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**IMPACT ASSESSMENT FOR LESOTHO HIGHLANDS WATER  
PROJECT AND SUSTAINABLE LIVELIHOODS: A CASE STUDY OF  
COMMUNITY AROUND KATSE DAM**

**BY NONTOSFANE LUCY SKEFU**

**MINI- DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR A MASTERS IN DEVELOPMENT STUDIES**

**FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES  
CENTRE FOR DEVELOPMENT SUPPORT  
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BLOEMFONTEIN**

**SUPERVISOR: DR T.P. NTILI**

**FEBRUARY 2018**

## DECLARATION

I, Nontosfane Lucy Skefu, do hereby declare that this dissertation titled **Impact assessment for Lesotho Highlands Water Project and Sustainable Livelihoods: A case study of community around Katse Dam** at the University of the Free State is my own work and that all the sources used and cited have been acknowledged by referencing. I also declare that it has not been submitted elsewhere for academic or non-academic purposes.

Candidate: Nontosfane Lucy Skefu

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## DEDICATION

This work is dedicated to the following people:

- My mother, who had always believed in me and raised me to be the best that I can be.
- My dear boys, Bafokeng and Ts'episo Lephaso, for giving up time which you should have spent with your mother.
- To my spouse, "*Mofokeng oaka*", it would have not been possible without your encouragement and support.

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Further appreciation is extended to all who have contributed in any way in my academic pursuit at the University of the Free State. Notable among them is my family – my younger brother, sister and, more especially, my mother – 'Me 'Matoka Skefu, who undoubtedly supported and helped me so much by taking care of my sons while I was trying to complete my studies. I am extremely grateful to my husband, my pillar of strength, Ntate Sehloho Lephaso. His desire to see me through has been my source of strength for the entire research process.

I am again grateful to my friends, more especially Mr Piti Ts'oeu and Mr Lets'ikhoana Nkeka, for their amazing assistance and support when I needed them the most. They always encouraged me that I would successfully complete this research. They assured me of their readiness to help whenever I needed them.

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## LIST OF ACRONYMS AND ABBREVIATIONS

<b>Abbreviations</b>	<b>Description</b>
<b>DID</b>	Development-Included Displacement
<b>DFID</b>	Department for International Development
<b>LHDA</b>	Lesotho Highlands Development Authority
<b>LHWP</b>	Lesotho Highlands Water Project
<b>MDG</b>	Millennium Development Goals
<b>MRP</b>	Manantali Relocation Project
<b>SADC</b>	Southern African Development Community
<b>SD</b>	Sustainable Development
<b>SDGs</b>	Sustainable Development Goals
<b>SPSS</b>	Statistical Package for Social Science
<b>WCD</b>	World Commission on Dams

## **ABSTRACT**

Massive water developments bring about change to the physical arrangement of the relevant areas and the local people as well. Water projects are not immune to this characteristic. Their existence is as important as that of the species, including human beings, found in their area of existence. Unpacking the whole concept of how water projects affect local people is an important approach to gaining a full understanding of the relationship between water infrastructure and sustainable livelihoods of local communities.

This study aimed at investigating the impact of and extent to which the Lesotho Highlands Water Project contributes towards sustaining the livelihoods of the project-affected communities in the rural areas of Lesotho, especially in the Katse and Lejone areas. Specifically, the intention was to assess the impact of the Lesotho Highlands Water Project on the communities residing adjacent to the Katse Dam. It further determined whether the Lesotho Highlands Development Authority is meaningfully contributing to the socio-economic livelihoods of the dam-based communities.

The information pertaining to the objectives of the study was generated from the field through questionnaires that were administered by the researcher. Respondents from five villages in the areas of Katse and Lejone were asked to comment on issues including their perceptions about the dam construction, risks facing them, improved service provision (available facilities) and their livelihood strategies after the dam was constructed in their area. Upon completion of that, a data sheet was drawn and thereafter entered into the Statistical Package for the Social Sciences-Version 17 so as to derive meanings and draw some conclusions.

This research revealed that the Lesotho Highlands Water Project duly has an impact on the sustainable livelihoods of the Katse and Lejone communities. The Katse Dam has had both a negative and a positive influence on local inhabitants. It further revealed that as a positive impact, the Lesotho Highlands Development Authority contributed meaningfully to the socio-economic wellness of the community based at the Katse Dam. There is convincing evidence that in some instances, the living conditions of people in the Katse and Lejone areas have improved. Care should be

taken that this effect is more noticeable on a much more general note that when considering individuals.

The research findings further disclose that the Lesotho Highlands Water Project has a negative impact on people as it poses multiple hazards, ranging among others landlessness for crops production, burial sites, food insecurity, poverty, inaccessibility to common goods including forests together with indigenous plants which supports their livelihoods, grazing areas for animals, movement restriction to neighbouring villages, as well as isolation from relatives on the other side of the dam.

In conclusion, the use of the Sustainable Livelihoods Framework (SLF) particularly the asset analysis helped in identifying the assets of the affected communities. It made it easy to identify some of the assets that local people hold dearly and those that contribute towards sustaining their livelihoods. Thereafter, an analysis of the impact of the dam in terms of such assets was done. The analysis showed that the negative impacts presented earlier on are tangible and that calls for immediate remedial action to allay the fears of the Katse and Lejone communities and the Basotho people at large, because an injury to one is an injury to all. It is therefore highly recommended that development planners formulate and devise policies and regulations that alleviate devastating effects on people affected by the water project.

**Keywords:** Livelihood, Sustainability, SLF, Katse Dam

# CHAPTER 1

## INTRODUCTION TO AND BACKGROUND OF THE STUDY

### 1.1 Introduction

This chapter provides a background on how water developments came about and how they are used to promote development. However, the ultimate intention for the study is to make an assessment of how water developments affect the people living closer to them. It is of the utmost importance for development planners to make certain that development initiatives do not disturb the livings of local people. This chapter further presents the main problem of the study, the aim and objectives and the conceptual framework in which the study has been framed. It also provides a brief outline of the whole dissertation.

### 1.2 Background of the study

Water is regarded as one of the most important substances on earth and is vital for life, since humans, plants and animals cannot survive, even for a few days, without it. In many countries, water resources seem to be depleting due to the increase in demand for these limited resources. This has forced many countries to seek new approaches to effectively manage this important resource. According to Zarghaami (2006), effective water management requires a comprehensive consideration of all related aspects, for instance social, environmental, political and financial aspects.

In line with the proposed standards for sustainable development of water infrastructure by the World Commission on Dams (WCD), countries such as China have introduced multipurpose water schemes all over the country with the aim to increase water storage and supply. Pittock (2010) provides that the Mekong Agreement by the government of China has identified the following five elements of sustainable water development:

- The right to use water
- The protection of water and the prevention of degradation of water
- The maintenance and conservation of water flow
- An ecosystem-related approach

- Procedural elements to achieve sustainable water development

Water resources need to be sustainably developed and this is even supported by Agenda 21 (1993), which states that freshwater resources are to be protected in order “to satisfy the needs of all countries”, like the generation of electricity for the specific country. Agenda 21 (1993) further mentions that there is a clear linkage between water quality, water quantity and aquatic ecosystems with protective measures for other objectives, such as food production.

Africa is well known as a continent endowed with abundant mineral resources; however, water remains a central restriction to its future economic growth and development. The economic development of the Southern African Development Community (SADC) region is defined in terms of water availability and in recent years, water has been depleting. For instance, Young (2010) puts forth that South Africa experiences on average 500 mm and Botswana 400 mm of rainfall annually. This inadequate amount of rainfall along with erratic and unevenly distribution attributed to the issues of climate change effects.

Due to these shortages, a bilateral agreement between the two governments of South Africa and Lesotho was signed in 1986. This treaty resulted in the formation of one of the largest water transfer projects, namely the Lesotho Highlands Water Project (LHWP). The LHWP is envisaged to be completed in four phases and the implementing authority will finally be able to transfer 768 m<sup>3/s</sup> of water to South Africa. The project comprises two main activities, that is, water transfer across the border and the generation of electricity within the country of Lesotho.

### **1.3 Motivation**

Water is a very important and seemingly depleting source in many countries. As such, it is necessary for governments in different countries to make sure that the existing reservoirs are well managed and protected for the proper storage of water. Dams need to be constructed to preserve water for the advantage of local communities and the country as a whole and further for neighbouring countries. Akindele and Senyane (2004) mention that the most important thing to note here is that such water developments often have an impact on the local communities and

giving their land and assets for such developments. The main issue or concern here, is that people are not to be left worse off than they had been before the introduction of a water development scheme in their area.

On the long term effect, specific attention should be given to these affected communities to measure whether they are adversely affected by the project or benefitted from the project. This is significant because it will clearly define their situations and the experiences that the communities have had ever since the dam was built in their area. Therefore, the responsible project coordinators can use the findings of the research to shape up their development projects that are in line with this massive one. Apart from that, the findings of this research can possibly assist the LHDA in establishing whether to continue with their approach towards sustaining the livelihoods of community around Katse Dam or to come up with new approaches for improved usage of the water.

The role of historical, social and political analysis in interpreting complex developmental problems would be highly appreciated for improving livelihoods. Many development theories have been formulated and applied to try and bring about development in particular in rural communities, however, nothing much has been achieved. In this case, the theories of sustainable development have been analysed to evaluate the way the rural communities get assistance to be evaluated from their position of poverty and maintain their livelihoods. Such aspect renders an important step if the people's lives can be a focus print, even after long period of the implementation of the LHWP.

Therefore, such type of water research project would provide assistance to the communities for improved water use from dams. Besides, it would be an important step to get some protection according to LHDA guide to decide to consider the findings of research as advisories.

#### **1.4 Problem statement**

The construction of large dams is one of the approaches adopted in many countries with the aim of promoting development within each specific country and globally. This significant development has been carried out on the existing rivers and that various capacity dams are constructed on the available rivers to potentially harness

water resources. As noted by Landberg (2012), in the year 2000, it was found that more than 45,000 dams with various sizes had been constructed in over 140 countries.

The construction of dams in countries has a positive impact in terms of development, but there is also a concern on how local populations are affected thereby. Large dams often result into enormous sociological costs for livelihoods of dam-based populations, including displacement and relocation (Ranasinghe, 2012). People are often displaced and relocated to other places, of which some may be altogether new to them in terms of the lifestyle there.

For illustrative purposes, Devitt and Hitchcock (2010) provide statistical information regarding the people affected by water projects. They state that in Ghana, 84,000 people were displaced and relocated due to the construction of the Akosombo Dam built on the Volta River. In Egypt and Sudan, 120,000 people were displaced to make way for the construction of the Aswan High Dam in 1970. In Lesotho, 71 households were displaced, 2,700 hectares of grazing and 925 hectares of arable land were lost. In addition, about 20,000 people were affected throughout the construction period (ibid).

In Lesotho, the LHWP provides for compensation and other development initiatives aimed at ensuring that people affected by the project are enabled to sustain their standard of living not inferior to the one experienced before the project (Lesotho Government Gazette, 1986). Finally, the problem that this research aims at addressing is based on all these questions:

- i. Are the development initiatives implemented by the LHDA really benefiting the affected communities?
- ii. Are their living conditions being maintained or being improved even after the implementation of the LHWP?
- iii. To what extent can it be said that their livelihoods are sustained after they have lost their valuable properties to make way for this water project?

## **1.5 Aim of the study**

The overall aim of this study is to investigate the impact and extent to which the Lesotho Highlands Water Project contributes towards sustaining the livelihoods of the communities based at Katse Dam.

### **1.5.1 Specific objectives**

The specific objectives of the study are

- To assess the impact of the Lesotho Highlands Water Project on the lives of the communities residing adjacent to the Katse Dam;
- To determine if the Lesotho Highlands Development Authority is meaningfully contributing to the socio-economic livelihood of the dam-based communities.

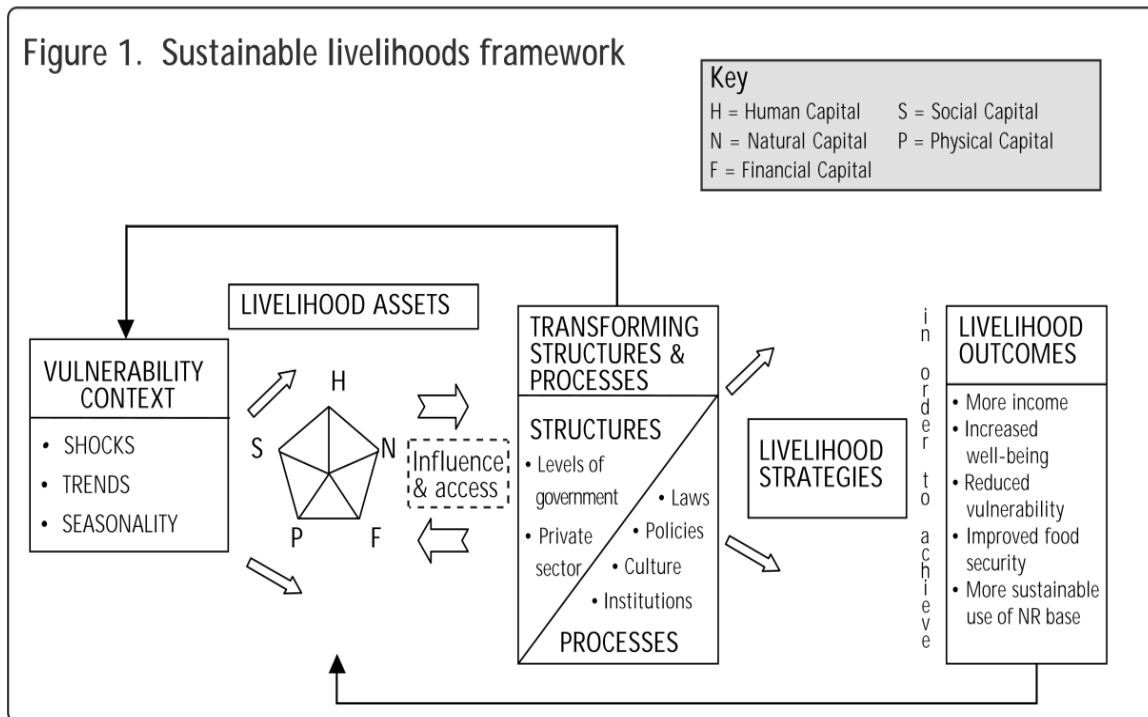
## **1.6 Research questions**

The research questions posed by the study are as follows:

- a) To what extent does the construction of the Katse Dam affect the lives of the people living adjacent to the dam?
- b) To what extent does the Lesotho Highlands Water Project contribute towards sustaining the livings of the communities based at the Katse Dam?
- c) Is the Lesotho Highlands Development Authority contributing meaningfully to the socio-economic livelihood of the dam-based villagers?

