

ASSESSMENT OF WATER USERS' PARTICIPATION IN WATER RESOURCES MANAGEMENT IN MALAWI: A CASE STUDY OF SENIOR CHIEF MKANDA'S JURISDICTION, MULANJE DISTRICT

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BONGANI KHOMBA

ABSTRACT

Senior Chief Mkanda's jurisdiction has Likhubula river which is one of the water resources that used as a supplementary water source by Blantyre Water Board (BWB). This created some resistance, by the local people, which led to conflicts between the two parties (BWB and the local people). This later affected the management and sustainability of Chambe basin which is the source Likhubula river. Public participation (PP) was introduced so as to minimise the conflicts. Public participation is increasingly expected to enhance the effectiveness of water resources management (WRM) and conflict resolution. This study aimed at exploring the effectiveness of form of PP put in place by BWB to achieve WRM in Senior Chief jurisdiction. Nakhonyo, Muhiwa and Mangombo villages found in Senior Chief Mkanda were selected for the study in this research. This was an exploratory study which involved a mixed method approach. Method used was a survey method which comprised of questionnaires and an interview guide with interest groups. This aimed at analysing and evaluating the form of PP that put in place, the extent to which the form of PP had contributed towards achieving WRM and exploring the challenges that affected the participation in WRM. Residents among different villages in Senior Chief Mkanda were compared and evaluated in terms of capacity building, willingness to participate, and scope. Data was analysed using mean and content analysis. Results showed that the residents in all the villages had a good capacity. Results also showed that there was room for interactive participation, due to the small scope, even though consultative participation had been put in place. There was also a high willingness to participate. Suggestions were made in two aspects: decision-making and whole-process participation; Improvement and strengthening of capacity.

Keywords: *Likhubula Water Project; Public participation; Water resources management*

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ACRONYMS/ABBREVIATIONS

BWB	-	Blantyre Water Board
CPM	-	Citizens for the Protection of Mulanje mountain
GoM	-	Government of Malawi
MGDS	-	Malawi Growth and Development Strategy
NOLIMP	-	North Sea regional and Local Implementation
PP	-	Public Participation
UN	-	United Nations
WRM	-	Water Resources Management
WWTW	-	Wastewater Treatment Works

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CHAPTER 1. INTRODUCTION

1.1. Background

Malawi is one of the countries in Africa that is rich in water resources. These water resources are mainly found in lakes, rivers and aquifers. According to the Ministry of Irrigation and Water Development (2007), the country's water systems cover over 21% of its territorial area. However, despite having such vast water resources, the water demand levels are increasing rapidly (Ministry of Irrigation and Water Development, 2007).

In 2007, Ministry of Irrigation and Water Development stated that one of the contributing factors to increased water demand is high population growth. Increased population results in increased demand of water for domestic, industrial and agricultural purposes. The distribution of water in the domestic, industrial and agricultural sectors are estimated to be 34%, 17% and 49% respectively, hence, to meet the needs of these sectors, pressure on existing water resources is increased (Mulwafu et al., 2003). This forces water service providers to look for supplementary sources of water that can be used for abstraction purposes to meet the growing demand of the population. van der Molen and Hildering (2005) stated that abstraction of water can cause second-order conflicts in which the local people in the area can have a hard time adapting to strategies used in projects meant to abstract water from their water source. As a result, they enforce resistance to the development.

Likhubula river is one of the water resources that has recently been used as a supplementary water source by Blantyre Water Board (Blantyre Water Board, 2017). The Board was producing 216,000m^3 from Walkers Ferry and Shire River and Likhubula was expected to produce an average 20,000m^3 (Muheya, 2017). This led to some resistance from the Citizens for the Protection of Mulanje mountain (CPM) as the group requested that the Board plant trees within the Chambe catchement if they wanted the project to commence (Muheya, 2017).

1.2. Problem Statement

On November 07, 2016, a K18 billion Likhubula Water Supply Project was launched to increase water supply to the city of Blantyre and surrounding areas to improve BWB's service delivery to its customers (Muheya, 2017). However, several challenges arose due to the development of the project. One of the biggest challenges was that the local people felt that the project was going to leave them with water scarcity issues as it was aimed at abstracting water from their only water source (BWB, 2019). This created some resistance in their participation in the management and sustainability of Chambe basin which is the source of Likhubula river (Muheya, 2017). BWB was then forced to employ a form of public participation to address the problem (BWB, 2019).

PP has been seen to impact the nature and perception of introduced water projects. In the Tarland Burn Catchment, located in Aberdeenshire, Scotland, the Scottish North Sea regional and Local Implementation (NOLIMP) project was introduced to replace wastewater treatment works (WWTW) serving the village of Tarland (Walker & Langan, 2004). Initially, there was some resistance from the local people as the effluent from the replaced WWTW was to be released in the stream which was the source of water for the local community and it sustained the wildlife in the area. Representatives from the Scottish Project introduced PP but it was not effective in resolving the differences between the two parties. Representatives from the Scottish project and the local community then met and they arrived at a resolution involving both parties. This led to the acceptance and support of the plan by the local community. On top of that, after the plan was implemented, the wetland continued to sustain wildlife habitat whilst polishing the effluent from the WWTW. This study was, therefore, designed to explore the effectiveness of the form of PP put in place by BWB with respect to WRM in Senior Chief Mkanda's jurisdiction.

1.3. Main and Specific Objectives

1.3.1. Main Objective

The overall objective of this study was to explore the effectiveness of the form of PP put in place by BWB with respect to WRM in Senior Chief Mkanda's jurisdiction.

1.3.2. Specific Objectives

- Identify the form of PP put in place to contribute towards achieving WRM in Senior Chief Mkanda's jurisdiction
- Assess the extent to which the form of PP has contributed towards achieving WRM in Senior Chief Mkanda's jurisdiction
- Analyse the challenges that affect the participation in WRM in Senior Chief Mkanda's jurisdiction

1.4. Research Questions

- What is the form of PP put in place to contribute towards achieving WRM in Senior Chief Mkanda's jurisdiction?
- To what extent has the form of PP contributed towards achieving WRM in Senior Chief Mkanda's jurisdiction?
- What are the challenges that affect the participation in WRM in Senior Chief Mkanda's jurisdiction?

1.5. Significance of Study

This study was of great benefit to the community and BWB as it was a means through which some of their concerns were heard and possibly tackled. This was because it had explored the concerns of the people in Senior Chief Mkanda's jurisdiction and gotten the concerns directly from the community to BWB. The study also provided possible solutions to BWB on how the Board could resolve the social and environmental problems BWB may be facing on the ground around Senior Chief Mkanda.

This study is of scholastic importance as it helps researchers to have insights of the relationship between management of water resources and participation of community members in the area where projects are implemented. The study has assessed PP in Senior Chief Mkanda's jurisdiction which has formed a basis upon which further similar research can be developed. This can consequently improve the understanding and address the occurrence of water conflicts between project developers and the local people.

