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MANAGEMENT RELATED CONFLICTS OVER SURFACE WATER USE IN DEVURE SUB CATCHMENT (DSC).

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DECLARATION

The undersigned attest that they have reviewed and approved this research project for marking in accordance with the department's standards and regulations.

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DEDICATION

To my loving family, Mr. M. Mukoroverwa, Mrs. V. Mukoroverwa,Mrs R.Mukoroverwa Dr J. Gotosa, my research supervisor and all my friends and fellow students.

ACKNOWLEDGEMENTS

The greatest and foremost gratitude goes to the Almighty God for the outmost grace of life from the beginning till the end of the project and my sincere outermost appreciation to all who cooperated with me to make this project successful. Special thanks go to my supervisor Dr J. Gotosa for guiding me in the course of the project, providing a unique technique of exploiting this research. I also extend my gratitude to my family who gave me moral support thank you for the job well done. I then give my gratitude to Devure catchment stakeholders understudy for their contributions in this research project.

ABSTRACT

In many regions of the world, including the Devure Sub Catchment, there is an increasing worry about water scarcity. In addition to offering solutions for sustainable water management, this study explores the management-related issues surrounding the Devure Sub catchment's utilization of surface water resources. Stakeholder interviews, focus groups and field observations were all combined in this mixed-methods study. The study's objectives are to determine the sources and reliability of surface water uses, determine the causes of conflicts over surface water use, identify measures to surface water use conflicts in the Chiwara area of Devure sub catchment.The results showed that the main management-related issues causing surface water scarcity in the Devure Sub catchment denial of access to water, illegal water diversion, non-payment of water bills and pollution of water sources and lastly lack of awareness of the water act .The report suggests a comprehensive set of tactics to address the issues with surface water use management based on the investigation which included DSC awareness programs, routine inspections of rivers and dams, laws, and additional development of surface water sources, like dams, to relieve strain on already existing surface water sources . These include putting integrated water resource management (IWRM) techniques into practice, legislation, education and awareness campaigns, mediation through experts, construction of more dams and watershed management .Policymakers, managers of water resources and development professionals who are tasked with addressing water shortages and promoting sustainable water use in the Devure Sub Catchment and other water-stressed regions will find great value in the study's findings. The findings can help

direct the development of integrated, community-based initiatives and the creation of context-specific water management strategies.

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CHAPTER ONE

INTRODUCTION

1.1BACKGROUND OF THE STUDY

Water is essential to human growth and function, yet its scarcity has led to several conflicts (Gleick, 2013), with each nation or society creating its own methods for obtaining the water it requires. However, a lot of water sources are subject to competing interests and do not respect national boundaries. Approximately 640 kilometers long, the Save River is a well-known example. In Southern Africa's typically parched climate, the Save is a crucial but extremely vulnerable resource that supports development and agriculture (Gleick, 2003).

The Save has become a cause of great controversy due to increased water demand brought on by population growth, agriculture and industry in an area that experiences high water stress and frequent hot, dry years, in addition to political issues (Swains, 2011). When competing interests emerge, going to war may not always be the first choice. For instance, when two countries need to share a crucial water source, a diplomatic solution can result in collaboration (Wolf, 2017). Kelvin et al. (2015) states that greater cooperation combining technological and commercial treaties and cooperative development of water infrastructure might take the shape of conversation and the declaration of common aims.

Water presents a dual challenge and a chance for the various societies across the globe. A growing lack of pure fresh water is detrimental to human health, development, and the conflict continuum between and among states. Water distribution is sometimes a major topic of contention in attempts to resolve conflicts and carry out regional and national development and reconstruction, even though it seldom sparks wars between states.

When, for example, water-dependent industries like irrigated agriculture can no longer maintain farming livelihoods, leading to destabilizing migrant movements, water scarcity can acquire an increasingly controversial and violent role inside governments. Water is a resource that is often ignored in conflict prevention, resolution, and post-war reconstruction efforts, especially in critical areas of the world like Southern and East Africa, which includes the Great Lakes.

Additionally, water has shown to be a successful means of fostering cooperation, confidence, and perhaps even conflict avoidance. From 1945 to 1999, there were more cooperative situations than conflicts more than two to one in total (Yoffel et al., 2016). The institutions'

ability to withstand pressures related to water management is more important than total water scarcity. Sometimes, one of the few avenues for communication in otherwise acrimonious bilateral disputes is water. Water plays a crucial role in regional development agreements, which work as de facto conflict prevention techniques in politically unstable areas. Water offers opportunities for cooperation, but it also has the potential to cause conflict. The UN system and its partners may take use of these opportunities.

Data on water conflicts between 2000 and 2009 show that 68% of conflicts happened locally and 32% occurred internationally (Gebremam, 2017). Localized conflicts over water use have the potential to escalate into minor acts of violence and instability among governments or regions. The existence and means of livelihood for millions of destitute people, especially in rural areas, depend on subsistence farming, which in turn depends on the availability of water. Growing water scarcity combined with poor economic development and governance portends increased conflict and instability.

There are many causes of water conflict, but the following are the most important ones: environmental factors like water scarcity, population growth and basic human needs, natural disasters, climate change, aquifer degradation, water pollution, and exploiting industries and water users; institutional political factors like poor governance, lack of transparency, tensions on borderline displacement, aggressive foreign policy wrapped in national security claims; and dam construction projects (Rogers, 2019).

Some of the concerns that are often, and maybe fundamentally, at the centre of resource conflicts at the national and sub-national levels are resource ownership, power distribution for resource access management, resource income distribution, and social and environmental impact from resource exploitation. Without the involvement of foreign parties, the majority of local issues have been settled by managerial, legislative, regulatory, and customary means (Keating, 2020). Hayati (2015) found that the primary source of conflict among the groups involved in water issues in Chimanimani was the relationship between farmers and the government. When it came to water allocation, farmers further downstream suffered the most.

Latent was also the dominant water conflict. Drought, lack of water, and kind of water management were the main causes of conflicts in agriculture. In addition, some attribute the conflicts surrounding water to problems such as low supply, pollution, unstable resources, high demand, inefficient water use, inappropriate institutional and regulatory networks, inadequate governance and centralization, water tariffs, lack of funding, unforeseen

adjustments to the schedule for managing water resources, low public awareness, and socioeconomic conditions (Abdel-Meguid, 2018).

According to an evaluation of the effectiveness of water users associations in Zimbabwe, these organizations have been successful in raising crop yields, lowering local conflict and disagreement, cutting irrigation costs and times, strengthening the bonds between farmers and irrigation advisory service staff, encouraging women's participation, and encouraging farmers to use more contemporary irrigation systems (Hassabou, 2017).