## **1.7 Conceptual framework**

A conceptual framework for this particular study is needed so that some literature can be reviewed. This will be carried out in relation to the concept of the sustainable livelihoods framework. Some variables of the framework will be explained further and later on the researcher will reflect on how they connect with one another. At a later stage, a summation of the available literature will be provided, which will help to locate this particular study in the available body of literature. It should, however, be noted that the framework will not be applied entirely; only specific parts will inform the study.



**Figure 1.1: Sustainable livelihoods framework (Levine, 2014:2)**

The concept of the sustainable livelihoods framework largely forms the crust of this research. The sustainable approach to livelihoods has been widely implemented in the development of interventions aimed at reducing poverty. Sustainable livelihoods are defined by Allison and Horemans (2006) as a systematic and adaptive approach that links issues of poverty reduction, sustainability and empowerment processes. The underlying approach to this involves the cooperation between people themselves with the natural environment. In many parts of developing countries, people are engaged in various activities to make a contribution to their well-being. Gautam and Andersen (2016) state that these activities range from agriculture, petty hawking, wage labour and low-cost transportation services.

However, many development practitioners assert that many households are still not obtaining enough to sustain their living. This situation pushed the practitioners to seek other approaches and as a result they adopted a livelihood perspective. They focused their attention on the development of people’s capacities so that their livelihoods can be secured. It is asserted that the sustainable livelihoods approaches should all be geared towards eradicating poverty (Norton & Foster, 2001).

### **1.7.1 Sustainable livelihoods strategies as presented by the framework**

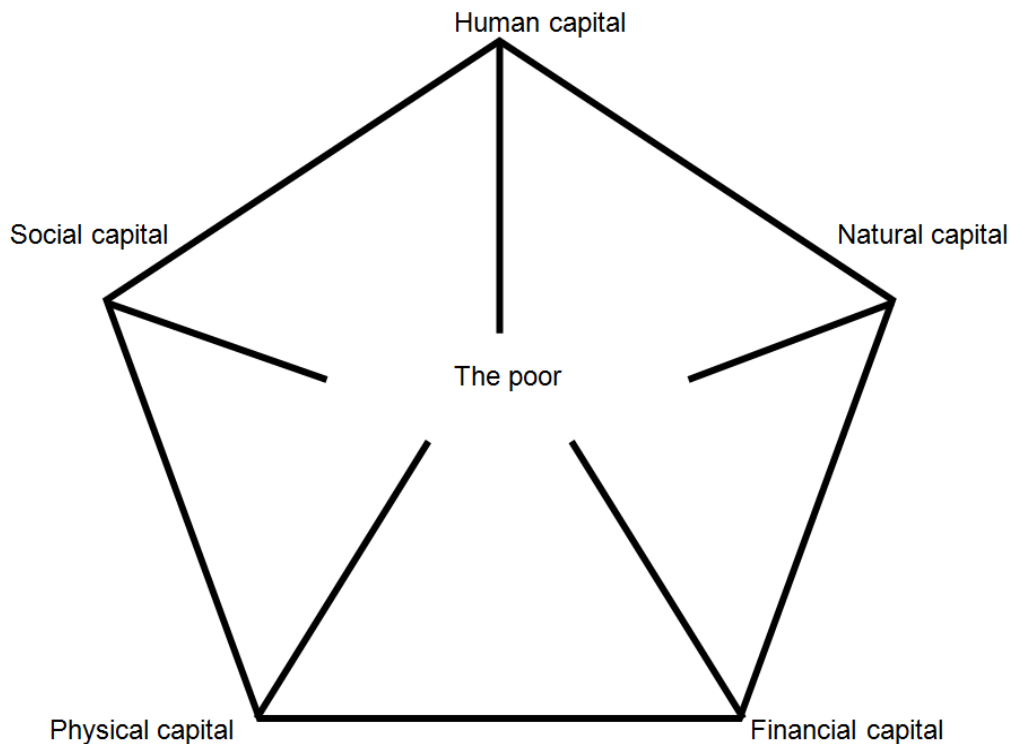
On a more general note, strategies are regarded as a combination of various activities and choices that specific community members engage in to make a living. Traditionally, rural people were known to be farmers or foresters, and urban people were regarded as a wage-seeking group of people or at least participants in the formal sector. So, all developmental efforts were directed at availing opportunities for these groups of people.

Contrary to this approach, the sustainable livelihoods approach seeks to establish a clear understanding of how people choose a certain strategy to overcome their challenges and attain positive outcomes. Solesbury (2003) puts forth that the framework advocates that such strategies that make a better contribution to a healthy living, should be reinforced and those that do not bring positive results should be mitigated. According to the framework, sustainable livelihoods can be best achieved if people have a clear access to certain assets.

The building blocks of livelihood strategies:

- I. Human capital – It represents the skills, knowledge and the ability to engage labour. This type of asset is essential for a positive living and people need to be willing and able to invest in their own human capital.
- II. Social capital – People need to be part of a larger group in order to gain access to certain social resources and influential institutions that may help improving their livelihoods (Pretty & Ward, 2001).
- III. Natural capital – It includes all of those natural resources that a human being needs to realise positive outcomes and this asset is important, to those that depend on resource-based activities, such as fishing, farming and gathering in forests.
- IV. Physical capital – It is made up of producer goods (equipment) and basic infrastructure necessary to support the livelihoods of the people. People need to own some form of shelter, food and clothing and have an adequate water to support themselves.
- V. Financial assets – People need financial resources to sustain their livelihoods. The availability of funds makes it easy for people to meet different needs because it can actually be converted to meet different needs (Wilson, 1999).

According to the Department for International Development (DFID) (2000:1), “a livelihood is sustainable when it can cope with and recover from the stresses and shocks and maintain its capabilities and assets both now and in the future without undermining the natural resource base”.



**Figure 1.2: The asset pentagon of sustainable livelihoods model as shown by Goodwin (2003)**

### **1.7.2 Vulnerability context**

The vulnerability context consists of the external environment which people exist in. People’s livelihoods and the wider availability of assets are, to a larger extent, affected by critical trends as well as shocks and seasonality which they have limited or no control over at all. These factors are seen to make people vulnerable and they are of critical importance due to the fact that they have a direct impact on the livelihood status of people.

**Table 1.1: Factors leading to vulnerability (Philip and Rayhan, 2004)**

<b>Trends</b>	<b>Shocks</b>	<b>Seasonality</b>
Population trends	Human health shocks	Of prices
Resource trends (including conflict)	Crop/livestock health shocks	Of production
Technological trends	Natural shocks	Of employment opportunities

Sustainable livelihoods strategies aim to achieve the following (Timothy, Drinkwater & Maxwell, 2000):

- a) To reduce and contain the risk of the experience of crises, shocks and stress.
- b) To equip people with capacities to cope with stress, shocks and by so doing, vulnerability will be reduced to a larger extent.
- c) To concentrate on potentiality by maintaining and enhancing the environment making it possible for people to actually realise their aspirations.

## **1.8 Chapter outline**

The study is structured as follows:

### **CHAPTER 1: INTRODUCTION TO AND BACKGROUND OF THE STUDY**

This chapter mainly introduces the study and its importance towards contributing to the available literature. Through an investigation, it reveals the problem and the problem here is how LHWP has impacted on the local populations.

### **CHAPTER 2: LITERATURE REVIEW**

Chapter two is a review of the theoretical influences and concepts that this whole research has been framed in. Selected developmental theories are explained in relevancy to the study. This is the case because the LHWP has developmental issues.

### **CHAPTER 3: RESEARCH METHODOLOGY**

Chapter three presents the general approach and methodology that the research followed in responding to the research problem. A quantitative research design was adopted because it provides summaries of data that supports generalisations about the matter under investigation.

### **CHAPTER 4: FINDINGS AND DISCUSSION**

Chapter four describes the findings through graphical representation and tables. Various questions relating to livelihoods status were asked participants.

### **CHAPTER 5: FINAL SUMMARY, RECOMMENDATIONS AND CONCLUSIONS**

Chapter five presents the combination of work from different parts of the report in order to make a meaningful summary in certain aspects of the study. This makes it possible for the researcher to draw conclusions about the impact of large dams on the nearby communities.

## CHAPTER 2

### LITERATURE AND THEORETICAL REVIEW OF THE STUDY

#### 2.1 Introduction

Water resources management and availability is a core development objective in its own right. The availability of adequate water can enhance productivity and even enhance development for both the present and future generations. Their living standards can be at a level whereby human development is realised to its full potential. This chapter presents the role of water infrastructure in enhancing development and thereby assisting the country of Lesotho to realise sustainable growth and development for the local people and the whole country at large. The LHWP is used as a reference for water infrastructure in this country.

#### 2.2 Contextual overview of developmental theories

A development theory can be defined as a concept focusing on the goals of development, including, among others, absolute growth and sustainable growth and the practical means to achieve these desirable changes in society. According to Raply (2007), these theories are primarily cultural constructs encouraged by a theory of socio-economic and socio-cultural change rooted in humanitarian values. In this part of the report, certain development theories will be discussed and they are modernisation, people-centred development and sustainable development.

##### 2.2.1 Modernisation theory

This theory originated from the ideas of the German sociologist, Max Weber, and provided a basis for the modernisation paradigm. According to Przeworski and Limongi (1997), modernisation denotes a progressive transition from a traditional to a modern society. It is closely defined in terms of industrialisation, in that it is a way that encompasses profound economic, social, political and cultural changes. Economic development is a pillar of industrialism.

Water is used in the generation of energy. Industries make use of large machines in their day-to-day activities and for this to work, water is needed for the generation of

energy. Among the many uses of water, it is also used for the improvement of sanitation, and Gauteng in South Africa is the benefactor in this instance. According to Yongsu (2010), more than 768 million people worldwide were without access to an improved source of water in 2011, and 2.5 billion had difficulty in accessing improved sanitation.

### **2.2.2 People-centred development theory**

People-centred development is a theory that is basically about improving the lives of the local populations through self-reliance, social justice and participatory decision-making. The basic foundation of this model is, if development efforts are to fulfil people's needs and demands, then it cannot be imposed from above or be driven by outsiders. The assumption here is that villagers know a great deal about their own situation – the causes and consequences of their daily actions. As such, Arputham (2008) points out that interference from the outside, has to be at its lowest; communities should be left alone to deal with their problems and find solutions themselves.

Development is an indigenous process and thus local populations should only be assisted to a certain extent (Antonio, 2001). Development has to be seen and understood from their perspective since they know what can work best among the many alternatives available. This theory is applicable in this study in that water projects that affect communities need to assist such communities with things that they do not have; they should not impose development initiatives on people, otherwise they will be futile.

### **2.2.3 Sustainable development theory**

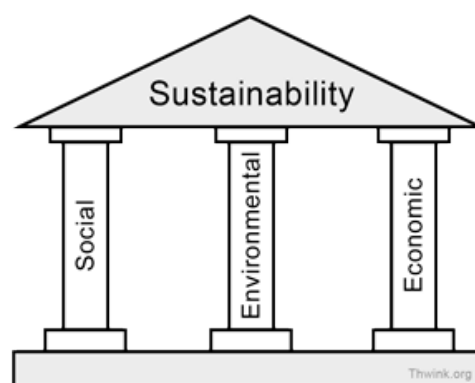
The term “sustainable development” was coined after the traditional development theories have proved not be pushing for sound development, though they were meant to do that. According to this investigation, water projects are to be a means through which the river-dependent populations will experience a positive change and be sustainable over time. For a proper definition of sustainable development as an integrated concept, it is essential that these two concepts – sustainability and development – are discussed independently, so as to make a distinction between

them. Care should, however, be taken that they are inseparable, because development is a process towards a certain specific goal.

To begin with, Torjman (2000) points out that the South African context of development is based on a number of issues. That is, to achieve development, countries should ensure that they address issues of poverty, unemployment, housing backlogs and the need for the development of infrastructure.

Sustainability, on the other hand, is all about maintaining the desired condition over time. This has to happen without necessarily eroding the natural, social or financial resources. The resource base has to be kept as it is, so that the current and future generations may enjoy the benefits of such resources. Seen in this context, sustainability describes a final goal that can be achieved through development. Simply put, sustainability is a proper means of or a proper end to development (Sen, 2013).

Sustainable development is interpreted by Berke and Conroy (2000) as development that permits the contemporary needs to be satisfied without necessarily making it challenging for future communities to meet their own basic needs and desires. Thus, sustainable development has the potential to address the most felt challenges of the people. It is also seen by Rao (2000) as maintenance and sustainable use of resources in the production of goods and services. Sustainable development can then be analysed as comprising three pillars – social development, the environment and the economy. Destroying one of the pillars could lead to serious damage to the other factors.



**Figure 2.1: A visual representation of the pillars of sustainable development (Lele, 1991)**

The theory of sustainable development is again interpreted as development that aims to achieve a balance between different and competing needs versus being cautious of the environmental, social and economic limitations that people face in their lives. For instance, people need to live within their environmental limits so as to avoid future impacts that may surface due to not doing so.

However, all the afore-mentioned scholars agree to certain elements in the concept of sustainable development, namely protecting nature, thinking long term, understanding the nature which we live in, recognising limits, practising fairness and embracing creativity. In terms of planning guidance for country planners, Agenda 21 (1993) presents some practical measures to implement in an attempt to attain sustainability in the socio-economic realm. These include the following:

- a) Equity
- b) Entrepreneurship
- c) Transfer of technology

According to Agenda 21 (1993), in order to achieve sustainable rural living, the responsible authorities need to ensure that they make the land accessible to all the inhabitants, improve security of land tenure and provide low-cost building material so that the needs of the people can be met halfway in the improvement of their livelihoods. The primary goals of sustainable development include the following:

- a) To end hunger and poverty.
- b) Responsible consumption and production.
- c) Sustainability to include health of the land, air and the sea.
- d) Sustainable economic growth while promoting jobs and stronger economies.

