fisherfolk attempts to survive conflict-induced difficulties in one country and to overcome both the spill over ramifications into the other as well as the stringent regulations, is an interesting maritime transboundary dynamic.

Contribution 3: Mixed institutional environments within fisheries both generate vulnerability and mediate coping strategies that can either reproduce/exacerbate or reduce fisherfolk vulnerability.

This thesis confirms that fisherfolk livelihoods is shaped by multiple factors inherently linked to institutional environments with associated local social and economic dynamics. Consequently, the livelihoods of the fishing communities inhabiting the shoreline areas of Lake Tanganyika were found to be impacted by any institutional factor that can impede their ability to fish. Identified of these institutional factors include stringent fishing regulations along with cultural norms associated with some adopted coping strategies that altogether appeared to differently impact various categories of fisherfolk, as explained under Key finding #8 and Key finding # 9.

Thus, institutions through certain state regulations and social norms can impact the livelihoods of those observing them. At the same time, coping strategies such as avoidances of these rules when fishing, resorting to illegal gears requiring clandestine landing and sometimes fishing during night times, appeared to interfere with their family social lives, rendering fisherfolk more vulnerable. If state regulations impacts are obvious to certain fisherfolk, for example, when they are caught breaking fisheries laws and are charged with expensive penalties, impacts from social norms including religious beliefs generally put fisherfolk in non-obvious disadvantageous positions. Some of these positions can hinder the adoption of more effective coping strategies maintaining concerned fisherfolk in conditions of vulnerability. This means that people do not easily notice how social norms function in impacting their behaviours. For state rules, many people know about them only when they are caught. This implies that while all the fisherfolk are considered susceptible to state rules and social norms' vulnerability, those who do not know them are sensitive to their vulnerability. The majority being those who cannot read English or French languages used for state rules are written.

For instance, in the context of Tanzania, perhaps given the conditions of peace and relative stability throughout the country, state structures at landing sites seemed more effective and include fisheries officers, patrol services, and the BMU (Beach Management Unit) members, working together to enforce fisheries laws. As a result, no occurrences of paying ransoms to/or bribing the officers were mentioned by both official and fisherfolk informants in exchange for allowing prohibited fishing activities. Additionally, the fact that a handful of fisherfolk appeared unaware of fisheries regulations and officers in charge, would possibly support the idea that unlike in the DRC, bribing officers is uncommon in Tanzania.

This suggests that Tanzanian fisherfolk have limited fishing alternatives in the face of state control mechanisms.

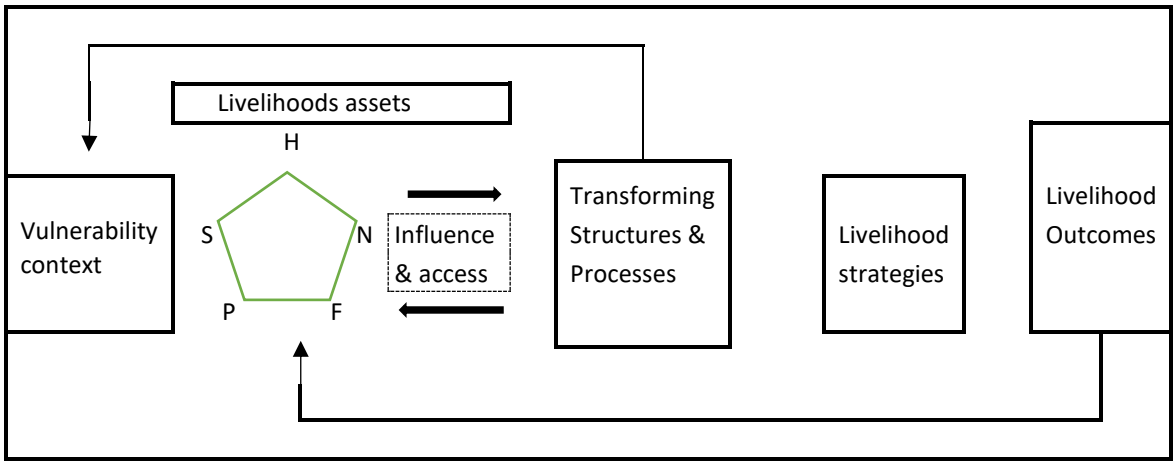
Contribution 4: To the same sources of vulnerability, different groups of fisherfolk were found to have varying degrees of susceptibility, sensitivity, and adaptive capacity specific to local realities.

This contribution conceptualises in **Fig**. 8.2 the data analysis undertaken in this study as summarised in **Fig.** 7.2 and **Fig.** 3.1, to suggest that in the adapted SLF diagram the context of vulnerability is captured in two dimensions, the first, in box 1 for sources of vulnerability and the second, in box 2 for experiences of vulnerability, unlike what can be observed in the traditional DFID SLF diagram (see **Fig.** 8.1). The rational of this is highlighted in key findings #1 and #9, which demonstrate that within and between the two contexts vulnerability is experienced differently by different groups of people linked to their social status and assets. One key element in point, is related to the effects of institutions, the two findings suggesting that institutions can affect the experience as well as sources of vulnerability.

This is an important contribution towards understanding the variations in the coping strategies that fisherfolk have shown to be adopting to survive the same disturbing factors. A closer examination of the DFD SLF diagram in relation to how the context of vulnerability is presented, indicates that such details in the variations of different experiences from similar sources of vulnerability will be missing. Therefore, to best capture findings of this particular case-study, the SLF diagram can be modified as shown in **Fig.** 8.2 highlighting three elements: 1) institutions as factors of vulnerability (placed in box 1) and mediator of

livelihood (kept in box 2 but adding an arrow 1); 2) institutions can affect how people experience the factor of vulnerability (adding an arrow 2); and 3) institutions can affect the livelihoods assets. This way, the change allows for the matching of the reality found on the ground.

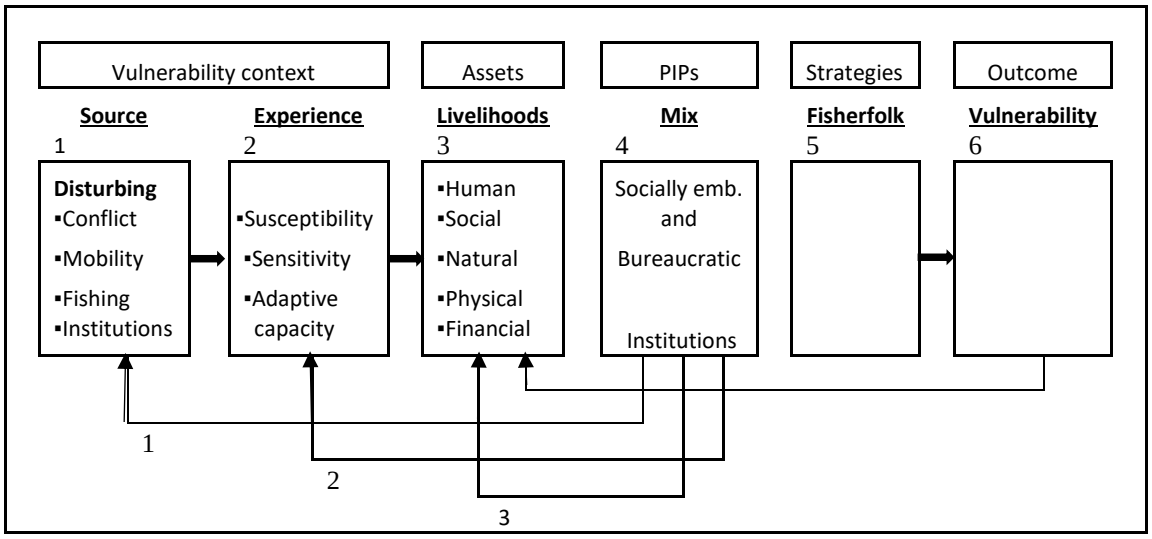
Fig. 8.1. DFID 's Sustainable Livelihood Framework diagram



Source: DFID (1999)

H=Human capital, S=Social capital, P=physical capital, F=financial capital, and N=natural capital

Fig. 8.2. Adapted DFID 's Sustainable Livelihood Framework diagram



Source: Author's work, 2020

8.4 Limitations of the research

There were several challenges in this study mainly in relation to fieldwork sites and qualitative data collection in impoverished populations. Both these challenges required changes to the study from its initial focus on only one country to the actually two countries and in data collection activities from the initial semi-structured interviews to the addition of PRA approaches and reduced secondary data in both countries. One other key challenge in the data collection was my inability to be physically present in the DRC, because of the high risks involved in such a volatile environment. As a result, the research necessitated the hiring of local RAs through whom I conducted phone interviews with key informants and collected data remotely. Face to face interviews would have had the value-added impact of interacting directly with research participants. However, I was able to conduct, in person, all the fieldwork activities in Tanzania.

A significant limitation of the study pertains to the gender representation of informants due to the very nature of fisheries, which is known to be generally gender differentiated. Thus,

it was not possible to select participants from both genders in each category of fishing related activities and in the official groups. For example, due to local traditional beliefs, fishing crew members are almost exclusively men, fish traders and processors are in the majority female, while boat owners are mostly men. Likewise, most officials are male. This situation was addressed in the second round of interviews which used focus group interviews attended by an equal number of men and women, and women's only focus group interviews in each of the six study villages.

Furthermore, the PRA techniques were used in the second round of the fieldwork as they appeared most appropriate for the selected research areas, which were largely rural, due to their cost-effective nature. However, their implementation in impoverished fishing communities imposed several constraints, particularly in focus group and observation activities. For instance, at each focus group event, we had more participants to choose from than we needed because of the settings, high interest and curiosity of most village dwellers.

Due to the prevailing context of conflict and state fragility in the DRC, organising PRA activities was obviously more dependent on local daily life priorities than to participants' availability. This problem was largely offset with the meal and transportation perdiems that were offered. An attempt to obtain secondary data from online materials proved difficult due to the lack of relevant published works and local databases on fisheries and other livelihoods. Obtaining such materials would have provided a comparative lens needed to better illustrate the scale of changes taking place in the fisheries sector and explain why other non-fisheries livelihoods options reported to exist in other locations, within or outside the same region, appeared less attractive to fisherfolk. Looking for secondary data in Kigoma was also challenging. In most cases, people who were approached in their

respective offices appeared reluctant to share the needed data which they indicated to have. However, field notes were taken on relevant facts and numbers when receiving information on fisheries data during conversations with personnel while visiting their offices.

8.5 Areas for future research

In addition to the two points on livelihood changes in relation to conditions of vulnerability and the roles of institutions in mediating response strategies, several areas emerge that would be fit for further research.

(i) In terms of theories and concepts, there are at least three areas for future research emerging from this study. First, it is important to better understand the dynamic relationships between institutions and the vulnerability experience of fisherfolk beyond the incidence of survival outcomes. There is a need to further explore the potential mechanisms for fisherfolk to break out of the vulnerability conditions in which they live and work. Results of such research would help inform development policy and interventions aimed at improving fishing communities living conditions and understanding their pathways out of poverty. Second, research to substantiate the scale and ways in which livelihood resources, valuable to fisherfolk including fishing equipment, fish catches and cash income/revenues, would contribute to further refining the concept of 'lootable resources' beyond its current application to largely mineral resources as enabler or motivating factors for conflicts' actors to sustain their violent activities. Third, more research is needed to re-categorise armed conflict situations in which the causes are unrelated to affected people's participation and the natural resources their communities are endowed with. The finding that armed conflict situations which mainly manifest as sporadic skirmishes targeting civilian resources rather

than full battles, can add a new categorisation beyond the labels of traditional 'old' wars and 'new' wars.

(ii) It would be valuable to learn how fisherfolk who appear to be trapped in vulnerable conditions due to their over-reliance on a lake with declining fish stocks, can turn towards non-fisheries livelihoods options that are available to them within and outside of their geographic regions, and to which they seem to have not been attracted to so far. One way of doing this in the context of Lake Tanganyika's shoreline region on the DRC's side, would be to undertake a replication of this research and include fishing shoreline villages of the districts Fizi, Moba and Kalemie to understand why fisherfolk are not attracted to non-fisheries livelihoods with which their communities are endowed. While these areas have mining activities taking place that appear to attract both civilian people and militia, it would be good to uncover why most people still do not divert from the lake and why militia still resort to the lake for income.

(iii) It will be crucial to build on the findings of this thesis to deepen the investigation of how existing institutions, both formal and informal, can play synergistic roles that could, at the same time, enable lake resources conservation and also facilitate improvement in peoples livelihoods. Research into sustainable fishing in ways that would allow for lower catches but higher income and/or finding ways in which fisherfolk vulnerability could be addressed through influencing them to value fish catching, warrant further study that would be valuable and worth undertaking to build on the results of this thesis.

(iv) Understanding the effects of gendered structures and intergenerational opportunities for women that can allow them to turn fishing-related activities they are involved in for living, into a viable business undertaking and employment for the youth;

(v) Exploring governance on how local fishing institutions can be used as instruments for peace building and conflict resolution between communities with the history of ethnic division and tension.

8.6 Concluding summary

The primary objective of this research was to investigate how small-scale fisherfolk navigate livelihoods in two different environments. One being of conflict, the DRC, and the other of relative stability, Tanzania, and how institutions, formal and informal, mediate their coping responses to vulnerability in both country contexts. The case study was Lake Tanganyika, which remains understudied in terms of fisheries institutions including human systems, transboundary water dynamics and livelihood patterns. Substantial fieldwork was undertaken to collect qualitative data from 141 key informants in DRC and 138 key informants in Tanzania. Three shoreline sites/villages were covered in the western Tanzanian region of Kigoma while three other shoreline sites/villages were covered in the eastern DRC's region of Uvira. These six villages on opposite sides of the lake were purposively selected for the fieldwork given their physical access and high intensity of small-scale fishing activities, as well as the prevalence of their shared Swahili language. Societies on the DRC's side, in areas around Uvira, have historically been shaped by ethnic divisions, which are associated with unending local tensions and conflicts. On the Tanzanian side, in the Kigoma region, are people of various tribes and ethnicity, among which are a few tribes and ethnic groups of people, who originated from the DRC (UTR,

1998). Unlike the Uvira region, communities in Kigoma, despite their ethnic diversity, live in relative peace and stability, which pulls immigrants to Kigoma (Landau, 2004).

This thesis entailed a detailed study of the factors and mechanisms of livelihood changes generating fisherfolk vulnerability. Within these factors that included the types and roles of existing multiple institutional arrangements, the study explored how they interact and how small-scale fisherfolk navigate through them to survive at the same time while adapting to external environmental changes. Among the prominent sources of these changes are the context of protracted conflicts and state fragility in one location as well as the context of spillover effects and local dynamics in the other location, which are on opposite sides of the same lake.

In the study, institutions were viewed through state regulations and their enforcement structures, considered as formal or bureaucratic institutions, and through traditional, cultural, and social norms, considered as informal or socially imbedded institutions. These two types of institutions were analysed in terms of how they impact the livelihoods of fisherfolk observing them. Also considered were various coping responses pursued by fisherfolk when all other alternatives are lacking to survive the multiple disturbing factors generating their vulnerability. Key themes which were identified to capture the factors and responses to vulnerability included i) vulnerability context, ii) institutions, and iii) livelihood strategies on a transboundary lake. These factors were used to analyse the qualitative data collected in two rounds of fieldwork. The procedures of data collection and analysis were guided and informed by the analytical framework, which combined elements of both the SLF and the CI and based on the reviewed literature.

One contribution of this study suggests that, in interacting and acting together, a mix of institutions including state rules, management and enforcement structures, social norms, community groups, and local beliefs (religious and traditional), mediate fisherfolk behaviours that can either exacerbate/maintain or reduce vulnerability depending on the conditions in which they operate and the socioeconomic categories of concerned fisherfolk. Altogether these institutions, which appeared unchanged in terms of associated rules, operated in changing environments which impacted the extent of their implementation, leading to similar effects but differently experienced by heterogenous fisherfolk.

Thus, when faced with various disturbing factors of vulnerability within different institutional environments, fisherfolk navigate through them making several choices of coping strategies that they believe can secure their livelihoods. This implies that some of their choices would likely secure their livelihoods, while others could result in adverse outcomes. Consequently, there are differences in the perceptions of fisherfolk on the role played by institutions in relation to their vulnerability. Those with a higher fishing income, more diversified livelihoods, and lower dependence on the lake, have more nuanced perceptions, while those considered poor and with high dependence on the lake and limited livelihoods' alternatives, tend to have a perception that institutions exacerbate their vulnerability.