CHAPTER 2. LITERATURE REVIEW

2.1. Water Resources Management

According to Loucks and van Beek (2017), WRM is a process that involves planning, developing and managing of water resources to ensure adequate and sustainable supplies and qualities of water for the consumption of both humans and natural ecosystems. It aims at ensuring that there is sufficient water of suitable quality for drinking and sanitation services, food production, energy generation, sustaining healthy water-dependent ecosystems and protecting the aesthetic values of water systems (Durán-Sánchez et al., 2018). In 1993, World Bank published a policy paper titled "*WRM*" where it stated that WRM covers a spectrum of activities, one of which is PP (World Bank, 1993). This was done after observing that, traditionally, WRM has been known to have a top-down approach. However, in recent years, this approach has brought a lot of limitations in introducing water supply projects. A study was conducted in Mpumalanga Province of South Africa where the Jeppes Reefs water project failed due to the top-down approach. This is because there was lack of co-ordination among the community members who were involved in the standpipe water project. The project was imposed on the community, as such, there was no consultation with regards as to how the water infrastructure was going to be maintained. World Bank (1993) argued that increased participation by communities in managing water resources not only improves the quality and quantity of water resources, but it also improves project continuity. This was observed in the same Jeppe Reef water project, as the second attempt to have a clean water supply in the community involved community members (Thwala, 2010). The water trenches were dug by community members. This helped to ensure continuity of the project as the local people felt that they were part of the project. This was evident by the household contributions made to purchase pipes (R200.00) and the majority of the community members indicated that they are willing to pay between R10.00 and R20.00 for water maintenance services (Thwala, 2010). In view of the above and

also in consideration of the aim of the study, there has evolved a need to closely consider the employment of PP in WRM

2.1.1. Definition of Public Participation

Mostert (2003) defined PP as the direct participation by non-governmental actors in decision-making. Mostert (2003) further stated that *governmental actors* are those acting on behalf of the government, such as governmental organisations, whilst *non-governmental actors* are those that are not affiliated or directed by the government, such as individual companies. Gaster and Squires' definition of PP serves as an addition to Mostert's definition. It assumes that those affected by a situation are best placed to determine how to change it and make implementation work (Gaster and Squires, 2003). Smith (2008) views PP as a means of embracing complexity over desirability. This can be seen as bottom-up approach which is a complex method that involves incorporating local people and their knowledge and skills in management and planning processes. Complexity of water management addresses the aspirations that arise from development of environmental, social, cultural and local economic values, attributed to water (Mostert, 2003). As such, PP is a direct involvement of all members of the community in sharing of views, taking part in decision-making processes and playing a role in the planning and management of water resources.

2.1.1.1. Types of Public Participation

2.1.1.1.1. Extractive Participation

This type of participation is also called *information supply* (Mostert, 2003; Özerol & Newig, 2008). According to Gomez and Nakat (2002), extractive participation involves the answering of questions posed by institutions through questionnaire surveys or similar surveys. Once the survey has been completed, data is taken outside the community and analysed by the institutions. Recommendations, plans and conclusions are formulated by the institutions and the actions decided upon are implemented by the community (Gomez & Nakat, 2002). Mostert (2003) stated that, in this type of participation, people do not have the opportunity to influence the participation process and the results of the study are not shared or checked for accuracy.

Chambers (1994) stated that extractive participation simplifies data collection and data analysis. It was also stated that this type of participation facilitates implementation of results because the implementation process is conducted independent of beneficiaries. This type of participation often fails because it does not invite the people's sense of ownership of water resources and water projects and decisions made lack their involvement (Chambers, 1994). Due to this, this type of participation uses a top-down approach as the public is merely used as an instrument for data collection.

2.1.1.1.2. Consultative Participation

Consultative participation can simply be referred to as *consultation* (Mostert, 2003; Özerol & Newig, 2008). In this type of participation, the public participates by being asked for information and institutions listen to their point of view (Gomez & Nakat, 2002). Problems and solutions are then identified and room for modification is given based on the responses from participants (public). Informal group and individual interviews, informal surveys and random visits to households are examples of consultative participation (Özerol & Newig, 2008). Gomez and Nakat (2002) stressed that this type of PP, professionals are under no obligation to approve local people's views. For instance, in Romania, a case study showed that a River Basin Committee facilitates consultative participation at basin and local level (Teodosiu et al., 2013). This committee comprises of local authorities that approach the public through interviews and open public debates in order to get views relating to water management. Afterwards, the committee meets non-governmental organisations, public institutions, professional associations and economic units. In 1994, Chambers stated that consultative participation the input from communities only serves to double-check assumptions made, solutions proposed and to also gives the public the impression that they are part of the project when, in fact, they are not.

2.1.1.1.3. Interactive Participation

This type of PP is also known as *active involvement* (Mostert, 2003; Özerol & Newig, 2008). Gomez and Nakat (2002) defined interactive participation as "*a process that encourages the joint analysis of information, which leads to action plans and the creation of new local institutions or the strengthening of existing ones".* Interactive participation involves the use of interdisciplinary methods that make use of

systematic and structured learning processes that incorporate both the public and the institutions (Gomez & Nakat, 2002). As a result, local groups take part in the decision-making process and have a role in maintenance of project structures. This type of participation is the most advanced form of participation and it requires a lot commitment from both the public and the institutions involved. Since active involvement needs a much more intense interaction and communication among all partners, it typically comprises fewer actors than the other types of participation (Özerol & Newig, 2008).

Interactive participation is hard to accomplish as it often requires previous successful experience participatory initiatives by the community and the institutions (Özerol & Newig, 2008; Teodosiu et al., 2013). However, it is the most preferred form of PP as it yields good results both the institutions and the public (Gomez & Nakat, 2002). Mostert (2003) stated that this form of PP would prevent over-exploitation of water resources and maximise social learning. It would also avoid the economically and environmentally harmful oversupply of infrastructure, and ensure proper maintenance and replacement. Interactive participation should be put in place to address upstream–downstream conflicts and conflicts between different water use sector. In a case study that happened in Weser-Ems region, located in Lower Saxony, Germany, the German NOLIMP project was introduced implementing "*cooperation model for groundwater protection*" (Hophmayer-Tokich & Krozer, 2008). This involved the protection of a groundwater source which had agriculture being the main polluter. The goal was to work with the farmers to promote and implement measures for groundwater protection. One of them involved taking away land from farmers. Farmers felt that their lands were being threatened, as such conflicts surfaced. Mediators had to be involved and they suggested that farmers should take part in the decision-making processes. After several meetings, the project representatives learnt of ways of how to protect the groundwater without having to remove farmers from the land. On the other hand, farmers learnt how to use agricultural products in an ecologically friendly manner. Henceforth, the conflicts decreased.

2.1.1.2. Effectiveness of Public Participation in Water Resources Management

Robbins (1984) defines effectiveness as the ability of managers to achieve their planned institutional goals with the primary concern being the end-result. This means that if the organisation's goals and objectives have made an impact, then the management has effectively done its job. In 1999, Duffy defined effectiveness as the extent to which a policy achieves its stated goals. In relation to PP, Beierle and Cayford (2002) defined effectiveness as "*the extent to which PP efforts achieve "social goals" where the social goals include incorporating public values into decisions, improving the quality of decisions, resolving conflict among competing interests, building trust in institutions and educating and informing the public.*". In the case of this study, effective PP in achieving WRM means the extent to which the form of PP introduced has helped in attaining the social goals, with respect to WRM. Carr et al. (2012) stated social goals related to WRM are improvement of environmental knowledge which acts as a base of the decisions but actually leads to more ecological decisions, Reduction in conflicts which acts as a base of low transaction costs of identifying, implementing, and enforcing a water management strategy and human health improvement in terms of the community-based water supply projects. As such, this study was assessed in terms of the social goals listed above. Özerol and Newig (2008) proposed an approach to the evaluation of the effectiveness of social goals of PP. This approach involves several constituents, which should be taken into account during the PP process. These constituents are scope and capacity building. Özerol and Newig (2008) stated that these constituents can be used as indicators thereof. As such, it is important to look into each of these constituents.