#### *2.2.3.1 Social sustainability*

In simpler words, social sustainability implies a system of social organisation that alleviates poverty. One main priority of sustainable development is to reduce poverty at all its levels and lack of poverty is a feature of social sustainability. According to the United Nations Development Programme (2004), that goal was premised on the fact that poverty is a threat to political stability, social cohesion and the environmental health of the earth.

The four pre-eminent concepts of the social pillar, as seen by Murphy (2012), are as follows:

- i. Equity
- ii. Awareness of sustainability
- iii. Public participation
- iv. Social cohesion

### *2.2.3.2 Environmental sustainability*

It is a well-noted fact that the construction of large dams has had serious impacts on the environment which they are based in. According to the WCD knowledge base, this is termed “ecocide”, that is, the deliberate destruction of the natural environment through various human activities that end up endangering the livelihoods of the local communities. This normally results in the extreme environmental degradation of important areas that local populations depend on for their survival.

The construction of dams mostly results in people being displaced, and these involuntary movements, according to Mwangi (2007), are mainly due to environmental degradation or harmful policies imposed by governments. These environmental refugees have to leave their habitats so that their survival is assured, since their previous environment can no longer sustain them. Moreover, large dams have had extensive impacts on rivers, watersheds and aquatic ecosystems. It is apparent that other dams have resulted in the loss of forests and wildlife habitat and the degradation of upstream catchment areas due to inundation of the basin area as well as the emission of gasses from decaying vegetation.

Mwangi (2007) continues to state that the construction of dams has also led to the loss of aquatic biodiversity, upstream and downstream fisheries, wetlands and the services of downstream floodplains. For instance, the Kariba and Cohara Bassa Dams have significantly altered local environmental conditions, and these have had a huge impact on biologically important floodplains, thereby affecting the local people’s livelihoods. Surely, dams have had adverse environmental effects, despite the fact that they are important.

### *2.2.3.3 Economic sustainability*

Economic sustainability is one of the key concerns facing many countries, especially the developing ones. Economic sustainability is described by Doane and MacGillivray (2001) as the process of allocating and protecting scarce resources while ensuring positive social and environmental outcomes. In this, an economy should produce to the levels that populations are able to consume to acceptable limits without compromising future consumption. In the analysis of economic sustainability, income and the market are the major factors.

Economists such as Aisen and Jose Veiga (2011) argue that for people to attain economic sustainability, they should earn some form of income and be able to acquire some of their basic needs. The market is an active actor in all these economic activities. Economic sustainability aims at increasing economic growth through the usage of the resources to support the social and economic development of community members. Proper implementation of policies such as education and other small income-generating projects is essential. In the final analysis, economic sustainability is a prerequisite for sustainable development in any given country.

## **2.3 Water infrastructure as an enabler for development**

### **2.3.1 Overview of rural water infrastructure development**

Infrastructure is of many different types and diversity in nature; these include roads, bridges, dams, water treatment plants and power lines. Demurger (2001) points out that infrastructure is very important to local communities because it has a way of improving development and growth needed for sustaining the livelihoods of rural people. The concept of infrastructure has been ignored for a long time, until recently when development pioneers focused their writing on it. In this study, the meaning of infrastructure development will largely be based on the afore-mentioned objects – roads, bridges, dams, water treatment and power lines.

The characteristics of infrastructure are discussed below:

- a) Infrastructure is regarded as capital goods

They are not directly consumed, instead, they are used to provide services to the neighbouring communities. This provision is carried out successfully in combination

with other inputs, such as labour. According to Prod'homme (2004), the services provided range from road construction to bridges used for facilitating transportation. Storage of water and treatment plants are often some of the services provided under the name of water infrastructure. Again, power plants are often erected as a result of this type of infrastructure and this benefits the majority of people who has been ignored in terms of providing them with this service. Indeed, what matters, is the service and therefore policies have to be implemented to make this provision of services possible.

b) Infrastructure is usually very long lasting

It takes time to build a road and, likewise, its life span is measured in decades, thus it lasts long. Wai Ho and Kim Him (2006) present an example of Europe, where roads that were constructed back in the times of the Roman Empire are still being used. This shows that roads and other infrastructure have the ability to last a long time.

c) Infrastructure is space-specific

Unlike most goods, infrastructure is generally immobile and belongs to a specific area as long as it lasts. For instance, a bridge in a specific area will always be there and be useful to the people in that area. Infrastructure development contributes to development in many facets. It plays a major role in economic development in that it enlarges the markets needed for improving livelihoods. So, if there are no roads, water, bridges and other structures, then development can never be realised and, as such, communities will suffer badly.

### **2.3.2 Origin and significance of dams globally**

During the twentieth century, large dams emerged as one of the many ways in which development can be achieved. According to the WCD (2001), the more than 40,000 dams constructed around the world have had a notable role in assisting communities and economies to harness water for food production, energy generation, flood control and domestic use. As more information was gathered on the performance and consequences of dams, the full cost of large dams became a public concern.

Questions were asked around issues of what impact they have on the nearby communities.

The construction of dams has the potential to have a positive or a negative impact on the livelihoods of the nearby communities. For a start, large dams are an instrument through which social and economic development can be accelerated, and this is very important because the living conditions of the affected people can be improved thereby (Prinsloo, 2008). This being said, the promoters of development have to ensure that policies are put in place to favour the most directly affected people. In terms of the positive impacts, Richer et al. (2010:19) point out that “dams are regarded as important because they are able to protect arable land from getting destroyed by flood and soil erosion”.

Again, dams are in a better position to enhance the development of aquaculture and fisheries. This is very important because some income can be generated from this type of activity. It is a known fact that more income means multiple needs can be met and thereby poverty is reduced in some ways. The evidence shows that communities residing closer to water projects gain access to fishing and sell what they catch in order to generate income. Hitchcock (2010) states that this also happened in the Lejone and Metolong areas where the Katse and Metolong Dams are closer to the people.



**Figure 2.2: Showing a Mosotho woman selling fish caught in the Katse Dam  
(Hitchcock, 2010)**

Water infrastructure is regarded as a vehicle through which employment opportunities can be strengthened. A considerable number of Basotho people has been employed in water projects found in Lesotho, for instance, the Metolong, Katse and Mohale Dams. Additionally, in the Katse area, many people also work for the Highlands Trout organisation. Apart from these factors, dams act as centres of attention, and unskilled people even get jobs there right from the construction phases (Scudder, 2012).

The introduction of dams in any particular area will certainly pave the way for the provision of essential services to the nearby populations and the country as a whole. According to Bird (2012), since Lesotho receives monetary transfers from the sale of water to South Africa, some of the funds are invested in the construction of roads, bridges, health care facilities and housing. A point worth noting is that all of these make a contribution to the improved living standards of the local people. Over and above, locally based projects also contribute to the increasing literacy rates, especially in the areas where the projects are based. This is a positive social indicator because education has a hand in reducing poverty in an area.

Moreover, the development of dams can actually promote the development of non-agricultural activities, including ecotourism, recreation and inland navigation. Most importantly, dams can assist in the generation of hydropower for household lighting and food processing. Slater and Mphale (2009) reckon that the majority of households has access to electricity now due to the LHWP, as its mandate is to generate electricity for Lesotho. Thus, development, in a number of facets, can be realised through the storage of water in reservoirs.

Dams are undeniably a good vehicle of development, but they also bring about the most felt social and environmental negative consequences. According to Richer et al. (2010), the problem here is that the benefits have generally been delivered to the urban populations, while the river-based communities have been the ones to feel the negative consequences of dams. One of these consequences is that dams affect the social, cultural and even the spiritual structure of the region. This normally results in people being removed from their homes to make way for this massive development. Also, the normal passing of territorial animals is hindered, since the dam acts as a barrier.

On a more general note, the construction of dams across the world has brought with them a more positive development result and has undeniably played a more important role in economic development. However, Wragg-Morris (2012) warns that the rural poor are not enjoying most of these developments, but are only experiencing the upheaval of their livelihood. That is, food insecurity is deepened and other impacts on their physical and cultural well-being have been more serious. This means that dam development projects are not reducing poverty in their areas and there are no sound economic opportunities for them, as was aimed at in the beginning (Unver, Gupta & Kibaroglu, 2012).

### **2.3.3 Overview of the Lesotho Highlands Water Scheme**

In 1986, a treaty was signed between Lesotho and South Africa, which resulted in the formation of a trans boundary water transfer project, namely the Lesotho Highlands Water Project (LHWP). The LHWP is envisaged to be completed in four phases and finally being able to transfer massive amounts of water –  $768\text{m}^3/\text{s}$  – to South Africa. Rousselot (2015) states that the project comprises two main activities,

that is, water transfer across the border to South Africa and the generation of electricity within the country of Lesotho. This project is implemented by constructing large dams and tunnels to enable the transfer of water to the hydropower plant and thereafter cross over to South Africa.

The LHWP involves the construction of five dams in the highlands of Lesotho, which are supposed to be completed by 2024. Currently, two dams have been completed – Katse and Mohale Dams – which constitute Phase 1A and Phase 1B respectively. Phase 1A constitutes the construction of the Katse Dam and ‘Muela Hydropower Station. For the purposes of this research, Phase 1A (Katse dam construction) will be the focus area. The Katse Dam is constructed where the two rivers of Bokong and Malibamats’o intersect (Lianos et al., 2002).

### *2.3.3.1 Phase 1*

#### I. Phase 1A – Katse Reservoir

Phase 1 of the project was successfully completed after seven years of construction and its major works include the construction of the Katse Dam, which is situated on the Maliba-Mats’o River. The dam is a double curvature arc design. Mashinini (2010) adds that there is also the Katse intake tower, which is situated 19 kilometres upstream of the Katse Dam and its depth is at the intake of 77 metres. The water that is transferred to South Africa enters into this tower and travels to the ‘Muela Hydropower Station through the transfer tunnel. Van der Zaag (2007) notes that this water, is used to generate electricity and then continues its journey of 82 kilometres into South Africa.

#### **The ‘Muela Hydropower Station**

This station is situated mid-way between the Katse Dam in Lesotho and the Ash River Outfall in South Africa. This local plant generates about 72 megawatts of power, which helps Lesotho not to be totally dependent on South Africa. After electricity has been generated, water exits from the three turbines into the ‘Muela Tailpond. This is a 55-metre-high dam, which is used to provide the head water for the continued delivery of water to South Africa.

## II. Phase 1B

Phase 1B has mainly been composed of the Mohale Dam, which is situated at the confluence of the Senqunyane and Likalaneng Rivers. This dam is joined to the Katse Dam by the Mohale Tunnel of 32 kilometres in length. The aim is that this tunnel will transfer water from the Mohale Dam to the Katse Reservoir and thereby increase the storage levels of water in that bigger reservoir. Other components of this project include the construction of the Matsoku weir and diversion tunnel. These are constructed to divert the flood flows in the Matsoku River into the Katse Dam.

### *2.3.3.2 Phase 2*

Phase 2 of the LHWP is envisaged to build on the successes of Phase 1. Likewise, it entails the construction of a dam and a hydropower plant and further has issues of social and environmental programmes to take care of the local people. According to the LHDA (2013), Phase 2 will be composed of the Polihali Dam in the Mokhotlong district and a transfer tunnel that will help in increasing the volume of water from 780 million metres to 1270 million metres per annum. This dam will be built downstream at the congruence of the Khubelu and Senqu Rivers. The Polihali transfer tunnel will work in such a way that it transfers water into the Katse Dam.

The envisaged Polihali Hydropower generation component will be composed of the Kobong pumped storage scheme, consisting of a hydropower station. It should be noted that this part of the LHWP is still in its inception stage and, as a result, nothing much except projections made can be said about it. Studies are being carried out further in order to ensure that this component is brought to a bankable status. As for the other two phases, nothing has been documented on them so far, so for now, the LHWP will be discussed in this report up to Phase 1A.

## **2.4 Sustainable growth and development in the water sector**

In the previous parts of this chapter, sustainable development has already been defined. Water resource projects indeed have an impact on or contribution towards development that is sustainable. As such, this section unpacks the whole issue of the LHWP contributing to sustainable livelihoods and development in the Katse area.

According to Mwanza (2005), water is at the core of sustainable development and is very critical in the analysis of socio-economic development, for healthy ecosystems and for human survival. Water forms the basis of production and is a way through which benefits and services can be extended to communities. Thus, it is a resource that is very fundamental to human well-being. The challenge is that it is depleting – today more than 1.7 billion people live in river basins where depletion through use exceeds natural recharge. If it continues in this trend, a serious challenge to sustainable development would be experienced.

### **Sustainable Development Goals (SDGs) on water**

As the time for the Millennium Development Goals (MDGs) drew closer to 2015, the global community saw it as fitting to try and come up with other approaches to carrying on and strengthening some of these goals. This is the case because the MDGs had not completely addressed some of the concerns of the full water and development agenda. The member states agreed that some issues were overlooked. Human rights, equity and development were to form the essential part of development and be seen as a vehicle towards true development (Loewe & Rippin, 2015). The United Nations’ overarching goal was “Securing Sustainable Water and Sanitation for All”. The water goal and its targets aimed at addressing the development aims of societies, promoting human dignity and ensuring that achievements were sustainable and led to desirable outcomes.

**Table 2.1: Presenting the SDG (6) in relation to development in Lesotho  
(Osborn, Cutter & Ullah, 2015)**

<b>Goal</b>	<b>Targets</b>
Ensure availability and sustainable management of water and sanitation for all	Achieve universal access to safe and affordable water for all
	Access to equitable sanitation and hygiene for all
	Improve water quality by reducing pollution and minimising hazardous chemicals and materials
	Increase water use efficiency and ensure sustainable withdrawals and supply of freshwater to address water scarcity
	Implement water resources management at all levels

	Protect and restore water-related ecosystems, including mountains, forests and wetlands
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### 2.4.1 Understanding of sustainable livelihoods

The concept of sustainable livelihoods is based mostly on the ideas of capability, equity and sustainability. That is, all these concepts are found in the definition of sustainable livelihoods. A livelihood is taken to comprise multiple things – people, their capabilities and their means of gaining a satisfactory living. These are seen by Petersen and Pedersen (2010) to include issues of food security and the availability of and access to various assets.

*Capabilities* – They denote situations whereby people are able to cope with the stress and shocks they face in their lives. They should further be able to find and make use of the opportunities a livelihood can present.