In particular, many people who have entered fisheries due to a lack of alternative livelihoods, and given their poverty status, will resort to coping strategies that could result in situations that exacerbate/maintain their vulnerable conditions. Whereas the same choices by those few of them who appeared to have more livelihood assets i.e. 'boss fishers' could result in positive outcome, thus reducing their vulnerability. In other words, faced by the same

factors of vulnerability and resorting to the same coping strategies, the two categories of fisherfolk will have different outcomes. Thus, while all the fisherfolk can be exposed to the same threats such fishing in distant waters, the poor fisherfolk would be particularly more sensitive to vulnerability if falling in the hands of pirates. Additionally, response strategies such as nearshore fishing and clandestine fishing, using illegal gears for the purpose of catching more fish, would be among the choices of those lacking alternative livelihoods but rendering them more susceptible to vulnerability.

For this reason, it appears that the negative outcome of the institutional influence manifested in the fact that people do not break out of the cycle of vulnerability, is to be nuanced. The nuance stems from the fact that the role played by institutions are related to contextual factors including the conditions in which they operate and the categories of concerned fisherfolk. Thus, in both country contexts the conditions in which institutions operate determine the type of role they can play towards the people who are directly impacted by institutional structures. Therefore, only interventions, either by states or other structures, that match the contextual institutional realities and constraints, would likely help fisherfolk to sustain their livelihoods, and eventually improve them. The contextual institutional realities imply the understanding of the formation background and functional mechanism of institutions that shape fisherfolk lives and livelihoods in their communities.

APPENDICES

Appendix 4.1. Interview guides: (Semi-structured)

TANZANIAN VERSION – Fieldwork in person

The questions in this interview guide have been prepared to cover as much as possible the three research thematic areas that should be identified in data that will be generated from participants' responses to them. Thus, during interviews they will not necessarily all be asked as some might be covered in a previous answer, but the questions will act as a prompt to the researcher.

Key informant categories:

1. Individuals & households of DRC origin who have crossed over into Tanzania fleeing conflict violence and who are carrying on with fishing activities on Lake Tanganyika from Western Tanzanian shorelines for livelihoods.
2. Local Officials

Selection: Persons of interest, available, and relevant to the study.

Research Question	*'How do small-scale fisherfolk secure livelihoods in situations of change?'*
Information needed	1) factors and mechanisms of livelihoods change in small-scale fisheries; 2) types of institutions which are important and how they interact to enable people to maintain their fisheries livelihoods; 3) mechanisms of how institutions can be helpful or unhelpful to small-scale fisherfolk in navigating their access to and use of fisheries resources; and 4) ways in which people living in conditions of relative stability and peace on a foreign land, use institutions in their coping mechanisms to survive/adapt to external environmental changes brought by the context of conflict in their home land.
Techniques	Interviews: Individual and household in-depth semi-structured

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FOR INDIVIDUALS / HOUSEHOLDS

Within small-scale fisheries: Fisher, trader, processor, boat owner, boat crew

Name / Age / Gender / Number of family members / Male or female headed households / Experience/ Fishing group member/ Tribe / Religion/ Ethnicity/ Time of residence/ Village of origin / Income status (Poor, Middle or Rich) / Assets profile/ Village of origin/ Interview site

Date:

General

1. Where do you live? How long? Why did you settle here? From where did you originate?
2. How many people make your household? Is everyone here? Any absents and why?
3. How many of you are involved in fishing-related activities?
4. When did you get into fisheries activity? How and why?
5. What specific activity do you do within fisheries? Such as fish catching, trading, processing etc..?
6. Which fish do you catch, trade or process? Why?
7. Is this your primary source of food and income? What are your other sources of income and food?
8. Has your activity changed over time? How and why?
9. What keeps you in this activity?

Theme 1: Vulnerability context

10. How did/does the DRC conflict affect your lives and fisheries livelihoods?
11. How dos being a migrant affect your lives and fisheries livelihoods?
12. What changes occurred in your lives and fisheries as a result of DRC conflict?

13. What changes occurred in your lives and fisheries since living in a relatively stable and peaceful environment?
14. How did those changes occur? Ex. what was your situation (income level) before in the DRC? Did it change with the move to Tanzania fleeing the conflict? What happened?
15. How can you describe your living conditions before while in the DRC's conflict environment, and after as migrants in peaceful Tanzania?
16. Do you turn to certain people for help? Why those people? What are the obligations for getting their help? What are the results if any?
17. What resources do you choose to get from them as help? Do you consider them as your best choices or your only choices?
18. How do you know when you have the ability to withstand these disturbances? Can you give an indicator?

Theme 2: Institutions and institutional bricolage

19. How is fishing considered in your community of migrants and what value do people give to Lake Tanganyika?
20. How do migrant people get into fishing (i.e. do they need permission, capital, etc.) and who is in charge of managing the fisheries?
21. Do migrant fisherfolk trust those in charge of managing the fisheries?
22. Are there are any rules that affect how migrant fisherfolk behave in the fisheries? Which ones?
23. When and how did they start? How do you know what those rules are? How do you use them?
24. Did they help you to cope with the impacts of DRC conflict that led you to being here?
25. What affect such rules in your experience as migrant fisher? How? Are there some specific rules for migrant fisherfolk?
26. How do their changes affect your fishing activities?
27. Are there any social groups or self-help committees in your community? Are you a member of any of them? Why? What do they do?
28. Do they help you to cope with the situations of being a migrant fisher? For example more access to fisheries resources?
29. Do you have any traditional or religious beliefs towards the Lake and fishing? What are they? How did you gain them? How do you use them? Are they different now as you are in a different country?
30. What can you say about your interaction with officers from government services, NGOs interventions or from any other structures, organisations or arrangements operating in fisheries?

Theme 3: Livelihoods strategies

31. When did you come to from the DRC?
32. Have any of you ever moved to other areas for better opportunities to support the family since you came to Tanzania?
33. Do you have any family member abroad who helps you financially?
34. Who/what else do you turn to for help when you are in need of money or when faced with situations disturbances as a migrant fisher? Why, how, what does that mean – e.g. do they have to return the favour or pay money back etc.
35. Has who/what you turn to changed over time since you are in Tanzania, if yes, why etc.
36. How do you cope with poor and stressful conditions in situations of relative stability?; What helps you the most to cope?

If there is anything else about these issues that you would like to add?
Thank you for time and kindness in answering these questions and sharing your experiences.

FOR OFFICIALS

At the community and provincial levels: Regional Initiatives staff members; Research staff from local institutions; Fisheries management committees; Fishers cooperatives and grassroots organisations; NGO personnel; fisheries researchers, planners, administrators, practitioners and other stakeholders

Name / Gender/ Profession/ Years of experience/ Position/ Interview location

Date:

General

1. Is fishing on the Lake an important living activity for migrant families and individuals?
2. Has the number of migrant fisherfolk changed over time with the conditions of conflicts in DRC? Has it increased? How?
3. In your opinion what do you think are some of important issues and benefits of fishing activities for small-scale fisherfolk, both local and migrant?
4. How and how frequently do you interact with fisherfolk, both local and migrant?

Theme 1: Vulnerability context

5. Was this area affected by the influx of migrant fisher fleeing the long-running DRC's conflict? When was that?
6. How did the conflict in DRC affect small-scale fisherfolk lives and the fisheries in Kigoma?
7. What changes occurred in migrant fisherfolk's lives and fisheries livelihoods since they arrived from the DRC?
8. And what change may have occurred in the lives of resident fisherfolk with the arrival of migrant fisherfolk for the DRC?
9. How can you describe the living conditions of Congolese migrant small-scale fisherfolk since they arrived in Tanzania?
10. Are there are any considerations, organisations or mechanisms that help them in how they cope with shocks and stresses facing them as migrant fisherfolk?
11. What do you think are their main coping strategies? What may have influenced their choice?
12. How do you know when they are disturbed and they have the ability to cope? Can you give an indicator?

Theme 2: Institutions

13. How is fishing considered in local communities and what value do people give to Lake Tanganyika?
14. How do migrant people get into fishing (i.e. do they need permission, capital, etc.) and who is in charge of managing the fisheries?
15. Are there any central/local government fisheries services that operate in fishing communities? Do migrant fisherfolk know and use them? Do these services help migrant fisherfolk improve their ability to cope with shocks and stresses?
16. Are you aware of any rules, policies or regulations over fishing activities on Lake Tanganyika applicable to migrant fisherfolk?
17. How do they influence migrant fishers' behavior in their activities? What are their origins?
18. How do migrant fisherfolk use them? How do they impact on their livelihoods?
19. Can you think of any specific cultural norms, taboos and beliefs that influence migrant fishing practices? Are they different from those of local communities? Do migrant fisherfolk adhere to local cultural norms, taboos and beliefs to cope with shocks and stresses facing them?

Theme 3: Livelihoods strategies

20. What livelihood strategies do fisherfolk / migrants adopt to withstand shocks and stresses?
21. What in your view influence and facilitate their choices of survival strategies? What enabled those choices to happen?
22. What can best indicate that their adopted strategies are effective?

23. What livelihood asset or resource base do migrant fisherfolk turn to in case of reduced access to the Lake, of decline in fish stocks and fish catches?
24. What opportunities in your view enable them to sustain their livelihoods in situations of disturbance?
25. Have migrant fishers' livelihood strategies changed over time since they arrived in Tanzania? How?

If there is anything else about these issues that you would like to add?

Thank you for time and kindness in answering these questions and sharing your experiences.

LOWER LEVEL FISHERIES STAFF

Question	*'How do small-scale fisherfolk secure livelihoods in situations of conflict?'*
Objectives:	• To obtain perceptions on the lake ecosystem change trends, key drivers of change, how they affect fishers' livelihoods, and on how small-scale fishers respond to survive them. • To identify seasonal variations in lake fisheries ecosystem health and services, and relative livelihoods strategies
Technique	15-mitute semi-structured interview + several observation visits to see how they behave, how they interact with fisherfolk and what they get up to
Target	Available 5-10 participants in each of the three fishing villages.

Participant characteristics

Age		**Years of experience overall**	
Gender		**Years of experience at this location**	
Activity / position		**Interview site & date**	

Interview questions

I. Fishing regulations' mechanisms

1. What do you do, who do you report to, what challenges do you face and how do you think you get along with fisherfolk? What do you think fisherfolk think of you?
2. What is the number of fishers annually registered over the last 10 years? Can you provide the estimates of the number of annually registered fishers (if no available records); why has the number changed?
3. What do you think are the factors of change and why do you think those are the factors that have led to the changes?
4. What fishing behaviour change have you noticed over time by small scale fishers? Why?
5. What impact has this behaviour change had on the lake? How do you know? How have the fishers responded?
6. What are the main rules and laws that regulate fishing activities and how have they changed over time? Where do they come from? Are there any that come from the fishers?
7. What in your experience have been the main fishers' behaviour patterns in relations to existing rules over fishing activities?
8. What would be the average number of fishing offences that you have recorded annually during the last 10 years? What are the main challenges in enforcing regulations here?

II. Health of the lake and fish stocks

9. What is your impression of the health of the lake? Why is this?
10. What are the main sources of influence on the lake ecosystem? Why is this?
11. What makes you think these are the main sources of influence (e.g. if they say agricultural run-off, how do they know? What evidence are they aware of?
12. What action has been taken to address any concerns with the health of the lake ecosystem?

13. What is the condition of the lake fisheries? How has it changed over time? What are the main factors that are behind these changes? What evidence is there for this?

Appendix 4.2. Terms of reference: RA recruitment for Tanzania & DRC

TERMS OF REFERENCE
Fieldwork Research Assistant - Data collection activities
Starting date: October 2017
Kigoma, Tanzania

This is a doctoral research work by Deo Namwira, under the supervision of Dr. Fiona Nunan and Dr. Danielle Beswick, from the International Development Department at the University of Birmingham, UK. The research will investigate how small-scale fisherfolk respond to situations of uncertainty and shocks resulting from chronic insecurity and associated migration, and how institutions help them to maintain their livelihoods. Factors that might affect how fisherfolk respond include government policies, local norms, taboos, rules and social, power and gender relations, which are referred to as 'institutions'.

A Research Assistant is needed to help with fieldwork data collection activities through interviews the doctoral researcher will be conducting with key informants including officials and either households or individuals. The work will be in the Kigoma region of western Tanzania on the shoreline areas of Lake Tanganyika. During this assignment, Deo will remain the focus of the research maintaining ownership of the collected data.

15 days in total are available for the Research Assistant in this assignment at a rate of $20.00 per day representing a total wage of $300.00 for the three-week period.

SCOPE OF WORK AND MAIN DUTIES

The Research Assistants will work under and assist Deo in a variety of data collection activities, including:

- Accompany Deo when travelling to and walking around research sites and assist him in identifying and meeting targeted participants for face-to-face interviews.
- Advise on cultural sensitivity, issues to be aware of, and expectations of behaviour, while interacting with research participants
- Help to plan and organise interview meetings as well as facilitate their proceedings
- Attend all interviews with Deo asking questions in Swahili, and repeat/explain Deo's questions or informant's answers, as appropriate.
- Write fieldwork notes on issues and relevant observations while interviews are unfolding.
- Communicate constantly with Deo to reflect on the research process and data collected.
- Organize interviews with key informants including officials and either households or individuals

QUALIFICATIONS

Preferred Research Assistant will possess some or all of the following characteristics:

- Graduate student in in social science, agriculture, environmental sciences, or any other field relevant to livelihoods and natural resources management.
- agriculture, environmental sciences, or any other field relevant to livelihoods and natural resources management
- Ability to understand the research project and its key concepts and terminology
- Ability to interact with individuals from a diverse array of backgrounds, including fisherfolk, government officials, NGO personnel, customary chiefs, local leaders, researchers, etc.
- Some experience of fieldwork research, preferably in locations similar to targeted sites
- Awareness of diversity and local cultural sensitivity
- Ability to write good quality fieldwork notes on issues and events observed
- Transferable and problem-solving skills
- Ability to communicate effectively in writing and orally in English and Swahili
- Punctuality, multi-tasking, good organisational and management skills
- Willingness to work under pressure to meet deadlines
- Ability to maintain confidentiality

TERM & SCHEDULE

This is a full-time three-month appointment commencing in October 2017 and concluding in November 2017, with a maximum of 8 hours per day and at a $20 daily rate totaling 15 working days for a total wage of $300.00.

The schedule for this assignment is expected to as shown in the following table:

Description	Kibirizi/Kigoma	Katonga/Kigoma	Ujiji/Kigoma	Total
Dates	Oct. 23 - 27	Oct. 28, 30-Nov. 2	Nov. 3,4,6-8	
No of working Days	5	5	5	**15**
No of interviews per day	5	5	5	
No of Interviews	15	25	25	**105**

RECRUITMENT PROCESS

A local institution, "Tuungane Project" through Peter Limbu, will be relied on to recommend a suitable and practical process to recruit th **TERMS OF REFERENCE**

Fieldwork Research Assistant - Data collection activities

Starting date: Mid-August 2017

South Kivu, Democratic Republic of Congo (DRC)

This is a doctoral research work by Deo Namwira, under the supervision of Dr. Fiona Nunan and Dr. Danielle Beswick, from the International Development Department at the University of Birmingham, UK. The research will investigate how small-scale fisherfolk respond to situations of uncertainty and shocks resulting from chronic insecurity, and how institutions help them to maintain their livelihoods. Factors that might affect how fisherfolk respond include government policies, local norms, taboos, rules and social, power and gender relations, which are referred to as 'institutions'.

A Research Assistant is needed to help with fieldwork data collection activities through facilitating interviews the doctoral researcher will be conducting by mobile phones with key informants including officials and either households or individuals. The bulk of the work will be in the Uvira region on the shores of Lake Tanganyika, but a few interviews with officials will be in Bukavu, the capital city of South-Kivu, in Eastern DRC. During this assignment, Deo will remain the focus of the research maintaining ownership of the collected data.

480 hours in total are available for each Research Assistant in this assignment at a rate of $1,440.00 for the three-month period representing a daily rate of $20.

SCOPE OF WORK AND MAIN DUTIES

The Research Assistants will work under and assist Deo in a variety of data collection activities, including:

- Traveling to Tanzania to meet with the doctoral researcher for orientation and short training
- Travel to and walk around research sites to identify and meet targeted participants for telephone interviews
- Negotiate interview, administer information sheet and obtain written or verbal consent.
- Facilitate telephone interviews to be conducted solely by Deo.
- Attend all interviews letting his/her mobile phone be used by participants responding to Deo's questions in Swahili, and at the same time repeat/explain Deo's questions or respondents' answers, as appropriate.
- Have his/her mobile phone fully charged and carry a phone power charger at every field visit.
- Arrange to have appropriate printed interview guides in hands and follow mindfully interviews question by question being asked and responded to.
- Write fieldwork notes on issues and relevant observations while interviews are unfolding
- Organize field notes and email them in PDF to Deo
- Communicate constantly with Deo to reflect on the research process and data collected.