2.1.1.2.1. Scope of the participants

Scope can be defined as the range of the participants in a participation process (Özerol & Newig, 2008). Although PP may sound like the participation of *everybody*, Özerol and Newig (2008) argued that participants regularly form different "*subsets of the public*" that change with participation processes. They stated that, in some cases, it may be practically impossible to involve *everybody* due to limited time and financial resources available. On top of that, the form of PP may not be suitable for involving everybody, as such, depending on the form and the

purpose of PP, relevant members of the public should be identified, selected and involved as participants. Teodosiu et al. (2013) stated that information supply and consultation involve the whole public, whereas it may reduce to stakeholders for specific participation processes. On the other hand, active involvement is assumed to be more selective since only the interested public groups are within the scope. If the scope meets the form of PP, then the PP is likely going to be effective.

In order to assess the scope, it is important to assess the degrees of interests of the stakeholders involved (Özerol & Newig, 2008). A stakeholder analysis can be carried out at the beginning of a participation process but it can also be used in further phases In 2010, Sabina and Stanghellini published a paper, titled "*Stakeholder involvement in water management: The role of the stakeholder analysis within participatory processes*", which focused on the importance of the stakeholder analysis methodology in river basin participatory decision-making processes and presents a new stakeholder analysis methodology. In this paper, Sabina and Stanghellini stressed that this method was specifically developed for water management at a catchment level, but it may also be used for the management of other natural resources. The new methodology for developing a stakeholder classification includes the taxonomy of Mitchell et al. (1997): latent, expectant and definitive stakeholders, obtained through the attributes of *power*, *legitimacy* and *urgency* . It also contained the addition of the attribute *proximity*, developed by Driscoll and Starik (2004). In the new stakeholder analysis methodology, the attributes are redefined and adapted to the water resource management field.

2.1.1.2.1.1. Power of the stakeholder

Power is defined as the past and present influence of a stakeholder in the decision and implementation phases of programmes, plans, rules, measures concerning water management, water use and water protection in the catchment, at the local, provincial, regional and national level (Stanghellini & Collentine, 2014).

2.1.1.2.1.2. Legitmacy of the stakeholder

Legitimacy is defined as the feature according to which the claims, requests, concerns and interests of a stakeholder with respect to water management, use or protection, could be and can be considered appropriate, proper and eligible within the social

system, with its values, common definitions and beliefs (Stanghellini & Collentine, 2014).

2.1.1.2.1.3. Urgency of the stakeholder

Urgency is defined as how much a stakeholder is and was active and can demonstrate an effort to present as urgent as possible his requests and to ask for immediate attention during the decision and implementation phases of programmes, plans, rules, measures concerning water management, water use and water protection in the catchment, at the local, provincial, regional and national level (Stanghellini & Collentine, 2014).

2.1.1.2.1.4. Proximity of the stakeholder

Proximity is defined as the state, quality or fact of being near or close in space to the catchment area (Stanghellini & Collentine, 2014).

2.1.1.2.2. Capacity Building

Capacity is defined as "*the public's ability to understand environmental problems, get involved in decision making and act collectively to implement the change*" (Beierle & Cayford, 2002). Loucks and van Beek (2017) stated that through participation, members of the public should be given the opportunity to improve their ability to participate which implies capacity building. Since capacity is based on the ability of the public to participate, it can have different levels of impact for different forms of participation. In the case of information supply and consultation, Özerol and Newig (2008) believed that the capacity of the public is adequate if the public can understand and respond to the information provided, regarding the issue at stake. On the other hand, more capacity is needed for active involvement as participation becomes a series of interactions between the stakeholders and the competent authorities. It cannot be expected that all the stakeholders have the necessary knowledge and skills to participate adequately. Therefore, PP requires capacity building in order to establish strong relations and a common understanding among the stakeholders so that the individual members of the public become more engaged in the PP process. Consequently, PP is more effective. Capacity building has also been seen to have a direct relationship with willingness to participate. Several case studies (European Union, 2002; Jingling et al., 2010; Priscoli, 2004) have noted

that when environmental knowledge increases, the willingness to participate also increases as the public have a greater purpose to engage in PP.

BWB (2019) were able to introduce PP in Senior Chief Mkanda's jurisdiction. However, it was not able to assess how effective the form of PP introduced was in achieving WRM in the area. It was also not able to assess the suitability of the form of PP introduced to the scope of the participants in the area. This study has addressed this gap using the literature available.

2.1.1.3. Legal Framework

From the local context, the Constitution of the Republic of Malawi, Chapter IV, of 1996, upholds human rights, freedoms and participatory democracy as drivers of transformation. This highlights the need for people to be central in taking part in programmes affecting their lives. It is, therefore, a constitutional obligation to ensure that the provision of services is done in a participatory and sustainable manner (GoM, 1996). The MGDS, in its key contents, stresses the need for water utilities in urban, peri-urban and market centres using demand-driven and responsive approaches which promote PP in order to explore people's needs (GoM, 2006).

In an international context, one of the first international instruments that proclaimed this principle was the United Nations World Charter for Nature, which states that "*All persons, in accordance with their national legislation, shall have the opportunity to participate, individually or with others, in the formulation of decisions of direct concern to their environment, and shall have access to means of redress when their environment has suffered damage or degradation*" (UN General Assembly, 1982). The Rio Declaration on Environment and Development (hereinafter '*Rio Declaration*') describes the principle of PP as follows: "*Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access*

to judicial and administrative proceedings, including redress and remedy, shall be provided" (UN General Assembly, 1992).

CHAPTER 3. METHODOLOGY

3.1. Research Design

3.1.1. Nature of the Study

This study was an exploratory case study. An exploratory case study is a study that investigates situations which have no clear sets of outcomes are best suited for researches that lack detailed preliminary research and formulated hypotheses that can be tested (Streb, 2010). As such, this study acted as a preliminary step for more case studies of WRM in Senior Chief Mkanda. It also involved a mixed method approach. This involves the employment of both qualitative and quantitative data.

3.1.2. Study Site

The study was conducted in Nakhonyo, Muhiwa and Mangombo villages located in Senior Chief Mkanda's jurisdiction in Mulanje district (Refer to Figure 1). These villages lie along the Likhubula River and are close to the Likhubula Water Supply Project. Nakhonyo Village is found upstream of the Likhubula River and it is close to the Likhubula Water Project. Mangombo Village is found in the middle stream and Muhiwa Village is located downstream furthest from the Likhubula Water Project.