*Equity* – It is used in a much broader sense to mean considerable unequal distribution of assets, capabilities and opportunities. Members of the communities should at least be treated equally and discrimination against women and all weak members should be reduced.

*Sustainability* – The concept of sustainability, in this case, means that community members need to be engaged in processes that push up to self-reliance and self-support. Even the supporting institutions need to be able to sustain themselves and raise their own revenue. According to Merrey et al. (2005), sustainability of livelihoods has to be in two main forms – environmental and social. Environmentally, a livelihood has to take caution of the impacts thereof on other livelihoods. Socially, it has to be able to cope with external shocks and be able to maintain and grow internally, thus improving the lives of its members.

### 2.4.2 The sustainable livelihood approach

The sustainable livelihood approach evolved earlier on in the context of intentional development, by which its pioneers were aiming at strengthening their efforts towards helping disadvantaged people.

The principles of the sustainable livelihoods approach are as follows:

a. Holistic diagnosis and analysis

The sustainable livelihood approach attempts to define problems and opportunities available for populations using a holistic approach. It achieves this by taking into account a number of issues. One of them is the context which the community is based on. In this way, Krantz (2001) puts forth that it considers the social, economic and political trends that play a part in influencing the options of a livelihood of a specific population. It further carries on taking a look at the risks that such a community faces.

Another aspect that this approach considers is the type of resources available in a particular area. It considers the type of assets, including financial, social and natural ones that households and communities have access to and how they can best be utilised to improve their living conditions. At this stage, vulnerability is assessed by taking a closer look at the risks a community is exposed to and its ability to cope with these risks. Lowe, Ebi and Forsberg (2013) advocate that coping mechanisms have to be at the disposal of the members of the community so that their lives are sustained.

Livelihood strategies are also of major importance in the holistic approach to sustainable livelihoods. This perspective attempts to identify the various strategies that people can adopt to make a living. These are seen as adoptive and coping techniques towards the improvement of people's living standards. So, interventions need to be tailored in such a way that they are suitable for each and every community. This implies that each strategy has to be formulated in accordance with the needs of the community in question. In that way, such intervention will adequately respond to the people's needs.

b. Participatory and people's centred approach

The sustainable livelihoods approach employs a wide variety of participatory tools in the designing, monitoring and evaluation of programmes. In Van Heck's (2003) advocacy, communities have to participate in the formulation, implementation and monitoring of the projects that are designed to lift them out of poverty. The

sustainable livelihoods approach employs certain elements. It has what is called a “focused strategy” and in this instance, single sector projects are adopted in pursuit of a good and healthy way of living. This is the case because a holistic approach does not necessarily imply that interventions have to be multi-sectorial. Care should be taken that strategies are based on the actual problem and opportunity analysis.

### c. Multi-level approach

Society operates at many levels, causing it to be complex as it has globalised. Lyon (2011) reckons that according to this principle, poverty is a complex problem that needs to be addressed by employing various levels from local to the global. Organisations from both the public and the private sector have to work in collaboration with one another in the fight against poverty. Resources have to be harnessed so as to lift rural communities out of this social illness.

In a nutshell, sustainable livelihood is a concept that integrates certain concepts such as capabilities, equity and sustainability. In the context of rural communities, certain aspects need to be considered. The Institute of Natural Resources (2014) states that rural livelihoods comprise several activities, including cultivating, herding, reciprocal wage labour and artisanal work, such as weaving and carving. Rural communities use these systems to provide food and earn some cash and other goods to satisfy variable human needs. The aim is to sustain their livelihoods.

The sustainability of livelihoods raises many questions, which are broadly categorised into two perspectives. The first one to consider, is whether a livelihood is environmentally sustained in its effects on local or global resources. Environmental sustainability is concerned with the external impact of livelihoods on other livings. The second one is whether a livelihood is sustained socially. This one analyses whether a livelihood is able to cope with some stress and shocks that come as a result of the implementation of a project or programme. Social sustainability is concerned with the internal capacity to withstand the outside pressure (Vickery-Niederman, 2010). The common denominator of these two aspects is that sustainability is a result of how assets and capabilities are employed, maintained and enhanced in order to preserve livelihoods.

The sustainable livelihood approach does not focus only on the assets, but also on the vulnerability context that people are faced with. This includes seasonal shocks and climate change conditions that might affect their livelihoods. It also considers the institutional context which people live in and, finally, the interventions introduced to improve their living conditions.

### **2.4.3 Tools for sustainable livelihood**

#### *2.4.3.1 Participatory development*

In order for people to achieve a sustainable livelihood for their well-being, certain mechanisms can be adopted. This includes following some approaches to development, one of which is a participatory approach. According to Ozdemir (2013), this approach advocates for a situation whereby all stakeholders – be it the local people, institutions and other private sector organisations – collaborate to influence and share control over development initiatives. In this sense, they will be able to match the causes of their problems with the techniques to eradicate such problems. Thus, development can be realised, since it is a multi-faced aspect.

Broader participation of different actors has a positive element in that it has a way of enhancing good governance, that is, public transparency and institutional accountability. By following this tool, community members will have a sense of ownership of development initiatives aimed at helping them to lead a more sustainable living. This is a positive element because results will, to a larger extent, be enhanced. Capacities will be built and social capital enhancement will be realised. This collaborative effort will address the social and economic challenges and thereby result in the reduction of poverty and the promotion of sustainability of livelihoods through strengthened voice and better-informed decisions (Moyo & Madlopha, 2016).

#### *2.4.3.2 Integrated rural development*

This tool is not very different from participatory development, but has its distinctions. It is of the view that a united effort is a necessity for achieving sustainable livelihoods. According to Basler (1979), integrated rural development assumes that it

is the responsibility of the government to make certain that local farmers are assisted with easy access to the services and inputs needed to improve their livelihood.

This tool further advocate for proper planning among those affected. Planning is a step towards increases in agricultural outputs and incomes and these are at the centre of rural development. Multi-sectoral planning is important since sustainable livelihoods cannot be achieved in isolation from the new non-agricultural commerce.

## **2.5 Perspectives on the effects of large dams on communities**

Dams have been a part of the economic advancement model of almost all nations. It is believed that at some stage of their improvement, most countries with water resources that can be economically exploited, have built dams for energy, irrigation and domestic purposes. However, the construction of dams goes along with some costs and poses adverse impacts on the physical environment. They can also disrupt the lives and lifestyles of people living near the reservoir area and who are dependent on it.

### **2.5.1 Displacement**

Physical displacement of communities is generally regarded as posing a great risk to people affected by such projects. Many scholars and researchers have thus sought to highlight the effects of development-induced displacement (DID). DID is described by Ray (2000) to occur when people are forced to move from their homesteads or land as a result of development. Reports show that the number of displaced people has reached 40 million up to now, but the official figures are mostly underestimations. Potential risks of displacement include food insecurity, landlessness, loss of access to common property and increased morbidity and mortality.

Displacement is seen to occur in two forms:

Primary or direct displacement – It occurs when people are involuntarily moved from their traditional places or land with the aim to make way for a development project or when people are attracted to a development place in search of labour opportunities.

Secondary or indirect displacement – it is a result of environmental, geographical and socio-political consequences of the project that take place over time. Twigge-Molecey (2013) presents a practical example of such a situation where people are moved from their place due to pollution of their water system caused by a mining project.

According to Mehni, Omar and Bahar (2015), development-induced displacement has been a major cause of trauma to the affected communities and has mostly resulted in a downward spiral of impoverishment. It has led to widespread socio-cultural consequences. This painful process has also led to the dismantling of traditional production systems, desecration of sacred zones and the disorganisation of informal social networks that usually provide mutual support to local populations. Displacement has also caused the disempowering of affected people – it has a tendency to break up socio-political organisations which oppose the project or the development process itself (Dear & McCool, 2010).

### **2.5.2 Resettlement**

River-based populations also suffer from the process of resettlement. Skinner, Niasse and Haal (2009) shed some light on how the resettlement process is carried out. In their view, the resettlement process has four sequential phases. The first phase has to do with the scheduling of the relocation operations and the development of early infrastructures. That is, for any project to commence, some preliminary infrastructures will have to be constructed, which include some access roads and other physical structures.

Phase two is the actual moving of the people from their place of living to new places to make way for the project. For instance, in terms of the dam construction, people are moved from their previous villages to the arranged places. Miescher (2014) discovered that in Ghana 80,000 people were displaced in 1963 to provide land for the Akossombo Dam to be built.

According to Skinner et al. (2009), phase three deals with the economic and social development of the river-based populations. Lastly, phase four is now fully including the dislocated people in the regional economic framework. In this phase, the project is now running and people are being served in terms of issues including

compensation. At this stage, issues of benefit sharing can now be brought up, and be analysed as to the extent that they have an impact on the people's well-being after the inception of the project.

According to Diez and Veronica (2011), most resettlement processes in West Africa have put much attention on phase one and to a considerably minimal extent on phase two. This is due to human and time constraints. For illustration purposes, Sanyanga and Asanzi (2015) mention that in Ghana, President Kwame Khruma perceived the resettlement of the people affected by the Akossombo Dam as a serious case in which the affected communities should be regarded as the true leaders of development. On the contrary, the Manantali Relocation Project (MRP), as seen by Skinner et al. (2009), was not regarded as a sole driver of development of the communities. It had been decided that it would not be a good stepping stone for either social and economic advancement. The problem with this kind of thinking was that no development initiative would be meaningful if the communities affected by the project were not involved.

### **2.5.3 Rehabilitation**

Rehabilitation is carried out in order to enhance the quality of life of the people, especially those affected in some disturbing way. The main aim is to meet their needs and for them to be independent so that their lives are restored to their original livelihoods. According to Brown et al. (2014), useful initiatives for community-based rehabilitation include social counselling, community awareness raising, facilitating school enrolment through strategies such as reduced fees for the affected people and facilitating information for local self-help groups. Rural communities are assisted by organisations that have an impact on their lives for them to be equipped with the needed skills to push for their own development. This stage is very crucial for the success of any locally based project, including water projects.

### **2.5.4 Reparation**

There is no doubt that the construction of dams has a negative impact on the local population and because of this, meaningful amends have to be made by the authorities responsible. They require functional efforts to repair, make amends and

compensate for the damages incurred. As it stands, reparation may be taken to imply remedies that seriously address human environmental needs and show an obligation to re-establish human integrity. Such remedies should furthermore involve decision-making processes by both the affected people and the authorities responsible for such development.

## **2.6 Conclusion**

Water is potentially a resource and certainly a critical point in achieving sustainable development for people. This calls for a better way to manage water resources to contribute to the provision of quality water for domestic and other productive uses. As a result, populations will be in a better position to benefit from water infrastructure in terms of food production and other economic development issues. This will ultimately be a stepping stone towards sustainable livelihoods and development. However, a gap exists in that there are clear indicators in place relating to access to water for productive purposes, including smallholder agriculture.



**Table 3.1: Principal statistics of the Katse Dam (Phakoe, 2001)**

Dam type	Double curvature concrete arch
Maximum height above foundation	185 metres high
Base thickness	60 metres
Crest volume	710
Concrete volume	2.34 million m <sup>3</sup>
Length of spill capacity	135 metres
Maximum spill capacity	6,000 m <sup>3/s</sup>
Reservoir area	38 km <sup>2</sup>
Full supply level	2053 masl
Catchment area	1883 km <sup>2</sup>
Mean annual rainfall	741.59 mm
System yield	18 m <sup>3/s</sup>

According to Rocci and Del Sette (2016), people in this area are considered to be rural in nature and are mostly dependent on agriculture as their main source of food, since most of them are not in any form of formal employment. The economy in these rural areas, as with the whole country, has experienced structural shifts in its agricultural production from predominantly subsistence to limited manufacturing. As a result, its contribution to the Gross Domestic Product of the area has declined. Despite this, agricultural production remains to be an important factor towards the livelihoods of the rural people. People have ventured into other small activities such as fishing. Again, the Katse and Lejone areas are characterised by low levels of employment, which force people to move to the urban areas within the country and outside in search of better employment opportunities. In this area, 40% of households live below the poverty line (Rocci & Del Sette, 2016).

### **3.3 Holistic diagnosis and methodology of the study**

Holistic diagnosis is seen as one art of a sustainable livelihood in that concerted efforts are to be made to increase the availability of resources for people. It says that attempts towards ensuring a sustainable livelihood need to take a holistic approach in determining the problems and opportunities that people are exposed to. According

to Frankenberger et al. (2002), it takes into consideration certain elements, namely context, resources, institutions and organisation, livelihood strategies and livelihood outcomes.

This study made use of the quantitative research approach, so that the problem could be adequately addressed. It involves the collection of data through questionnaires and surveys in a numerical format. According to Babbie (2010), the aim of this type of research is to classify features and finally construct statistical models in an attempt to explain what is being observed.

The study also employed some qualitative methods in going about finding answers to the research problem. Brynard, Hanekom and Brynard (2014) assert that qualitative research methodology offers thick descriptions of situations using the applicable methods as advocated by this method, hence its suitability in this research. Thus, the qualitative research made it possible for the researcher to acquire the views of the affected populations in the Katse and Lejone areas.

The mixed research approach is also advantageous in this situation because it has provided room for flexibility in terms of matching the method of data collection to the situation on the real ground. Even in terms of theory development or extension, both approaches contribute a lot to that. It identifies themes that may be applicable to situations that are more or less the same as this one.

### **3.4 Research design**

The choice of a research design depends predominantly on the general objective of the proposed study, as well as the resources available to the researcher. There are four types of quantitative designs – descriptive, correlational, quasi-experimental and experimental. This being the case, the researcher adopted the descriptive design in trying to respond to the research problem. Dulock (1993) puts forth that there are certain ways a researcher can go about doing a descriptive research project and these are observational research, case studies and surveys. Combining both methods to a large extent minimises the deficiencies that may be experienced in each of them.

### **3.4.1 Case study research design**

For the research problem in this study, a single case study design was used. Merian (1998) defines case study as an intensive description and analysis of a single instance, phenomenon or a social unit. In particular, this research focuses on communities residing in the area of Katse Dam, particularly those in Katse and Lejone areas.

The Lesotho Highlands Development Authority (LHDA) is the implementing organisation and is controlled by a jointly established board of directors composed of the Lesotho and South African delegation – three directors from both sides. It is a project that is planned to run for a period of 50 years and the plan is to ultimately construct five dams in this period.

