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DEPARTMENT OF DISEASE CONTROL AND ENVIRONMENTAL HEALTH

ASSESSMENT OF COMMUNITY MANAGEMENT OF WATER SOURCES IN PAKELE
TOWN COUNCIL, ADJUMANI DISTRICT, UGANDA

BY

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DECLARATION

I **MAPKWE Fred** hereby declare that to the best of my knowledge; this dissertation is my original work and has never been submitted to this university or any institution of higher learning for an academic award or publication. However, many sources of information were used as references and they included; articles and the internet.

Signature.......... Date.....27.11.2023.....

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APPROVAL

The development of this dissertation by **MR. MAPKWE Fred** has been under my close supervision and I therefore recommend its approval.



Signature:

Date: ...5th July 2023.

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DEDICATION

I dedicate this dissertation to my family members, Ms. Likico Beatrice and my Son Amatu Anson Joshia for the love they showed to me in this academic struggle.

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I give glory to the almighty God for the good health, protection and blessings that enabled me successfully develop this dissertation.

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OPERATIONAL DEFINITIONS

Community: - A unified body of individuals living in the same place having common rights, privileges, or interests, or living in the same place under the same laws and regulations

Operation: - The action of functioning or procedures and activities involved in the actual delivery of services, e.g. abstraction, treatment, pumping, transmission and distribution of drinking water

Maintenance: - The activity aimed at keeping existing capital assets in serviceable condition, e.g. by repairing water distribution pipes, pumps and public taps. Maintenance can be divided into three categories:-

- Preventive maintenance it means regular inspection and servicing to preserve assets and minimize breakdowns:
- Corrective maintenance it means minor repair and replacement of broken and worn out parts to sustain reliable facilities: and
- Repair means replacement of worn-out accessories such as bolts, nuts, connecting rods, pipes, sealing rings and pump heads of water supply system with new or sound ones.

Management: - The process of planning, organization, leading and controlling the efforts of the community members and using all the 3 other community resources to ensure that community water facilities are properly maintained.

Sustainability: - In this case it means that water continues to be available for the period for which it was designed in the same quantity and at the same quality as it was designed.

LIST OF ABBREVIATIONS/ACRONYMS

AAH:	Action Against Hunger
ADLG:	Adjumani District Local Government
CBMS:	Community Based Management System
CDO:	Community Development Officer
DDEG:	District Discretionary Equalization Grant
DWD:	Directorate of Water Development
DWRM:	Directorate of Water Resource Management
GOU:	Government of Uganda
HI:	Health Inspector
HIV/AIDS:	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HPMA:	Hand Pump Mechanic Association
IPs:	Implementing Partners
LMIC	Low and Middle Income Countries
LWF:	Lutheran World Federation
MDG:	Millennium Development Goal
MWE:	Ministry of Water and Environment
NDP:	National Development Plan
NEMA:	National Environment Management Authority
NUWS:	Northern Umbrella Water and Sanitation
O&M:	Operation and Maintenance

PHC	Primary Health Care
PI:	Principle Investigator
PTC:	Pakele Town Council
SDG:	Sustainable Development Goal
SRS:	Simple Random Sampling
TA:	Town Agent
TB:	Tuberculosis
TC:	Town Clerk
UN:	United Nation
UNHCR:	United Nations High Commissioner for Refugees
UNICEF:	United Nations Children’s Fund
URWF:	Urban and Rural water facilities
WASH:	Water, Sanitation and Hygiene
WHO:	World Health Organization
WSC:	Water Source Committee
WSSB:	Water Supply Service Board
WUC:	Water User Committee

ABSTRACT

In Uganda today, the operations and maintenance of Urban and Rural Water Facilities are largely based on the Community Based Management Systems, which emphasizes community's responsibility and authority over operations and maintenance of their water facilities. Pakele town council being one of the newly created town councils in Uganda, water supply is largely from old existing deep boreholes and new piped water taps under the management of the community. However, the community still faces a number of water supply challenges which is believed to be due to poor management of existing resources. This study aimed to establish the status of existing community water sources; to determine knowledge of users on community management, to establish attitudes of community towards management of their water sources and to ascertain community's operation and maintenance practices of water sources.

The study utilized simple random sampling design of which 344 households were selected. Semi-structured questionnaires and checklists were used to collect information that was analyzed in both qualitative and quantitative data.

The average age of respondents was 35.6 years (SD 11.1). Majority were females 250 (72.7%), farmers 150 (43.6%) and Catholics 256 (74.4%). The major source of water in Pakele town council was public deep boreholes. Majority of the boreholes 31/32 (96.9%) were community owned, were functional 31 (96.9%) and had a water source committee 30 (93.8%). However, the water source committee was trained in only 10 (31.3%) of the boreholes. The knowledge of critical hand washing times was poor as only 45 (13.1%) mentioned after visiting the toilet, 14 (4.1%) mentioned before and after eating and only 12 (3.5%) mentioned after cleaning babies bottom as the critical hand washing moments. From qualitative data, respondents had mixed reactions on who should take care of the community water sources. Some said it should be government while others said it should be community members. Majority of the respondents reported that they were okay paying monthly fees for water source maintenance.