Joseph (2001) reports that an equivalent investigation on the efficacy of water users associations in India showed that the two areas in which these associations excelled were the distribution of irrigation water and the settlement of disputes. Water conflict has been the subject of numerous studies over the past 20 years, most of which have concentrated on the scarcity of water, the institutions involved, and the socioeconomic situations in transnational basins.

1.2 PROBLEM STATEMENT

Zimbabwe made a number of obligations, commitments and appended its signature to international, regional protocols and conventions and established participatory structures, seven Catchment and forty eight Sub catchment councils to minimise surface water use conflicts .Despite all these efforts still water conflicts are on the rise in these participatory institutions enshrined in the 1998 Water Act particularly in DSC. Access to water, its allocation and use for different sectors of economy are becoming increasingly critical concerns that may have profound consequences on societal stability and welfare. Much of the literature and research focused on the operations of these institutions excluding conflict management. Issues that have been researched are on proper stakeholder presentation and catchment planning (Manzungu, 2004). As mention above, the literature does not encompass conflict management whilst these participatory institutions tasked to manage water resources on behalf of the government have been crippled by surface water use conflicts in executing their responsibilities.

DSC (2022), Annual General Meeting (AGM) report highlights that sub catchment's mandents have been jeopardised by water disputes emerging from progressive deterioration of water quality, high water demand among others sources. Additionally, it showed that, compared to an average of 10 every year, just seven water conflicts had been reported in the first half of 2022. Zimbabwe is therefore unlikely to adhere to the IWRM water management

guiding principles in this climate of water conflicts. This study will concentrate on disputes over surface water use in the Devure sub-catchment that are related to management.

1.3 MAIN OBJECTIVE

- To identify sources of surface water, causes of conflicts and solutions for better surface water management in Devure Sub-Catchment, Gutu.

1.4 RESERACH OBJECTIVES

1. To determine the sources and reliability of surface water uses in the Chiwara area of Devure sub catchment.
2. To determine the causes of conflicts over surface water use in Chiwara area of Devure Sub Catchment.
3. To identify measures to surface water use conflicts in the Chiwara area of Devure sub catchment

CHAPTER TWO

LITERATURE REVIEW

2.1 .WATER CONFLICTS

Disagreements arising from mismatches in supply and demand about the allocation and use of water resources, including access, control, and consumption, are referred to as water conflicts (Wolf, 2019). Since water naturally flows from one place to another, it is difficult to claim "ownership" of it, making it a "common good" (Ashton, 2000). Managing this "common good" best involves all water users working together. Human activity and population expansion create competition for water, which leads to conflict and hostilities amongst stakeholders or water users. Among water users, instability, hostility, and disagreements are the main causes of "water conflicts." (Swartz, 2020).

Season to season and area to region variations are noticeable in the type and intensity of water disputes. For instance, in non-arid areas, development projects like building dams and contaminating transboundary waterways are usually the source of water conflicts. Water scarcity is the main source of water conflicts in arid and semi-arid regions, however some are also brought on by development initiatives (Starr, 1991). A scarcity of water may result from supply, demand, or systemic injustices among different water users. Supply-induced scarcity is exacerbated by rivers drying up, dropping water tables, and contaminated surface and groundwater channels (Ohlson, 2017).

2.2 UPSTREAM-DOWNSTREAM WATER CONFLICTS

Any dispute over water that calls for political, military, social, economic, or legal involvement to resolve is referred to as a "water conflict" (Ashton, 2016). Water disputes, with varying degrees of intensity and scale, are common at both the trans-border and local levels, especially those involving upstream and downstream water users. Water-related conflicts have existed for millennia, and many of the contributing factors or causes of these conflicts still exist and will continue to exist in the future (Ashton, 2000). Insufficient resource management and a scarcity of water are the main causes of water conflicts (Carius et al., 2020). Makali and Kiteme (2017) noted that different sub-catchments have different distributions of water.

According to study done in Kenya's Ewaso Ng'iro Basin, overuse in the upper reaches and decreased or non-existent flow in the lower reaches are the main causes of disputes between upstream and downstream (Kiteme, 2005). In a similar vein, Vigusa (2017) discovers that extended drought, poor furrow maintenance, and unsuitable furrow design are the root causes of water conflicts in Tanzania's Pangani basin. In certain cases, upstream-downstream conflicts are caused by illegal abstractions or abstractions that beyond authorized levels. This is in line with the claims made by Kampata (2020) that conflicts have arisen in the Chalinbana basin during periods of water scarcity because upstream farmers have taken lump sum sums of water allotted to them because they had rights spread throughout.

When conflicts between upstream and downstream parties arise during the dry season, when river flows are already at a low level, the nature of the conflict changes (Gichuki, 2019). This condition has detrimental implications on ecosystems that depend on water as well as communities downstream. The availability of water for primary use is the main externality for the downstream community, while the loss of aquatic life is the main externality for the ecosystems.

2.3INSTITUTIONS OF WATER MANAGEMENT IN ZIMBABWE

Institutions for managing water in Zimbabwe's seven catchments. Village Development Committees (VIDCO), Water and Irrigation Committees, Farmer Syndicate Committees, and Environmental Committees all have different and disorganized means of influencing water use attitudes and practices, which leads to water disputes.

The Water User Board, which is made up of farmer representatives from several wards with varying hydrological bases, is situated somewhat above these community-based groups. The middle-level Sub-Catchment Council is composed of stakeholder members from political leadership, contemporary leadership, traditional leadership, and other government entities. Poor institutional "fit" in the form of uncertain positions and relationships leads actors to over-rely on political power as a "management" tool in the context of Zimbabwe's unpredictable social interactions.

Representatives from several hydrological wards who are farmers make up the Water User Board, which is situated somewhat above these grassroots organizations. The middle-level Sub-Catchment Council is made up of delegates from various government entities and political, modern, and traditional leadership. In Zimbabwe, players sometimes over-rely on

political power as a "management" tool because of a lack of institutional "fit," which shows up as hazy positions and connections.
The members of the Catchment Council are the delegated chairpersons of the Sub-Catchment Councils, the representatives of the Department of Irrigation, the Environmental Management Agency (EMA), the Agricultural Research Extension (AREX), and the Chiefs (traditional leadership). Chereni (2007) emphasized how contentious and challenging the associational relationship is between ZINWA and the Catchment Councils.

Legislation, regulations, and programs that impact water consumption and management practices across the board are examples of macro-level institutions. The Water Resource Management Strategy, ZINWA Act, Land Acquisition Acts, Water Act, Environmental Management Act, and Traditional Leaders Act are a few of these. Several Ministerial Departments sit at the top, and their programmatic initiatives have an impact on water management at lower levels (Peters, 2004).