QUALIFICATIONS

Preferred Research Assistant will possess some or all of the following characteristics:

- Graduate student in social science, agriculture, environmental sciences, or any other field relevant to livelihoods and natural resources management.
- Ability to understand the research project and its key concepts and terminology
- Ability to interact with individuals from a diverse array of backgrounds, including fisherfolk, government officials, NGO personnel, customary chiefs, local leaders, researchers, etc.
- Some experience of fieldwork research, preferably in locations similar to targeted sites
- Awareness of diversity and local cultural sensitivity
- Ability to write good quality fieldwork notes on issues and events observed
- Transferable and problem-solving skills
- Ability to communicate effectively in writing and orally in English and Swahili.

- Punctuality, multi-tasking, good organisational and management skills.
- Willingness to work under pressure to meet deadlines.
- Ability to maintain confidentiality.

TERM

This is a full-time three-month appointment commencing in September 2017 and concluding in December 2017, with a maximum of 40 hours per week and at a rate $20 daily rate totaling 160 hours monthly for a monthly wage of $400.00.

RECRUITMENT PROCESS

- The local university endorsing this research in the DRC, namely the University Evangelique en Afrique in DRC, has proven records of successful recruitment of research assistants among their students to assist academic research, will be relied on to recommend a suitable Research Assistant for this assignment.
- Through our contact person, Dr Katcho Karume, the Head of Agriculture and Environmental Sciences Department at UEA, we will request help in August 2017 to select a qualified candidate for this assignment, in accordance with the University's internal policies and procedures and in consideration for these Terms of Reference.
- In September 2017, the selected candidate will be required to travel to Tanzania to meet Deo for a short training session. The session will consist in orienting the Research Assistant to tasks, main concepts, ethics involved in the research At the same time, fieldwork schedules and activities will be mapped out prior to setting out to research sites for actual data collection activities.
- e preferred Research Assistant for this assignment.
- A qualified candidate for this assignment in consideration for these Terms of Reference, will be selected from a list of potential candidate that will be proposed by Peter Limbu.
- From a short list of two to three candidates that will be interviewed, the final candidate will be selected and will be given a short training by Deo prior to starting the assignment.
- The training will concentrate on orienting the Research Assistant to tasks, main concepts, and ethical aspects involved in the research. At the same time, the fieldwork schedule will be discussed and confirmed.

Appendix 4.3 RA candidate interview: recruitment

RA CANDIDATES' SELECTION PROCESS

In the first table below, I am comparing the shortlisted candidates from the list provided by Peter Limbu of Tuungane Project, focussing on the information provided in their curriculum vitae and in consideration of their relevance and suitability for my research work.

Shortlisted candidates	**Candidate 1**	**Candidate 2**	**Candidate 3**
TORs for a RA sent on	October 10, 2017	October 10, 2017	October 11, 2017
Application received on	October 10, 2017	October 10, 2017	October 12, 2017
Education	Diploma in Environment and Coastal Resources Management Institution: Fisheries Education and Training Agency	B.Sc. in Social Protection Institution: The Institute of Finance Management (IFM)	Diploma in fisheries science and technology Institution: Fisheries education and training agency Nyegezi (FETA)
Most desirable relevant experience: **Social systems**, **human subjects**, **rural context**, **fisheries**, **Kigoma areas**	• Survey on mangrove species identification at Rufiji delta (2016) • Hygiene and sanitation at Bagamoyo landing site (2013) • Designing and assessing the efficiency of charcoal fridge on preserving post-harvest fishery products (2015)	• Refugees Registration Officer at National Identification Authority(NIDA) • Assistant Operation Officer at Public Service Pension Fund(PSPF) • Data Clerck and Field Officer at Wekeza Project	• Assistant fisheries field technician, Maji makubwa ecosystem project in Kigoma- Tanzania from 2009 till 2016. • Assistant fisheries data collector and compiler, TAFIRI –Kigoma center 2016. • Assistant fisheries field technician in determining the distribution of the Oreochromis spp in lake Tanganyika with BongoFish from Dar es salaam September to early October 2017.
Relevant language **Swahili, English**,	Swahili & English	Swahili & English	Swahili & English

RA CANDIDATES' SELECTION PROCESS (Continued)

INTERVIEWS CONDUCTED FOR THE SELECTION OF THE SUITABLE RESEARCH ASSISTANT – October 13, 2017 at the Tuungane Project Office

While responses from the three candidates seem to indicate closely equal levels of knowledge, Georges shows to have provided more relevant points in addition to his ending two questions that I considered to be important. Thus, based on the assessment in the second table below, Georges is leading and is the selected candidate for this assignment.

Interview questions	**Candidate 1** **10:30 AM to 11:00 AM**	**Candidate 2** **11:00 AM to 11:30 PM**	**Candidate 3** **11:30 AM to 12:00 PM**
When entering a community, what can you do to get the maximum access to people you are looking for	• Set a friendship environment with them • Be cheerful to them • Use a good language • Have them not to fear you but to feel as friends • No attitude of superiority • Ask different people for leads • Give them feedback • Use local leaders as they can take you to their people • Have the local leaders show you to their communities	• Be familiar with them • Be cheerful to them • Use their language as some don't speak Swahili well • Dress in a culturally appropriate way.	• Make sure to communicate with leaders of the area • Explain what is the reason of meeting people • Be very specific about the main point • The leader can help you to show where people you are looking for are available. • Then go to meet them • I can go straight in their homes
When meeting people, what can you do to get the maximum information from them?	• Introduce the idea and what is to be done • Deal with those who are aware as they can take you to people who have the information you are looking for.	• When asking a question repeat it for a better understanding • Use a local language that they are comfortable with • Tell them to not fear to answer the questions • Tell them that their answer will not cause any problem to them • Give some incentives to them and they will be encouraged to respond to questions	• Ask them questions • Use simple language • Very specific and straight to the point • Use picture as it they tend to explain things • Use video and audios • Be more charming to them so that they can feel comfortable
If they think you are a spy and wanting to harm them, what can you do?	• Introduce yourself, • Show your ID • Say what will be done • Say that what you are doing will be useful to them in the future	• Explain to them where you are coming from. Ex. Tuungane project and what it does so that they don't worry • Explain that it is a research that is being conducted and its results will help them.	• Introduce yourself and your intentions • Mention that you are a native of Kigoma and that at the end of the day, the outcome of the research is to help them. • Ask them to explain in more details as fishing is the main issue

			• The more they explain, the better people will know how to improve their situation.
Do you have any question for me?	• What methodology will be used? • Can situations of insecurity affect the livelihoods of fishers?	• None	• Will the work be done in Kibirizi only?
Relevant points	**16**	**12**	**14**

Appendix 4.4 Fieldwork plan

MONTH 1	ACTIVITY/ METHOD	LOCATION	OUTPUTS	
WEEK 1				
Date TBD	• Flight to Dar es Salaam			
	• Collect research permit at COSTECH	Dar es Salaam		
	• Meet Paul for some orientation and practical advice	Dar es Salaam		
	• Travel, Accommodation, Research visa arrangements	Dar es Salaam, Kigoma		
WEEK 2				
Mon., Jul. 23	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work plan details confirmation • Practical advice & orientation	
Tue., Jul. 24	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Katonga** village – TZ • **Kalundu** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Wed. Jul. 25	• Individual **semi-structured interviews:** 5 people • **Focus Group activity**: 4 to 8 people	• **Katonga** village – TZ • **Kalundu** Village – DRC	• Credit within fisheries economy • Seasonal calendar & trend analysis • Women, marriage & family in fisheries	
Thu Jul. 26	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Katonga** village – TZ • **Kalundu** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Fri Jul. 27	• **Transect walk** (2 to 3 hrs along the lake observing and recording the ecosystem health visual features) by 2 groups de 3 - 4 participants.	• **Katonga** village – TZ • **Kalundu** Village – DRC	• record indicators of erosion • eutrophic state in certain areas of the lake - pollution features	
Sat Jul. 28	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
WEEK 3				
Mon., Jul. 30	• Meeting: Dr Emmanuel – Tanzania	• TAFIRI – Kigoma	• Consultation & work progress	

	• Meeting: Dr Nshombo – DRC (Over the phone)	• HRC – Uvira	• Practical advice & orientation	
Tue., Jul. 31	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Wed. Aug. 1	• Individual **semi-structured interviews:** 5 people • **Focus Group activity**: 4 to 8 people	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• Credit within fisheries economy • Seasonal calendar & trend analysis • Women, marriage & family in fisheries	
Thu Aug. 2	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	Sample counts of fish landed; species composition and size/maturity of fish; quantity; & value.	
Fri Aug. 3	• **Transect walk** (2 to 3 hrs along the lake observing and recording the ecosystem health visual features) by 2 groups of 3 - 4 participants.	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• record indicators of erosion • eutrophic state in certain areas of the lake - pollution features	
Sat Aug. 4	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
WEEK 4				
Mon Aug. 6	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	
Tue., Aug. 7	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Ujiji** village – TZ • **Kilomoni** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Wed. Aug. 8	• Individual **semi-structured interviews:** 5 people • **Focus Group activity**: 4 to 8 people	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• Credit within fisheries economy • Seasonal calendar & trend analysis • Women, marriage & family in fisheries	
Thu Aug. 9	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Fri Aug. 10	• **Transect walk** (2 to 3 hrs along the lake observing and recording the ecosystem health visual features) by 2 groups of 3- 4 participants.	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• record indicators of erosion • eutrophic state in certain areas of the lake - pollution features	
Sat Aug. 11	• Update Dr Fiona & Dr Danielle	• UK by email	• Progress review	

	• Notes compilations	• Stationary work	• Supervision advice	
MONTH 2	**ACTIVITY/ METHOD**	**LOCATION**	**OUTPUT / OUTCOME**	
WEEK 5				
Mon Aug. 13	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	
Tue Aug. 14	• Review of secondary data - Re: **Katonga** Village • Review of secondary data - Re: **Kalundu** Village	• TAFIRI – Kigoma • HRC – Uvira	• Fish catches for the periods of 1997-2007 & 2008-2018 • Number of fishers & gear types for the periods of 1997-2007 & 2008-2018	
Wed Aug. 15	• Review of secondary data - Re: **Katonga** Village • Review of secondary data - Re: **Kalundu** Village	• Fisheries department – Kigoma • Fisheries department – Uvira	• History of water pollution for the periods of 1997-2007 & 2008-2018 • Fish species for the periods of 1997-2007 & 2008-2018	
Thu Aug. 16	• Review of secondary data - Re: **Kibirizi** Village • Review of secondary data - Re: **Mulongwe** Village	• TAFIRI – Kigoma • HRC – Uvira	• Fish catches for the periods of 1997-2007 & 2008-2018 • Number of fishers & gear types for the periods of 1997-2007 & 2008-2018	
Fri Aug. 17	• Review of secondary data - Re: **Kibirizi** Village • Review of secondary data - Re: **Mulongwe** Village	• Fisheries department – Kigoma • Fisheries department – Uvira	• History of water pollution for the periods of 1997-2007 & 2008-2018 • Fish species for the periods of 1997-2007 & 2008-2018	
Sat Aug. 18	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
WEEK 6				
Mon Aug. 20	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	
Tue Aug. 21	• Review of secondary data - Re: **Ujiji** Village • Review of secondary data - Re: **Kilomoni** Village	• TAFIRI – Kigoma • HRC – Uvira	• Fish catches for the periods of 1997-2007 & 2008-2018 • Number of fishers & gear types for the periods of 1997-2007 & 2008-2018	
Wed Aug. 22	• Review of secondary data - Re: **Ujiji** Village	• Fisheries department – Kigoma • Fisheries department – Uvira	• History of water pollution for the periods of 1997-2007 & 2008-2018	

	• Review of secondary data - Re: **Kilomoni** Village		• Fish species for the periods of 1997-2007 & 2008-2018	
Thu Aug. 23	• Documentation – Relevant local thesis works • Documentation – Relevant local thesis works	• Kigoma – Local NGO • Uvira – Local NGO	• Fish catches for the periods of 1997-2007 & 2008-2018	
Fri Aug. 24	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
Sat Aug. 25	• Health break			
WEEK 7				
Mon Aug. 27	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	
Tue Aug. 28	• Documentation – Relevant local thesis works • Documentation – Relevant local thesis works	• Kigoma – Local NGO • Uvira – Local NGO	• Number of fishers & gear types for the periods of 1997-2007 & 2008-2018	
Wed Aug. 29	• Catch up any missed/unfinished Or arising addition • Catch up any missed/unfinished Or arising addition	• Kigoma – Local College • Uvira – Local College	• Fish species for the periods of 1997-2007 & 2008-2018	
Thu Aug. 30	• Wrap up meeting: Emmanuel – Tanzania • Wrap up meeting: Nshombo – DRC	• TAFIRI – Kigoma • HRC – Uvira	• Final recommendation on last details	
Fri Aug. 31	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
Sat Sept. 1	• Hotel check out & Flight to Dar Es Salaam			
WEEK 8				
Mon Sept. 3	• Wrap up meetings with Dr Paul	Dar es Salaam	• Final recommendation on last details	
Tue Sept. 4	• Health break	Dar es Salaam		
Wed Sept. 5	• **Field Work Ends**! Fly back to Birmingham	Dar es Salaam		

MONTH 1	ACTIVITY/ METHOD	LOCATION	OUTPUTS	
WEEK 1				
Date TBD	• Flight to Dar es Salaam			
	• Collect research permit at COSTECH	Dar es Salaam		
	• Meet Paul for some orientation and practical advice	Dar es Salaam		
	• Travel, Accommodation, Research visa arrangements	Dar es Salaam, Kigoma		
WEEK 2				
Mon., Jul. 23	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work plan details confirmation • Practical advice & orientation	
Tue., Jul. 24	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Katonga** village – TZ • **Kalundu** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Wed. Jul. 25	• Individual **semi-structured interviews:** 5 people • **Focus Group activity**: 4 to 8 people	• **Katonga** village – TZ • **Kalundu** Village – DRC	• Credit within fisheries economy • Seasonal calendar & trend analysis • Women, marriage & family in fisheries	
Thu Jul. 26	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Katonga** village – TZ • **Kalundu** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Fri Jul. 27	• **Transect walk** (2 to 3 hrs along the lake observing and recording the ecosystem health visual features) by 2 groups of 3 - 4 participants.	• **Katonga** village – TZ • **Kalundu** Village – DRC	• record indicators of erosion • eutrophic state in certain areas of the lake - pollution features	
Sat Jul. 28	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
WEEK 3				
Mon., Jul. 30	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	

Tue., Jul. 31	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Wed. Aug. 1	• Individual **semi-structured interviews:** 5 people • **Focus Group activity**: 4 to 8 people	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• Credit within fisheries economy • Seasonal calendar & trend analysis • Women, marriage & family in fisheries	
Thu Aug. 2	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	Sample counts of fish landed; species composition and size/maturity of fish; quantity; & value.	
Fri Aug. 3	• **Transect walk** (2 to 3 hrs along the lake observing and recording the ecosystem health visual features) by 2 groups of 3 - 4 participants.	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• record indicators of erosion • eutrophic state in certain areas of the lake - pollution features	
Sat Aug. 4	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
WEEK 4				
Mon., Aug. 6	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	
Tue., Aug. 7	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Ujiji** village – TZ • **Kilomoni** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Wed. Aug. 8	• Individual **semi-structured interviews:** 5 people • **Focus Group activity**: 4 to 8 people	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• Credit within fisheries economy • Seasonal calendar & trend analysis • Women, marriage & family in fisheries	
Thu Aug. 9	• **Direct observation visits** at landing sites (5-10 boats/fishers randomly. Ex. Every second boat landing)	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• Sample counts of fish landed; • Species composition/diversity • Size/maturity of fish; quantity; & value.	
Fri Aug. 10	• **Transect walk** (2 to 3 hrs along the lake observing and recording the ecosystem health visual features) by 2 groups of 3 - 4 participants.	• **Kibirizi** village – TZ • **Mulongwe** Village – DRC	• record indicators of erosion • eutrophic state in certain areas of the lake - pollution features	
Sat Aug. 11	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	