Community management of public water sources in Pakele town council was good despite the knowledge and attitudes of community members towards management of community water sources. The study recommends community sensitization, empowerment and support so as to address the identified knowledge/attitude gaps.

CHAPTER ONE

1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

Access to adequate safe potable water is important to human health and well-being. Water supports all forms of life on the earth and it is a basic human right. Therefore, adequate supply of safe water and basic sanitation is one of the important components of primary health care (PHC) as stated in the declaration of Alma-Ata (WHO, 1978). Having no access to safe water or inadequate quantity of water for domestic use and/or water from contaminated water sources can lead to water related diseases such as; typhoid fever, cholera, poliomyelitis, amoebiasis, hepatitis A, dysentery, skin and eye diseases including scabies and trachoma. In a study conducted in India, prevalence of waterborne diseases among the elderly was found to be 22.5% in the rural areas and 12.2% in urban areas; presenting a significant absolute difference of about 10.2% majorly resulting from diarrheal diseases such as cholera, dysentery and typhoid fever (Kumar et al., 2022).

Sustainable water supply in a given community is guaranteed by having a strong community engagement and empowering them to manage their existing water source. The aspect of sustainable access to water is a key development challenge, as expressed in the United Nations Sustainable Development Goal 6. Target 6.1 aims, "by 2030, to achieve universal and equitable access to safe and affordable drinking water for all". Though considerable water infrastructural investments have been implemented over several decades, the inadequacy of water supply continues persist across Sub-Saharan Africa (Cleaver et al., 2021).

Community based management system is concerned with; identifying problems with the lower water supply system, the possibilities for and constraints on the management by the communities, including possible solutions that can be tested. The fundamental principles of community water management in this context are; each community develops its own specific management systems, communities own the process of change, facilitators and local researchers participate in the community's project and increased management capacities are the basis for improved water supply systems.

Community management is a governance strategy; it gives water users or a committee of water users the administrative powers and operational responsibility for their water supply system. For convenience, the definition used in principle 10 of the Rio Declaration will be considered in this

study, it bounds the roles and responsibilities of water users in decision-making, users' right to information, express concerns about services, and to receive appropriate remedies and accountability from service providers (Shields *et al.*, 2021).

Good operation and maintenance practices of water sources is a cardinal role of community management system which can be achieved via transparency and accountability by user committees, community taking ownership and awareness of users on matters relating to the water source (Shields *et al.*, 2021). Under the leadership of Local Council Ones (LCIs), the community select their own water source committee members, make by-laws governing their sources, carryout minor maintenance repairs, attend meetings related to their water sources, conduct communal cleaning of water source surrounding and drainage channels, pay user fees, monitor performance of water source, report major repair works to higher authority and ensure good household hygiene and sanitation.

Poor operations and maintenance of water facility negatively impacts on the socio-economic development of an area. In the event maintenance is not responded to timely, the outcome will be reduced life span of the water facility wasting the scarce resources. Poorly managed water source leads to poor quality water hence prevalence of waterborne diseases (Elagu, 2019). Poor maintenance of water facilities can not only result in breakdown, but also contamination of water sources, community will resort to unsafe sources due to non-functionality and exorbitant prices for alternative water sources. Low functionality of water sources means less quantity of water in the households since there will be overcrowding leading long waiting hours at few water points, and people trekking long distance to safe water source (IRC briefing, October 2015).

The National Water Policy (1999) states, communities are the owners of the improved communal water facilities whereas the Water Statute vests the ownership in Directorate of Water Development (DWD), with the community managing and maintaining it for their joint benefit. The involvement of communities in the planning process and payment of user contribution is intended to create a sense of ownership of the facilities by the ('District Implementation Manual Revised 2013.)

1.2 Background

Community participation has become pertinent in water resource management in the global south. Involving local people in decision-making, implementation and evaluation in water resource

management increases efficiency and equity right from project initiation. Pillar 3.4 of the East African Community (EAC) vision 2050 target to promote sustainable use of the available natural resources, environment management and conservation, in mind that 92.9% of the population having access to safe water. In Uganda, 15.3% of the total 20052square kilometer land area is covered by fresh water resources such as rivers, lakes, streams and swamps. Total renewable water resources of the country is 43.3km³ meaning, average annual recharge of groundwater is relatively high in the range of 19.1 to 39.9mm. However, both groundwater and surface water is polluted with bacterial and chemical contaminations from inadequate sanitation facilities, unsafe disposal of municipal and industrial wastes, poor farming practices accelerated by degradation of wetlands and catchment areas. The National Development Plan III (NDP-III) targets to achieve surface abstraction from 76% in 2020/21 to 85% by 2024/25 and groundwater abstraction from 73% in 2020/21 to 83% by 2024/25. It also targets to increase water samples tested free of contaminants complying with the national quality standards; from water bodies to 65% by 2025 and from water supply systems/point water sources to 80% by 2025.