2.4 COMPETITION OVER SURFACE WATER RESOURCES

Water supply competition is the root cause of over 60% of water conflicts in Zimbabwe; the two main competing sectors are urban supply and agriculture (Manzungu, 2002). Conflicts between water users will increase as competition for limited water supplies intensifies due to growing economies and populations.

The Urban Councils Act of 1980 increased competition for surface water resources in Zimbabwe by enabling local authorities to extract water forcibly from any reservoir in the event that drinking water became scarce. It further specifies that the council will establish the connections and bill the property owner for any associated expenses if the owner of the premises refuses to cooperate. This has happened when water has been taken from commercial farms and given to city people, particularly during drought seasons. Conflicts have arisen with this section because certain commercial farmers contend that they should take precedence over certain urban areas. One instance is the dispute between the City of Harare and Upper Manyame.

The Act also gave Urban Council the power to remove any impediment that impedes the flow of a public stream, excluding constructions carried out in compliance with legal requirements. This clause affected certain farmers who built minor dams, some of which were built illegally because they were vulnerable to destruction at any time and without any kind of compensation Homer, D (2008).

2.5 WATER RESOURCES MANAGEMENT IN ZIMBABWE

Zimbabwe's management of its water resources has been greatly influenced by the Rio Summit's Agenda 21 of the United Nations Conference on Environment and Development and the Dublin principles from the 1992 International Conference on Water and the Environment in Dublin. The Water Act of 1976, a reform of the 1927 act that legally denied the majority of the black population access to agricultural water, has directed water sector development since independence (Kujinga, 2017).

The Water Acts of 1927 and 1976 established the first-in-time, first-in-right priority date system for allocating water. The 1976 Water Act was to be administered by the Water Court. Zimbabwe passed two water statutes and Statutory Instruments (SI), namely SI 206 of 2001 and SI 47 of 2000, to regulate water management practices, nearly 20 years after winning national independence in 1980. The two acts, which were passed during Zimbabwe's fourth Parliament, were the Zimbabwe National Water Authority (ZINWA) Act [Chapter 20: 25] and the Water Act [Chapter 20: 24].

Zimbabwe supplied the statutory underpinnings for institutional institutions of water resources management and indigenousized IWRM concepts. The Department of Water Development was reimagined as Zimbabwe National. 48 Sub-Catchment Councils were placed below the Catchment Councils in terms of institutional arrangements. Their duties included regulating and overseeing the use of permits, keeping an eye on water flows and usage in compliance with permits, resolving conflicts, and gathering sub-Catchment rates, fees, and levies.

2.6 SURFACE WATER CONFLICTS IN ZIMBABWE

A lack of well-defined associational links among the institutions that make up integrated water resources management is associated to about 20% of water conflicts in Zimbabwe (Chereni, 2017). After land redistribution and indigenization/affirmative action, the most contentious issues in Zimbabwe are access to water and its use for agriculture (Nemarundwe, 2016 Numerous droughts (1991–1992, 2001–2002, 2004–2005, 2006–2007) have occurred since 1990, drastically altering the amount of water accessible across the country and escalating rivalry and conflict among various water consumers (Johnson, 2018). Droughts caused the water flow in the Devure irrigation scheme in the Gutu District to decline, resulting in water shortages. Agritex, the Natural Resources Board (NRB), the police, and a few laborers and irrigators from the Devure irrigation project went upstream of the Devure River in May 1994 and forcibly blocked the canals used by impromptu irrigators (Pazvakavambwa, S 2002) .

The canals were shut down for no other reason than that the upstream informal irrigators, who had official water rights, were taking water from the Devure River and its tributaries, resulting in shortages for the irrigation plan that did. Later on, the local district administrator denounced this coercive closure. After a week, it was decided that the unofficial irrigators upstream would utilize the water and then allow it to flow to the system the following week. This agreement was only effective for a few weeks since the unofficial irrigators upstream disregarded the terms of the agreement. The purpose of Catchment and Sub Catchment Councils is currently to resolve conflicts.

2.7 SURFACE WATER RESOURCES IN ZIMBABWE

Over 90% of the nation's water supply comes from surface water resources, primarily from rivers. The oscillations in rainfall cause seasonal and interannual variations in river flows (Manzungu 2019). In 1998, Zimbabwe possessed 10,747 minor dams with an impounded water capacity of more than five billion cubic meters, and 140 larger dams with a capacity greater than one million cubic meters (Hammer et al 2003). There aren't many wetlands in Zimbabwe, such as floodplains, swamps, pans, and "dambos," and the majority of them are

undeveloped (Sithole, 2018). Because they are widely utilized for home water supply, dry season agriculture, and cow grazing, wetlands are very significant (Seyam, 2017).

The Mean Annual Runoff (MAR) in Zimbabwe varies from 17 to 19 mm, while the MAR in the Sanyati, Runde, and Save Catchments varies from 60 to 70 mm. With MAR variations between 80 and 120mm, the Manyame and Mazowe Catchments in the country's northeast and north have a significant potential for runoff generation. Munyati, Manyame, and Mazowe are three of Zimbabwe's major perennial rivers; they are primarily located in regions that receive more than 800 mm of rain a year.

2.8 WATER CONFLICTS MANAGEMENT AND RESOLUTION

While interstate water differences necessitate preventative discussions and treaty agreements, local water issues require integrated conflict prevention techniques (Gleick, 2017). Water conflict management and water conflict resolution techniques are the two facets of resolving water conflicts. Water conflict resolution methods, on the other hand, concentrate on using techniques after a conflict occurs, whereas water conflict management takes a more proactive approach to preventing conflicts by promoting productive communication and collaboration among diverse interests, addressing the root causes of conflicts, and using participatory and collaborative planning for complex task execution (Barnett, 1995).The conflict management strategy also makes use of techniques including consensus-building, mediation, negotiation, and conciliation.

2.8.1 NEGOTIATION

The consensual process of resolving and managing disputes resulting from conflicting desires, interests, and objectives is called negotiation. Instead of using force and violence, the parties try to reach an agreement as a means of solving problems. Negotiation is a particularly challenging but all the more essential problem-solving strategy when relationships are at risk or have already been damaged, there is a high level of mistrust, and violence has happened (Bloomfield et al, 1998). This is primarily due to the fact that in negotiation, the parties to the dispute should get together and attempt to settle it without the need for a mediator.

2.8.2 MEDIATION

The term "mediation" describes a procedure wherein a third party assists parties to help them overcome their conflicts through procedural support. The mediator must be a neutral third party with no decision-making power who is impartial and independent. His primary responsibility would be to set up the procedure such that it fosters a secure atmosphere in which the parties may address the disagreement and come to mutually beneficial agreements (Centre for Conflict Resolution, 2001).