MONTH 2	ACTIVITY/ METHOD	LOCATION	OUTPUT / OUTCOME	
WEEK 5				
Mon Aug. 13	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	
Tue Aug. 14	• Review of secondary data - Re: **Katonga** Village • Review of secondary data - Re: **Kalundu** Village	• TAFIRI – Kigoma • HRC – Uvira	• Fish catches for the periods of 1997-2007 & 2008-2018 • Number of fishers & gear types for the periods of 1997-2007 & 2008-2018	
Wed Aug. 15	• Review of secondary data - Re: **Katonga** Village • Review of secondary data - Re: **Kalundu** Village	• Fisheries department – Kigoma • Fisheries department – Uvira	• History of water pollution for the periods of 1997-2007 & 2008-2018 • Fish species for the periods of 1997-2007 & 2008-2018	
Thu Aug. 16	• Review of secondary data - Re: **Kibirizi** Village • Review of secondary data - Re: **Mulongwe** Village	• TAFIRI – Kigoma • HRC – Uvira	• Fish catches for the periods of 1997-2007 & 2008-2018 • Number of fishers & gear types for the periods of 1997-2007 & 2008-2018	
Fri Aug. 17	• Review of secondary data - Re: **Kibirizi** Village • Review of secondary data - Re: **Mulongwe** Village	• Fisheries department – Kigoma • Fisheries department – Uvira	• History of water pollution for the periods of 1997-2007 & 2008-2018 • Fish species for the periods of 1997-2007 & 2008-2018	
Sat Aug. 18	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
WEEK 6				
Mon Aug. 20	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	
Tue Aug. 21	• Review of secondary data - Re: **Ujiji** Village • Review of secondary data - Re: **Kilomoni** Village	• TAFIRI – Kigoma • HRC – Uvira	• Fish catches for the periods of 1997-2007 & 2008-2018 • Number of fishers & gear types for the periods of 1997-2007 & 2008-2018	
Wed Aug. 22	• Review of secondary data - Re: **Ujiji** Village • Review of secondary data - Re: **Kilomoni** Village	• Fisheries department – Kigoma • Fisheries department – Uvira	• History of water pollution for the periods of 1997-2007 & 2008-2018	

			• Fish species for the periods of 1997-2007 & 2008-2018	
Thu Aug. 23	• Documentation – Relevant local thesis works • Documentation – Relevant local thesis works	• Kigoma – Local NGO • Uvira – Local NGO	• Fish catches for the periods of 1997-2007 & 2008-2018	
Fri Aug. 24	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
Sat Aug. 25	• Health break			
WEEK 7				
Mon Aug. 27	• Meeting: Dr Emmanuel – Tanzania • Meeting: Dr Nshombo – DRC (Over the phone)	• TAFIRI – Kigoma • HRC – Uvira	• Consultation & work progress • Practical advice & orientation	
Tue Aug. 28	• Documentation – Relevant local thesis works • Documentation – Relevant local thesis works	• Kigoma – Local NGO • Uvira – Local NGO	• Number of fishers & gear types for the periods of 1997-2007 & 2008-2018	
Wed Aug. 29	• Catch up any missed/unfinished Or arising addition • Catch up any missed/unfinished Or arising addition	• Kigoma – Local College • Uvira – Local College	• Fish species for the periods of 1997-2007 & 2008-2018	
Thu Aug. 30	• Wrap up meeting: Emmanuel – Tanzania • Wrap up meeting: Nshombo – DRC	• TAFIRI – Kigoma • HRC – Uvira	• Final recommendation on last details	
Fri Aug. 31	• Update Dr Fiona & Dr Danielle • Notes compilations	• UK by email • Stationary work	• Progress review • Supervision advice	
Sat Sept. 1	• Hotel check out & Flight to Dar Es Salaam			
WEEK 8				
Mon Sept. 3	• Wrap up meetings with Dr Paul	Dar es Salaam	• Final recommendation on last details	
Tue Sept. 4	• Health break	Dar es Salaam		
Wed Sept. 5	• **Field Work Ends**! Fly back to Birmingham	Dar es Salaam		

Appendix 4.5 – List of research participants.

First round fieldwork

Count	Coded		INDIVIDUAL SEMI-STRUCTRUED INTERVIEWS					
CONGO								
	Officials' category							
	TZ	CD	Bukavu City		CODED	Position	CODED	Gender
1	0	46	1	CD46	**7**	Natural Resources Researcher		Male
2	0	47	2	CD47	**7**	Fisheries Researcher		Male
3	0	48	3	CD48	**7**	Hydrobiological Researcher		Male
4	0	49	4	CD49	**7**	Inspector of Agri. & Fisheries		Male
5	0	50	5	CD50	**7**	NGO Director		Male
6	0	51	6	CD51	7	Environment Administrator		Male
7	0	52	7	CD52	**7**	Aquaculture Researcher		Male
8	0	53	8	CD53	**7**	Former LTA Project Researcher		Male
			Uvira City					
9	0	54	1	CD54	**7**	Hydrobiological Researcher		Male
10	0	55	2	CD55	**7**	Socio economist Researcher		Male
11	0	56	3	CD56	**7**	Territorial AFGRI-Inspector		Male
12	0	57	4	CD57	**7**	Secretary of Traditional Chief		Male
13	0	58	5	CD58	**7**	The Territory Administrator		Male
14	0	59	6	CD59	**7**	Catholic Priest		Male
15	0	60	7	CD60	7	Manager of the Fisher Coop		Male
16	0	61	8	CD61	**7**	Hydrobiological Researcher		Male
17	0	62	9	CD62	**7**	NGO Coordinator		Male
	Individual & Household Category							
			Kalundu Site		CODED		CODED	Gender
18	0	1	1	CD01	**7**	Fisher	**2**	Male
19	0	2	2	CD02	**7**	Fisher	**2**	Male
20	0	3	3	CD03	**7**	Fisher (Crew captain)	**2**	Male
21	0	4	4	CD04	**7**	Fisher	**2**	Male
22	0	5	5	CD05	**7**	Fisher	**2**	Male
23	0	6	6	CD06	**7**	Fisher	**2**	Male
24	0	7	7	CD07	**7**	Fisher	**2**	Male
25	0	8	8	CD08	**7**	Fish trader	**1**	Female
26	0	9	9	CD09	**7**	Fisher	**2**	Male
27	0	10	10	CD10	**7**	Fish trader	**1**	Female
28	0	11	11	CD11	**7**	Fisher	**2**	Male
29	0	12	12	CD12	**7**	Boat owner	**3**	Male
30	0	13	13	CD13	7	Line Fisher	2	Male
31	0	14	14	CD14	**7**	Fisher	**2**	Male
32	0	15	15	CD15	**7**	Fisher	**2**	Male
			Mulongwe Site		CODED		CODED	Gender
33	0	16	1	CD16	**7**	Boat owner	**3**	Male
34	0	17	2	CD17	**7**	Fisher & Head fisher association	**2**	Male
35	0	18	3	CD18	**7**	Boat owner	**3**	Male
36	0	19	4	CD19	**7**	Fish Trader	**1**	Female
37	0	20	5	CD20	**7**	Boat owner & Fisher	**3**	Male
38	0	21	6	CD21	**7**	Fish Trader	**1**	Male
39	0	22	7	CD22	**7**	Boat owner	**3**	Male
40	0	23	8	CD23	**7**	Fish Trader	**1**	Female
41	0	24	9	CD24	**7**	Fisher	**2**	Male
42	0	25	10	CD25	**7**	Fisher & Crew Captain	**2**	Male

43	0	26	11	CD26	**7**	Fisher	**2**	Male
44	0	27	12	CD27	**7**	Fisher	**2**	Male
45	0	28	13	CD28	7	Fisher	2	Male
46	0	29	14	CD29	**7**	Fisher	**2**	Male
47	0	30	15	CD30	**7**	Fisher	**2**	Male
					CODED		**CODED**	**Gender**
			Kilomoni Site					
48	0	31	1	CD31	**7**	Fisher	**2**	Male
49	0	32	2	CD32	**7**	Fisher	**2**	Male
50	0	33	3	CD33	**7**	Fisher	**2**	Male
51	0	34	4	CD34	**7**	Fisher & Crew Captain	**2**	Male
52	0	35	5	CD35	**7**	Fisher	**2**	Male
53	0	36	6	CD36	**7**	Fisher	**2**	Male
54	0	37	7	CD37	**7**	Boat owner	**3**	Male
55	0	38	8	CD38	**7**	Fisher & Crue member	**2**	Male
56	0	39	9	CD39	**7**	Fisher	**2**	Male
57	0	40	10	CD40	**7**	Fisher	**2**	Male
58	0	41	11	CD41	**7**	Fisher	**2**	Male
59	0	42	12	CD42	**7**	Fisher	**2**	Male
60	0	43	13	CD43	**7**	Fisher	**2**	Male
61	0	44	14	CD44	**7**	Fisher	**2**	Male
62	0	45	15	CD45	7	Boat owner	3	Male
TANZANIA								
	Officials' Category							
			Kigoma City		**CODED**		**CODED**	**Gender**
63	1	0	1	TZ001	7	Senior Pastor	5	Male
64	2	0	2	TZ002	7	Fisheries Adviser Leader	5	Male
65	3	0	3	TZ003	7	Director Fisheries Research	5	Male
66	4	0	4	TZ004	7	Fisheries Researcher TAFIRI	5	Male
67	5	0	5	TZ005	7	Fisheries Director LTA	5	Female
68	6	0	6	TZ006	7	Fisheries Researcher TAFIRI	5	Male
69	7	0	7	TZ007	7	Manager Fisheries Education	5	Male
70	8	0	8	TZ008	7	Officer Fisheries Surveillance	5	Male
71	9	0	9	TZ009	7	Pastor PEFA Church	5	Male
72	10	0	10	TZ010	7	Fisheries biologist & NGO Head	5	Male
	Individual & Household Category							
					CODED		**CODED**	**Gender**
			Katonga Site					
73	11	0	1	TZ011	7	Boat owner	3	Female
74	12	0	2	TZ012	7	Boat owner	3	Male
75	13	0	3	TZ013	7	Boat owner	3	Male
76	14	0	4	TZ014	7	Fisher	2	Male
77	15	0	5	TZ015	7	Fisher	2	Male
78	16	0	6	TZ016	7	Fisher	2	Male
79	17	0	7	TZ017	7	Boat owner	3	Male
80	18	0	8	TZ018	7	Boat owner	3	Male
81	19	0	9	TZ019	7	Fisher	2	Male
82	20	0	10	TZ020	7	Fisher (crew captitain)	2	Male
83	21	0	11	TZ021	7	Boat owner & Fisher	3	Male
84	22	0	12	TZ022	7	Processor (female)	1	Female
85	23	0	13	TZ023	7	Boat owner	3	Male
86	24	0	14	TZ024	7	Boat crew and Fisher	2	Male
87	25	0	15	TZ025	7	Processor	1	Male
88	26	0	16	TZ026	7	Boat owner	3	Male

89	27	0	17	TZ027	7	Boat owner	3	Male
					CODED		**CODED**	**Gender**
			Kibirizi Village					
90	28	0	1	TZ028	7	Boat owner	3	Male
91	29	0	2	TZ029	7	Processor	1	Female
92	30	0	3	TZ030	7	Fisher / Captain	2	Male
93	31	0	4	TZ031	7	Boat owner /Fisher	3	Male
94	32	0	5	TZ032	7	Boat owner	3	Male
95	33	0	6	TZ033	7	Boat owner	3	Male
96	34	0	7	TZ034	7	Fish processor	1	Male
97	35	0	8	TZ035	7	Fisher	2	Male
98	36	0	9	TZ036	7	Fisher	2	Male
99	37	0	10	TZ037	7	Boat owner	3	Male
100	38	0	11	TZ038	7	Fisher	2	Male
101	39	0	12	TZ039	7	Fisher	2	Male
102	40	0	13	TZ040	7	Fisher	2	Male
103	41	0	14	TZ041	7	Fisher	2	Male
104	42	0	15	TZ042	7	Boat owner	3	Male
105	43	0	16	TZ043	7	Boat owner	3	Male
106	44	0	17	TZ044	7	Fisher	2	Male
107								
108					**CODED**		**CODED**	**Gender**
			Ujiji Village					
109	45	0	1	TZ045	7	Fisher/crew member	2	Male
110	46	0	2	TZ046	7	Fisher	2	Male
111	47	0	3	TZ047	7	Fisher	2	Male
112	48	0	4	TZ048	7	Boat owner	3	Male
113	49	0	5	TZ049	7	Fisher	2	Male
114	50	0	6	TZ050	7	Fisher	2	Male
115	51	0	7	TZ051	7	Boat owner	3	Male
116	52	0	8	TZ052	7	Fisher	2	Male
117	53	0	9	TZ053	7	Trader	1	Female
118	54	0	10	TZ054	7	Boat owner	3	Male
119	55	0	11	TZ055	7	Fisher	2	Male
120	56	0	12	TZ056	7	Boat owner	3	Male
121	57	0	13	TZ057	7	Boat owner	3	Male
122	58	0	14	TZ058	7	Fisher	2	Male
123	59	0	15	TZ059	7	Boat owner	3	Male
124	60	0	16	TZ060	7	Boat owner	3	Male
125	61	0	17	TZ061	7	Fish processor	1	Female

Second round fieldwork

CONGO								
	FOCUS GROUP WOMEN: WOMEN IN FISHERIES							
	TZ	**CD**			**CODED**	**Position**	**CODED**	**Gender**
			Kalundu					
107	1	63	1	CD063	1	Fish trader	1	Female
108	2	64	2	CD064	1	Fish trader	1	Female
109	3	65	3	CD065	1	Fish processor	1	Female
110	4	66	4	CD066	1	Fish processor	1	Female
111	5	67	5	CD067	1	Fish trader	1	Female
112	6	68	6	CD068	1	Fish trader	1	Female
113	7	69	7	CD069	1	Fish processor	1	Female

114	8	70	8	CD070	1	Fish trader	1	Female
			Mulongwe					
115	9	71	1	CD071	1	Fish Processor	1	Female
116	10	72	2	CD072	1	Fish Trader	1	Female
117	11	73	3	CD073	1	Fish Trader	1	Female
118	12	74	4	DC074	1	Fish Processor	1	Female
119	13	75	5	CD075	1	Fish Trader	1	Female
120	14	76	6	CD076	1	Fish Trader	1	Female
121	15	77	7	CD077	1	Fish Processor	1	Female
122	16	78	8	CD078	1	Fish Trader	1	Female
			Kilomoni					
123	17	79	1	CD079	1	Fish trader	1	Female
124	18	80	2	CD080	1	Fish trader	1	Female
121	19	81	3	CD081	1	Fish processor	1	Female
122	20	82	4	CD082	1	Fish processor	1	Female
123	21	83	5	CD083	1	Fish trader	1	Female
124	22	84	6	CD084	1	Fish trader	1	Female
125	23	85	7	CD085	1	Fish processor	1	Female
126	2	86	8	CD086	1	Fish processor	1	Female
	2	**FOCUS GROUPS: 1) SEASONAR CALANDAR & 2) TRENDS ANALYSIS**						
			Kalundu		**CODED**		**CODED**	**Gender**
127	25	87	1	CD087	2	Boat owner	3	Male
128	26	88	2	CD088	2	Fisher / Crew member	2	Male
129	27	89	3	CD089	2	Fisher / Boat captain	2	Male
130	28	90	4	CD090	2	Fisher / Crew	2	Male
131	29	91	5	CD091	2	Fish trader	1	Female
132	30	92	6	CD092	2	Fish processor	1	Female
133	31	93	7	CD093	2	Fish trader	1	Female
134	32	94	8	CD094	2	Fish processor	1	Female
			Mulongwe		**CODED**		**CODED**	**Gender**
135	33	95	1	CD095	2	Boat owner	3	Male
136	34	96	2	CD096	2	Fish porter	4	Male
137	35	97	3	CD097	2	Boat crew captain	2	Male
138	36	98	4	CD098	2	Net maker/repairer	4	Male
139	37	99	5	CD099	2	Fish processor	1	Female
140	38	100	6	CD100	2	Fish trader	1	Female
141	39	101	7	CD101	2	Fish processor	1	Female
142	40	102	8	CD102	2	Fish processor	1	Female
			Kilomoni		**CODED**		**CODED**	**Gender**
143	41	103	1	CD103	2	Fisher	2	Male
144	42	104	2	CD104	2	Boat owner	3	Male
145	43	105	3	CD105	2	Crew captain	2	Male
146	44	106	4	CD106	2	Fisher	2	Male
147	45	107	5	CD107	2	Fish processor	1	Female
148	46	108	6	CD108	2	Fish trader	1	Female
149	47	109	7	CD109	2	Fish trader	1	Female
150	48	110	8	CD110	2	Fish processor	1	Female
	3	**NARRATIVE - LIFESTORIES**						**Gender**
			Kalundu		**CODED**		**CODED**	**Gender**
151	49	111	1	CD111	3	Fish trader	1	Female
152	50	112	2	CD112	3	Fish processor	1	Female
153	51	113	3	CD113	3	Fisher	2	Male
154	52	114	4	CD114	3	Crew captain	2	Male
			Mulongwe					
155	53	115	1	CD115	3	Fish trader	1	Female