In Uganda, over 80% of the populations live in rural areas and 76% of the rural population receives water from a point water source. The big and already growing population exerts pressure on the few water sources and as a result many are constrained and experience many breakdowns or failures leaving the community with limited alternatives such as traveling long distances, standing in queues and using unsafe sources. The operation and maintenance of many water facilities has proved to be a great challenge and consuming quite big sums of the water grants to the districts in Uganda. This has led to many water points (up to 25%) failing within 5 years of age after inception as they still have to grapple with two big challenges including ineffective management and inadequate funding for operation and maintenance (Elagu , 2019).

The government of Uganda pledges to increase water supply in urban areas from 71% in 2018 to 95% and 100% in towns under National Water and Sewerage Corporation by 2022. To promote functionality of the facilities, stakeholders should adhere to National water policy spelling out equal opportunity for both men and women in community based management; that is, water source committee should have 50% women representatives. The Uganda gender policy (2007) encourages gender equality and women's empowerment in Uganda. Women and children bear the burden of inadequate supply of safe water in their localities and they trek long distances to reach available safe water sources at the expense of other economic activities for women and education in case

children. Daily on average, women spend approximately 55% of their time (about 6 hours in a day) fetching water. Most importantly the success and effective usage of water facilities depends on the women and men, boys and girls who must be involved in site selection, choosing appropriate water technology and taking management roles of operation and maintenance (WSGS III, 2018-2022).

Management and rehabilitation of some of the water sources has also been put in the hands of contractors/private operators some of whom most times are constrained by budget challenges and in some instances lack requisite skills to operate and maintain the rural water sources. There were instances of Hand Pump Mechanics overcharging the community and others losing interest because they had less work to do (Elagu, 2019).

In the financial year 2018/2019, the water and sanitation department of Adjumani district local government secured funding from District Discretionary Equalization Grant (DDEG) and Pakele Town Council was identified for the implementation of the grant. The purpose was to support Pakele Town Council achieve sustainable provision of safe water and hygienic sanitation based on the management responsibility and ownership by users, to 77% of the population in the town and 90% of the small town's population by the 2020 (Feasibility Study Report Pakele, 2019).

Major rehabilitation works are conducted by the Adjumani District water office with funding from the conditional grant from the central government which is inadequate to meet needs of all the sources. Adjumani District Local Government works collaboratively with Implementing Partners (IPs) dealing in Water, sanitation and hygiene (WASH). Organizations handling WASH activities in the District include; Lutheran World Federation (LWF), Plan International Uganda, Action Against Hunger, and United Nation High Commissioner for Refugees (UNHCR). These IPs drilled boreholes, formed and trained water source management committees, rehabilitated water sources and routinely do major and minor repairs both in refugee settlements and the host communities.

The operation and maintenance of water sources in Pakele Town Council is governed by the Water User Committees and Water Supply Services Board. Currently, the population of Pakele town council is approximately over 15,000 people who depend on both Motorized Pipe Water System and U2 hand pump deep borehole sources. Pakele Rural Growth Center Pipe water facility was designed for a population of 12,000 which is currently being run by Northern Umbrella.

Few boreholes namely; Agalejo, Pakele Army, and Meliaderi primary school were uplifted from U2 hand pump to solar powered systems with funding from UNICEF, formed and built capacity of Water Source Committees and Water Supply Services Board member. In 2022, the motherboard of solar inverter for Agalejo water source supplying Pakele health center III got spoiled and users were unable to replace it in time since they were not contributing the monthly user fee. The Town Mayor had to purchase new inverter to rescue the crisis.

There are 45 boreholes out of which 9 are non-functional and 36 are functional with majority having operation and maintenance gaps which includes; faulty soak away pits, broken drain channels, bushy/dirty water source surroundings, no fence, cracked borehole aprons, breakdown that at times lasts for weeks or month without fixing, minor repairs not being done and routine water quality monitoring not performed.

In the last three financial years, Pakele town council out of 45 water sources, there has been a progressive increase in the number of non-functional water sources reported during the annual water source data update. Rate of non-functionality of water sources were 6(13.3%) in 2019/20, 8(17.8%) in 2020/21 and 9(20%) in 2021/22 (source: Urban water office, Pakele Town Council). This is a threat to adequate access to water by the population of Pakele town council.

Inadequate water supply has a considerable impact on the ill health of the population of Pakele Town Council. In the calendar year 2022, some of the diseases related to scarcity and poor maintenance of water sources reported at Pakele Health Center IV include; diarrhea, malaria, and skin infections. Malaria is ranked top with prevalence of 73.2%, Urinary tract infection 5.4%, intestinal worms 3.59%, diarrhea 3.24%, skin diseases 1.05%, and trachoma 0.22%. (Source: HMIS 105, Pakele Health Center III, 2022)

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter encompasses related literature on community management of water sources. The study dwelt on the knowledge, attitudes and the ongoing operation and maintenance practices of water user.