2.8.3 COOPERATIVE PROBLEM SOLVING

Cooperative issue solving is an unaided process that involves official or informal dialogues amongst parties to a dispute. Through this procedure, the parties collaborate to identify the specifics of their disagreements and search for innovative solutions that will enable them to address their requirements or worries. While strong relationships are not necessary for parties to use cooperative issue solving, they must recognize that working together to resolve their problems is. (Wolf, 2002).

2.8.4 WATER CONFLICT RESOLUTION- THE IWRM APPROACH

The term "water crisis" has given rise to a new field of study called Integrated Water Resources Management (IWRM). Inefficiencies and conflicts resulting from the uncoordinated development and use of water resources are some of the core reasons of this management crisis that IWRM aims to address (Smits et al., 2008). Uncoordinated management of water resources typically exacerbates conflicts that already exist in catchments with high water use. According to Pallet et al. (1997), most of the time, individuals use the water that is available in their area of the catchment for their own benefit, disregarding the needs of the natural processes that water supports and everyone downstream. Furthermore, they frequently overlook the catchment from upstream to downstream. It goes against the principles.

CHAPTER THREE

METHODOLOGY

3.1 STUDY AREA

The study was conducted in Zimbabwe's Gutu district, which is 1118 meters above sea level and part of Masvingo Province. According to Maponga (2007), it is located between latitude 170 08' south and longitude 310 19' east. This study was limited to the Chiwara area in Gutu District, which is part of the Devure Sub Catchment area. It is roughly 46 kilometers south of Masvingo Town.

3.2 RESEARCH DESIGN

Both quantitative and qualitative methods of study were applied. A cross-sectional survey was employed to gather data from the selected group of stakeholders. In order to gather information about management-related conflicts over surface water use in the Devure sub-catchment, local stakeholders and expert sources were consulted through observations, focused groups discussions, key informant interviews, and interviews.

3.3TARGET POPULATION

Since they had sufficient local knowledge, the target demographic consisted of adults over the age of eighteen and exclusively those who had lived in wards 27, 30 and 31 for more than two years. Among the informants were miners, small and large-scale commercial farmers (A1), irrigation projects, schools and local governments. These individuals comprised the category of commercial water users.

The entire set of individuals or entities from whose information were needed were known as the target population (Creswell, 2018). Because they are informed about the causes of water conflicts, the researcher selected ZINWA and EMA officials as the target population.

The chairperson of the Devure sub-catchment was also a crucial source of information, as she possesses knowledge about the groups that experience water-related disputes most frequently, either inside or between them. He knows how prior disputes over water have been settled. Additionally, information was gathered from the Catchment Manager, who oversees daily water management. There are 620 households total in wards 27, 30, and 31, with an average of 41 households each hamlet (Zimstat, 2022).

3.4 SAMPLING TECHNIQUE

Purposive and random sampling approaches were employed in the multistage sample procedures that were utilized to get the data. Villages were selected for the survey using random sampling techniques. Information from the village chief, the DSC sub-catchment manager, the Agritex extension officer, ZINWA, and EMA authorities was gathered through the use of purposeful sampling.

3.5 SAMPLE SIZE

Four communities were purposefully sampled and 10% of the 620 water consumers were used in this study. Accessibility had a role in the villages' selection (Bhalerio, 2010).

3.6 DATA COLLECTION TECHNIQUES

To find out the respondents' opinions on management-related disputes over surface water use in the Devure sub-catchment, both closed-ended and open-ended questions were employed. Sixty-eight stakeholders completed a questionnaire interview; sixty-two of the questionnaires were returned.

There were two focus group talks involving groups of farmers, village heads, and ward committee members. There were six groups formed, with nine participants in each group and one facilitator. The facilitator is in charge of establishing a welcoming atmosphere for new members and directing the conversation within the group. Information was gathered from some gardens, rivers, and dams by direct observations. By using cameras to take images of the region, this was improved.

3.7DATA ANALYSES

The questionnaires' nominal and ordinal data were analysed and presented using Microsoft Excel and the Statistical Package for Social Sciences, version 27 (SPSS). Pie charts and graphs were used to display the data since they are simple to understand.

CHAPTER FOUR

RESULTS.

4.1 PAST WATER CONFLICT RESOLUTION

Fifty six percent of the past conflicts were not been effectively resolved (55.7%) and forty four percent were relatively resolved as shown by fig 4.1.

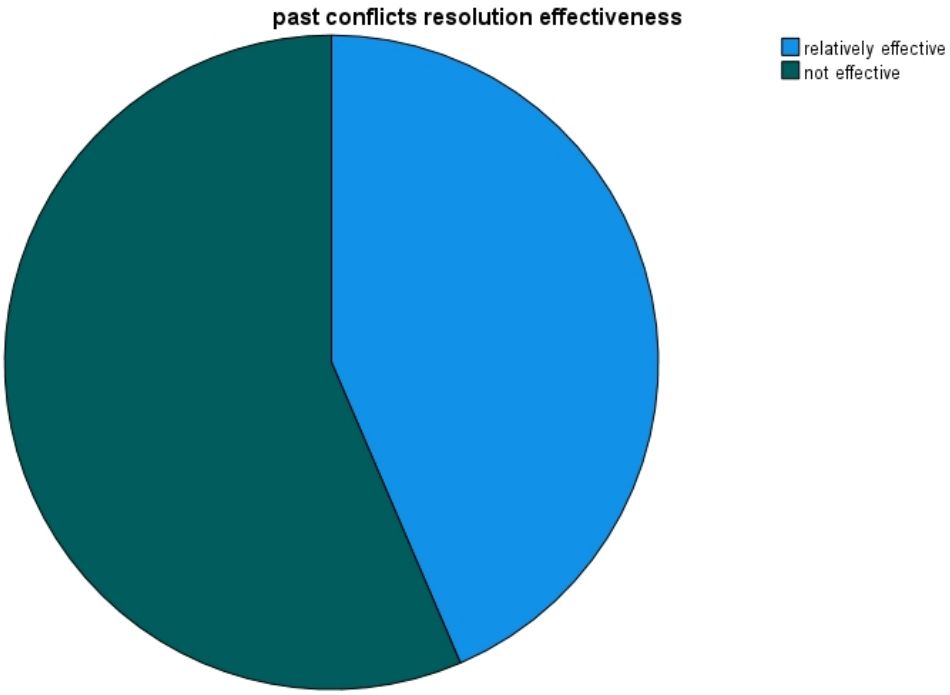

fig 4.1. Effectiveness of past conflict resolution

4.2 MAJOR SOURCES OF SURFACE WATER IN DSC

Majority of the surface water sources were streams with 42.2% followed by dams and rivers with 21.9% and lastly communal reservoir with the least percentage of 10.9% (fig 4.2)