156	54	116	2	CD116	3	Fish trader	1	Female
			Kilomoni					
157	55	117	1	CD117	3	Crew captain	2	Male
158	56	118	2	CD118	3	Fisher – Crew member	2	Male
159	57	119	3	CD119	3	Fish trader	1	Female
160	58	120	4	CD120	3	Fish trader	1	Female
	4	**INTERVIEWS: LOWER-LEVEL FISHERIES OFFICERS**						**Gender**
			Kalundu		**CODED**		**CODED**	**Gender**
160	59	121	1	CD121	4	Fisheries officer	5	Male
161	60	122	2	CD122	4	Fisheries guard	5	Male
162	61	123	3	CD123	4	Fisheries guard	5	Male
			Mulongwe					
163	62	124	1	CD124	4	Fisheries guard	5	Male
164	63	125	2	CD125	4	Fisheries guard	5	Male
165	64	126	3	CD126	4	Fisheries officer	5	Male
			Kilomoni					
166	65	127	1	CD127	4	Fisheries guard	5	Male
167	66	128	2	CD128	4	Fisheries officer	5	Male
168	67	129	3	CD129	4	Fisheries officer	5	Male
	5	**FOCUS GROUPS: CALENDAR ANALAYS, MATRIX EXERCISE, RANKING, SCORING**						**Gender**
			Kalundu		**CODED**		**CODED**	**Gender**
169	68	130	1	CD130	5	Boat owner	3	Male
179	69	131	2	CD131	5	Fisher – Boat crew	2	Male
171	70	132	3	CD132	5	Fisher – Boat crew	2	Male
172	71	133	4	CD133	5	Fish trader	1	Female
			Mulongwe					
173	72	134	1	CD134	5	Fisher	2	Male
174	73	135	2	CD135	5	Boat owner	3	Male
175	74	136	3	CD136	5	Crew captain	2	Male
176	75	137	4	CD137	5	Fish processor	1	Female
			Kilomoni					
177	76	138	1	CD138	5	Fisher	2	Male
178	77	139	2	CD139	5	Crew captain	2	Male
179	78	140	3	CD140	5	Fisher	2	Male
180	79	141	4	CD141	5	Fish trader	1	Female
	6	**TRANSECT WALK ACTIVITIES**						**Gender**
	1		**Kalundu**			**Transect walk Group A & B**		
181	80	142	1	CD142	6	Practicum student,	5	Female
182	81	143	2	CD143	6	Practicum student, Environment	5	Male
183	82	144	3	CD144	6	Practicum student, NRM	5	Female
184	83	145	4	CD145	6	Research Assistant	5	Male
185	84	146	5	CD146	6	Research Assistant	5	Female
			Mulongwe			**Transect walk Group A & B**		
186	85	147	1	CD147	6	Worker - fisheries research Lab.	5	Male
187	86	148	2	CD148	6	Student at l'ISRD - Environment	5	Male
188	87	149	3	CD149	6	Student - Bio-Chemistry	5	Female
189	88	150	4	CD150	6	Research Assistant	5	Male
190		151	5	CD151	6	Research Assistant	5	Female
			Kilomoni			**Transect walk Group A & B**		
191	89	152	1	CD152	6	Student - Bio-Chemistry	5	Male

192	90	153	4	CD153	6	Graduate -regional planning	5	Male
193	91	154	3	CD154	6	Graduate computing	5	Female
194	92	155	4	CD155	6	Research Assistant	5	Male
195	93	156	5	CD156	6	Research Assistant	5	Female
TANZANIA		**No**		**Name**		**Occupation**		**Gender**
		FOCUS GROUP WOMEN: WOMEN IN FISHERIES					**CODED**	**Gender**
	TZ	DC	**Katonga**		**CODED**		**CODED**	**Gender**
196	62	0	1	TZ062	1	Fish Processor / Trader	1	Female
197	63	0	2	TZ063	1	Fish Processor / Trader	1	Female
198	64	0	3	TZ064	1	Fish Processor / Trader	1	Female
199	65	0	4	TZ065	1	Boat owner	3	Female
200	66	0	5	TZ066	1	Fish Processor / Trader	1	Female
201	67	0	6	TZ067	1	Fish Processor / Trader	1	Female
202	68	0	7	TZ068	1	Fish Processor / Trader	1	Female
203	69	0	8	TZ069	1	Fish Processor / Trader	1	Female
			Kibirizi		**CODED**		**CODED**	**Gender**
204	70	0	1	TZ070	1	Fish Processor / Trader	1	Female
205	71	0	2	TZ071	1	Fish Processor / Trader	1	Female
206	72	0	3	TZ072	1	Fish Processor / Trader	1	Female
207	73	0	4	TZ073	1	Fish Processor / Trader	1	Female
208	74	0	5	TZ074	1	Fish Processor / Trader	1	Female
209	75	0	6	TZ075	1	Fish Processor / Trader	1	Female
210	76	0	7	TZ076	1	Fish Processor / Trader	1	Female
			Ujiji		**CODED**		**CODED**	**Gender**
211	77	0	1	TZ077	1	Fish Processor / Trader	1	Female
212	78	0	2	TZ078	1	Fish Processor / Trader	1	Female
213	79	0	3	TZ079	1	Fish Processor / Trader	1	Female
214	80	0	4	TZ080	1	Fish Processor / Trader	1	Female
215	81	0	5	TZ081	1	Fish Processor / Trader	1	Female
		FOCUS GROUPS: 1) SEASONAR CALENDAR & 2) TRENDS ANALYSIS						**Gender**
			Katonga		**CODED**	**SEASONAR CALENDAR**	**CODED**	**Gender**
216	82	0	1	TZ082	2	Boat owner	3	Male
217	83	0	2	TZ083	2	Fisher / Crew	2	Male
218	84	0	3	TZ084	2	Fisher / Crew captain	2	Male
219	85	0	4	TZ085	2	Boat owner	3	Male
220	86	0	5	TZ086	2	Boat owner	3	Male
221	87	0	6	TZ087	2	Fish Processor	1	Female
222	88	0	7	TZ088	2	Fish trader	1	Female
223	89	0	8	TZ089	2	Fisher	2	Female
			Kibirizi Site		**CODED**	**SEASONAR CALENDAR**	**CODED**	**Gender**
224	90	0	1	TZ090	2	Processor	1	Male
247	91	0	2	TZ091	2	Fisher gilnet	2	Male
248	92	0	3	TZ092	2	Fisher	2	Male
249	93	0	4	TZ093	2	Trader/Seller	1	Female
250	94	0	5	TZ094	2	Trader/Seller	1	Female
251	95	0	6	TZ095	2	Trader/Seller	1	Female
252	96	0	7	TZ096	2	Processor/Seller	1	Male
253	97	0	8	TZ097	2	Fisher	2	Female
254	98	0	9	TZ098	2	Fisher	2	Female
			Ujiji Site		**CODED**		**CODED**	**Gender**
255	99	0	1	TZ099	2	Processor	1	Male
256	100	0	2	TZ100	2	Fisher	2	Male
257	101	0	3	TZ101	2	Fisher	2	Male
258	102	0	4	TZ102	2	Processor	1	Female

259	103	0	5	TZ103	2	Fisher	2	Male
260	104	0	6	TZ104	2	Processor	1	Male
		NARRATIVE - LIFESTORIES					**CODED**	**Gender**
			Katonga site		**CODED**		**CODED**	**Gender**
261	105	0	1	TZ105	3	Fish processor	1	Female
262	106	0	2	TZ106	3	Fish processor	1	Female
263	107	0	3	TZ107	3	Fish processor	1	Female
			Kibirizi Site					
264	108	0	1	TZ108	3	Fish trader	1	Female
265	109	0	2	TZ109	3	Fish processor	1	Female
			Ujiji Sirerer					
266	110	0	1	TZ110	3	Fish trader	1	Female
267	111	0	2	TZ111	3	Fish trader/Restaurant owner	1	Female
		INTERVIEWS: LOWER-LEVEL FISHERIES OFFICERS						**Gender**
			Katonga		**CODED**		**CODED**	**Gender**
268	112	0	1	TZ112	4	Fisheries officer	5	Male
269	113	0	2	TZ113	4	Fisheries officer	5	Male
				Kibirizi				
270	114	0	1	TZ114	4	Fisheries officer	5	Female
271	115	0	2	TZ115	4	Fisheries officer	5	Male
				Ujiji				
172	116	0	1	TZ116	4	Fisheries officer	5	Male
		FOCUS GROUPS: CALENDAR ANALAYS, MATRIX EXERCISE, RANKING, SCORING					**CODED**	**Gender**
			Katonga		**CODED**	**Seasonal Calendar Matrix**	**CODED**	**Gender**
273	117	0	1	TZ117	5	Fish processor	1	Female
274	118	0	2	TZ118	5	Fisher / Crew member	2	Male
275	119	0	3	TZ119	5	Fish processor	1	Male
276	120	0	4	TZ120	5	Fish trader	1	Female
277	121	0	5	TZ121	5	Fish processor	1	Male
278	122	0	6	TZ122	5	Fish processor	1	Female
279	123	0	7	TZ123	5	Fish processor	1	Female
			Kibirizi		**CODED**	**Seasonal Calendar Matrix**	**CODED**	**Gender**
280	124	0	1	TZ124	5	Fish trader	1	Female
281	125	0	2	TZ125	5	Boat Owner	3	Male
282	126	0	3	TZ126	5	Fish trader	1	Male
283	127	0	4	TZ127	5	Fish processor	1	Male
284	128	0	5	TZ128	5	Fisher - Crew member	2	Male
285	129	0	6	TZ129	5	Fish processor	1	Female
286	130	0	7	TZ130	5	Fish processor	1	Female
287	131	0	8	TZ131	5	Fish trader	1	Female
			Ujiji		**CODED**	**Trends Analysis Matrix**	**CODED**	**Gender**
288	132	0	1	TZ132	5	Boat Owner	3	Male
289	133	0	2	TZ133	5	Fish processor	1	Male
290	134	0	3	TZ134	5	Boat Owner	3	Male
291	135	0	4	TZ135	5	Fish trader	1	Female
292	136	0	5	TZ136	5	Boat Owner	3	Male
293	137	0	6	TZ137	5	Fisheries Officer	4	Male
294	138	0	7	TZ138	5	Fisher/Crew member	2	Male
		TRANSECT WALK ACTIVITIES					**CODED**	**Gender**
			Katonga		**CODED**	**Transect walk Group A & B**	**CODED**	**Gender**
295	139	0	1	TZ139	6	Fish trader	1	Female
296	140	0	2	TZ140	6	Fisher/ Crew member	2	Male

297	141	0	3	TZ141	6	Fish trader	1	Female
298	142	0	4	TZ142	6	Research Assistant	5	Male
299	143	0	5	TZ143	6	Fish trader	1	Male
300	144	0	6	TZ144	6	Fish trader	1	Male
301	145	0	7	TZ145	6	Research Assistant	5	Female
302	146	0	8	TZ146	6	Fisher/ Crew member	2	Male
			Kibirizi		**CODED**	**Transect walk Group A & B**	**CODED**	**Gender**
303	147	0	1	TZ147	6	Processor	1	Female
304	148	0	2	TZ148	6	Boat owner	3	Male
305	149	0	3	TZ149	6	Fish trader	1	Female
306	150	0	4	TZ150	6	Research Assistant	5	Female
307	151	0	5	TZ151	6	Fisher	2	Male
308	152	0	6	TZ152	6	Processor	1	Male
309	153	0	7	TZ153	6	Boat Owner	3	Female
310	154	0	8	TZ154	6	Research Assistant	5	Male
			Ujiji		**CODED**	**Transect walk Group A & B**	**CODED**	**Gender**
310	155	0	1	TZ155	6	Fisher / Crew member	2	Male
311	156	0	4	TZ156	6	Fish processor	1	Female
312	157	0	3	TZ157	6	Research Assistant	5	Male
313	158	0	2	TZ158	6	Boat Owner	3	Male
314	159	0	5	TZ159	6	Fisher / Crew member	2	Male
315	160	0	6	TZ160	6	Research Assistant	5	Female

Appendix 4.6 Risk assessment: Fieldwork in DRC

RISK ASSESSMENT AND PROCEDURES

Visit to: BUKAVU and UVIRA, Eastern Democratic Republic of Congo (DRC)

This is a brief assessment of the risks and the procedures in place to minimise risks involved in a University study visit to a conflict-ridden region of Eastern DRC; to safely access fieldwork sites and conduct planned research activities. Eastern DRC is known for its chronic instability and seemingly unending violence, the origin of which has been mainly attributed to external pursuits of economic gains in accessing and extracting valuable natural resources including gold, diamonds, and coltan, by exploiting ethnic and tribal tensions within and among its major population groups.

Travel plans

Deo Namwira of Congolese origin but a Canadian citizen, will be travelling to Uvira, DRC in April and May, and August and September of 2017 to carry out the fieldwork for his PhD research i.e. investigating how small-scale fisherfolk respond to situations of prolonged, violent conflict in developing countries and to study what enables them to survive and maintain their livelihoods. The research will use Lake Tanganyika in Eastern DRC as the case study.

The visit will start out in Bukavu, capital city of the South Kivu province where all the necessary permits will be obtained as well as receiving orientation and completing practical formalities with the assistance of the local University which has offered to provide support during this fieldwork. The choice of the fieldwork sites is related to their good conditions of access and security in addition to their high fishing intensity. Roads are good and fairly safe for visitors to access any of these sites.

Crime/Security

The travel advisory section on the Foreign and Commonwealth Office (FCO) website advises "against all but essential travel to Bukavu". Uvira where most of the work will take place is not explicitly named among the cities concerned in the travel advisory to DRC.

While the situation in DRC is generally considered to be unstable due to the state of protracted crisis and state fragility; uncertainties ahead of elections expected to take place in December 2017 could possibly increase the potential risk of unrest by people. However, to decrease this risk, all the fieldwork activities are planned to be completed by September 2017.

Other risks are possible night armed banditry and theft, which will be allayed by exercising a high degree of caution including avoiding being in rural areas and on the road after dark when most attacks on people occur. Such attacks tend only to be directed at employees in the mining industry and have never occurred in main cities like Uvira and Bukavu.

Doctoral researchers from Oxford and Birmingham, to whom Deo spoke, who, in the recent past travelled to North and South Kivu indicated no record of problems during their visits.

Being of Congolese origin will help Deo keep a low profile. He will not be directly exposed to same threats foreigners are naturally exposed to do to their perceived wealth. As well, Deo's ability to speak several of the local languages will also assist him in not making himself obvious by needing a translator for everything he will be doing.

Finally, it is important to stress that this study does not address any sensitive issues both culturally and politically, and that its activities will be authorised by all essential and necessary authorities and endorsed by the Evangelical University of Africa (UEA). UEA is a well-regarded local university with important networks essential in terms of gathering security-related information and planning. This will give Deo access to the many UN agencies and International NGOs which are on the ground and provide him with security updates and flash information.

Health

All travellers to DRC are advised to take suitable preventative measures against health hazards. These include anti-malarial and vaccinations for yellow fever, cholera, typhoid, hepatitis A, tetanus, polio and meningitis. Deo has taken all these recommended vaccinations on March 7, 2017, at the Harborne Travel Clinic in Birmingham and a prescription for anti-malaria drugs was provided to him. Deo will also take necessary precautions to stay in accommodation facilities after obtaining advice/information on basic hygiene and environment safety conditions.

Transportation

Deo will be flying from Heathrow Airport to Kigali international airport in Rwanda. Travel to and from Heathrow will be by public transport. From Kigali Deo will board a domestic flight to Kamembe, a Rwandan city at the border with DRC. From Kamembe Deo will be escorted by the UEA personnel and vehicle to enter DRC and proceed to the arranged accommodation. UEA will facilitate Deo's way to Uvira from Bukavu overland through Rwanda. This will require a multiple entry visas to the DRC which Deo will obtain

Once in Uvira, all on the road travel for field visits should generally be taken with motorbikes as public transportation is not reliable. Deo will rent two motorbikes as needed with drivers, recommended by UEA or its NGO partners, for their knowledge and respect for safe driving guidelines. These visits by motorbikes will take place between 8:00 am to 4:00 pm in villages as well as in cities.