2.2 Community management of water resources

Global population was expected to have reached 8 billion by 2022 and the latest world population projection shows by 2030 it will be 8.5 billion, 9.7 billion in 2050 and 10.5 billion in 2100. Population in sub-Saharan Africa is expected to grow through 2050, contributing more than half of the global population by 2100. There is ever increasing population shift from one location to another due to civil wars, natural disasters and search for jobs especially in urban centers. The ever growing population is detrimental to attainment of progress development and exacerbates challenge of eradicating poverty (SDG 1). Higher population exerts pressure on already existing strained water resources and challenging policies to reduce poverty and inequality (UN DESA, 2022).

The Uganda population census 2014 revealed 20.2% of the population in Uganda lived in 259 urban centers and approximately 78% were in rural. Adjumani district had 8% of its population accessing water from piped system and 84.6% households get their water from boreholes. Pakele town council is in Adjumani east constituencies and the constituency had 3.4% of households having access to piped water, 88.2% use borehole water and 20.9% had no toilets (UNBOS, 2017)

Uganda adopted community based management of water sources in the year 1986 basically to address issues related to rural water supply facility management. The national target for rural water supply facility in 2015 was 90% but it was not achieved and stagnated at 85% in 2014 up to date. However, the 85% functionality rate for rural water supply facility was achieved via increased operation and maintenance, formation of hand pump mechanics association (HPMA), advocacy meetings at district and Sub County including quarterly Sub County extension workers meetings. Water source committee functionality stagnated at 71% as opposed to national target of 95% by 2015. Water source committee with women occupying key position was at 83% (Kiwanuka et al., 2019).

Though community management approach, water supply systems has reached a great number of rural settlements worldwide especially in developing countries, functionality of these water sources still remains a great challenge since stakeholders responsible for maintaining the services have failed to provide the adequate technical, financial and social resources necessary to guarantee its sustainability. A lot of breakdowns have been attributed to lack of political recognition of community organizations. In Latin America, Community organizations have been able to sustain strong recognition in decision-making processes through the creation of associations involving several community organizations that represents a second organizational level. Community organizations demonstrated strong ability in adequately maintaining their water supply systems by joint initiative with the local governments, multi-lateral entities and associations from second and third organizational level. The efficiency and functionality of rural water services will fail when the local governments and local communities are the only actors involved in the operation and maintenance. Institutional weaknesses hinder the sound development of community organizations (Machado et al., 2019)

2.3 Communities Knowledge on provision of safe drinking water

Acceptance of change in policies, practices and technologies is necessary to establish sustainable water source management by users. To build engaged community, knowledge on water resource is paramount. In a study to identify strength and weakness in knowledge related to water issues, the outcome indicated less than 1/5 of the community had knowledge rated at 80%. The older and those with greater education demonstrated higher knowledge on water. Active dissemination of information via newsletter proved more effective in building knowledge than passive media like television and radio. An individual with poor water-related knowledge may avoid seeking advice about water due to shame, have difficulty processing information limiting engagement with water organizations, or avoid informal conversation about water which will limit informal information sharing or activation of social norms about water uses (Dean et al., 2016).

In a related study (Getahun and Adane, 2021), revealed a relatively high two-week prevalence of acute diarrhea (17.6 %) among children under five. The study identified water consumption of less than 20 liters per capita per day, use of unimproved sanitation facility, mothers'/caregivers' poor hand washing practice at critical times, unsafe child feces disposal methods and mother/caregiver having no information about acute diarrhea being prevented by hand washing with water and soap as significantly associated with acute diarrhea.

Giardia and Cryptosporidium are the protozoans that have been identified during outbreaks of waterborne or water-washed diseases. They are less sensitive than most bacteria and viruses to conventional drinking water and wastewater treatment methods. To achieve drinking water source free from protozoan parasites, institutional and systems approach should include; access to safely managed drinking water sources, improved personal hygiene behavior, access to safely managed sanitation services. The institutional approach must ensure efficient implementation measures (Omarova et al., 2018).

2.4 Attitude of the community towards managing their water sources

To today in rural and developing urban areas, management of water sources needs active involvement of users. WASH intervention design should capture factors related to cultural traditions, resources dependency, quality services and satisfaction not exempting rules and procedures guiding the community. Resources required for sustainable maintenance are often scarce in LMICs hence failure for reasons such as lack of community involvement in design, lack of community ownership, abuse of funds, unwillingness to contribute, poor communication and stagnation in behavior change. Inequality and unfairness among the community members; for instance, privilege and socioeconomic status impact on who has a voice, listen to or has powers to influence decision-making and negotiation (Nelson et al., 2021).