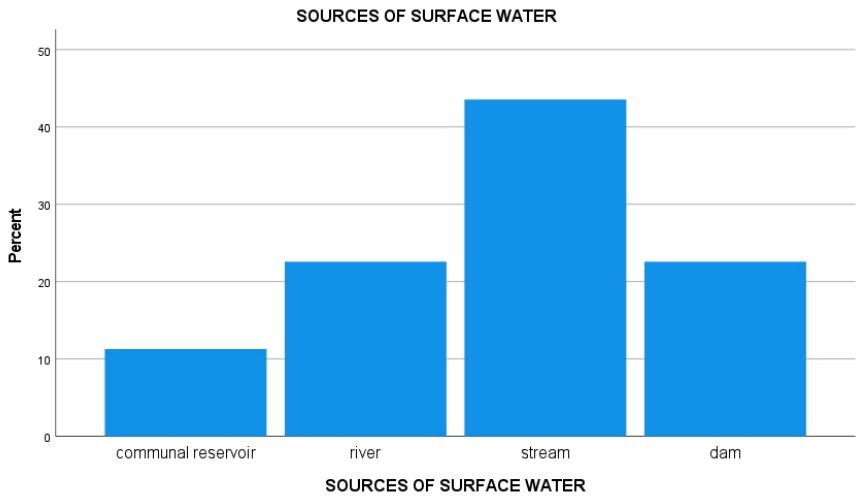

Fig 4.2. Major sources of surface water in DSC

4.3 THE MAJOR USES OF SURFACE WATER.

Dominant uses of surface water resources in DSC were water supply for crop production (51.6%) , livestock watering (25.0%), domestic consumption (18.8%) and lastly mining (1.6%) with the least number of uses .

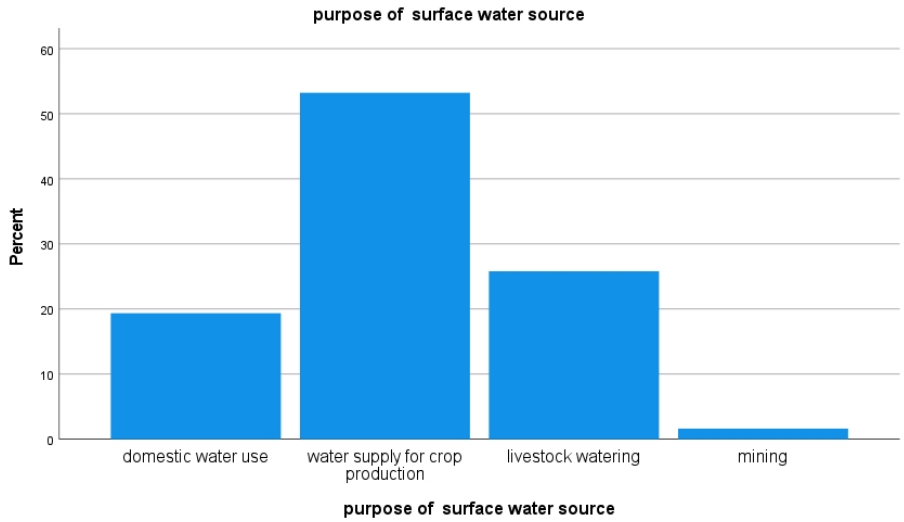

Fig 4.3 Major uses of surface water

4.4 PERCEPTION ON RELIABILITY OF SOURCES OF WATER

The majority of surface water sources are reliable and only a few are not reliable as shown by fig 4.4

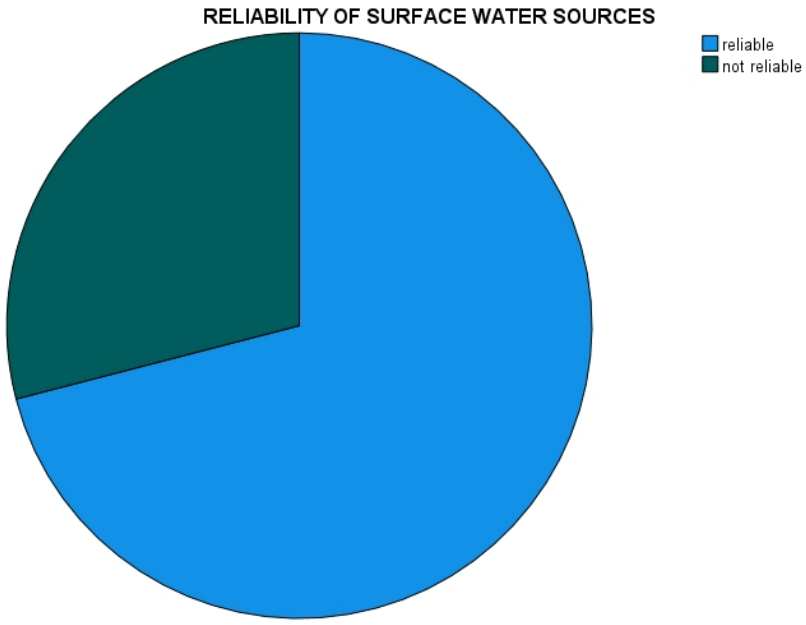

Fig 4.4. Water reliability in DSC

4.5 THE MAJOR SOURCES OF CONFLICTS

Denial of access to water with 28.1% and illegal water diversion (26.6%) were dominant sources of conflicts as shown by fig 4.5. Non-payment of water bills and pollution of water sources were among the major causes of conflicts. The least possible cause of conflicts was lack of awareness of the water act (4.7%).