#### *3.4.1.1 Advantages and disadvantages of a case study design*

Case study research is advantageous to adopt because data are often examined within the environment which the activity takes place in real-life situations. In this case, the data were collected in the Katse and Lejone areas, where the dam is built. According to Yin (1994), a case study research design is also useful in that it assists in learning more about an under-examined situation and helps to provide clarity on how it develops over time. The case study design has attracted some criticism too, but still remains an appropriate tool in qualitative research because of its flexibility. It enables researchers to analyse both qualitative and quantitative data without much of a hassle (Murphy, 2014).

### **3.4.2 Survey design**

Surveys are generally regarded to come in different ways. A survey, according to Collie and Rine (2009), includes interviewing people on a face-to-face setup or handing out questionnaires to the respondents of a specific study. In this study, the affected community members were asked questions through questionnaires administered by the researcher.

### **3.5 Sample size and sampling procedures**

The population for this study comprises all villages found in both Katse and Lejone areas which were affected by the construction of Katse Dam. However, due to certain constraints, five villages were purposely selected to be in the sample. The villages from which the information was collected, are Theko, Makhoabeng, Mphorosane, Kosetabole and Khokhoba. Their selection was based purely on their location from the dam and the fact that they could easily be accessed, as compared to other villages.

A sample is used to enhance the validity of findings, so that results can be generalised to other situations. Selection of villages was then followed by selection of community members in their respective villages. A sample of 111 community members that were affected, was selected. For this group, a cluster random sampling technique was adopted for them to be included in the sample. In discussing this sampling technique further, the affected community members were included in the sample through a probability sampling technique, called “cluster sampling”. In cluster sampling, three steps are followed:

- i. Divide the population into groups or clusters.
- ii. Randomly sample clusters.
- iii. Measure all units within sampled clusters.

Welman (1999) states that cluster sampling is applicable to situations where the population is spread across a wide area and it is not possible to study the whole population. The same goes for these villages that have been affected by the implementation of the water project. So, in using cluster sampling, it would allow the researcher to pick up a few villages (five in this case) in the Katse and Lejone areas.

### **3.6 Data collection strategy**

#### **3.6.1 Primary sources**

This study adopted the questionnaire survey method to collect data relevant to this research. Narayan (1996) puts forth that a questionnaire consists of a series of close-ended questions with a choice of answers, asked in a certain planned order.

The questionnaire in this study further employed some open-ended questions which enabled the respondents to comment in a broader sense and express their opinions of the functioning of the LHWP in their area.

The questionnaire was divided into themes which the relevant information was collected for. The data that were collected through the questionnaire, covered areas such as background information, livelihood strategies, infrastructure-related questions, food security issues, and health and education service provision. The adapted sections in the questionnaire were all directed towards the objectives of the study.

The questionnaire was administered by the researcher. The questionnaire was beneficial to the study due to a number of reasons. According to Fowler (1993), a direct questionnaire survey further provides room for probing by the researcher, so that a question is answered satisfactorily. This does not, however, imply that a researcher guides a respondent on how to reply to the question. On the other hand, questionnaires have their own disadvantages, including the fact that they are time consuming. However, the administered questionnaires enabled the community members to express their views on the water project in line with their livelihoods as a result of being affected by the LHWP.

### **3.7 Data analysis methodology**

#### **3.7.1 Techniques for data editing and coding**

In this research, certain techniques for data editing and coding were employed. Data editing involves the review of the collected data so as to improve the quality of such data. Data editing was done manually through the use of a computer. In terms of data coding, numbers and letters were used to imply certain information and thus simplified the tabulation of information in the data sheet. This assisted the researcher to reduce large amounts of data into manageable categories.

### **3.7.2 Data entry**

The researcher drew a data sheet from the raw data collected and then all the collected data were entered into the Statistical Package for Social Science (SPSS) data matrix by a statistician.

### **3.7.3 Data cleaning**

Data cleaning is done solely to extract needed information and to do away with unwanted information. It helps in addressing the problem of bad quality data. According to Rubin and Babbie (2010), possible code cleaning can be used to complete the data cleaning process.

### **3.7.4 Data processing**

This process covers a wide range of steps, ranging from data editing, coding, classification and tabulation of the collected data. Upon completion of all these processes, the data were analysed to make sense from of it. Both descriptive and inferential data analysis methods were used. According to Braun and Clarke (2006), descriptive statistics include cross tabulations, frequency distributions, percentages, and line and bar graphs. As for the open-ended questions, the analysis was done with the help of grouping similar responses and assigning numbers to these groups.

## **3.8 Data quality issues**

### **3.8.1 Reliability**

According to Olsen (2012), data reliability occurs where the same meanings of concepts or terms used throughout the research remain constant. This will most possibly lead to the same outcome, even if the same research is conducted on numerous occasions. All observers should be able to agree on what is being recorded. In this case, the data are regarded to be more reliable. For the results to be reliable, questions are asked as they are and the recording of all answers is ensured.

### **3.8.2 Validity**

Validity refers to the believability of the research findings. Kimberlin and Winsterstein (2008) assert that any research report should produce genuine findings. Data can be classified as being valid internally or externally. Internal validity refers to the case whereby the employed instruments in the study really measure what they are expected to measure. External validity refers to the situation whereby the results of the research can, without a doubt, be generalised, even beyond the immediate study. Validity would be ensured through pre-testing of the questionnaire. That is, it should be easy to generalise the findings even to those affected members who have not been part of the sample. These two concepts are closely related – if the data are valid, the data are also reliable.

### **3.9 Research ethics**

Simons (2009) points out that ethical consideration is practised by researchers to make sure that the study is conducted in a way that meets the interests of the individuals or the community as a whole. It is true that the researcher has some interests to be met by conducting a research, but the participants' interests should also be catered for. In addition, ethics in research is in place with the intention of making it possible to observe some specific research activities to measure their ethical soundness. It looks into issues of protection of confidentiality, management of risks and the process of informed consent.

### **3.10 Limitations of the study**

The study encountered the following limitations:

- The study concentrated mainly on gathering information from the affected communities, it did not cover the side of the organisation implementing the project, the LHDA officials.
- Due to limited funding, the study covered only five villages out of about thirty-two villages in the Katse and Lejone areas in trying to go about answering its main research problem.

### **3.11 Conclusion**

Chapter three clearly presented a combination of methods used to gather data from the communities affected by the project. These methods involved both primary and secondary instruments and as such, deficiencies that might be experienced in each method were complemented by the other. Self-administered questionnaires and surveys were adopted in this research. The researcher proposed to use various methods in the analysis of the data, combining both manual and technological methods.

## **CHAPTER 4**

### **FINDINGS AND DISCUSSION**

#### **4.1 Introduction**

Chapter four describes the findings and discussion of data collected through both primary and secondary sources. The discussion is mostly crafted from the livelihood outcomes and the vulnerability context as depicted in the Sustainable Livelihoods Framework. Analysis and interpretation of the collected data is done in relation to the objectives of the study in the form of statistical representation, graphs and tables. The findings should provide an understanding of the impact of Phase 1A of the Lesotho Highlands Water Project (LHWP) on the local communities and the extent to which the LHWP has contributed towards socio-economic sustainability of the livelihoods of local populations.

The presentation of the findings is done in sections namely-biographical information of the respondents; perceptions of the affected people about the LHWP; the hazards or risks the project-affected people faced as a result of Katse dam; food security issues and socio-economic aspects making up their livelihoods both previously and currently.

#### **4.2 Biographical characteristics**

The biographical characteristics of the respondents are presented in Table 4.1. The highest number of respondents was from Khokhoba (23.3%) and Ha Kosetabole (23.4%) and Makhoabeng at the lowest with a turnout of 15.3%. However, there were not enough representatives from each selected village for the study. Mphorosane has the lowest number of males (27.3%) and highest number of females (72.7%) while Ha Kosetabole has the highest number of males 57.7% and lowest number of females (42.3%). These gender categories in each village allowed the researcher to get prospective from both gender variable and imbalance in the village.

Gender is an important aspect to look at because men and women do not perceive circumstances in the same way and thus they are affected by conditions differently. They are not equal in terms of worldviews and value orientation hence analysis of their views is needed.

**Table 4.1: Number of representatives of respondents and gender category in 5 selected villages**

Selected villages	Frequency	%	Gender of respondents	
			Male	Female
Ha Theko	19	17.1	8 (42.1%)	11 (57.9%)
Khokhoba	27	24.3	13 (48.1%)	14 (51.9%)
Ha Kosetabole	22	19.8	6 (27.3%)	16 (72.7%)
Mphorosane	26	23.4	15 (57.7%)	11(42.7%)
Makhoabeng	17	15.3	7 (41.2%)	10 (58.8%)
Total	111	100%	44.1%	55.9%

Table 4.2 shows that 77.5 % of the respondents are people of 46 years of age and above, while people aged from 26-35 are the lowest group of 6.3%. Age is one of the aspects to be considered in this study because mature people are relevant sources of information since they have relatively richer experiences of the social and physical environments both before the water project and after its implementation in their area.

**Table 4.2: Respondents in terms of age categories**

Age range	Frequency	Percentage
26-35	7	6.3
36-45	18	16.2
46 and over	86	77.5
Total	111	100%

### 4.3 Effects of Dam construction on local people

Table 4.3 shows that 105 respondents (94.6%) were affected by the construction of the Katse Dam, through losing their fields, grazing land, trees, houses or burial sites. Only six respondents (5.4%) have lost their household properties or experienced damage to their furniture. All of the respondents have been affected by the construction of the dam in wide range of losses. From the result, one can understand how the dam-construction project has affected their livelihoods. Variations in people's responses regarding their feelings about the project indicated that people experience conditions differently during infrastructure construction.

The afore-mentioned assets formed a crucial part of the livelihoods of these people – they ploughed their fields to increase their food production and to generate an income by selling the surplus. Construction of the dam has contributed in a way to food insecurity in the Katse and Lejone areas despite the advantages of water storage increases. An observation made is that if a food-generating asset is taken away from the owner, it becomes difficult to maintain the necessary quantity of food. Attainment of livelihood outcomes becomes a problem (Fisseha, 2014). Note has to be taken that none of the respondents mentioned the project as a cause of food shortages in their households.

In the context of the respondents being vulnerable, it can be drawn that the project has contributed towards increasing their vulnerability. According to Jinadu (2014), when rural communities are exposed to hazards and their coping capacities are low, these makes them highly vulnerable and less protected. As the sustainable livelihoods framework depicts, the livelihoods of vulnerable communities are not entirely maintained. Moreover, the project seems to have reduced the well-being of the local populations in other aspects when looked at in the context of assets being taken away from them.

**Table 4.3: Responses concerning how communities were affected by the construction of the Katse Dam**

Local community losses	Frequency	Percentage
Field/grazing land/cracked house/kraals	105	94.6

destruction/inundated burial sites		
Household properties	6	5.4
Total	111	100

#### 4.4 Risks faced by local populations

Out of 111 respondents, 102 (91.9%) have been exposed to risks or dangers as a result of the construction of the dam in their area (Table 4.4). Nine of them (8.1%) do not regard the Katse Dam as a life-threatening feature on their part. Comparatively, most of the respondents asserted that the water project has brought with it some dangers to their lives. According to the responses, it can be drawn that the people have been affected in a negative manner by the construction of the dam.

**Table 4.4: The frequency and percentage of respondents to risk due to dam construction in their area**

Responses for respondents	Frequency	Percentage
Yes	102	91.9
No	9	8.1
Total	111	100

#### 4.5 Types of risks faced by local people

People who have been affected by the LHWP, face multiple hazards due to the dam being constructed in their area. Figure 4.1 shows that 79.28% of the respondents face problems of landlessness, food insecurity and a lack of access to common property, including forests and burial sites. Respondents further claimed to face a problem when it comes to their animals – they no longer have enough grazing space and as such it becomes senseless to have animals in large quantities. From Table 4.4 results, only 8.1% of the Katse and Lejone people have not been exposed to

dangers due the dam. However, the dam construction has a huge benefit to conserve the water and to make use for agricultural purpose.

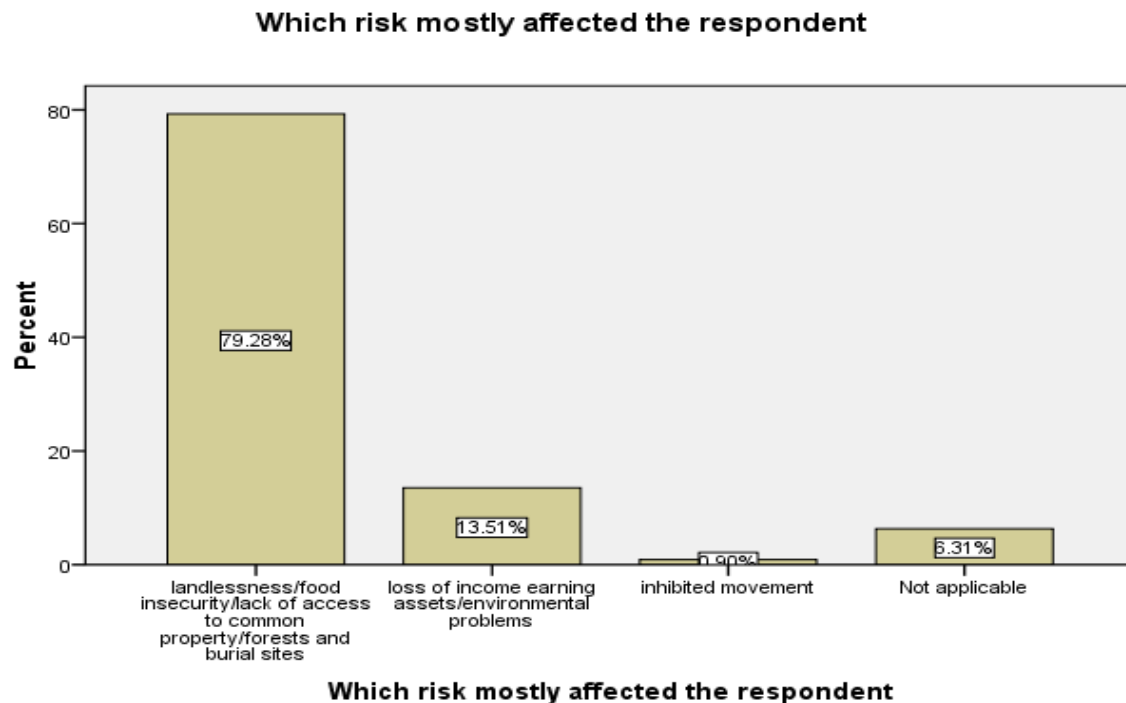
The construction of the Katse Dam brought with it a lot of challenges for the local communities. The sampled people claimed that they confronted issues that really made life difficult for them. One of the major things they experienced, was that they no longer had access to common properties, such as forests and plants, which they claimed, had supported their livelihoods. You et al. (2012), mention that the sustainability of livelihoods is basically dependent on properties that people perceive as important to them. They also claimed to have lost their land due to the construction of the dam and as a result their animals did not have enough grazing land.