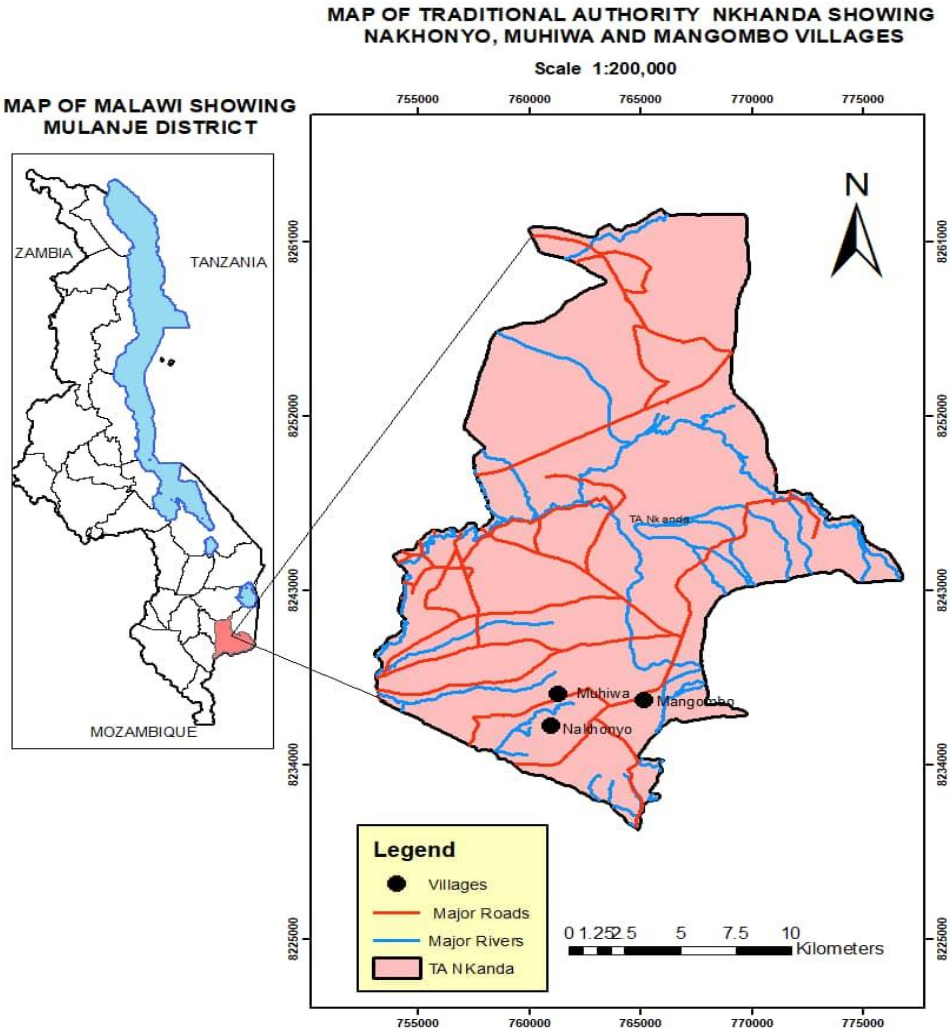


Figure 1: Map showing Nakhonyo, Muhiwa and Mangombo villages

3.1.3. Study Population

The population selected was heterogenous in nature. It consisted of CPM representatives, BWB engineers, BWB plant operator, community members from the villages in Senior Chief Mkanda's locality that lie along the Likhubula River, Mulanje District Water Officer, Village Head Mangombo, Village Head Muhiwa, Group Village Head Nakhonyo and BWB project managers who have more than two years of experience within the Likhubula Water Supply Project process in terms of public participation and its challenges with respect to WRM. The aim of this selection was to gather a collective view in terms of what the critical challenges exist and what form of public participation exists among the different professions.

3.1.4. Sampling and Sample Size

A purposive sampling method was used, whereby participants who are knowledgeable about the topic were selected because of their involvement and experience within the process (Palinkas et al., 2013). As a result, it aided in the understanding of the Likhubula Water Supply Project process.

According to Taherdoost (2017), a management research should use the following formula so as to find the sample size:

$$n = \frac{p(100 - p)z^2}{E^2}$$

Where:

n is the required sample size

p is the percentage occurrence of a state or condition

E is the percentage maximum error

z is the level of confidence

Taherdoost (2017) also stated that the acceptable margin of error in a management research is 5% whilst the typical levels of confidence used are 95% (0.05: A z value equal to 1.96). In order to maximize the variance and produce the maximum sample size, researchers should use 50% as an estimate of P (Bartlett et al., 2001). As such, this study sampled from 50% of the total population in each village and use a 95% confidence level with a margin of error of 5%.

The projected population for Nakhonyo Village, Muhiwa Village and Mangombo Vilage was 22,900 in each village. As such, the sample size was 340 respondents. However, only 243 respondents were involved. 81 questionnaires were used in each village. This was mainly due of financial constraints. However, it was discovered that there was 71.4% completion of data collection which gave the researcher assurance that the limitations would not affect the results obtained.

3.1.5. Participant selection Criteria

The sampling criteria for this study was based on the characteristics essential to the involvement of the target population. For this study the inclusion criteria were:

- The participants had at least two or more years of experience within their professions to enable the researcher to extract reliable data from each discipline.
- Participants from the communities were those who use the Likhubula River and stay close to Likhubula dam in Senior Chief Mkanda
- The participants were willing to participate in this study

3.1.6. Study Limitation

Every academic work has its limitations, as such, this proposed study is no exception. The main limitation of this study was the lack of prior research studies on the topic in Senior Chief Mkanda's jurisdiction. As such, an exploratory research design was adopted instead of an explanatory research design.

3.1.7. Ethical Considerations

In this study, the ethical consideration of confidentiality was adhered to. Confidentiality was maintained by not revealing the identity or names of the participants. Written approval for the use of the questionnaires was also obtained from Malawi University of Science and Technology to ensure that the ethical considerations were strictly indorsed. Participants also had the freedom to voluntarily participate or to not participate in the research study. The participants were also given freedom to withdraw from the process at any time.

3.2. Methods and materials

3.2.1. Survey method

In 2000, Rowe and Frewer argued that survey method is a good approach of data collection when dealing with researches that involve agreements and disagreements in PP. This is because it serves as a basis on which subsequent policies and strategies can be formed that can boost PP in an area (Rowe & Frewer, 2000). As such, the survey method was best fit for this research as it also took into consideration the conflicts that occurred in Senior Chief Mkanda due to the development of the Likhubula Water Project. This method involved getting a permission letter from BWB (Appendix A) which helped in obtaining data from all participants.

Kabir (2016) states that survey method is a research method that involves the assessment of thoughts, opinions, and feelings. This is done through the use of questionnaires, interviews and observations in order to obtain higher response rates (Kabir, 2016). In view of this, this study used a combination of the questionnaires and an interview guide as data collection tools that are grounded in participants' experiences.

3.2.1.1. Questionnaire

Face-to-face surveys were used to collect data pertaining to questionnaires. These questionnaires helped the researcher to obtain data pertaining to the scope of the participants involved in the PP process as they contained a list of key stakeholders who were rated based on their power, legitimacy, urgency and proximity (Appendix B). This data helped in the assessment of the extent to which the employed form of PP had contributed towards achieving WRM in Senior Chief Mkanda's jurisdiction. The questionnaires were administered to participants individually to make sure that their confidentiality was maintained as most of them found the questionnaires too sensitive to be administered in focus groups.