It is unlikely that at any time Deo will be travelling alone for the duration of his fieldwork in DRC.

Further action

On March 04, 2017 Deo took five on-line training modules which included surveillance, awareness, observations, vigilance, and kidnapping with the International SOS e-learning program modules on security awareness and safety. He also has signed up for the registration of Canadian citizens abroad to get services and assistance in case of an emergency. These services include receiving the latest safe travel news.

Deo is committed to making every possible effort to observe these additional measures that will include:

- Monitor for any security alerts on security situations through both British travel advisories and will also seek local advice prior to travel.
- Prepare and carry an emergency contact list of relevant and useful persons to whom he can turn in the event of need.
- Keep a low profile and avoid to be directly exposed to threats foreigners are frequently exposed to due to their perceived wealth. In other words dress simply and as much in the local context so as not to stand out in a crowd.
- Choose an accommodation in areas where International NGOs are located to ensure personal safety.
- Have transit visitor's visas for Rwanda and Burundi valid at all times to be able to safely transit to either one of the two countries whenever it is needed
- Follow local laws, regulations, and interact politely, courteously and respectfully with people at all times.
- Carry a First Aid kit and a flashlight on all field visits.

Appendix 4.7 Emergency evacuation plan: Fieldwork in DRC

SECURITY PROCEDURES AND EMERGENCY EVACUATION PLAN

In what follows, several measures and procedures are set out based on information provided by a French based Consultant working on European Union projects in Eastern Congo, the Christian-Aid/ UK Eastern Congo Regional Director and the Advisor working with the Europe Security Team that covers Democratic Republic of Congo at the from Global Security Centre, a London-based organisation. These measures and procedures obtained and put together in the first week of November 2016 contain current conditions to safely access fieldwork sites and conduct planned research activities. Every possible effort will be made to observe these measures and procedures during my fieldwork in the Eastern Democratic Republic of Congo (DRC), both for risk prevention and emergency evacuation in the event of extreme safety risks or actual danger.

1. Awareness and Information

- Obtain updates on security situations before setting out for the DRC through both British and Canadian travel advisories.
- Get all necessary travel vaccinations in Canada before my departure and carry an international vaccination card. .
- Once in the DRC obtain information from established local contacts to confirm itinerary and logistical arrangements of my fieldwork.
- Prepare and carry an emergency contact list of relevant and useful persons to whom I can turn in the event of need.
- Obtain additional briefing and security information from the International NGOs partners present on the ground.
- Inform the Canadian embassies and consulates in Rwanda, Burundi and DRC of my presence in DRC and my intended destination and locations.
- Refrain from giving opinions on sensitive or internal political issues and questions.

2. Safety procedures

- At all times carry my passport, visitor's visa, student card and relevant authorisation letters and documents required to travel within the country.
- Keep the cellular phone topped up and maintain spare airtime for emergency use.
- Follow local laws, regulations, and interact politely, courteously and respectfully with people at all times.
- All on the road travel for field visits should generally take place between 8:00 am to 4:00 pm in villages, and 8:00 am to 8:00 pm in cities such as Bukavu and Uvira.
- Carry a First Aid kit and a flashlight on all field visits.
- Avoid or exercise caution in a built-up areas when there is a potential for crowds to form.
- Refuse politely but firmly if asked for goods in exchange for passage/bribe at checkpoints.
- Stay in guest houses, hotels or other lodging facilities after obtaining advice/information on, basic hygiene, environment safety & security arrangements.
- Rent two motorbikes as needed with drivers who will be recommended by partner local NGOs from their knowledge and respect of safe driving guidelines. They will be used by my assistant and myself for overland transportation as public means are not reliable when going back and forth to villages.
- Be always accompanied by a local individual who knows the area well. This will be the research assistant
- Keep a low profile and avoid to be directly exposed to threats foreigners are frequently exposed to due to their perceived wealth. In other words dress simply and as much in the local context so as not to stand out in a crowd.

4. Emergency preparedness and evacuation

- Save valuable research information and documents in online dropbox folder and in an external driver as computers can be destroyed or lost in a situation of emergency.
- Follow procedures set out by international NGOs present on the ground in cases of incidents that require evacuation.
- Maintain one-week stock of non-perishable food items for emergency situations, which may arise at any time without warning.
- If needed, move to a location to ensure personal safety, in areas where International NGOs are located such as Baraka and Uvira.

- Be aware of and fully familiar with policies on evacuation for expatriate and foreign visitors by NGOs present on the ground in situations of medical emergency, a critical security incident or intense security threat.
- Contact the insurance company as well as Canadian embassies, which can be alerted of any event of extreme risk that requires evacuation.
- Have transit visitor's visas for Rwanda and Burundi valid at all times to be able to safely transit to either one of the two countries whenever it is needed.

Appendix 4.8 Ethical approval letter: Fieldwork in DRC

UNIVERSITY OF BIRMINGHAM

FINANCE OFFICE

17th August 2017

Dear Dr Nunan & Dr Beswick

Re: "Fisherfolk Livelihoods and Institutional Bricolage: a cross-sectional comparison of coping and adapting on Lake Tanganyika"
Application for Ethical Review ERN_16-1482

Thank you for your application for ethical review for the above project, which was reviewed by the Humanities and Social Sciences Ethical Review Committee.

On behalf of the Committee, I confirm that this study now has full ethical approval.

I would like to remind you that any substantive changes to the nature of the study as described in the Application for Ethical Review, and/or any adverse events occurring during the study should be promptly bought to the Committee's attention by the Principal Investigator and may necessitate further ethical review.

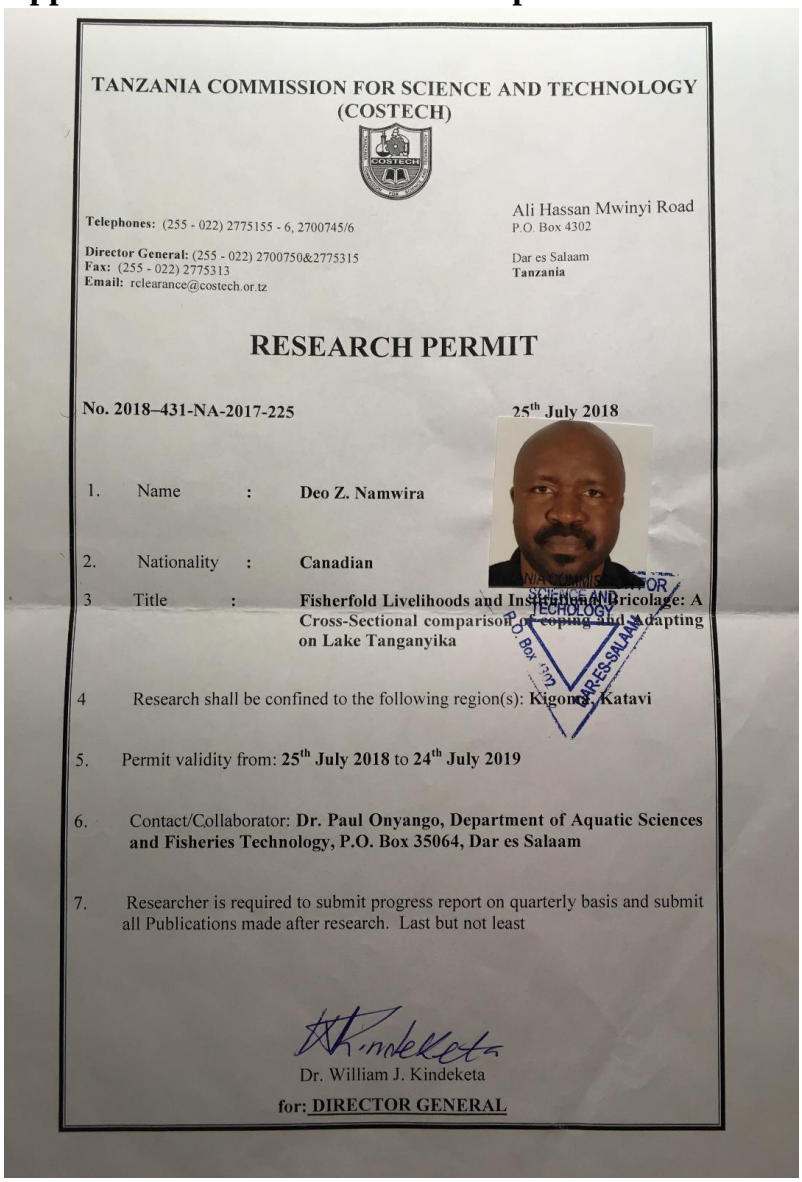
Please also ensure that the relevant requirements within the University's Code of Practice for Research and the information and guidance provided on the University's ethics webpages (available at https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx) are adhered to and referred to in any future applications for ethical review. It is now a requirement on the revised application form (https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Ethical-Review-Forms.aspx) to confirm that this guidance has been consulted and is understood, and that it has been taken into account when completing your application for ethical review.

Kind regards,

Miss Sam Waldron
Deputy Research Ethics Officer
Research Support Group
University of Birmingham
Tel: 0121 414 8101
Email: s.m.waldron@bham.ac.uk

University of Birmingham Edgbaston Birmingham B15 2TT United Kingdom
w: www.finance.bham.ac.uk

Appendix 4.9 Tanzanian research permit



TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY
(COSTECH)

Telephones: (255 - 022) 2775155 - 6, 2700745/6

Director General: (255 - 022) 2700750&2775315
Fax: (255 - 022) 2775313
Email: rclearance@costech.or.tz

Ali Hassan Mwinyi Road
P.O. Box 4302

Dar es Salaam
Tanzania

RESEARCH PERMIT

No. 2018–431-NA-2017-225

25th July 2018

1. Name : Deo Z. Namwira

2. Nationality : Canadian

3 Title : Fisherfold Livelihoods and Institutional Bricolage: A Cross-Sectional comparison of coping and adapting on Lake Tanganyika

4 Research shall be confined to the following region(s): Kigoma, Katavi

5. Permit validity from: 25th July 2018 to 24th July 2019

6. Contact/Collaborator: Dr. Paul Onyango, Department of Aquatic Sciences and Fisheries Technology, P.O. Box 35064, Dar es Salaam

7. Researcher is required to submit progress report on quarterly basis and submit all Publications made after research. Last but not least

Dr. William J. Kindeketa
for: DIRECTOR GENERAL

Appendix 4.10 Participant Information Sheet: Fieldwork

Project Title:

Fisherfolk Livelihoods and Institutional Bricolage: a cross-sectional comparison of coping and adapting on Lake Tanganyika.

This in-depth interview is being conducted by: Mr. Deo Namwira

Name of organization: International Development Department (IDD), University of Birmingham

Name of Supervisors: Dr. Fiona Nunan and Dr Danielle Beswick

Name of Sponsor: None

This consent form has two parts:

- **Part I:** Information Sheet
- **Part II:** Consent form

Part I: Information sheet

Mr. Deo Namwira is conducting research to investigate how small-scale fisherfolk respond to situations of uncertainty and shock resulting from chronic insecurity and associated migration. Factors that might affect how fisherfolk respond include government policies, local norms, taboos, rules and social, power and gender relations, which are referred to as 'institutions'. Understanding people's coping mechanisms and how they use institutions to adapt, survive, and maintain their livelihoods, can inform development policies, interventions and fisheries management projects. I would like to invite you to participate in this research. (I will read this to informants)

Purpose of the research:

This research is being undertaken for my PhD studies at the University of Birmingham, for which a thesis will be completed and submitted to the University for the fulfilment of the degree.

Type of research intervention:

This research interview will take about one hour.

Participant selection

You are being invited to take part in the research because, based on the researcher's judgement, you have knowledge about Lake Tanganyika fisheries, about any existing regulation mechanisms of fishing activities, and about externally imposed disturbances experienced by Congolese fisherfolk, either as residents or migrants.

Procedures:

If you agree to take part in this research, I will ask you to help with the following:

• Take part in an interview with me

• Share your knowledge and experiences in response to questions that I will be asking you.

• Give permission for the interview to be audio recorded.

Risks and Benefits of being in this study:

You do not have to answer any question or take part in the discussion if you feel the questions are too sensitive. All the questions were carefully prepared to avoid any aspect that would be considered as sensitive or culturally inappropriate in the context of eastern DRC and Western Tanzania. Therefore, no risk is anticipated if you choose to participate in the study.

Your participation will help find out about the connection between fisheries livelihood changes in both conflict and more stable situations.

Confidentiality and sharing the results:

Information provided through interviews will be kept confidentially and generated results will be reported anonymously. The recording and notes will be referred to by codes in the analysis rather than by name or position. Data without names, which will be recorded in text format, will saved electronically. Electronic files containing them will be securely stored using available university services in a location accessible through a secured password and a log-in identifier.

Voluntary participation and right to refuse or withdraw:

Please note that you have the right to withdraw your information provided for the research within two weeks after the interview if you wish by contacting me on +447821461422 either calling or texting using the most common free services provided by 'whatsup'. There will be no consequence for withdrawing given that this is a voluntary participation. In the event of withdrawal, your information will be permanently deleted. If you so wish, you may also stop the interview and withdraw your consent during the interview itself.

Contact and questions:

If you have any question, you may ask it now. Should you wish to ask it later, you may contact me at: dzn588@student.bham.ac.uk You may also contact my main supervisor Dr Fiona Nunan via email and Skype at: f.s.nunan@bham.ac.uk and fiona.nunan1, respectively.

Appendix 4.11 Coding structure used – Data generated (Selected items)

Participants categories	
1	Official
2	Household/ Individual
3	Law level fisheries officers

Site Location - TZ	
1	Katonga
2	Kibirizi
3	Ujiji

Marital Status	
1	Married
2	Single/Separated
3	Single/Widowed

Family category	
1	Household
2	Individual

Tribe	
1	Bembe
2	Fuliru
3	Vira
4	Other
5	No answer

Gender	
1	Male
2	Female

Participants per rounds of fieldworks	
1	First Round of Fieldwork
2	Second Round of Fieldwork
3	Other

Reasons for entering fisheries	
1	Followed family activity/ parents' profession
2	Unable to find another job
3	Attracted by fast and high income
4	Hunger and poverty
5	Can eat also my activity products
6	I like fishing

Fishing techniques used	
1	Use one fishing technique only
2	Navigate between two or more techniques
3	No answer

Types of Fishing techniques used (1=Y & 2=N)	

Official category	
1	Government Offices/Services
2	Research & University Professional
3	NGO & Local Associations
4	Traditional & Religious Authorities

Age category	
1	15 – 25 years
2	26 – 35 Years
3	36 – 45 Years
4	46 – 46 + Years
5	No Answers

Family Size	
1	One person
2	2 – 6 People
3	7 – 11 People
4	12 + People
5	No Answer

Religion	
1	Christian
2	Muslim
3	No religion
4	No answer

Self-help groups memberships	
1	Member
2	Not member

Participants types of fieldwork activities	
1	Focus Groups Women Only
2	FG Trends Analysis & Seasonal Calendar
3	Life Stories Narratives
4	Interviews with Fisheries Officer
5	FG Calendar Analysis & Matrix Exercise
6	Transect walks
7	Semi-structured Interviews

Types of fish Catch, Trade. (1=Y & 2=N)	
Y/N	Any fish that I found without preference
Y/N	Targets only those in high demand and easily sold
Y/N	Fish that the laws permit
Y/N	No answer

Types of fish (catch, trade or process)	
Y/N	Dagaa – Karumba
Y/N	Kahuzu (babies Dagaa – Small sardines)
Y/N	Mukeke – Mukebuka

Site Location - DRC	
1	Kalundu
2	Mulongwe
3	Kilomoni

Type of Fishing-related activity	
1	Fish Trader/Processor
2	Fisher/Crew Member
2	Boat Owner
4	Other

Years of Experience	
1	1 – 10 Years
2	1 – 10 Years
3	21 – 30 Years
4	31 + years

Residence status	
1	Native / Autochthonous resident
2	Migrant resident (National)
3	Migrant resident (International)
4	No answer

Family members living location	
1	Living together
2	Scattered
3	Single living alone
4	No answer

Fishers' secondary sources of food/income	
Y/N	Farming – Food crops
Y/N	Small business
Y/N	Manual handling jobs / construction
Y/N	Soccer player
Y/N	Charcoal / Bricks burning and sales
Y/N	Transportation / porterage

Types of change in fishing over time	
Y/N	Reduced fish catch / Lack of fish
Y/N	Drop in income / Increased hunger & poverty
Y/N	Change technique / gears / long fishing hours
Y/N	Reduced traditional beliefs practice overfishing
Y/N	Increased number of fishers, boats, gears
Y/N	Loss of people, fishing equipment due to conflict
Y/N	Reduced access to lake, fishing areas & distances
Y/N	Unstable & dysfunctional state services
Y/N	Prohibited fishing techniques
Y/N	Change of the climate / Weather / Water