Community contribution inform of cash, labor and locally available construction materials; towards construction and maintenance has been assumed as one of the indicators of a good foundation for sustainability of operation and maintenance (O&M) and functionality of water sources. Although fulfillment of this critical requirement is a prerequisite for O&M and sustainable functionality of water facilities, communities take it as a condition for receiving a new water source; while its continued functionality becomes secondary (Kiwauka et al., 201).

Effective community based management of Urban, Peri-urban and Rural water supply systems requires both women and men involved and must have an equal voice in managing the sustainable use of water resources and sharing the benefits. Though much effort has been laid on stakeholder engagement about women's participation and roles in water source management, less attention has been paid to the differences between women and men's contributions. Women not only are more willing to contribute but have also stated higher actual contribution than their male counterparts. The gender division of labor and women's higher dependence on clean drinking water as a means of survival and source of livelihood largely dictates increased women's willingness to pay for

water provision. In Uganda, the role of safe water provision at the household level is primarily played by women and girls. Females do protect and maintain water sources, and/or determine water storage and usage in the home, which determines the healthy well-being of their children and other members of the family. On the other hand, the role of men in water management is looked at mostly to purchase of household water containers and fetching water for commercial purposes like brick laying and watering animals. This study revealed, female were four times more willing to contribute water user fees, and they have more trust on Water User Committees, particularly those with female members. The willingness to contribute and trust in local governance organizations are key for an effective implementation of the demand-driven approach that depends on financial and in-kind contribution from water users. Women have much higher stakes in the long-term access to safe water than men. A financial and in-kind contribution toward safe water infrastructure is a key determinant of whether women and children can access water (Naiga et al., 2017).

Violence against women in East Africa especially in Uganda is due to poor access to clean safe water as one of contributing factors. Women are perceived to be responsible for all domestic tasks which require constant contact with water. Poor drinking water infrastructure combined with socially defined gender roles interact to create a profile of vulnerabilities that women and girls in East Africa experience. Distant water sources create opportunity for women to experience rape or sexual assault. Women experience exhaustion as a result of being overworked by their daily responsibilities and more likely use the closest water source, rather than the water source they may know is safe. This exhaustion means that, at times, women are either unable to provide water to the home or fail to comply with other gender-related demands such as cooking, cleaning, or participating in sex. As a result, they are more likely to experience intimate partner violence at home. Long-term back injuries, micronutrient deficiencies due to high caloric expenditure, and a lack of choice continue to stunt the health and development of women and girls in communities where water fetching is commonly practiced (Pommells et al., 2018).

2.5 Operation and maintenance practices of existing water resources

According to a survey (Musoke et al., 2018) conducted in two Urban slums of Kikulu zone in Kawempe division, Kampala district and Kikooza zone in Mukono Municipality, 38% of households obtain water from piped water supply, 30% used protected spring and 20% got their water from unprotected spring. Majority, 86% of households in these slums had latrines with poor sanitary conditions out of which 84%

lacked squat hole covers and 70% had hand washing facilities. Under solid waste management; 55% practiced open burnt pit, 11% buried solid wastes, 18% practiced indiscriminate dumping and only 7% took their solid wastes to skips. Among the households; 40% disposed their wastewater into drainage channel, 33% in the backyard and only 2% disposed wastewater into soak away pits. Bacteriological tests conducted only indicated 39% of samples collected from these water sources were free from *Escherichia coli*. The survey revealed poor quality water from the sources; shared latrines had poor sanitary conditions, poor solid and wastewater management and all these were associated with poor practices of the communities.

A related study on community water management conducted in 17 villages of Lwengo district, Ndagwe Sub County, Makondo parish pointed out communities contributed towards water resource management in form of money, labor, land and ideas in meeting. However, 52% of the households in the study area have never contributed since they depended on ponds, springs, rivers, rainwater and shallow wells. There was high rate of non-functionality due to lack of borehole maintenance, use of alternative sources due to prolonged period to repair broken down boreholes. Contribution was also politicized and the community never made contribution a priority. The occasional contribution resulted into abandoned water sources. Rehabilitation of water points was very low in the study area and politicization of water made it difficult for transparency and accountability. Approximately 50% of water points in the area were functional compared to 84% performance of rural water supply according to 2017 report of the Ministry of Water and Environment. (Etongo et al., 2018)

CHAPTER THREE

3.1 Problem statement

Water and environment sector semi-annual budget monitoring report 2020 indicated 68% of the population in rural areas and 70.5% in urban areas have access to safe water; whereas, 32% in rural and 29.5% in urban areas do not access safe water. Pakele town council is water stressed urban area experiencing inadequate supply of domestic water for its entire population. Approximately 29% of the resident population of Pakele town council use inadequate quantity of water for domestic purposes; that is, less than the minimum 20 liters per capita per day World Health Organization (WHO) standard.

The vulnerable groups of people affected by lack of access to safe water are mostly the women and children who bear the responsibility of fetching water in the household. The long dry season led to low water table affecting the existing water supply sources as such less water is supplied. Some water sources have become non-functional due to breakdown and residents affected had to queue long distances in search for water.