3.2.1.2. Semi-structured interviews

In this study, data was also collected through semi-structured interviews (Appendix C). Dicicco-bloom and Crabtree (2006) stated that semi-structured interviews are well organised as they are usually scheduled in advance at a designated time and location outside of everyday events. Due to this, data was obtained within the designated time without disturbing the participants' schedules. This allowed the participants to have the opportunity to share their own experiences and perceptions towards the form of PP put in place in order to achieve WRM at Senior Chief Mkanda. Semi-structured interviews also allowed both key stakeholders and the general public to share their views on how they understand environmental issues and get involved in decision making processes. They were also used to explore the challenges that affect the participation in WRM in Senior Chief Mkanda in this study. It allowed all water users to share their perceptions and experiences on what hinders them from participating properly in the management of Chambe catchment. These

perceptions were taken from both key stakeholders and the general public in order to develop an understanding as to how participation can be made more effective.

3.2.1. Data Analysis

Data collected in this study was analysed using both quantitative and qualitative data analysis tools for the precision of the findings. These tools were:

- Statistical Package for Social Sciences (SPSS): SPSS was used for the analysis of data collected from questionnaires as recommended by Arkkelin (2014). SPSS is used to group the scores obtained from the collection process into designated themes and then analysis tools are used based on the needs of a particular study (Arkkelin, 2014). In this study, scores were allocated into designated themes were analysed using mean. Mean aided in obtaining the average score of each attribute. After the mean was calculated, key stakeholders who had three or all their mean attribute scores equal to or higher than 3 were classified as *definitive stakeholders*; stakeholders who had only one or no attribute were classified as *latent stakeholders*; the remaining stakeholders, who had two of their mean attribute scores equal to or higher than 3 were classified as *expectant stakeholders*. This form of classification was made by (Sabina & Stanghellini, 2010). It helped in the analysis of the scope of the participants involved in PP in the area.
- Content Analysis: Vaismoradi et al. (2013) highly recommended content analysis when conducting an exploratory work in an area where not much is known as it can be used for the simple reporting of common issues mentioned in data. In view of the nature of the study, content analysis was used in the analysis of data pertaining to semi-structured interviews. This analysis was done through a systematic coding and categorizing of the data to determine trends and patterns of words used, their frequency and their relationships with the objectives. Thereby it aided in identifying the form of PP put in place, the challenges and the capacity building.

CHAPTER 4. RESULTS AND DISCUSSION

Introduction

This chapter offers the results from the data collected through questionnaires given to the respondents and the semi-structured interviews conducted. Tables were used to represent the analysed data. The fundamental argument of this study was that the form of PP employed by BWB in Senior Chief Mkanda's jurisdiction was not very effective in achieving WRM and the results presented and interpreted below showed whether this argument was relevant and valid or not.

Form of Public Participation employed in Senior Chief Mkanda's jurisdiction

A lot of respondents from both BWB and the community stated that WRM was better before the Likhubula Water Project was produced. There was sufficient water for both the ecological integrity and the well-being of the local community. However, after the project was introduced, the balance of the distribution of water resources was disturbed. This sparked disputes between the two parties. After some time, the disputes escalated to conflicts as the people felt that their water source was being over-exploited.

To handle this, most of the respondents from the community stated that BWB paid random visits to their households and listened to their point of view with respect to the Likhubula Water Project. Respondents also stated that individual interviews individuals were conducted with the chiefs, mostly Group Village Head Nakhonyo. This was only done during the preparations of the development of the Likhubula Water Project. This concurred with the argument brought up by Hophmayer-Tokich and Krozer (2008) that the relationship in which authorities develop plan proposals and ask the public to comment as a means of obtaining input that can be used during plan preparation is called *consultation* or *consultative participation*. The responses also concurred with the argument stated by Gomez and Nakat (2002) that institutions listen to the point of view of the public so as to gather local values and viewpoints in *consultative participation*. As such, the form of participation that was employed in the locality is *consultative participation*.

However, it was acknowledged by respondents from both BWB and the community that the only solution that was put in place is the tree planting program. One of the respondents said, "*The tree planting program is the only resolution that came in after BWB came in to meet the people on the solutions that can be put in place. However, the rest of our interests were not adhered to.*" These tree planting programs were conducted in the early stages of the rainy season.

Extent to which Consultative participation has contributed towards achieving WRM in Senior Chief Mkanda's jurisdiction

Scope of the participants

Table 1: Mean scores of the scope of the Plant Operator from all villages

	Attributes			
	Power of plant operator	Legitimacy of plant operator	Urgency of plant operator	Proximity of plant operator
Sample size	243	243	243	243
Mean score	2.43	3.23	3.31	3.37

Table 2: Mean score of the scope of Group Village Head Nakhonyo from all villages

	Attributes			
	Power of Group Village Head Nakhonyo	Legitimacy of Group Village Head Nakhonyo	Urgency of Group Village Head Nakhonyo	Proximity of Group Village Head Nakhonyo
Sample size	243	243	243	243
Mean score	3.14	2.57	3.15	3.21

Table 3: Mean score of the scope of Village Head Mangombo from all villages

	Attributes

	Power of Village Head Mangombo	Legitimacy of Village Head Mangombo	Urgency of Village Head Mangombo	Proximity of Village Head Mangombo
Sample size	243	243	243	243
Mean score	3.12	3.46	3.06	2.69

Table 4: Mean score of the scope of Village Head Muhiwa from all villages

	Attributes			
	Power of Village Head Muhiwa	Legitimacy of Village Head Muhiwa	Urgency of Village Head Muhiwa	Proximity of Village Head Muhiwa
Sample size	243	243	243	243
Mean score	3.10	3.19	2.72	1.97

Based on the assumption made by Sabina and Stanghellini (2010) that any mean score equal to or higher than 3 is considered a high score while any mean score lower than 3 is considered a low score. In terms of the plant operator, the mean attribute scores higher than 3 were on legitimacy, urgency and proximity (Refer to Table 1). From Table 2, it was observed that Group Village Head Nakhonyo had fairly high mean scores in power, urgency and proximity. In terms of Village Head Mangombo, it was noted that the stakeholder had a high mean score in power, legitimacy and urgency (Table 3). In contrast to the other 3 key stakeholders, Village Head Muhiwa only had two of the attributes above 3 namely: power and legitimacy (Table 4).

Mitchell et al. (1997) classified stakeholders based on their salience where the low salience class were identified by the possession or attributed possession of only one of the attributes and were named *latent stakeholders*. The moderately salient stakeholder class was identified by their possession or attributed possession of two attributes and were named *expectant stakeholders*. The highly salient class was identified by the possession of three to all attributes and were named *definitive stakeholders*. Based on this classification, the plant operator, Group Village Head

Nakhonyo, Village Head Mangombo were classified as definitive stakeholders. On the other hand, Village Head Muhiwa was classified as an expectant stakeholder Stanghellini and Collentine (2014) added on to say that the appropriate degree of involvement for the definitive stakeholders is active involvement which was classified as *co-operating* or *co-working*. On the other hand, the appropriate degree of involvement of the expectant stakeholders is consultation and is classified as *co-thinking* (Stanghellini & Collentine, 2014).

As such, the appropriate degree of involvement for the plant operator, Group Village Head Nakhonyo, Village Head Mangombo was active involvement or interactive participation. Village Head Muhiwa was given consultation or consultative participation as the appropriate degree of involvement. From this, the study revealed that the suitable form of PP for Senior Chief Mkanda's jurisdiction was interactive participation. This was in contrast to the form of participation employed by BWB which was consultative participation. When the form of PP employed does not meet the scope of participants, the overall PP is not effective (Özerol & Newig, 2008). As such, it was concluded that consultative participation was not effective in achieving WRM in Senior Chief Mkanda.