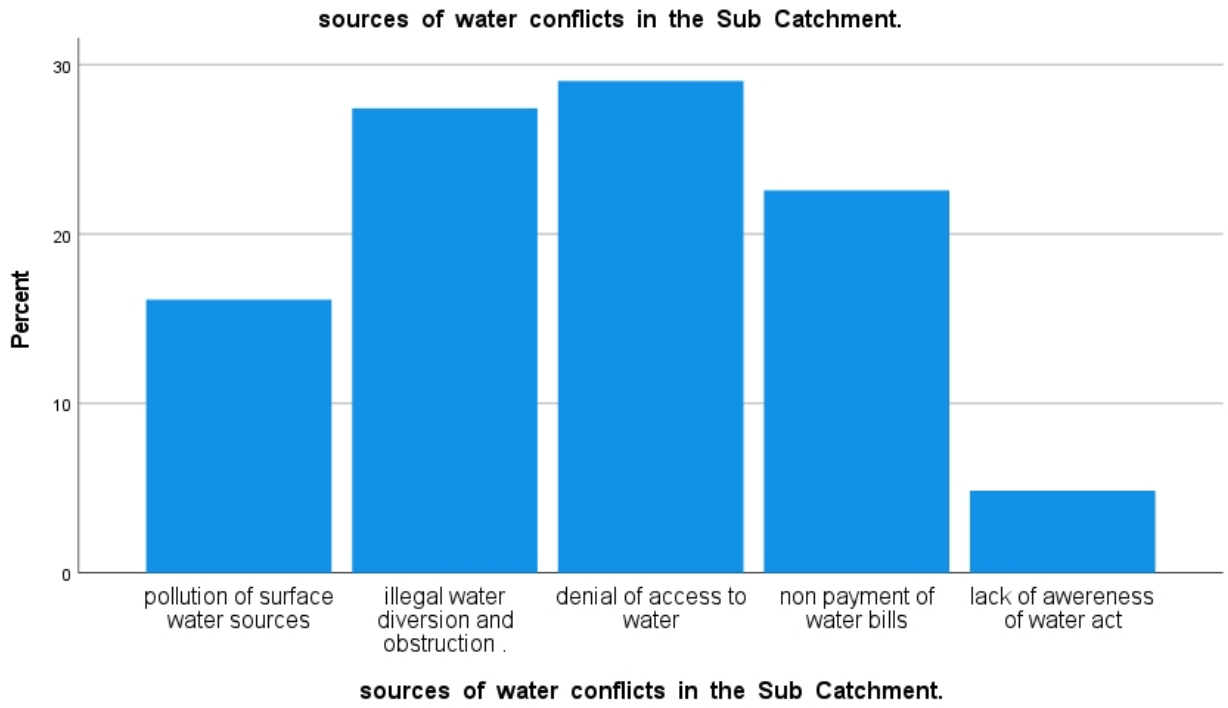

Fig 4.5 Main sources of conflicts

4.6 AWARENESS OF THE WATER LEGISLATION ACT

About 39, 1% respondents are knowledgeable with the Water Act and 59.8 % of the respondents were not familiar with the Water Act as shown by fig 4.6.

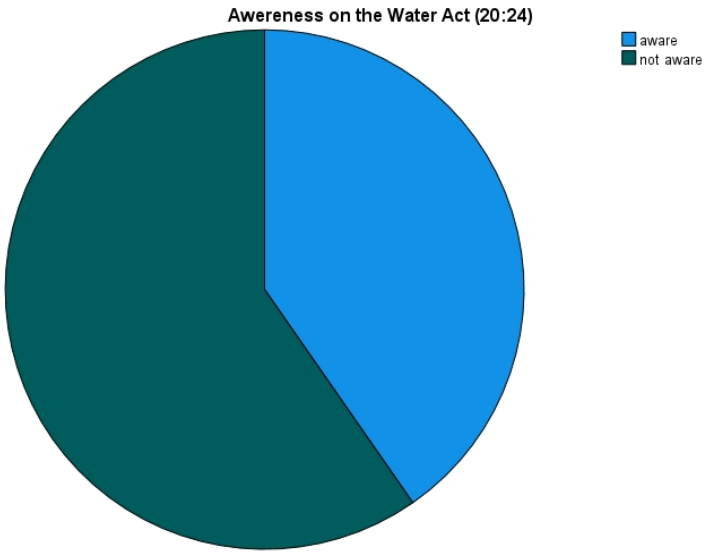

Fig 4.6 Awareness on 1998 Water Act

4.7 CONFLICT RESOLUTION INVOLVEMENT

More than half of water users have participated in water conflicts management in DSC (fig 4.7).

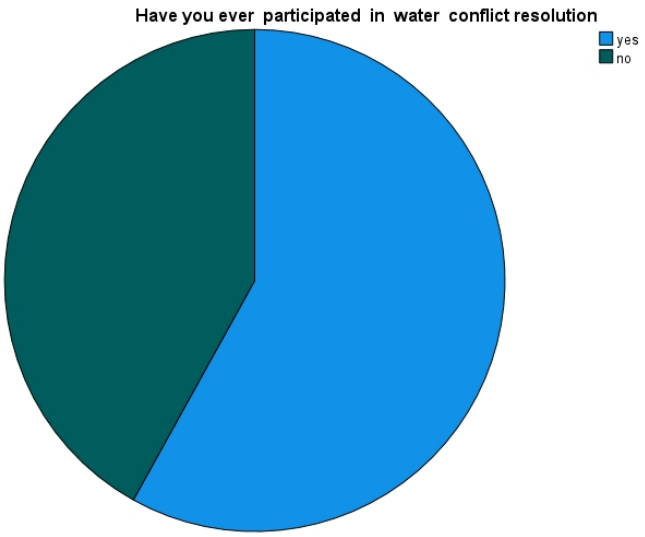

Fig 4.7. Conflict management participation

4. 8 MEASURES TO MINIMISE SURFACE WATER CONFLICTS

The majority of the water users said awareness campaigns (45.3%), legislation (31.3%) and construction of more dams (10.9%) should be done to minimise surface water conflicts. Lastly, 1.6% of the water users said mediation through experts should be used to minimise conflicts occurrence as shown in fig 4.8.

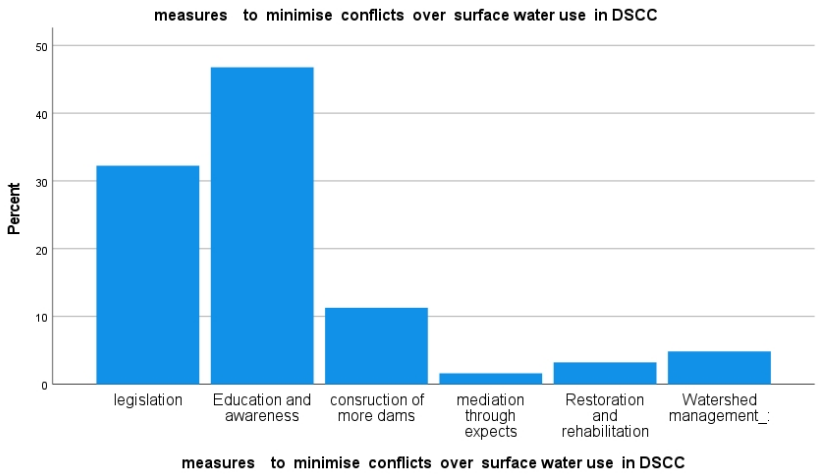

Fig 4.8 .Measures to minimise conflicts

4.9 LEGISLATION

More than half of the water users believed that legislation should be used in solving and preventing conflicts over surface water management 65%.as shown by fig 4.9.