The results from the survey also show that the dam resulted in the loss of income-generating assets such as grass (for making brooms and roofing), and led to some environmental problems for the locally based people. Others also asserted that their movement to other neighbouring villages had been restricted by the dam. Campos, Muraao and Magnusson (2017) conclude that these villagers are more of prisoners in their own homes due to the dam. Socialising with people from other villages is very difficult in this situation. Some respondents concluded that these villagers are almost prisoners in their own homes due to construction in their fertile area. Socialising with people from other villages is very difficult under the existing conditions.

The findings present that the responsible people do not seem to do anything to assist them in minimising these problems. Respondents expressed that the dam has undoubtedly had a negative impact on the people. These findings lead one to come up with ideas that the conclusion that the communities living in the Katse and Lejone areas have not found the means to minimise these risks; hence, they still blame the project even after 20 years from its inception. In line with construction of the dam it is necessary to consider local people demands and future.

One would say the authorities need to find ways and means to work with these people to come up with recommendations on how they can best mitigate these risks. Development initiatives should not put the lives of the local people in danger, but

assist in improving them. On this note, the findings say that it is the responsibility of the implementing authority to ensure the survival of these communities.

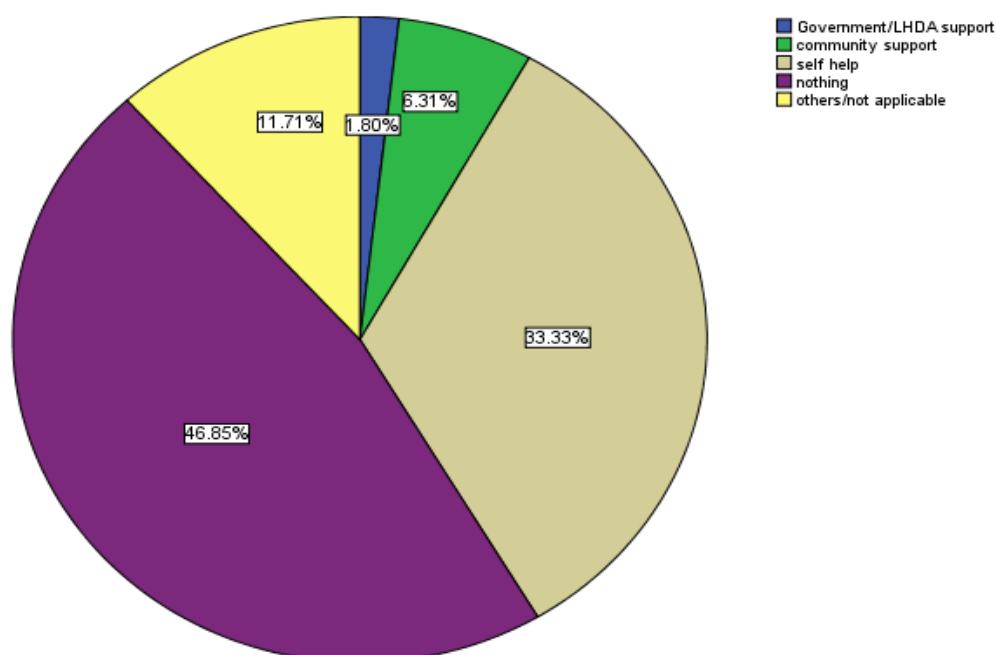


**Figure 4.1: Responses regarding risks faced by the people due to construction of the dam**

#### 4.6 Strategies adopted to minimise risks

Figure 4.2 presents the strategies that the affected people have adopted in trying to survive after the construction of the dam has affected them in many different ways. It shows that the majority of the people agree that they have been affected negatively; they are still struggling to adapt to changes and have no clear strategies to survive. This is evidenced by the statistical presentation of people (46.8%) who claim to have done nothing although they still face shocks. According to the respondents, little support for their livelihoods is received from the government or the LHDA, 1.8%. That is, the people now have to fend for themselves, even after having lost their property for this development initiative. This survival attribute is important because it relates to the impact the water project has had on the nearby communities.

### Which strategies did the respondent apply to minimise the risks



**Figure 4.2: Responses regarding strategies adopted by respondents for survival**

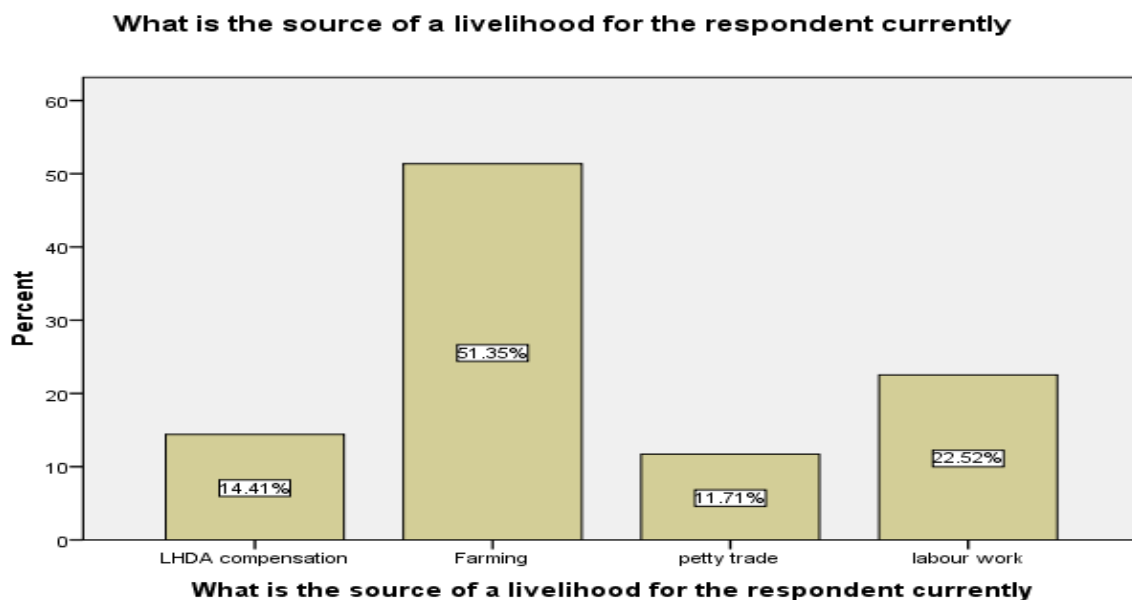
#### 4.7 Sustainable livelihoods maintenance

Table 4.5 presents the responses regarding livelihood maintenance by the respondents before the construction of the dam. Table 4.5 presents the livelihoods of the respondents before the implementation of the water project in their area. According to this table, 92.8% of the respondents gained their livelihood mainly through farming, while 1.8% of the respondents claimed to have maintained their living through other means before they have been affected by the water project. Livelihood maintenance is crucial for people affected by developmental projects because better social and economic standards are important in the lives of these people (Redclift, 2000). This approach is very crucial for the communities nearby Katse Dam to improve their lifestyle.

**Table 4.5: Responses regarding livelihood maintenance by the respondents before the construction of the dam**

Livelihood maintenance	Frequency	Percentage
Crop/animal farming	103	92.8
Non-farming activities	6	5.4
Others	2	1.8
Total	1111	100

In comparison to the respondents' sources of livelihood before they had been affected by the water project, their dependence on farming has been reduced. Figure 4.3 shows that farming is no longer the sole source of livelihood for the respondents because it has been dropped from 92.8% in Table 4.6 to 51.3%. The respondents seem to have other means through which they maintain their livings. However, farming remains the main survival strategy, since 51.3% are still practising farming. Of the respondents, 11.7% acquire their livelihoods through petty trade because they say the construction of the dam has brought with it a lot of economic opportunities.



**Figure 4.3: Responses regarding livelihood sources currently**

The livelihoods of rural populations are largely dependent upon crop and animal farming and these are needed to sustain their livings. The findings of this research indicate that prior to the implementation of the water project in the Katse and Lejone areas, the communities there relied on farming for their means of support (Table 4.5). The villagers had animals and fields through which their livelihoods were supported. As time went on, after the construction of the dam in the Katse and Leajone areas, the people's dependence on farming subsided. Ashfaq (2007) assert that water resources development is crucial for the improvement of agriculture in a specific area. This applies in the case whereby local peasants are afforded access to such resources. Contrary to this, people affected by Katse dam do not have direct access to the dam. Thus, this water does not contribute to agriculture sustainability in this area and consequently food production is affected.

Another way of looking at the issue of sustaining livelihoods is that farming subsided due to fields' acquisition for this project and as a result people had to find other ways of supporting their livelihoods. The findings show that other people currently rely on compensation offered by the LHDA in exchange for their fields. Other people have established some small businesses since naturally a big development project attracts many people to it. Other people maintain their livelihoods through labour work in different companies that were established as a result of the dam.

From these findings, the full understanding can be drawn that the dam has indeed had an impact on the livelihoods of the populations based at the Katse Dam. The construction of the Katse Dam has changed the living patterns and the sources of livelihoods of the local people. It introduced other survival strategies through which people can sustain their livelihoods, even when their properties were acquired. It should be noted that in some instances, people had no choice – they had to change their living patterns. It is, therefore, difficult to say whether their lives were changed for the better, since it was not according to free will. In general, the construction of the dam has definitely made an impact on the means of supporting their livelihoods.

## 4.8 Socio-economic issues

### 4.8.1 Sources of energy for respondents

The respondents in this study stated that before the LHWP had been initiated in their area, they used firewood for cooking; that constitutes 97.3% of the people in the sample, as shown in Table 4.6. The table shows that 3% of them had access to gas as their source of cooking. After this massive development project, the number of people using firewood and crop/animal residue was reduced to 45%, while the number of people with access to gas has increased from 3% to 37.8%. Electricity is also accessible to 17.1% of the people in the sample after the construction of the dam in their area. It proves that the construction of the dam improved the capacity of the country to generate electricity and made it possible for more people to access it .

With the construction of the dam, different types of sources of energy surfaced in the livelihoods of the local people. People are now exposed to different kinds of energy sources – *“We are able to buy gas and electricity due to infrastructure development (roads) that has been made in our area. This has helped us in shaping our livelihoods for the better”* (interview with one respondent from Khokhoba village).

The understanding can be drawn that in this aspect, the project has contributed to improving the livelihoods of the populations based at the Katse Dam. In their households, the means of cooking has also changed, since they now have access to gas and electricity.

**Table 4.6: The frequency and percentage of cooking materials usage by the communities before and currently**

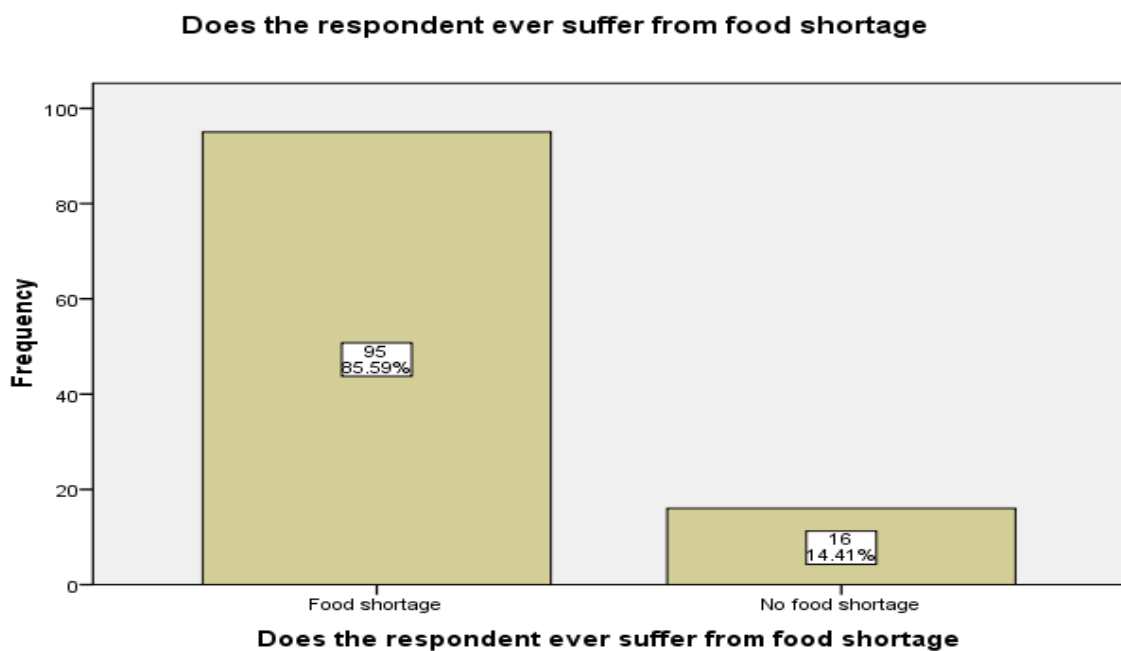
Types of cooking materials	Usage of cooking materials			
	Before		Currently	
Firewood/animal crop residue	108	97.3	50	45.0
Gas	3	2.7	42	37.8
Electricity	-	-	19	17.1
Total	111	100%	111	100

## 4.9 Food security issues

The food security aspect needs to be looked at because the local people have indeed been affected by the dam, and their fields from which they had extracted food, were seized by the project authorities. The researcher wanted to assess the impact of the construction of the dam on food production. This aspect will be unpacked in different approaches to actually find out whether the dam has really contributed in a way to the shortage of food for local communities.