Capacity Building and willingness to participate

Respondents from BWB pointed out that there were water shortages in the community which had been enhanced by the increased deforestation rates occurring in the area. This was in agreement with the argument raised by Hlásny et al. (2015) argument that forests regulate the water cycles and water tables at various scales and their proper management is thought of as capable to mitigate the effect of adverse hydrological events such as floods and droughts. This showed that most of the BWB respondents had environmental knowledge that could aid in PP and they understood environmental issues. This concurred with the argument made by Özerol and Newig (2008)that environmental knowledge is a key element of capacity building.

Respondents from the community indicated that participation of water users, with respect to WRM, had been voluntary in most villages. One of the respondents said "*In the recent years, especially after BWB came in the area, there has been high siltation rates in Likhubula river. However, after our leader told us to take care of*

the seedlings that exist in our area, the siltation reduced.". This was in agreement with what Özerol and Newig stated in (2008) that capacity building greatly involves acting collectively to implement the change. The voluntary work also showed that the community's willingness to participate in WRM was high. This was in agreement with the argument of Jingling et al. (2010) which states that high environmental knowledge (capacity building) increases the willingness to participate. This is because the environmental knowledge gives PP a greater purpose.

Challenges that affect the participation in WRM in Senior Chief Mkanda

Most of the respondents from the community indicated that water shortages had greatly affected the community. One of the respondents said, "*The water shortages have left many people in water scarce situations. As a result, they do not have time or space to participate in activities that help in the management of Chambe catchment*". It was also noted that the presence of other dams downstream of BWB, before the community pipeline, had escalated the water shortages in the community who were further downstream of all the dams. Most respondents stated that there was uncalculated and inconsiderate withdraw rates which consequently affected downstream users. As such, there was normally less water available for the community.

Another challenge pointed out was poor communication. From BWB's point of view, there had been vandalism of pipes and equipment due to the conflicts between BWB and the community. It was acknowledged by both BWB and the community that the conflicts occurred during the dry season when the water table was low because the community hardly received water from the river. From the community's point of view, uncontrolled deforestation rates had affected the local people's motivation to participate in activities pertaining to WRM. Due to poor communication, there were no measures put in place to curb the uncontrolled deforestation rates.

CHAPTER 5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

In Malawi, several studies have been done on PP. Ferguson (2018) studied the interactions of PP in water access. Coulson et al. (2021) looked how PP can be used to ensure sustainable water supply. Chiluwe and Nkhata (2014) studied how PP can be incorporated in Malawi's water governance. However, little research has been done on interactions between PP and WRM. This study aimed to investigate the effectiveness of PP in WRM in the case of Senior Chief Mkanda's jurisdiction in Mulanje district.

The first objective focused on identifying the form of participation put in place to contribute towards achieving WRM in Senior Chief Mkanda's jurisdiction. It was discovered that the type of participation in Senior Chief Mkanda's jurisdiction was consultative participation which involved the public being asked for information by BWB and the organisation listened to their point of view. Afterwards, the problems and solutions were identified by organisation and room for modification is given without involving the public. This led to the introduction of a tree planting program in the area so as to aid in conserving the water in the catchment. Tree planting programs alone cannot ensure effective participation in local communities as most people value education and health more than the environment. This was also confirmed in a study done by Obiri et al. in 2011. As such, consultative participation in Senior Chief Mkanda's jurisdiction has not been effective with respect to WRM.

The second objective entailed the assessment of the extent to which the PP have contributed towards achieving WRM in Senior Chief Mkanda's jurisdiction. This involved the use of three key indicators namely: scope, willingness to participate and capacity building. In terms of the scope, it has been noted that most of the key stakeholders in the area are definitive stakeholders which shows that there is more room for interactive participation or active involvement. This is in contrast to the type of participation that exists in the area which is consultative participation. In a study done by Sabina and Stanghellini (2010), it was noted that when the form of PP employed does not suit the form of PP analysed through a stakeholder analysis,

the overall PP is not effective. In a study done by Özerol and Newig (2008), the stakeholder analysis was done to see how PP can be modified based on the key stakeholders involved. This was based on the classifications given to the key stakeholders. As such, this study did not only reveal that consultative participation was not effective in achieving WRM in Senior Chief Mkanda's jurisdiction, but it also revealed how the form of PP can be modified to enhance the effectiveness of PP in Senior Chief Mkanda's jurisdiction with respect to WRM. It was also noted that there was generally a high willingness to participate in WRM in Senior Chief Mkanda's jurisdiction, therefore. The findings showed that there was a good capacity in the locality.

The third objective focused on exploring the challenges that affect the participation in WRM in Senior Chief Mkanda's jurisdiction. The findings showed that the main challenge was water shortages. This mainly occurred during the dry season when the water table was low. The water shortages forced people to look for alternative sources of water, hence, they spent less to no time in the participation of activities in WRM. Another main challenge was poor communication between parties in the area.

5.2. Recommendations

Based on the issues raised by BWB and the community, the following recommendations have been drawn:

- Improvement and strengthening of capacity: The study established that most of the community are good at acting collectively so as to implement change related to WRM. However, most of the community lack the environmental knowledge to give them the purpose to participate in water projects. Most of them participate because of financial motivation and compliance to their leaders' requests. As such, the participation lacks continuity and consistency. It is advisable that BWB invests in capacity building by promoting civic education and training programs to increase the environmental awareness in the community.
- Development of an Interactive participation program: The majority of the respondents stated that they are not involved in the activities of BWB as far

as decision making process is concerned. This does not only marginalise communities but also reduces the ability of communities to actively engage with BWB in activities pertaining to the management of water resources. It is, therefore, imperative that BWB involves the community in its decision-making processes concerning water related activities. This can be done through regular public meetings with key community representatives where decisions can be discussed and agreed upon in a unified manner. The community should also be given the room to air out their concerns without any hinders. These meetings should also involve key representatives of the other dam owners as they are abstracting water from the same source as BWB and the community, hence, they need to be involved in the decisions made pertaining to the management of the water source and its catchment area.

REFERENCES

Arkkelin, D. (2014). *Using SPSS to Understand Research and Data Analysis. In Psychology Curricular Materials*. http://scholar.valpo.edu/psych_oer/1

Bartlett, J. E., Kotrlik, J. W. & Higgins, C. C. (2001). *Organizational Research: Determining Appropriate Sample Size in Survey Research*. Learning and Performance Journal, 19, 43-50.