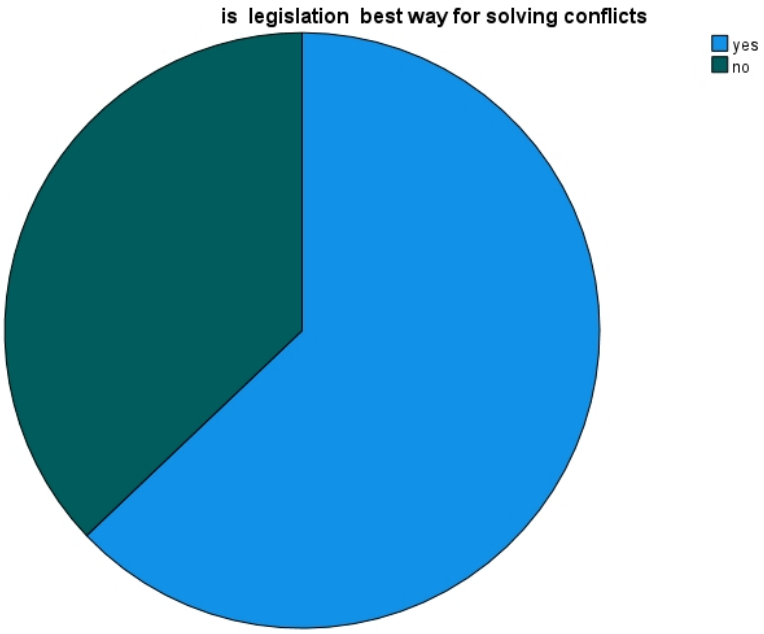

Fig 4.9. Legislation as a measure to minimise conflicts

4.9. ILLEGAL WATER OBSTRACTION AND DIVERSION ON THE STREAMS

The researcher observed stream diversions and illegal surface water abstraction in Mutorahuku stream causing acute water shortages in the tail reaches of the downstream farmers.

Fig 4.10. Showing illegal stream diversions into a garden Gandashanga village

CHAPTER FIVE

DISCUSSION

5.1 SOURCES OF SURFACE WATER

Dominant sources of surface water resources were streams, dams and rivers which is about 87 percent of surface water in DSC. When asked about reliability of surface water sources, respondents cited that rivers, dams and streams are much reliable in rainy season than in dry season. Surface water resources in Chiwara tend to be more reliable and abundant during the rainy season compared to the dry season due to differences in precipitation patterns that is, during the rainy season, the country receives the majority of its annual rainfall, often in the form of heavy showers and thunderstorms. This influx of precipitation directly replenishes surface water sources like rivers, streams, lakes and wetlands. Surface water reliability in rain season can be supported by existing literature of (Kyoung-Sim Jung et al., 2020) which suggested that, in drier regions like North Africa and Southern Africa, surface water sources are most reliable during the wettest months, which can vary from December-February in Southern Africa to March-May in North Africa.

Stakeholders believed that high temperatures and low humidity during the dry season lead to increased evaporation from surface water bodies and this aggravates the seasonal decline in surface water availability. These respondent's sentiments can be supported by Biney, (2018) who highlighted that Shifting rainfall patterns and increased drought frequency are altering surface water reliability in parts of Africa

5.2 CONFLICT MANAGEMENT STRATEGIES

According to the survey, 71% of respondents indicated conflict avoidance strategies include DSC awareness programs, routine inspections of rivers and dams, laws, and additional development of surface water sources, like dams, to relieve strain on already-existing surface water sources. The respondents generally perceived that surface water conflicts can be solved by investment in water infrastructure and storage for example dams ,reservoirs since they increases supply reliability, reduces seasonal variations and improves water security reducing shortages. It can be noted that the findings of this study were comparable with some studies which were carried out before. In a study done by (Yousefiet et al., 2016) it was discovered

that Africa's population is rapidly growing, increasing demands on limited water resources, financing in infrastructure allows for greater water storage and distribution to meet these rising needs.

People in Chiwara area believed that surface water conflicts can be managed through legislation as shown by fig4.9. These research finding were supported by reports by (Yousefiet et al., 2016) which stated that laws carry the force and authority of the state, making water management decisions harder to challenge or ignore. This is important for ensuring compliance, especially when dealing with powerful or non-cooperative water users

5.3 LEGAL INSRUTMENTS AWARENESS

The majority of water users in Devure Sub catchment Council water users were not aware of the water act as shown by fig 4. 3. Studies by Sithole (2001) indicated the same findings that, the government and relevant authorities have not undertaken extensive public education and outreach efforts to inform citizens about the Water Act and their water rights under the law, information about the Act is not widely disseminated through accessible channels like community meetings, media or public forums.

Most ranked challenge with uninformed about the Water Act were inconsistent implementation and enforcement that were uneven or negligent implementation of the Water Act's provisions which undermine public confidence in the law and its ability to protect their water rights.Water act unaware and compliance can also be hindered by technical language and complexity as indicated by a similar study by O.Manzungu (2013) which stated that the Water Act contains a lot of legal and technical terminology that can be difficult for the average citizen to comprehend.

Nonetheless, 35% assert that they were aware of the Water Act. Of the people who knew, fifteen said they learned about the Water Act of 1998 from their local Agricultural Extension Officer and water resource officer, who helped them with the application process for licenses and agreements.

According to a study by Swatuk (2012), the majority of water consumers are unaware of the Water Act since they were not informed or consulted during the 1998 Water Act's

formulation (Swatuk, 2012). A top-down method was employed throughout the Water Act's development process, which was intended to be collaborative and incorporate participation at the lowest possible level.

5.4 OCCURRENCE OF CONFLICTS.

The study's findings demonstrated that, as a result of seasonal variations, the bulk of water conflicts in recent years took place between July and November. Fifty-five percent reported seeing people involved in these water disputes and witnessing them. Thirty percent of respondents believed that the Devure Sub Catchment's water disputes are caused by unlawful water abstraction along with the growing demand for irrigation water exacerbated by land reform programs. This is being supported by (Carius et al., 2020), who suggested disputes have arisen over the construction of dams, irrigation schemes and water transfers, with stakeholders asserting their rights to the shared river.

5.6 SOURCES OF SURFACE WATER CONFLICTS.

5.6.1SOCIAL WATER CONFLICTS

The study noted that social water conflicts at Dewure Irrigation Scheme were interlinked to different perceptions on water and population increase which lead to denial to access of surface water. Dewure Irrigation Scheme in 2015 had 60 farm families and the number shot up to 72 farm families in 2022. Devure sub catchment chairperson reported that population increase was due to farm sub division into several plots during the land reform programme, land tenure and family expansions. Dewure irrigators has a dam with less than 250 ML net capacity. Because the reservoir was situated within each farm family's allotment, several agricultural families thought the water in it was exclusively for the purpose of producing crops. The findings of this research were similar with findings carried by Kiteme, (2005) which indicated that, water supply competition is the root cause of over 60% of water conflicts in Zimbabwe, the two main competing sectors are urban supply and agriculture (Manzungu, 2002).