### 4.9.1 Food shortages responses in terms of existence and non-existence

Figure 4.4 presents that 85.6% of the respondents face the problem of food shortage, while a few of them (14.4%) are not confronted with this problem.



**Figure 4.4: Responses regarding the issue of food shortage**

### 4.9.2 The level of yield

The people living in the Katse and Lejone areas claim to have depended entirely on crop and animal farming before they were affected by the construction of the dam. However, their agricultural fields were acquired to make way for the enlargement of the dam. Table 4.7 shows that out of 74 respondents, 65 claimed that they experienced low yield in summer months, that is, they experienced food shortages especially in these times. Out of 15 respondents, 4 experienced a high yield during that period.

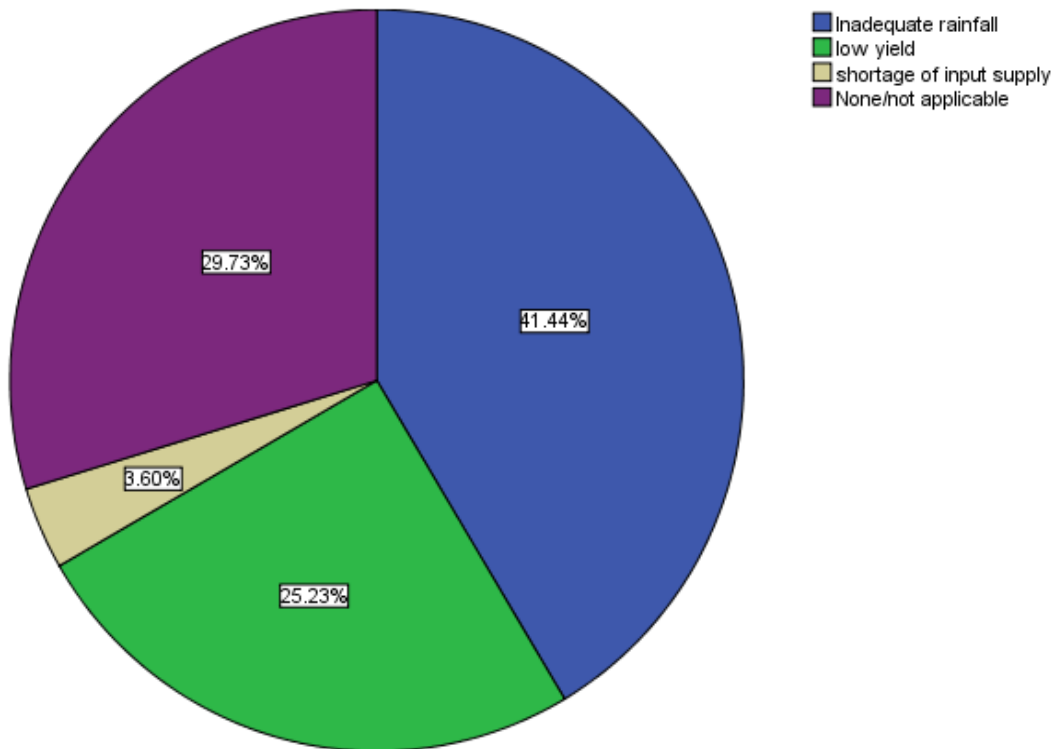
**Table 4.7: Responses regarding the level of produce/yield currently (seasonal)**

Level of production	Duration of food shortage				Total
	Summer	Always	Winter	Not applicable	
Low	65	4	1	4	74
High	4	1	0	10	15
Better	8	1	0	0	9
No yield	13	0	0	0	13
Total	90	6	1	14	111

### 4.9.3 The causes for shortage of food as experienced by the respondents

Weather conditions seem to be causing a problem for most of the respondents – 41.44% asserted that inadequate rainfall affected their ploughing produce and therefore led to food shortages. Of the respondents, 3.6% believed they were experiencing food shortages due to shortages in input supply. These are not easily accessible to the people. It was established that there is no clear relationship between the dam construction and the shortage of food in this instance.

### In the respondent's view, what causes food shortages

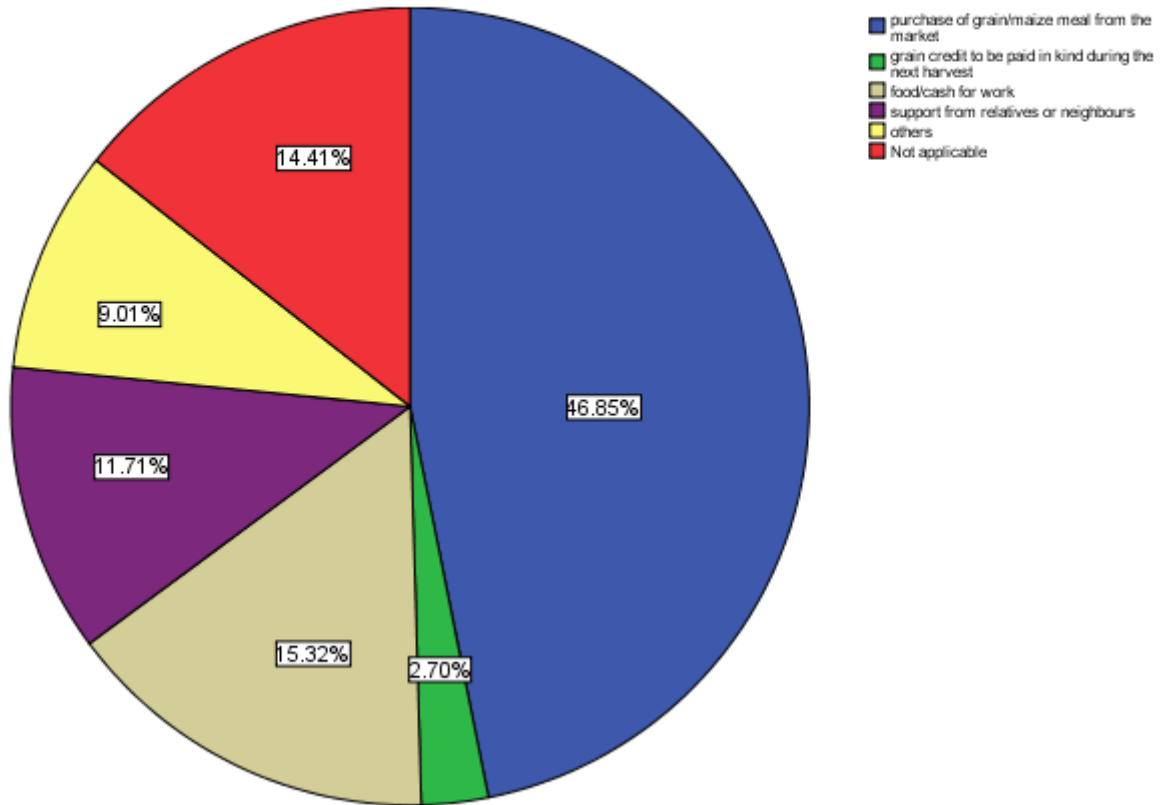


**Figure 4.5: Responses regarding the reasons for food shortages**

#### 4.9.4 Strategies adopted for food shortages

Figure 4.6 shows that 46.8% of the respondents deal with the problem of food shortages by buying maize meal and other household items from the stores/local shops. Their main source of food, therefore, has shifted from farming to purchasing from the stores seasonally. The minority of the respondents (2.7%) minimise the risk of food shortage through grain credit, which is paid in kind during the next harvest.

### How does the household deal with the problem of food shortage



**Figure 4.6: Strategies adopted for food shortage**

The concept of food security had been defined by the World Food Summit on several occasions, but this research aligns itself with the one given in 2001. According to Bajagai (2013), the State of Food Insecurity 2001 defined food security as a situation that exists when all people, at all times, have physical, social and economic access to sufficient food that satisfy their daily needs. In that definition, it is clear that food security is built on three dimensions:

*Food availability* – It is the situation whereby people have enough food in the right quantities supplied through domestic efforts or any other means.

*Economic and physical access to food* – It addresses whether the households or individuals have enough resources to acquire appropriate quantities of quality foods.

*Food utilisation* – It addresses not only how much food people eat, but also what and how they eat.

According to the research findings, the majority of the respondents face the problem of food shortages and this has an impact on their livelihoods. Only a few of them are not experiencing food shortage supply problem. Among the issues that have led to this condition is the fact that their produce from the previous harvest is not enough to sustain them for a long time. The sampled population claims that the weather conditions are not favourable enough to allow them to rely on farming. According to Chauvin, Mulangu and Porto (2012), drought leads to food shortage, since it restricts people from making good harvests, thereby affecting the people negatively. Another important issue to take note of is that some of the respondents agreed that they had a problem of food insecurity, but they were not certain of what exactly causes this situation.

Moreover, the research findings also provided a picture of how the affected people tried to overcome this problem of food deficits. One of their survival strategies is to purchase food and other household items from the store, although it is not easy. From the analysis of the research findings, none of the respondents claim to have a problem of food deficits due the construction of the dam in their area. It could not be established if the project has made a contribution to this problem on the basis of the responses. It is only fair to draw a conclusion that there is no connection between the LHWP and the problem of food deficits facing the populations found in the Katse and Lejone areas.

### **4.3 Conclusion**

This chapter presented the findings and interpretations as collected from the sampled population, covering the perceptions of the affected people on socio-economic issues and other related concerns that were of interest to the researcher. Analyses were done and discussions were held in relation to livelihood outcomes and factors that lead to the vulnerability of the people based in Katse and Lejone areas. One main objective was to establish the extent to which the construction of the dam has contributed towards sustaining the livings of the communities based at adjacent to Katse Dam. The presented results indicate that the dam has indeed

impacted on the people and their lives had been disturbed and therefore compromising some sustainability factors. The understanding is that the livelihoods of communities around Katse Dam have not really been sustainable since this development in their area. The suspicion is also that the local people have not totally adapted to the new ways of living they had to practice as a result of the construction of dam.

## **CHAPTER 5**

### **FINAL SUMMARY, RECOMMENDATIONS AND CONCLUSIONS**

#### **5.1 Introduction**

This chapter presents a summary of the research findings and their interpretations. It is divided into two sections, with the first part focusing on summarising the findings of the study as provided by the people residing at the Katse and Lejone areas. The second section presents some recommendations as per the outcomes of the study.

#### **5.2 Summary of research findings**

This study was designed to assess the impact of the construction of the Katse Dam on the local people and the extent to which the project authorities contribute towards sustaining the livelihoods of the people. The research questions focused on the affected communities and took the sustainable livelihood framework as the focal point in this study. The local communities will then be able to attain their livelihood outcomes, having a better income, increased well-being, reduced vulnerability and improved food security.

##### **5.2.1 Communities' opinion on Dam construction**

Having explored the outcomes of the study, initially the construction of the dam was welcomed by most people in the area. The way it was presented, gave them hope that their lives were going to be improved both socially and economically. However, based on the existing findings, the dam has had both negative and positive effects on the livelihood of the farming communities. The assets through which people gained their livelihood were acquired and thus had an impact on their way of living and the farming community had to find other means of survival.

The Federal Emergency Management Agency, FEMA (2013) states that if dams are not maintained and operated correctly, they could pose risks to those living downstream. This is the case even in Lesotho, where people affected by the Katse Dam assert that they faced some risks, hazards and shocks after the construction of the dam in their area. Their land and some assets, such as fields were seized and as

a result they could not maintain their livelihoods as they should. The dam forced them to shift from their traditional ways of living to more adaptive ones. At a glance, one would assume their lives have improved because there are signs of improvement, but surprisingly, they do not regard these developments to be improving their lives. Their adaptive strengths to these new ways of living are questionable.

### **5.2.2 Impacts of Dam construction on local community**

Over the past decades, countries have sought ways of collecting and keeping water for various reasons. One of such ways includes the construction of large dams. However, these proposals have attracted extreme hostility. Other impacts of dams include loss of culture for local people, exposure to health vulnerability and loss of cultural heritage assets. Plants and animals also suffer due to dam construction. Living organisms usually disappear from the flooded area. This in turn is a problem because people somehow depend on animals and plants for their survival. Thus, dams are a source of discomfort for local inhabitants despite the advantage as water resource for local people. People are not immune to ecosystem changes and this is a problem because many of them gain their livelihood from livings related to water.

The construction of dams really impact on people in that in extreme cases, they have to alter their lifestyles due to their homes and land being inundated. At some times, local people experience the flooding of their villages due to the dam leaving them stranded for a certain period. This forces the affected people to be homeless. Another measurable impact of dams on local people is that people are often forced to leave their places in order for dams to be constructed. The problem here is that communities normally keep growing and yet the land is constantly getting small. This hardens life for these people and consequently their survival is questionable.

The understanding here is that negative impacts of dams are costly to local people. The construction of Katse dam is not an exception in this case, it has impacted on the livelihoods of local people. Note should be taken that dams impact differently on different communities and often fail to achieve their projected goals. This being the case, the affected people have to adapt to the changes so as to survive or else they will perish.

There are also positive impacts of dams on local people. Dams are necessary for national and local economic enhancement. The findings of this study presented that energy sources at the disposal of local communities have increased in variety. According to Williams and Drabu (2015), dam construction opens up economic opportunities in areas where they are constructed. It cannot easily be concluded that this improved their lives since such resources are costs related. Dams also open up the construction of infrastructure in areas where they are constructed.

The construction of dams makes it possible for the country to erect hydro-electric energy plants to increase the supply of electricity in the country. People living closer to areas where dams are really benefit from this development. Moreover, dams make it possible for local people to access water. This is vital for various functions in a household and one can be food production and storage. Dams are sources of fish which people can use for subsistence and sale. Water provides opportunities for people in that they can relax and swim if are allowed by the assigned authorities.

### **5.2.3 Sustainability of livelihoods**

This study mainly wanted to establish the extent to which the livelihoods of the local people are maintained even after the construction of the Katse Dam in their area. It looked at different aspects in order to come to an informed conclusion on this matter. Among the considered areas, infrastructure, social services and food security issues were part of the analysis. The research found out that the people in this area enjoyed the improvement in different aspects pertaining to infrastructure. Tared roads and access roads were constructed and these simplified their movement from one place to another relatively.

Another notable development in this area is that electricity provision was boosted and made accessible to the majority of the people due to the implementation of the LHWP in their area. The above statements are supported by Peter et al. (2009), stating that infrastructure improvements have a positive effect on the standard of living of people in the long term.