Beierle, T. C. & Cayford, J. (2002). *Democracy in Practice: Public Participation in Environmental Decisions. Resources for the Future*. Washington, DC

Blantyre Water Board. (2017). *Construction of new water supply system from Likhubula river in Mulanje to Blantyre water supply area*. Retrieved from https://www.bwb.mw/LikhubulatoBlantyreWaterSupplySystem.php

Blantyre Water Board. (2019). *BWB Detailed Likhubula Water Project*

Carr, G., Blöschl, G., & Loucks, D. P. (2012). *Evaluating participation in water resource management : A review*. Water Resources Research, 48(11), 1–17. https://doi.org/10.1029/2011WR011662

Chambers, R. (1994). *Participatory rural appraisal (PRA): Challenges, potentials and paradigm*. World Development, 22(10), 1437–1454. https://doi.org/10.1016/0305-750X(94)90030-2

Chiluwe, Q., & Nkhata, B. (2014). *Analysis of Water Governance in Malawi : Towards a Favourable Enabling Environment*? Journal of Water, Sanitation and Hygiene for Development, 4(2), 313–323. https://doi.org/10.2166/washdev.2014.087

Coulson, A. B., Rivett, M. O., Kalin, R. M., Fern, S. M. P., Truslove, J. P., Nhlema, M., & Maygoya, J. (2021). *The Cost of a Sustainable Water Supply at Network Kiosks in Peri-urban, Blantyre, Malawi*. Sustainability, 13(4685), 1–18. https://doi.org/doi.org/10.3390/su13094685

Dicicco-bloom, B., & Crabtree, B. F. (2006). *The Qualitative Research Interview*. Medical Education, 40(4), 314–321. https://doi.org/10.1111/j.1365-2929.2006.02418.x

Driscoll, C., & Starik, M. (2004). *The Primordial Stakeholder: Advancing the Conceptual Consideration of Stakeholder Status for the Natural Environment*.

Journal of Business Ethics, 49(1), 55–73. https://doi.org/10.1023/B:BUSI.0000013852.62017.0e

Duffy, F. (1999). *The New Office*. London: Conron-Octopus

Durán-Sánchez, A., Álvarez-García, J., & Río-Rama, M. de la C. del. (2018). *Sustainable Water Resources Management : A Bibliometric Overview*. Water, 10(1191), 1–19. https://doi.org/10.3390/w10091191

Ferguson, A. (2018). *Decentralization , Participation and Access to Water Resources in Malawi*. BASIS, 1–32. https://rmportal.net/library/content/nric/1049.pdf/view

Gaster, L. & Squires, A. (2003). *Providing Quality in the Public Sector: A Practical Approach to Improving Public Services*. Maidenhead: Open University Press

Gomez, J. D., & Nakat, A. C. (2002). *Community Participation in Water and Sanitation*. Water International, 27(3), 343–353. https://doi.org/10.1080/02508060208687014

Government of Malawi. (1996). *The Constitution of the Republic of Malawi*. Zomba: Government Printers.

Government of Malawi. (2006). *Malawi Growth and Development Strategy: from Poverty to Prosperity*. Lilongwe

Hlásny, T., Kočický, D., Maretta, M., Sitková, Z., Barka, I., Konôpka, M., & Hlavatá, H. (2015). *Effect of deforestation on watershed water balance : Hydrological modelling- based approach*. Forestry Journal, 61(2), 89=100. https://doi.org/10.1515/forj-2015-0017

Hophmayer-Tokich, S., & Krozer, Y. (2008). *Public participation in rural area water management: experiences from the North Sea countries in Europe*. Water International, 33(2), 243–257. https://doi.org/10.1080/02508060802027604

Jingling, L., Yun, L., Liya, S., Zhiguo, C., & Baoqiang, Z. (2010). *Public participation in water resources management of Haihe river basin , China : the analysis and evaluation of status quo*. 2(5), 1750–1758. https://doi.org/10.1016/j.proenv.2010.10.187

Kabir, S. M. S. (2016). *Methods of data collection. In Basic Guidelines for Research: An Introductory Approach for All Disciplines* (1st ed., pp. 201–275). Book Zone Publication.

Loucks, D. P., & van Beek, E. (2017). *Water Resources Planning and Management:*

An Overview BT - Water Resource Systems Planning and Management: An Introduction to Methods, Models, and Applications. Springer International Publishing. https://doi.org/10.1007/978-3-319-44234-1_1

Ministry of Irrigation and Water Development. (2007). *National Water Policy [Malawi]*. In Miscellaneous (2nd Ed). Malawi, Ministry of Irrigation and Water Development. http://www.gsfmalawi.org/fil1/National Water Policy FINAL.pdf

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). *Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. Academy of Management Review*. 22(4), 853–886. https://doi.org/10.5465/AMR.1997.9711022105

Mostert, E. (2003). *The challenge of public participation*. Water Policy, 5(2), 179–197. http://iwaponline.com/wp/article-pdf/5/2/179/407378/179.pdf

Muheya, G. (2017, August 23). *Protection of Mulanje Mountain group warns on project to tap water from Likhubula River to Blantyre. Nyasa Times*. https://www.nyasatimes.com/protection-mulanje-mountain-group-warns-project-tap-water-likhubula-river-blantyre/

Mulwafu, W., Chipeta, C., Chavula, G., Ferguson, A., Nkhoma, B. G., & Chilima, G. (2003). *Water demand management in Malawi: Problems and prospects for its promotion.* Physics and Chemistry of the Earth, 28(20–27), 787–796. https://doi.org/10.1016/j.pce.2003.08.003

Obiri, B. D., Kyereh, B., Obeng, E. A., & Acquah, S. B. (2011). *Perception and participation of local communities in tree planting initiatives*. Ghana Journal of Forestry, 27(3), 80–93.

Özerol, G., & Newig, J. (2008). *Evaluating the success of public participation in water resources management: Five key constituents*. Water Policy, 10(6), 639–655. https://doi.org/10.2166/wp.2008.001

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2013). *Method Implementation Research Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research.* Administration and Policy in Mental Health and Mental Health Services Research. https://doi.org/10.1007/s10488-013-0528-y

Priscoli, J. D. (2004). *What is Public Participation in Water Resources Management*

and Why is it Important? Water International, 29(2), 1–7. https://doi.org/10.1080/02508060408691771

Robbins, S. P. (1984). *Management; Concepts and Practice*. United States of America: Prentice Hall Inc

Rowe, G., & Frewer, L. J. (2000). *Public participation methods: A framework for evaluation. Science Technology and Human Values*, 25(1), 3–29. https://doi.org/10.1177/016224390002500101

Sabina, P., & Stanghellini, L. (2010). *Stakeholder involvement in water management: The role of the stakeholder analysis within participatory processes*. Water Policy, 12(5), 675–694. https://doi.org/10.2166/wp.2010.004

Smith, J. L. (2008). *A critical appreciation of the "bottom-up" approach to sustainable water management: embracing complexity rather than desirability*. Local Environment, 13(4), 353–366. https://doi.org/10.1080/13549830701803323

Stanghellini, L., & Collentine, D. (2014). *Stakeholder discourse and water management – implementation of the participatory model CATCH in a Northern Italian alpine*. Hydrology and Earth System Sciences, 12(1), 317–331. https://doi.org/10.5194/hess-12-317-2008

Streb, C. (2010). *Exploratory case study. Encyclopedia of case study research*. A. J. Mills, G. Durepos and E. Wiebe. Thousand Oaks, CA, SAGE Publication Inc: 373-375. https://dx.doi.org/10.4135/9781412957397.n139

Taherdoost, H. (2017). *Determining Sample Size ; How to Calculate Survey Sample Size*. International Journal of Economics and Management Systems, 2, 237–239. https://www.researchgate.net/publication/322887480%0ADetermining

Teodosiu, C., Barjoveanu, G., & Kruijf, J. V. (2013). *Public Participation in Water Resources Management in Romania : Issues , Expectations and Actual Involvement.* Environmental Engineering and Management Journal, 12(5), 1051–1063. https://doi.org/10.30638/eemj.2013.129

Thwala, W. D. (2010). *Community participation is a necessity for project success : A case study of rural water supply project in Jeppes Reefs , South Africa*. 5(10), 970–979. https://doi.org/10.5897/AJAR09.700

UN General Assembly. (1982). *World Charter for Nature*. UN General Assembly. https://www.refworld.org/docid/3b00f22a10.html

UN General Assembly. (1992). *Rio Declaration on Environment and Development*. I, 1–5.