5.6.2 ECONOMIC WATER CONFLICTS

Findings from key informant interviews revealed conflicting pressure between Devure Sub Catchment council and Dewure irrigation scheme over unpaid water bills. DSC supplies 43% of its surface water to the irrigation scheme. Dewure Irrigation Scheme owes DSC over

USD3.1 thousand in unpaid water bills. The results of this study are consistent with a study by Ashton (2016) that showed utilities may disconnect users' access to piped surface water supplies when stakeholders fail to pay their water bills. In an effort to recoup payments, DSC tried to shut off water supplies and threatened legal action against these irrigation projects in 2022. But the endeavour led to a battle over water that became more economic and then turned political. This can lead to disputes and conflicts as people struggle to find alternative sources.

5.6.3 WATER QUALITY ISSUES

On account of water conflicts the study found that water quality issues were the principal source of surface water conflicts. Bikita minerals and some illegal miners polluted water with cobalt ,clay stone and heavy metals, that entered surrounding streams and rivers in March 2020 (Kujinga, 2022) which was a big issue among users . The findings of this study were consistent with some studies which were carried out before. In a study done by (Yousefiet et al., 2016) it was discovered that surface water pollution from industrial wastes, agricultural runoff and poor sanitation can degrade water quality and quantity. This can spark arguments between upstream and downstream users. Water customers wanted Bikita Minerals to reimburse them for their losses.

The Catchment Manager reported that in October 2022, representatives of Bvisanungo Irrigation, acting through the Environmental Management Agency (EMA) and Devure Sub Catchment Council, issued a warning to the Bikita Minerals Wastewater Treatment Department regarding the improper discharge of partially treated wastewater. The wastewater contained high concentrations of suspended solids and inorganic chemicals, among other contaminants, which could have an adverse effect on the availability of essential nutrients and the overall health of the crop.

5.6.4 ILLEGAL WATER DIVERSION AS SOURCE OF SURFACE WATER CONFLICTS

The image in fig.4.10 shows water that has been diverted into a garden in Gandashanga hamlet, preventing the water from continuing downstream and leading to severe water shortages in the stream's lower reaches. Tensions between upstream and downstream water users have arisen as a result of surface water shortages in the tail run of Mutorahuku Steam

caused by river water impoundments, illicit water abstraction through the use of pumps, and illicit water diversion. The researcher discovered that the findings of this research are consistent with findings of the study carried by (Carius et al, 2020) which indicated that, in Zimbabwe , there are numerous cases of individuals, societies or even organisations illegally constructing dams, canals and other infrastructure to impound or divert surface water for their own use. This denies downstream users of their rightful access to these shared water resources water conflicts emerge not only owing to a scarcity of water but also due to the insufficient management of the resource.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The purpose of this study was to discuss management related conflicts over surface water use in Devure Sub Catchment. To achieve this purpose, three objectives were developed and one of the objectives was to determine the sources and reliability of surface water uses in the Chiwara area of Devure sub catchment and it was noted that sources of surface water were rivers, dams, streams and reservoirs and were much reliable in rain season than in dry seasons. Another objective under study was to determine the causes of conflicts over surface water use in Chiwara area of Devure Sub Catchment, basing on the findings of the study it was denial of access to water, illegal water diversion and obstruction and pollution were the highest contributors of surface water conflicts while uninformed about legal instruments being the least contributor. lastly, a third objective was of identifying measures to surface water use conflicts in the Chiwara area of Devure sub catchment with legislation , awareness campaigns by DSC, regular river and dam inspections, legislation and further development of surface water sources being advised by many water users

6.2 RECOMMENDATIONS

- Sub catchment councils need financial support from the government in order to run awareness initiatives.
- To lessen competition for the country's present surface water resources, the Zimbabwean government should encourage the use of groundwater and the expansion of surface resources through dam construction.
- Develop and enforce policies and laws to protect surface water sources and their watersheds in Devure catchment.
- Stakeholders should promote water-saving practices and efficient use of water resources.

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APPENDICES

APPENDIX 1

My name is Mukoroverwa Stanford a BSc Student in Natural Resources Management at Bindura University of Science Education. I am currently undertaking a research on ***Management related Conflicts over Surface Water use in Devure Sub Catchment.*** Kindly, assist by going through the questionnaire and provide responses. The information provided by the respondents is for academic purposes and your views shall remain confidential and anonymous. Thank you in advance for your co-operation.

Instructions

(a) Do not write your name or any other identification details on this paper.

(b) Put a tick..... In the box for the answer you have selected.

(c) Fill in the spaces provided.

Questionnaire number……

Section A: Socio-demographic data

1) Gender: Male Female

2) Age: 18-29 30-49 50+

3) Education: Primary level Secondary level

College

4) Marital Status: Married Single

5) Occupation: ……

Section B:

6) Which surface water source in your do you use?

Communal reservoir River Canal Stream Dam

Specify name ……..

7) What is the purpose of that surface water source to you?

Domestic water supply Water supply for crop production

Livestock watering urban water supply

Mining

8) How reliable are your surface water resources?

……

Section C:

9) Which of the following do you think is primary source of water conflicts in the Sub Catchment.

Pollution of surface water sources	
Illegal water diversion	
Denial of access to water	
Non-payment of water bills	
Lack of awareness to 1998 Water Act	

10) Are there any water conflicts in Devure Sub Catchment?

Yes No

If yes explain why

……

11) Are you aware of 1998 Water Act provisions?

Aware Not aware

12) Have you ever participated in water conflict resolution?

Yes No

Section D

13) How effective were the past conflicts been resolved?

Relatively effective Not effective

14) What is your comment about the frequency of conflicts over surface water use?

……

15) Do you think legislation is the best for solving conflicts over surface management challenges?

Yes No

16) Could you suggest any measures which can be adopted to minimise conflicts over surface water use in DSC

a)……
…

b) ……..……

c)……

d)……

Thank you for your co-operation

APPENDIX 2:

Semi structured Interview guide for key informants

Interview guide for DSC manager

1) Could you outline major sources or causes of water conflicts in DSC?

2) Briefly explain any water conflicts that have occurred within Devure Sub Catchment and how they were settled ?

3) Could outline stakeholder groups which participate in water conflict resolution?

4) How effective are your conflict resolution mechanisms?

Interview guide for the hydrologist

8) How does your organization ensure effective flow of water in Devure Sub Catchment Rivers?

9) How does your organization respond to hydrological droughts in terms of water allocation and water demand management?

10) Briefly explain any water conflict that have occurred in the sub catchment and how it was settled ?

Interview guide for the River inspector

11) Could you describe major surface water sources in Devure Sub Catchment?

12) How reliable are the surface water sources to different water needs of different?

Thank you for your co-operation