Y/N	Line fishing – Kachinga – Ndoano
Y/N	Trap fishing – Mtego
Y/N	Lift net fishing – Kipe
Y/N	Gill net fishing – Makira
Y/N	Ring net fishing – Mutimbo
Y/N	Beach seine fishing – Kokoro – Mukwabo
Y/N	Unspecified / Different techniques

Change in fishing over time	
1	Yes
2	No
3	No answer

Areas affected by the conflict	
1	Most often / Very much / Many times/ A lot
2	Occasionally / Not really
3	Just recently
4	Never

Reasons for staying in fisheries	
Y/N	Family activity / parents' legacy / family tradition
Y/N	Fishing gives fast and good income
Y/N	Unable to find another job
Y/N	Hunger and Poverty
Y/N	Fishing only available job / I have no other choice
Y/N	Content with anything I can get when fishing
Y/N	It is the only job known / that we are used to
Y/N	Hope for a better future by God's grace
Y/N	No answer

Fishers' lives affected by the conflict	
1	Yes
2	No

Ways fishers' lives were affected by the DRC conflict	
Y/N	Food shortage and Hunger
Y/N	Constant fear of losing lives and properties
Y/N	Losses of lives and equipment / Gang robberies

Y/N	Lumbu
Y/N	Nonzi
Y/N	Kambaza
Y/N	Marumbu
Y/N	Mbiya
Y/N	Nyamunyamu (babies Mikeke)
Y/N	Capitaine
Y/N	Kuhe
Y/N	Tilapia
Y/N	Marinda
Y/N	Sangare
Y/N	Sangare

Coping / adapting approaches	
1	Fleeing
2	Keep fishing

How fisheries / fishing were affected by the DRC conflict	
Y/N	Forced to stay in homes / Inability to fish in battles
Y/N	Loss/destruction of people & equipment in waters
Y/N	Lack of fish / fish stock decline/ longer fishing hrs
Y/N	Drop in fishing income / Drop in fish prices
Y/N	Reduced access to waters by fear of being harmed
Y/N	Impediment to socioeconomic progress f
Y/N	Devaluation of local currently against US$
Y/N	Hunger/Unemployment / Unbearable life
Y/N	Recurrent fleeing & Displacement/ separations
Y/N	Increased fishers / bringing new fishing methods
Y/N	Killed the state & its services /unable to help us

Coping and adapting approaches	
Y/N	Catch, trade or process fish in one location
Y/N	Catch, trade and process fish in multiple locations
Y/N	Use one fishing technique
Y/N	Use multiple fishing techniques
Y/N	Illegal fishing practices to catch more fish

Y/N	Chronic insecurity and fear of life/properties
Y/N	Fish price increase
Y/N	More hassles by officers than in the past
Y/N	Numbers of fishers (to hirer) has dropped

Reasons for reduced fish catch	
Y/N	Will , plan of God
Y/N	Inadequate technique / rickety equipment
Y/N	Conflict and permanent conditions of insecurity
Y/N	Destructive practice/activities, prohibited gears
Y/N	Reduced practices of rituals / work of witches
Y/N	Too many fishers/ boats/ gears on the lake
Y/N	Climate, season and weather conditions
Y/N	Pollution in the waters/from human activities
Y/N	Change in fish prices

Fishing related activities respected	
1	Yes - Because it gives higher income
2	Yes - Because it allows to eat from catches
3	Yes - Because many depend on it for living

Resources to choose for help	
Y/N	Saving / money / loan
Y/N	God / Jesus
Y/N	Fishing equipment
Y/N	Peace / rights/Justice
Y/N	Job / work

How do people get into fishing related activities	
Y/N	Needs Fishing Permit for boat owners only
Y/N	There are people who fish without permit
Y/N	Needs to have own means/ fishing equipment
Y/N	Has to learn how to fish
Y/N	Permits are issued from Environment services
Y/N	Permits are issues from Maritime Services

Y/N	Poverty generation
Y/N	Loss of purchasing power
Y/N	Unemployment and changes in livelihoods
Y/N	Peaceful/ stable environment/ less hassles
Y/N	Difficult condition to integrate fishing activities
Y/N	Many fishers, longer fishing, less family time
Y/N	Forced fleeing, displacement, migrations
Y/N	Social ties disruptions by constant displacements
Y/N	Facing difficulties in a foreign country

Who to turn to for help in situations of difficulties	
1	Jesus / God
2	Family members / Children
3	Boss / boat owner
4	Close friend
5	State services
6	Fishers committees
7	No answer / None

Livelihood strategies according to officials	
Y/N	Flee to safer places and return
Y/N	Organise in self-help associations
Y/N	Stop fishing momentarily
Y/N	Migrate to areas where they can resettle and fish
Y/N	Stay hiding in their homes
Y/N	Pay ransom to armed groups in control
Y/N	Change their food habits & rely farming produces
Y/N	Seek the highest possible catches by illegal gears
Y/N	Involve in non-fisheries as secondary activities

Cope with stressful situations	
Y/N	Family members abroad helping financially
Y/N	Faith in God/Jesus and prayers
Y/N	Seek means to catch more fish / Save as more
Y/N	Switching fishing equipment / methods
Y/N	Try to get loans / use saved provisions
Y/N	Negotiate payment to officers or armed groups

Y/N	Find an additional job outside of fisheries / saving
Y/N	Other

Ability to withstand disturbances indicators	
1	When we have extra income / Good savings
2	I don't know / Will of God
3	Courage to carry on with work despite difficulties
4	When I can flee safely / stay safe / fish safely

Strategies in response to violence & insecurity	
Y/N	Flee to safer areas and return
Y/N	Stay locked inside the houses / temporarily Stop fishing
Y/N	Migrate and resettle to safer areas
Y/N	Enter the waters and try to fish during insecurity

Most difficult conditions	
Y/N	Fishing machines / equipment confiscated
Y/N	Drop in fish stock in the lake

What influences choices of survival strategies	
Y/N	Lack of outside help
Y/N	Level of pressures and difficulties
Y/N	Knowledge of the type of the types of violence
Y/N	Knowledge of survival livelihood possibilities
Y/N	Types of relations they have with armed groups
Y/N	Awareness of danger from past experiences lived
Y/N	Availability of means (financial from savings)
Y/N	Favourable conditions in their areas
Y/N	Reliance on God for guidance

What keeps people into fishing activities	
Y/N	Family activity/Parents legacy/Family tradition
Y/N	Fishing gives fast and good income
Y/N	Unable to find another job
Y/N	Hunger and Poverty
Y/N	Fishing is the only available job
Y/N	Fishing is the only job I know/ I am used to

Y/N	No condition to enter fishing
Y/N	Get hired by a boat owner
Y/N	Join a fishing association
Y/N	Needs to have money to pay daily taxes
Y/N	Needs to pay an annual tax

Management services at landing sites	
Y/N	Do people trust those is charge?
Y/N	Any rules affecting behaviour in the fisheries
Y/N	Knowledge of any traditional rule

Interactions with actors & services at the beach	
Y/N	We have no choice but interact well with them
Y/N	We interact well when we have good catch
Y/N	We only see those who come to ransom us
Y/N	We interact well with them
Y/N	We never seen any NGO here
Y/N	Interaction is good when we have lower catch

Livelihood assets or resources base fisherfolk turn to	
Y/N	Farming / vegetable growing
Y/N	Manual handling jobs
Y/N	Forest for cutting trees
Y/N	Animal rearing
Y/N	Aquaculture activities
Y/N	Small business
Y/N	Closeness to other countries sharing the lake
Y/N	Children support

How did the DRC conflict affect you (Tanzania)	
Y/N	Piracy, robbery & banditry on the lake / Limiting
Y/N	Changed practices / brought destructive nets
Y/N	No consequence, it has not affected us
Y/N	Brought migrants who valorised fishing
Y/N	Forced to flee & resettled where we can fish
Y/N	Migrants are taking our jobs

Y/N	Try / rely on other activities	Y/N	I content with anything I get	Y/N	Increased thefts, broken marriages & prostitution
Y/N	Get help from children / family members	Y/N	Hope for a better future by God's grace	Y/N	Forced displacement of fishers/many Congolese
Y/N	Move to other areas for better opportunities			Y/N	Loss in the waters of people & equipment
Y/N	Motorbike taxi , Bicycle/ Truck transportation	**Women Household Heads**		Y/N	Reduced fishing distances/ afraid to go far
Y/N	Move around for fishing purposes	**1**	Yes	Y/N	Reduced catches / Lack of income
Y/N	Farming	2	No	Y/N	Inability to fish by lack of equipment
Y/N	Small business	3	Non answer	Y/N	Inability to fish peacefully/lots constraints & hiding
Y/N	Manual handling jobs/masonry/tree cutting/	4	Non applicable	Y/N	Increased the number of fishers / Many migrants
Y/N	Membership in a fisher association			**Fishers knowledge of fisheries rules**	
		Factors helping fishers to cope and adapt		Y/N	Lake closure seven days a month
Do fisheries officers help cope with conflicts impacts		Y/N	Social groups or self-help committees	Y/N	No fishing small fish
1	Not at all / They don't help in any thing	Y/N	State and public service regulations	Y/N	No fishing in spawning areas
2	They don't help that much	Y/N	Local rules and regulations	Y/N	Don’t use fuel generated Coleman lamps
3	Yes, they help us very much.	Y/N	Cultural, traditional & ethnic norms	Y/N	Not fishing within 100 or 200 me from the shores
4	No response	Y/N	Religious beliefs and restrictions		
		Y/N	Rules of occupying militia groups or armies		
		Y/N	Other		

Appendix 4.12 Focus group guide – Women only - DRC / Tanzania

Key informants: Women involved in fishing-related activities

Venues: TAFIRI Room, (Tanzania) & Uvira Hydrobiological Centre (DRC) **Date**:

Question	*'How do small-scale fisherfolk secure livelihoods in situations of conflict?'*
Objective	To investigate what women, marriage & family means in fisheries
Technique	Two-Hour FOCUS GROUP on Women, Marriage & Family in Fisheries
Target	8 randomly selected women in each of the three fishing villages.

Participants

No	Age	Marital Status	Household head	Activity / position in fisheries
1				
2				
3				
4				
5				
6				

Focus group questions.		Prompts
1	What activities are women mainly involved in within your fishing community? **CONGO / TANZANIA**	• How did they get into the area of work and why did they? • How do you get access to fish to buy and process? • Do you need to know fishers, be related to them, offer gifts, etc.?
2	What has changed in how women are involved in the fisheries in the recent past since the conflict? **CONGO**	• What social norms and taboos affect women? • What do you think about them?
	Have the fishing communities in Tanzania been affected by the conflict in the DRC? **TANZANIA**	• if so how and why?
3	What challenges do women experience in fisheries? **CONGO / TANZANIA**	• What kinds of difficulties do you face in fisheries? • What are the issues associated with women's family status?
4	What do women do in times of difficulty? **CONGO / TANZANIA**	• Who do women turn to and why?
5	What's good about working in fisheries? **CONGO / TANZANIA**	• What benefits do women get from fishing activities? • What keeps you in fishing-related activities?

Appendix 4.13. **Focus group guide – Trends Analysis** – DRC/Tanzania

FOCUS GROUP GUIDE – CONGO / TANZANIA

Key informants: Fishers (ALL)

Venues: TAFIRI Room, (Tanzania) & Uvira Hydrobiological Centre (DRC) **Date**:

Question	*'How do small-scale fisherfolk secure livelihoods in situations of conflict?'*
Objectives	• To obtain perceptions on the lake ecosystem change trends, key drivers of change, how they affect fishers' livelihoods, and on how small-scale fishers respond to survive them. • To identify seasonal variations in lake fisheries ecosystem health and services, and relative livelihoods strategies
Technique	One-Hour TRENDS ANALYSIS Focus Group
Target	Randomly selected 4-8 participants in each of the three fishing villages.

Participants

No	Name	Gender	Type of activity	Years of experience
1				
2				
3				
4				
5				
6				
7				
8				

Focus group questions.	Prompts
A. Trend analysis of changes over time in the lake's small-scale fishery ecosystem health.	
1. What significant changes have you seen in the lake fish stock in the recent past? (**Fish Stock**)	• When did they occur? What periods do they tend to occur? • What in your views are the key causing factors?
2. What significant changes have you seen in your fish catches i.e. species composition? (**Fish diversity**)	• When did they occur? What periods do they tend to occur? • What in your views are the key causing factors?
3. What significant changes have you seen in the lake's water quality? (**Lake Pollution**)	• When did they occur? What periods do they tend to occur? • What in your views are the key causing factors?
B. Trend analysis of changes over time in the lake's small-scale fishery ecosystem services	
4. What significant changes you have seen in the fishing equipment, hours, and areas? (**Fishing effort**)	• When did they occur? What periods do they tend to occur? • What in your views are the key causing factors?
5. What significant changes have you seen in the total quantity of you fish catches? (**Fish catches**)	• When did they occur? What periods do they tend to occur? • What in your views are the key causing factors?

Trend analysis with participants: A matrix scoring exercise on the changes in the fish stocks; the fish species diversity, the fisheries water quality; the fishing efforts, and in the fish catches in the recent past.

Appendix 4.14. **Focus group guide – Seasonal calendar** – DRC/Tanzania

FOCUS GROUP GUIDE – CONGO / TANZANIA

Key informants: Fishers (ALL)

Venues: TAFIRI Room, (Tanzania) & Uvira Hydrobiological Centre (DRC) **Date**:

Question	*'How do small-scale fisherfolk secure livelihoods in situations of conflict?'*
Objectives:	• To obtain perceptions on the lake ecosystem change trends, key drivers of change, how they affect fishers' livelihoods, and on how small-scale fishers respond to survive them. • To identify seasonal variations in lake fisheries ecosystem health and services, and relative livelihoods strategies
Technique	One-Hour SEASONAL CALENDAR Focus Group
Target	Randomly selected 4-8 participants in each of the three fishing villages.

Participants:

No	Name	Gender	Type of activity	Years of experience
1				
2				
3				
4				
5				
6				
7				
8				

Focus group questions

A. Seasonal variations in the lake's access

1. How do your access to the lake for fishing activities vary across the year?
2. What are the different fishing seasons in the year? And which fishing activities are associated with them?
3. Would you list which types of fish you catch the most in each season?

B. Seasonal variations in main adverse changes or problems affecting your livelihoods

1. What are the problems that affect your fisheries livelihoods seasonally?
2. Do they occur regularly at certain times of the year?
3. When in the year do they affect you the most?

C. Seasonal variations in livelihood strategies

1. What livelihood activities (fishing and no-fishing related) help you to sustain your living?
2. For each type of them, indicate which time in the year you dedicate most of your time on them
3. Which time of the year certain fishing practices are usually performed? Which ones and why?