Vaismoradi, M., D, P., Ms, N., Bs, N., Turunen, H., D, P., Bondas, T., & D, P. (2013). *Content analysis and thematic analysis : Implications for conducting a qualitative descriptive study*. Nursing and Health Sciences, 15(3), 398–405. https://doi.org/10.1111/nhs.12048

van der Molen, I., & Hildering, A. (2005). *Water: Cause for conflict or co-operation*? ISYP Journal on Science and World Affairs, 1(2), 133–143. https://www.researchgate.net/publication/26428355

Walker, S. Langan, S., (2004), *Delivering environmental improvement through integrated catchment management in sub-catchments of the River Dee, NE Scotland*, Hydrology: Science & Practice for the 21st Century, II, pp. 504-509.

World Bank. (1993). *Water Resources Management: A World Bank Policy Paper*. 1–132. https://doi.org/10.1596/0-8213-2636-8

APPENDICES

Appendix A: Permission letter

BLANTYRE WATER BOARD

Telephone: (265) 01 872 000
Telegrams: WATERBOARD
Telex: 44455
Fax: (265) 01 872 026

P.O. Box 30369
CHICHIRI
BLANTYRE 3
MALAWI

Your Ref:

Our Ref:

0232

20 May 2021

TO WHOM IT MAY CONCERN

This letter seeks to confirm that **Bongani Khomba,** who is a final year student at Malawi University of Science and Technology (MUST), in Water Quality Management, is carrying out a study, assessing how the Mulanje Water Project was implemented in terms of integrated water resources management concepts.

Being an institution that promotes research, Blantyre Water Board has given **Bongani** a **"No-Objection"** to collection of any pieces of information or data on the Mulanje Water Project which may be relevant towards execution of his dissertation.

The Board therefore requests total support from you, as may be required by **Bongani Khomba**, for successful delivery of his assignment.

We thank you for your cooperation.

Yours faithfully

ENG L. DETTE
ACTING DIRECTOR OF TECHNICAL SERVICES
FOR: CHIEF EXECUTIVE
SB/gk

Appendix B: Research Questionnaire

STAKEHOLDER ANALYSIS QUESTIONNAIRE

Identified Key Stakeholders for Likhubula Water Project

- BWB Plant Operator
- Group Village Head Nakhonyo
- Village Head Mangombo
- Villabe Head Muhiwa

Plant Operator

Please rate the Plant Operator's performance

1. How would you rate the Plant Operator's influence in the decision making and implementation processes concerning management of water in Chambe catchment? (Power)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

2. How would you rate the way the Plant Operator's requests and interests in the management of water in Chambe catchment is considered appropriate within the social system of Senior Chief Mkanda? (Legitimacy)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

3. How would you rate the way the Plant Operator makes sure that requests and decisions made concerning the management of Chambe catchment is given immediate attention? (Urgency)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

4. How would you the rate the Plant Operator's interaction and occurrence at Chambe catchment area (Proximity)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

Group Viilage Head Nakhonyo

Please rate the Group Viilage Head Nakhonyo's performance

1. How would you rate the Group Viilage Head Nakhonyo's influence in the decision making and implementation processes concerning management of water in Chambe catchment? (Power)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

2. How would you rate the way the Group Viilage Head Nakhonyo's requests and interests in the management of water in Chambe catchment is considered appropriate within the social system of Senior Chief Mkanda? (Legitimacy)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

3. How would you rate the way the Group Viilage Head Nakhonyo makes sure that requests and decisions made concerning the management of Chambe catchment is given immediate attention? (Urgency)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

4. How would you the rate the Group Viilage Head Nakhonyo's interaction and occurrence at Chambe catchment area? (Proximity)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

Viilage Head Mangombo

Please rate the Viilage Head Mangombo's performance

1. How would you rate the Viilage Head Mangombo's influence in the decision making and implementation processes concerning management of water in Chambe catchment? (Power)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

2. How would you rate the way the Viilage Head Mangombo's requests and interests in the management of water in Chambe catchment is considered appropriate within the social system of Senior Chief Mkanda? (Legitimacy)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

3. How would you rate the way the Viilage Head Mangombo makes sure that requests and decisions made concerning the management of Chambe catchment is given immediate attention? (Urgency)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

4. How would you the rate the Viilage Head Mangombo's interaction and occurrence at Chambe catchment area? (Proximity)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

Viilage Head Muhiwa

Please rate the Viilage Head Muhiwa' performance

1. How would you rate the Viilage Head Muhiwa' influence in the decision making and implementation processes concerning management of water in Chambe catchment? (Power)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

2. How would you rate the way the Viilage Head Muhiwa' requests and interests in the management of water in Chambe catchment is considered appropriate within the social system of Senior Chief Mkanda? (Legitimacy)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

3. How would you rate the way the Viilage Head Muhiwa makes sure that requests and decisions made concerning the management of Chambe catchment is given immediate attention? (Urgency)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

4. How would you the rate the Viilage Head Muhiwa' interaction and occurrence at Chambe catchment area? (Proximity)

1. Very Poor	2. Poor	3. Satisfactory	4. Good	5. Very Good

Appendix C: Interview Guide

SEMI-STRUCTURED INTERVIEW GUIDE

INTRODUCTION SCRIPT

Thank you for agreeing to speak with me today about the participation of water users at the Likhubula Water Project. The interview should take about 15-20 minutes to complete. Please remember that everything you share with me will be kept strictly confidential. None of your information will be shared to anyone outside of this study. Please know that there are no right or wrong answers to these questions, I am only interested in your opinions. If you find any of these topics difficult, please let me know. If you have any questions, please let me know. Before I begin, do I have your permission to audio-record our conversation? Do you have any questions before we begin the interview?

FORM OF PUBLIC PARTICIPATION	• Tell me about the Likhubula Water Project and what conflicts it caused?
	• What measures were put in place to reduce the conflicts?
	• What measures were put in place to ensure that management of Chambe basin is not compromised?
	  o What measures involve the participation of water users in the area?
	  o Tell me how the participation takes place and how often are these measures are implemented?

CHALLENGES	• Can you tell me the advantages and disadvantages of the development of the Likhubula Water Project on the management of Chambe catchment? • Are there any disadvantages that make participation of water users in the management of Chambe basin challenging?

	○ Can you share what is done when this happens? ○ How would you want these challenges to be addressed?
CAPACITY BUILDING	• I now want to talk about the trees that exist in the Chambe catchment. What is the importance of the tree planting activities? • Do the people engage in tree planting activities? ○ *If yes*, how often do the people engage in the tree planting activities? • Are there any agricultural activities that occur along Likhubula River? ○ *If yes*, do these activities affect the water in the river?
CONCLUSION	• What would you recommend Blantyre Water Board and all the key stakeholders do to improve participation of water users in the management of Chambe basin?