The government of Uganda through Ministry of Water and Environment (MWE) currently contracted Nexus Green (UK) Ltd to develop solar powered water supply system project in Pakele town council with funding from the United Kingdom Export Finance. This water source has yield of 16m³/hour located in Ataboo west cell and reservoir tank of 150m³ on Pakele Catholic Church land in order to boost the existing Pakele rural growth center pipe water facility. UNICEF also supported the town council by motorizing some of the boreholes using solar power majorly supplying water to Pakele health center III and schools with a tap stand for respective communities.

Poor management of water sources results to inadequate safe water for domestic use, promoting poor household hygiene that leads to ill- health of the population from diseases such as diarrhea, skin infection and eye infection. Members of the communities will continue to experience less quantity of drinking water that is based on the fact that broken-down water sources will no longer produce water and people have to trek long distances in search for functional source of water, where users crowded hence long waiting hours to fetch water.

3.2 Justification

The study was intended to isolate the critical factors that hinder community management system of water sources within Pakele town council basing on community's knowledge, attitudes and practices. The results obtained will inform the key stakeholders dealing in Water, Sanitation and Hygiene to plan and create demand for supplies and services, lobby for funds and build the capacity of community water source managers to sustainably maintain their water sources functional.

3.3 Research Questions

1. What is the status of water sources in Pakele town council regardless of how they are being managed?
2. Do the community members in Pakele Town Council know and understood the approach of community management of water sources?
3. What are the attitudes of Pakele Town Council communities towards managing their water sources?
4. What are the current operation and maintenance practices exhibited by the community of Pakele Town Council in managing their water sources?

3.4 Conceptual framework

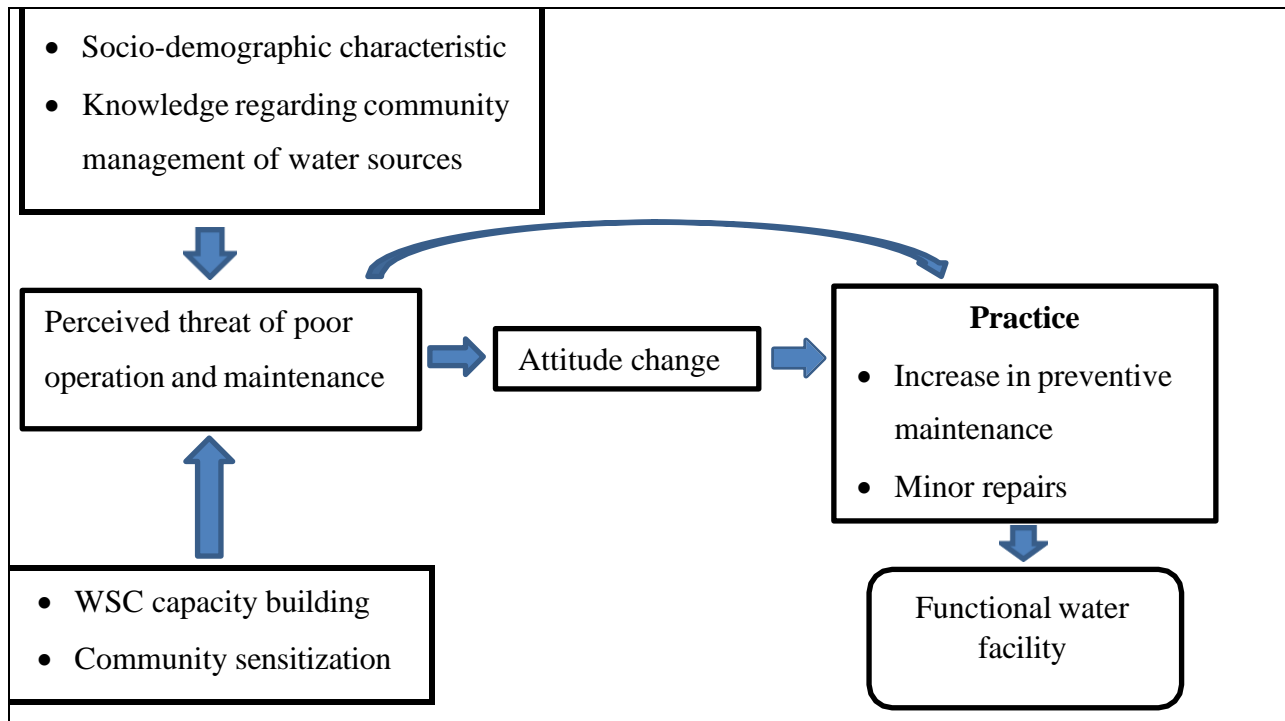


Figure 1: Conceptual framework

The conceptual framework demonstrates community management of water sources leads to continued functionality. Increased functionality rates are related to sound community's knowledge, attitude and practices of the local people for particular source.