The construction of the dam has also brought with it a lot of other soft infrastructure. People who are closer to the dam have clean water supplied by the implementing authority. Even in other villages, people claim that since the construction of the dam,

they have access to safe drinking water under the project called “Water and Sanitation Program”. This project was implemented by the LHDA. The researcher also noted that more businesses were seen in the areas closer to the dam. These are believed to be generating income for local business people.

As much as there are positive implications of the dam for local people and the economy of the country, there are still issues of concern. The respondents claim to have experienced the problem of food deficits ever since the dam had been built in their area. Many respondents mentioned to have this problem, but the research could not get clear responses regarding the connection between the dam and food insecurity. There are no clear statements that convince the researcher that the dam has indeed caused food insecurities based on the responses the research has generated. However, Ziegler et al. (2013) believe there is a connection between dam-building projects and food insecurity.

Equally important, the dam has in some instances made it difficult for people to move from one village to another. People there, claim they now have to take long and formal routes to and from local places. In the older days, communities used to walk all over without having to avoid the dam. This even threatened their safety since they now have to be far away from the dam. There are regulations made by the LHDA concerning the allowed distance to be kept from the dam. Katse and Lejone communities have experienced most of the negative impacts caused by Katse dam. Some of the common negative impacts are listed as follows:

- i. Land inundation leading to food insecurity
- ii. People being removed from their original homes
- iii. Land seizure
- iv. Plants and animals depletion
- v. Environmental degradation

Due to all these negative impacts in the community, one can conclude that the livelihoods of people in the area of study-Katse and Lejone, are not experiencing sustainable livelihoods. On the other way, the authorities implementing LHWP need to incorporate these impacts into workable structures and be applied right from the planning of other dams to be built under the same project.

Sustainability has three facets being ecological, economic and social. In assessing the sustainability of livelihoods for a certain area or people, all features have to be considered. The main argument is that development should not be achieved at the cost of social disruption. In the area of the study, the picture that is painted by the collected data is that though the dam is a development initiative for the country, it has really disturbed their livelihoods and thereby putting their lives at risk. Environmental and social sustainability are not easy to achieve in situations like this.

### **5.3 Conclusions and recommendations**

#### **Implications of the study**

The researcher had spent some time in the field in the generation of data in order to respond to the research questions as shown in Chapter One and came up with some conclusions on related matters. The collected data imply that:

- i. Dams construction promote human development in some way though provision of services.
- ii. Dams destroy the livelihoods and reduce well-being of local people.
- iii. They spoil the natural settings and organisations.
- iv. Dams reduce security of species living downstream

#### **Recommendations**

The researcher has made some observations some of which are not presented in the aim of the study but are of interest due to the nature of the study itself. Therefore, the following recommendations are presented:

- i. The aim of the study was to investigate the impact of the LHWP on local populations and the study has shown that there are serious impacts of the dam. This being the case, the researcher recommends that proper social impact assessments have to be conducted regularly. Howitt (2005) points out that this will help in monitoring and managing the intended and unintended consequences of development initiatives. This will additionally assist the implementing authorities to address some the most felt concerns for local people.

- ii. Another point relates to the issue of information being made available to local people. The researcher observed that most of the respondents seem to have been frustrated by the implementation of LHWP in their area. It is as though communities were not well-informed about the operation of the project. The communities seem to have many expectations of which they claim the authorities have not met up to so far. This might provide clarity of some of the issues and reduce this negative feeling of the project by local people. Bruch (2002) maintains that clear communication is necessary because it improves project's acceptability to the local people.
- iii. Sustaining the livelihoods of local people has to be a central point for the implementing agency as its Compensation Policy dictates. This being the case, the LHDA has to come up with clear policies to address these issues. Local communities are to be part of the project and participate in all its details as public participation is key to sustainable decision making (Bastdas, 2004). During an informal discussion with one of the officials the researcher found out that even the officers are not as conversant as they should be about the compensation policy. This will be of assistance in coming up with the best methods that development planners in this case can practise in order to promote sound development for local communities.
- iv. In general, much more research needs to be done on the organisation implementing the LHWP. This will provide insights into issues of how they work with affected people, the opportunities they provide to local people and their policies relating to sustaining the livelihoods of the affected people. A deeper understanding and critical analysis of their policies aimed at improving the lives of the affected people is needed.

From the study, it can be concluded that large dams do have an impact on the livelihoods of local people. They impact on them positively and negatively in other instances. Some concrete developments are usually experienced in areas where dam infrastructure is done and the local communities are usually the ones to enjoy the first hand benefits of such developments. They again pose some threats and risks to local people in their areas of existence. However, the most important issue to be considered is the role that authorities are charged with in terms of implementing

the project. They need to work with the project beneficiaries to avoid local people feeling side-lined and yet they had to make way for the project to be implemented.

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## APPENDIX A: QUESTIONNAIRE

### ADAPTED QUESTIONNAIRE

#### QUESTIONNAIRE FOR ASSESSING THE IMPACT OF THE LESOTHO HIGHLANDS WATER PROJECT AND SUSTAINABLE LIVELIHOODS OF COMMUNITIES IN THE KATSE AREA

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Interviewer's name \_\_\_\_\_ Date of interview \_\_\_\_\_

Thank you for participating in this study. For assurance purposes, please note that this study is intended for academic purposes only and information that will be generated here will only be used for this study. Please feel free and comfortable to respond to questions in this questionnaire.

<b>1. Biographical information</b>			
1.1	Household current location District: Village:	1.2	Household previous location District: Village:
1.3	Gender of household head X=Male, Y=Female	1.4	Age of household head (circle):18-25yrs, 26-35yrs, 36-45yrs, 46 and over.
1.5	Household size (circle): 1=six or more 2=5 3=4 4=3 or less		

<b>2. Perceptions of the affected households about the water project</b>		
2.1	Were you well informed about the water project to be in your area?	1= Yes 1=No

2.2	If yes for Q2.1, who informed you?	1= Media 2=Government officials 3= LHDA officials 4=Others, specify <hr/>	
2.3	If yes for Q2.1, how did you feel about this project?	1= Accepted it immediately 2=Rejected it but was convinced otherwise 3=Could not accept it 4=Others, specify	
2.4	How were you affected by the LHWP?		
2.5	How can you describe your livelihood before and after the LHWP? Use codes – 5=better, 4=good, 3= no change, 2= bad, 1=worst.	2.5.1 Before      	2.5.2 After      

<b>3. Push and pull factors (for the resettled or relocated households only)</b>		
3.1	Were you resettled or relocated due to this water project?	1=Yes 2=No
3.2	If yes for Q3.1, what factors motivated you to resettle or relocate from your original area to the new location? <hr/> <hr/>	

3.3	<p>If yes for Q3.1, how did you find this resettlement site as compared to the information you had?</p> <hr/> <hr/> <hr/>

<b>4. Risks, shocks and vulnerabilities</b>		
4.1	Have you been exposed to any dangers after being affected by the water project?	1=Yes 2=No
4.2	If yes for Q4.1, which risk mostly affected the household?	1=Landlessness/Food insecurity/Lack of access to grazing land/Lack of access to common property/forests and burial sites 2=Loss of income earning assets/ environmental problems-pollution, floods and others 3=Inhibited movement due to the dam 4=Not applicable
4.3	Which strategy did you employ to minimise these risks/shocks?	1=Government/LHDA support 2=Community support 3=Self help 4=Nothing 5=Others/Not applicable <hr/>

5. Housing and other related facilities				
5.1	What type of a house did you own before and after being affected by the water project?(circle) 1=rondavel, 2=mud/stone walls and thatched, 3=mud walls and tin-roofed, 4=brick walls, 5=others, specify	5.1.1 Before LHWP	5.1.2 After LHWP	
5.2	Where do household members go for toilet services currently?	1=open pit/forest 2=community latrine 3=private modern latrine 4=others		
5.3	Did you have access to clean and protected drinking water previously and currently? 2 and 1=1, 1 and 2=2, 2 and 2=3, 1 and 1=4	Before the project	After the project	
		1=yes	1=yes	
		2=No	2=no	
5.4	Do you treat your water before use?	1=Yes 2=No		
5.5	If yes for Q5.4, how do you do it? 1=By boiling it 2=Using chlorine 3=Filtration 4=Others 5=Not applicable			
5.6	If no for Q5.4, what are the reasons for not doing it? 1=Time consuming 2=Water already clean 3=Not interested 4=Not applicable			

5.7	How can you evaluate the water provision in your area previously and currently?	1=Better 2=Good 3=Unchanged 4=Bad 5=Worst	
5.8	What was your main source of cooking and lighting before LHWP and currently?	5.8.1 Before the project	5.8.2 After the project
		1=Firewood/animal or crop residue 2=Electricity 3=Gas 4=Others, specify	1=Firewood/animal or crop residue 2=Electricity 3=Gas 4=Others, specify

<b>6. Education facilities</b>		
6.1	Did you have education facilities before the LHWP?	1=Yes 2=No
6.2	If yes for Q6.1, how far did you travel to these facilities? Please choose. 1=>4kms, 2=4-6kms, 3=6-8kms, 4=8kms and above, 5=Not applicable	_____Km
6.3	How would you rate the overall education currently as opposed to earlier conditions?	1=better 2=good 3=Not changed 4=bad 5=worst
6.4	Do you possess any skills or training?	1=Agric training 2=Dressmaking 3=Hats/Broom making 4=Not applicable

<b>7. Health facilities</b>		
7.1	Did you have health facilities in your area before being affected?	1=Yes 2=No
7.2	If yes for Q7.1, how long did you travel to these facilities? Please choose. 1=>4kms, 2=4-6kms, 3=6-8kms, 4=8kms and above, 5=not applicable	_____Km
7.3	Has any of your household members been severely ill in the past?	1=Yes 2=No
7.4	If yes for Q7.3, who was affected the most by that illness?	1=children, 2=elderly, 3=wife, 4=husband, 5=Not applicable
7.5	How had the sick person been assisted? Tick the best option.	1=took to a clinic, 2=took to traditional healer, 3=sought neighbourly help, 4=others, 5=not applicable  _____

<b>8. Livelihood strategies (Land acquirement/ownership and food security) related questions</b>		
8.1	How did you gain your livelihood before being affected by the water project? Please tick one.	1= Crop/Animal farming 2= Off farm activities 3= Non-farm activities 4= Others  _____
8.2	What is your main source of a livelihood currently?  _____  _____	

8.3	Did you own land in the past, before being affected?			
		1=Yes		
		2=No		
8.4	What did you harvest mainly in the past and after being affected by the project? (Use codes). 1=maize 2=sorghum 3=beans/ peas 4=others (please specify) 5=not applicable	8.4.1 In the past	8.4.2 Now	
8.5	How would you rate the yield both in the past and now?	8.5.1 In the past	8.5.2 currently	
	1=very low			
	2=low			
	3=unchanged			
	4=high			
	5=very high			
	6=not applicable			

8.6	Did you harvest any vegetables in the past and currently?	Vegetables	8.6.1 in the past	8.6.2 currently
		1=potatoes		

		2=cabbage		
		3=tomatoes		
		4=others		
		5=none		
8.7	What tools do you use to harvest crops?	1=tractor 2=oxen 3=traditional hand tools 4=others 5=not applicable <hr/>		
8.8	Did you produce enough food for the household members in the past?	1=yes 2=no		
8.9	How is the produce/yield currently?	1=low 2=high 3=better 4=no yield		
8.10	Do you ever suffer from food shortage?	1=yes 2=no		
8.11	If yes for Q8.10, during which months/period?  <hr/> <hr/> <hr/>			
8.12	In your view, what are the main causes of food shortages? Explain in detail.  <hr/> <hr/> <hr/>			
8.13	If yes for Q8.10, how does your family deal with the problem of food shortages? 1=purchase of grain/maize meal from the market.			

	<p>2=grain credit to be paid back in kind during the next harvest.</p> <p>3=food/cash for work.</p> <p>4=support from relatives/neighbours</p> <p>5=others</p>	
8.14	How do you see crops and vegetable productivity in the past and after being affected by the project?	<p>1=very low</p> <p>2=low</p> <p>3=unchanged</p> <p>4=high</p> <p>5=very high</p>
8.15	Do you use agricultural inputs for your farming?	1=yes 2=no
8.16	If yes for Q8.15, what do you use regularly?	<p>1=improved seeds</p> <p>2=modern agricultural tools</p> <p>3=fertilizers/pesticides</p> <p>4=others</p> <p>5=not applicable</p>
8.17	<p>If no for Q8.16, what are the reasons?</p> <hr/> <hr/> <hr/>	
8.18	Have you undergone any training in agricultural farming by development agencies?	1=yes 2=no
8.19	<p>If yes for Q8.19, what type? (Use codes)</p> <p>1=crop and animal production</p> <p>2=soil conservation</p> <p>3=use of improved seeds</p> <p>4=others</p> <p>5=not applicable</p>	
8.20	In your view, what is the major challenge to crop farming in your area?	

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8.21	Have you been practising livestock farming?	1=yes 2=no		
8.22	If yes for Q8.26, what is the main type?	1=cattle 2=goats, sheep 3=chickens 4=donkeys, horses 5=not applicable		
8.23	What did you use your livestock for?	1=subsistence 2=ploughing 3=transportation 4=others, specify 5=not applicable <hr/>		
8.24	What is the major challenge in livestock farming?	<hr/> <hr/> <hr/>		
8.25	Are you still earning your livelihood through animal farming?	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">1=yes</td> <td style="width: 50%;">2=no</td> </tr> </table>	1=yes	2=no
1=yes	2=no			
8.26	Did you ever engage in off-farming activities to supplement your income?	1=yes 2=no		
8.27	If yes for Q8.26, which one of the following activities were you involved in?	1=petty trade 2=rent of land 3=agricultural wage 4=labour work		

		5=not applicable
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<b>9. Infrastructure/social services related questions</b>		
9.1	How frequently do the household members take their meals daily?	1=once 2=twice 3=three times or more
9.2	What can you say about the household feeding system, do you have enough food for all days?	
	1=yes	2=no

<b>10. Any general comments</b>	
10.1	Please state any concern or comment related to this study. <hr/> <hr/> <hr/>

**THANK YOU FOR YOUR COOPERATION AND PARTICIPATION IN THIS STUDY.**