Calendars analysis with the participants

- Drawing from participants responses, elaborate a table with seasons

Appendix 4.15. **Transect walk guide** – DRC/Tanzania

Location: Lake Tanganyika shoreline areas around the selected fishing communities

Participants: Small-scale fisherfolk

Date:

Question	*'How do small-scale fisherfolk secure livelihoods in situations of conflict?'*
Objectives:	• Observe and record the Lake ecosystem health from visual pollution features • Identify how healthy is the Lake ecosystem for fish.
Technique	2 to 3 hrs TRANSECT WALK along the Lake observing and recording the state of the ecosyste health's visual features.
Target	2 groups of 3 to 4 participants

Participants

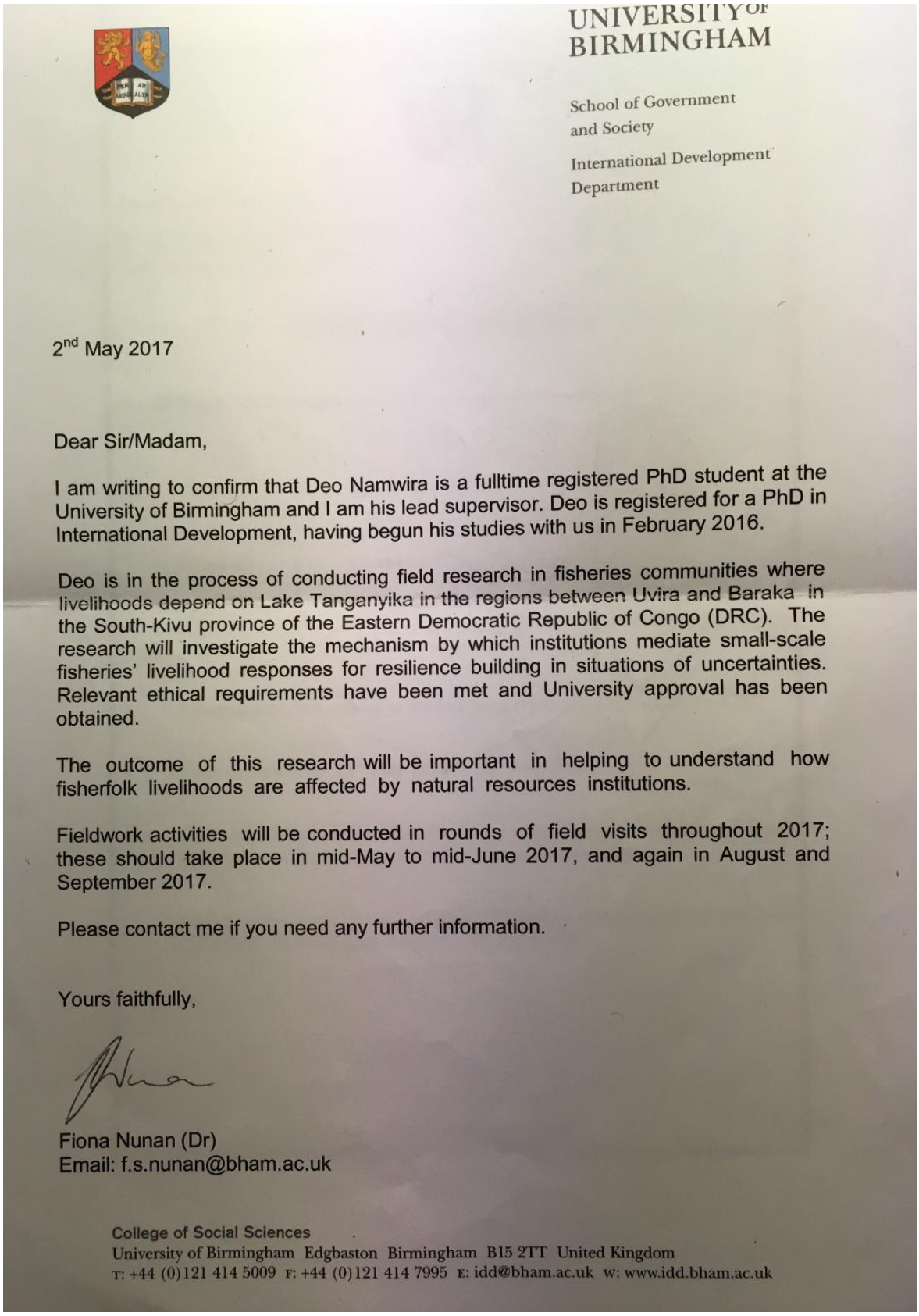
No	Name	Gender	Type of activity	Years of experience
1				
2				
3				
4				

Visual features to observe and record.

1. Indicators of shoreline erosion (turbidity of water)
2. Signs of eutrophic state in certain areas of the Lake (Algae coverage)
3. Signs of sediments (particles, metals, plastics, debris, households waste, etc..) materials deposits from human activities
4. Anarchic housing constructions
5. Fish species seen along the way

• Recording transect results: Map showing transect path

Appendix 4.16 University of Birmingham letter



UNIVERSITY OF BIRMINGHAM

School of Government and Society

International Development Department

2nd May 2017

Dear Sir/Madam,

I am writing to confirm that Deo Namwira is a fulltime registered PhD student at the University of Birmingham and I am his lead supervisor. Deo is registered for a PhD in International Development, having begun his studies with us in February 2016.

Deo is in the process of conducting field research in fisheries communities where livelihoods depend on Lake Tanganyika in the regions between Uvira and Baraka in the South-Kivu province of the Eastern Democratic Republic of Congo (DRC). The research will investigate the mechanism by which institutions mediate small-scale fisheries' livelihood responses for resilience building in situations of uncertainties. Relevant ethical requirements have been met and University approval has been obtained.

The outcome of this research will be important in helping to understand how fisherfolk livelihoods are affected by natural resources institutions.

Fieldwork activities will be conducted in rounds of field visits throughout 2017; these should take place in mid-May to mid-June 2017, and again in August and September 2017.

Please contact me if you need any further information.

Yours faithfully,

Fiona Nunan (Dr)
Email: f.s.nunan@bham.ac.uk

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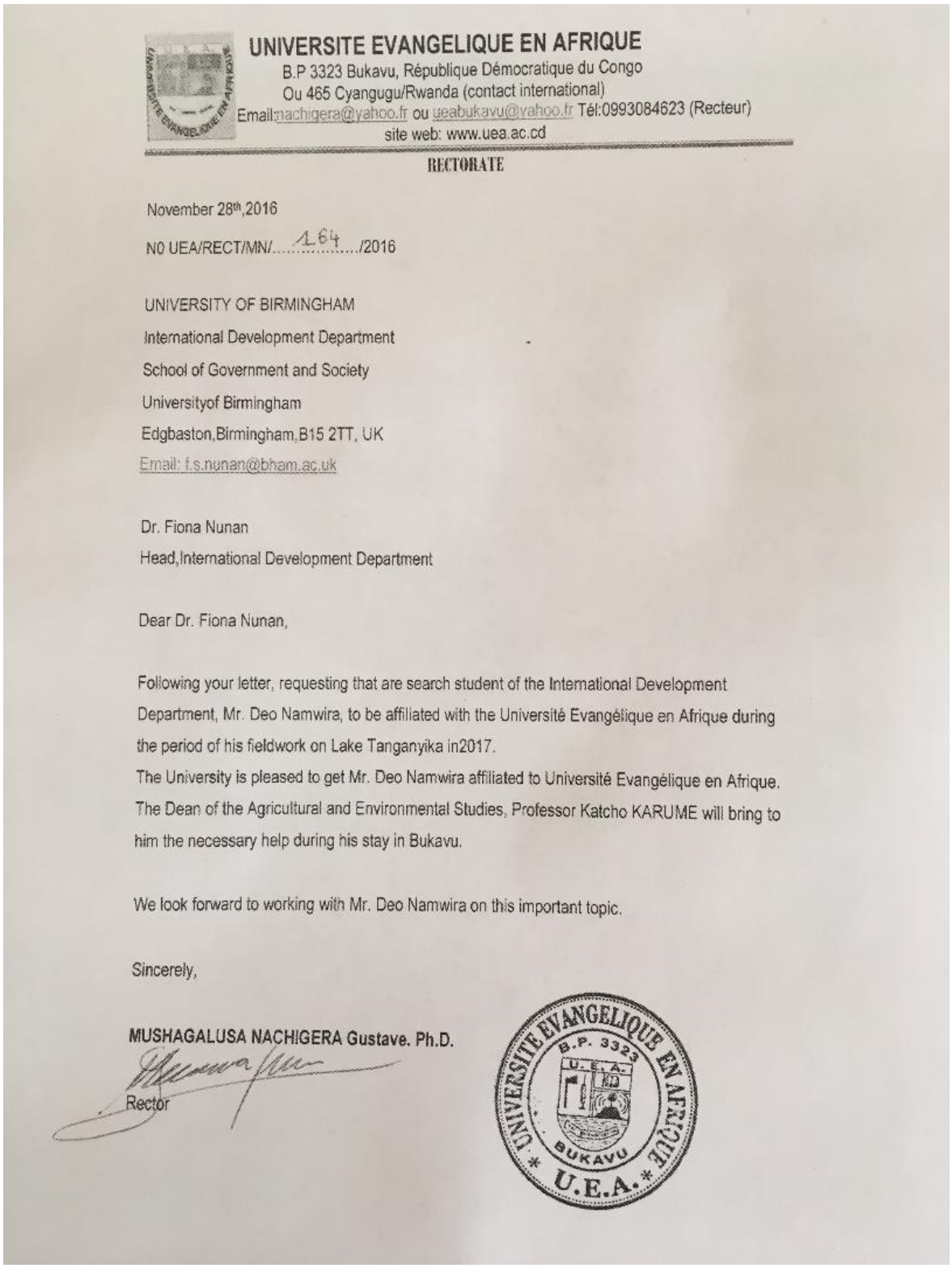
Appendix 4.17 Congolese university letter



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RECTORATE

November 28th,2016

N0 UEA/RECT/MN/...164.../2016

UNIVERSITY OF BIRMINGHAM
International Development Department
School of Government and Society
Universityof Birmingham
Edgbaston,Birmingham,B15 2TT, UK
Email: f.s.nunan@bham.ac.uk

Dr. Fiona Nunan
Head,International Development Department

Dear Dr. Fiona Nunan,

Following your letter, requesting that are search student of the International Development Department, Mr. Deo Namwira, to be affiliated with the Université Evangélique en Afrique during the period of his fieldwork on Lake Tanganyika in2017.
The University is pleased to get Mr. Deo Namwira affiliated to Université Evangélique en Afrique. The Dean of the Agricultural and Environmental Studies, Professor Katcho KARUME will bring to him the necessary help during his stay in Bukavu.

We look forward to working with Mr. Deo Namwira on this important topic.

Sincerely,

MUSHAGALUSA NACHIGERA Gustave. Ph.D.
Rector

UNIVERSITE EVANGELIQUE EN AFRIQUE B.P. 3323 U.E.A. BUKAVU * U.E.A. *

Appendix 4.18 – Tanzanian university letter

UNIVERSITY OF DAR ES SALAAM
COLLEGE OF AGRICULTURAL SCIENCES AND FISHERIES TECHNOLOGY
DEPARTMENT OF AQUATIC SCIENCES AND FISHERIES TECHNOLOGY

Telephone: 255 22 2410462
Fax: 255 22 2410480
E-mail:

Address: P.O. Box 35064
Dar es Salaam
TANZANIA

Our Ref.

Date: 14 August, 2017

Dr. Fiona Nunan,
Head, International Development Department
School of Government and Society
University of Birmingham

Dear Madam,

RE: COLLABORATION ON THE PROJECT: FISHERFOLK LIVELIHOODS AND INSTITUTIONAL BRICOLAGE: A CROSS-SECTIONAL COMPARISON OF COPING AND ADAPTINGON LAKE TANGANYIKA

This is to confirm our willingness to collaborate with you on the above captioned study to be undertaken by Deo Zihindula Namwira. We note that the aim of the research is to investigate how institutions, as 'rules of the game', help fisherfolk cope with and adapt to change. Information on these coping mechanisms and sources can inform fisheries management and community development measures. We find the study very timely and in line with our research focus. We are therefore in support of this research and are ready to participate as deemed appropriate.

Thanks

Dr. Paul Onyango
Senior Lecturer.

Appendix 5.1 Identified response strategies – DRC

Identified Coping strategies	Officials N	Fisherfolk N	Officials %	Fisherfolk %			Fr N
In response to shocks	**34**	**37**	**100**	**100**			**100**
Flee to safer places and return	17	13	50	35			30
Stop fishing momentarily/ stay hiding in homes	17	11	50	30			28
Faith in God/Jesus and prayers	0	6	0	16			6
Enter the waters and try to fish even during conflict	0	7	0	19			7
Total	**34**	**37**	**100**	**100**			**71**
In response to stresses	**67**	**56**	100	100			100
Withdrawal from fishing / Shift to other livelihoods	20	27	30	48			47
Change food habits; reliance on farming produces	3	0	4	0			3
Pay ransom /negotiate with armed groups /officers	3	2	4	4			5
Migrate to resettle in areas elsewhere	17	0	25	0			17
Organise in self-help associations for solidarity	17	0	25	0			17
Seek the highest fish catches /switching gears	7	12	10	21			19
Try to get loans / use saved provisions	0	8	0	14			8
Move around & to other areas for better catches	0	3	0	5			3
Family members abroad helping financially	0	3	0	5			3
Get help from children / family members	0	1	0	2			1
Total	**67**	**56**	**100**	**100**			**123**
In response to trends	**67**	**70**	100	100			100
Withdrawal from fishing / Shift to other livelihoods	20	27	30	39			47
Change food habits; reliance on farming produces	3	0	4	0			3
Faith in God/Jesus and prayers	0	6	0	9			6
Move around & to other areas for better catches	0	3	0	4			3
Seek the highest fish catches /switching gears	7	12	10	17			19
Pay ransom /negotiate with armed groups /officers	3	2	4	3			5
Migrate to resettle in areas elsewhere	17	5	25	7			22
Organise in self-help associations for solidarity	17	3	25	4			20
Try to get loans / use saved provisions	0	8	0	11			8
Family members abroad helping financially	0	3	0	4			3
Get help from children / family members	0	1	0	1			1
Total	**67**	**70**	**100**	**100**			**137**
In response to Seasonality	**47**	**94**	100	100			100
Faith in God/Jesus and prayers	0	60	0	64			60
Move around & to other areas for better catches	3	0	6	0			3
Migrate to resettle in areas elsewhere	17	5	36	5			22
Seek the highest fish catches /switching gears	7	12	15	13			19
Organise in self-help associations for solidarity	17	3	36	3			20

	Try to get loans / use saved provisions	0	8	0	9			8
	Family members abroad helping financially	0	3	0	3			3
	Get help from children / family members	0	1	0	1			1
	Pay ransom /negotiate with armed groups /officers	3	2	6	2			5
	Total	**47**	**94**	**100**	**100**			**141**

Appendix 6.1 Identified response strategies – Tanzania

Identified Coping strategies	Officials N	Fisherfolk N	Officials %	Fisherfolk %			
In response to shocks	**16**	**59**	**100**	**100**			1
Temporarily stop fishing, Withdraw from fishing/ Switch to other livelihoods,	8	10	50	17			
Faith in God/Jesus and prayers / Traditional rituals	0	10	0	17			
Keep fishing / Stay in fish trade / Perseverance	7	36	44	61			
Alerting each other on pirates' whereabouts	1	3	6	5			
Total	**16**	**59**	**100**	**100**			
In response to stresses	**41**	**188**	100	100			1
Temporarily stop fishing, Withdraw from fishing/ Switch to other livelihoods,	8	10	20	5			
Faith in God/Jesus and prayers / Traditional rituals	5	20	12	11			
Keep fishing / Stay in fish trade / Perseverance	7	36	17	19			
Negotiate with officers, ransom payment / Bribery	2	4	5	2			
Migration to settle in other areas/Forced displacements/ Return native home	6	5	15	3			
Membership in Self-help groups	0	24	0	13			
Maximise catches / Fish sales / Turn to illegal gears & techniques / clandestine fishing/nearshore	7	34	17	18			
Use Savings / Seek loans	0	28	0	15			
Mobility / Moving to areas with better catches	2	12	5	6			
Family member abroad helping financially / remittances	0	3	0	2			
Add side activities / Expand activities / other sources of income	4	12	10	6			
Total	**41**	**188**	**100**	**100**			2
In response to trends	**41**	**195**	100	100			1
Temporarily stop fishing, Withdraw from fishing/ Switch to other livelihoods,	8	10	20	5			
Keep fishing / Stay in fish trade / Perseverance	7	36	17	18			
Faith in God/Jesus and prayers / Traditional rituals	5	20	12	10			
Mobility / Moving to areas with better catches	2	12	5	6			
Maximise catches / Fish sales / Turn to illegal gears & techniques / clandestine fishing	7	34	17	17			
Negotiate with officers, ransom payment / Bribery	2	4	5	2			
Migration to settle in other areas/Forced displacements/ Return native home	6	5	15	3			
Membership in Self-help groups	0	24	0	12			
Use Savings / Seek loans	0	28	0	14			
Family member abroad helping financially / remittances	0	3	0	2			
Get help from family / church members	0	7	0	4			
Add side activities / Expand activities / other sources of income	4	12	10	6			
Total	**41**	**195**	**100**	**100**			2

In response to Seasonality	**33**	**185**	100	100			1
Keep fishing / Stay in fish trade / Perseverance	7	36	21	19			
Faith in God/Jesus and prayers / Traditional rituals	5	20	15	11			
Mobility / Moving to areas with better catches	2	12	6	6			
Migration to settle in other areas/Forced displacements/ Return native home	6	5	18	3			
Maximise catches / Fish sales / Turn to illegal gears & techniques / clandestine fishing	7	34	21	18			
Membership in Self-help groups	0	24	0	13			
Use Savings / Seek loans	0	28	0	15			
Family member abroad helping financially / remittances	0	3	0	2			
Get help from family / church members	0	7	0	4			
Add side activities / Expand activities / other sources of income	4	12	12	6			
Negotiate with officers, ransom payment / Bribery	2	4	6	2			
Total	**33**	**185**	**100**	**100**			2

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