CHAPTER FOUR

4.1 Main objective

To assess community management of water sources within Pakele town council and suggest doable actions that will improve the current management system.

4.2 Specific objectives

1. To establish the status of water sources regardless of how they are being managed.
2. To determine the knowledge of Pakele town council community members on community management of water sources.
3. To establish the attitudes of Pakele town council community members towards managing their own water sources.
4. To ascertain the operation and maintenance practices of Pakele Town council water users.

CHAPTER FIVE

5.0 METHODOLOGY

5.1 Study area

Pakele Town Council is a fast growing Town Council located 7 km North-East of Adjumani Town. It is the seat of United Nations High Commissioner for Refugees (UNHCR) Sub Office in Adjumani district. Adjumani district is located in the Northern part of Uganda. It is bordered by Moyo district to the North, South Sudan to the Northeast, Amuru district to the East and South, Arua district to the Southwest and Yumbe district to the Northwest. Adjumani district is located approximately 125 kilometers (78 miles), by road, Northeast of Arua City, the only City in the sub-region. The district lies on the Southern bank of the White Nile River, just before it flows into South Sudan. The coordinates of the district are: 03⁰ 23'N, 31⁰ 47'E. The town has 2,666 households with a resident population of 15,603 people; which includes the indigenous, refugees and employees of implementing agencies and companies. Pakele town council has four wards and 13 cells.

The town depends on 'Pakele rural growth center pipe water facility' managed by Northern Umbrella Water and Sanitation (NUWS) initially designed to serve 12,000 people. This water facility has a single production well with installed production capacity of 133m³ per day nominal flow with total consumer connections of 237 taps; however, currently there are roughly 229 active connections. The system has pumping main of length 5km to reservoir tank of 50m³ with 6 meters pressure head and total distribution length of 18km. The system is powered by solar and a generator. Water abstracted from this source is not treated. The town also has existing old community boreholes and private boreholes which greatly serves the overwhelming population.

5.2 Study population

Target population were the resident members of households, water sources committees and local council I of all the 45 water points, Local council II, Pump mechanics, Scheme operator of Pakele rural growth center piped water facility, Town agents of Central, Ataboo, Pereci and Nyivura wards, Health Inspector, Community Development Officer, and Water supply service board members. All categories of people from 18 years were allowed to participate in the research since they can provide adequate information.

5.3 Research design

A cross sectional study design was used and a sample of households were selected from total number of households from whom data was collected to answer the research questions of interest. Results obtained were generalized to cover the entire population of Pakele town council. Questionnaires were used to investigate the relationships between knowledge, attitudes and practices (KAP) and operation and maintenance of water sources by users. Observational checklist was used to ascertain the status of existing water sources at the time of visit.

5.4 Sample size determination

Determination of sample size for household respondents

Sample size determination using Yamane's formula

$$n = \frac{N}{1 + (e)^2}$$

Where; n = Sample size of households to be selected for interview
N = Total number of households (N = 2,666) in the study population
e = 0.05(5%) the desired 95% level of precision

$$n = \frac{2,666}{1 + 2,666(0.05)^2}$$
$$n = \frac{2,666}{1 + 2,666(0.05 * 0.05)}$$
$$n = \frac{2,666}{7.665} = 347.8 \approx 348 \text{ Households}$$

Data cleaning was done and only 344 household respondents information were complete, the remaining incomplete 4 data sets had to be dropped during analysis.

Similarly, determining sample size (n) of water sources for each cell

Considering a total of 45 water sources in Pakele town council, and a highest level of precision of $\pm 5\%$ (e), the value n was determined using Yamane (1967) formula;

$$n = \frac{N}{1 + (e)^2}$$

Where; n = Sample size of water sources where observation checklist was administered
N = Total number of water sources (N = 45) in the study area
e = 0.05(5%) the desired 95% level of precision

$$n = \frac{45}{1 + 45(0.05)^2}$$

$$n = \frac{45}{12.25} = 3.67 \approx 3 \text{ water points}$$

Due to the limited fund, three water points were to be considered per the thirteen cells within the Town Council to make a total of 39 water points. However, only 32 water points ended up being visited irrespective of functionality status by utilizing a simple random sampling method.

Sample size of key informants and number of FGDs conducted

Key informants included in the research were; 12 water user committee members, Water Supply Services Board chairperson and 4 Hand Pump Technicians making a total of interviewed KIs to 17 in number. Four focus groups, one per parish were met to obtain qualitative information.

5.5 Sampling procedure and selection criteria

Proportionate study sample ‘n’ was distributed to all the 13 cells of the study area. Simple random sampling (SRS) technique was used to select the actual households from the study population for interview. Every household in the study area drawing water from the selected point sources had equal chance of being included in the study. Cell codes and household numbers in ascending order were allocated for each day of data collection for ease of identification.

5.6 Data collection tools

Structured Questionnaires were used to interview respondents and water point observation checklist was used to assess sanitary conditions including performance of the source. FGD questionnaires were applied to respondents in groups.

5.7 Quantitative data

Data in the form of numerical value and can be counted. The variables were presented in form of tables, and figures.

5.8 Qualitative data

This is a descriptive and conceptual findings inform of words. The ideas of respondents were probed using the questionnaires.

5.9 Data Collection procedures

Eligible households were identified from which respondents were interviewed to answer research questions. The approach was personal interviews, observations, key informant interviews and focus group discussions (FGD). Research assistants were recruited to administer the study tools under the supervision of Principal Investigator (PI). Semi structured questionnaires constructed in English were used and were translated by the research assistants and PI at time of administering the questions to respondents. Respondent questions will have open-ended and close-ended. Observation guide was used and fully filled for each water source reached. PI and research assistants sought consent from the respondents after thorough explanation of study objectives. Appointment was made with the respondents to agree on convenient time to meet them.

5.10 Quality control and assurance

Research Assistants were trained for two days on the data tools, the questionnaires and checklists were administered for four days. The questionnaires/checklists were pre-tested in day two of the training to ascertain whether the data collection tools would generate the required data. Debriefing meetings were held at the end of each day of data collection to ensure data was collected as planned. To safe guard against mistakes and bias, the Principal Investigator supervised the data collection process.

5.11 Data management and analysis

5.11.1 Editing

The field data collected was subjected to proof reading and was edited before leaving the field to check for completeness, accuracy and uniformity.

5.11.2 Coding and interpretation

Data coding refers to the transformation of questionnaire data into another format that the computer can read.

Microsoft Excel spreadsheets were used for coding after which the data was analyzed using SPSS 15. The quantitative data was represented in the form of graphs, pie-charts and tables, whereas qualitative data was interpreted manually by the principal investigator and presented in form of descriptive words and texts.

5.12 Ethical consideration

The permission to conduct this study was sought from Makerere University, School of Public Health, Adjumani District Health Office and Pakele Town Council Authority. The respondents had to first consent before answering the questionnaires and were assured of confidentiality.

5.13 Dissemination of findings

The dissertation was submitted to Makerere University, School of Public Health as a requirement of partial fulfillment for the award of a Bachelor of Environmental Health Science degree of Makerere University and on publication, copies of the report was given to Adjumani District Health Office and Pakele Town council authority for consideration of the recommendations made by the Principal Investigator.

CHAPTER SIX: RESULTS

6.0 Introduction

This chapter presents the findings of the study carried to assess community management of water sources within Pakele town council. The results are presented in accordance with the study objectives in form of frequency tables and bar graphs. Both qualitative and quantitative findings are presented concurrently in accordance with the study objectives.

6.1 Socio-demographic characteristics of respondents

A total of 344 respondents participated in the study. The average age of the respondents was 35.6 years (SD 11.1). Majority of the respondents were females 250 (72.7%), farmers 150 (43.6%) and their level of education was 'O'- level 110 (32.0%). Over two thirds of the respondents 256 (74.4%) were Roman Catholics and majority of the respondents were Madi by tribe 311 (90.4%).

Table 1: Socio-demographic characteristics of respondents

Variable	Frequency (N=344)	Percentage (%)
Age (years)		
18-35	196	57.0
36-50	107	31.1
51-65	25	7.3
Above 65	16	4.7
Gender		
Male	94	27.3
Female	250	72.7
Occupation		
Crop farmer	150	43.6
House wife	93	27.0
Student	55	16.0
Salaried worker	40	11.6
Causal laborer	11	3.2
Self-employed	99	28.8
Livestock farmer	10	2.9
Mixed farmer	12	3.5
Others	2	0.6
Level of education		
Primary	74	21.5
'O' level	110	32.0
'A' level	27	7.8
Diploma	40	11.6
University	24	7.0
None	69	20.1
Marital status		
Single	151	43.9
Married	143	41.6
Divorced	23	6.7
Widowed	26	7.6
Religion		
Roman Catholic	256	74.4
Protestant	46	13.4
Muslim	32	9.3
No religion	2	.6
Born again	8	2.3
Tribe		
Madi	311	90.4
Lugbara	19	5.5
Aringa	6	1.7
Acholi	8	2.3

6.2 Status of water sources in Pakele town council

6.2.1 Availability, accessibility and adequacy of water sources

The major source of water in Pakele town council was public deep boreholes which are accessible to majority of the residents 296 (86.0%). Majority of the respondents reported that public water sources produced adequate 294 (85.5%) and good quality water 315 (91.6%).

Table 2: Availability, accessibility and adequacy of water sources

Variable	Frequency (N=344)	Percentage (%)
Source of drinking water		
Public deep borehole	294	85.5
Private borehole	45	13.1
Public shallow well	2	0.6
Private shallow well	2	0.6
Tap on plot/yard	84	24.4
Public stand post	4	1.2
Buy bottled water	8	2.3
Water source accessible and reliable		0.0
Yes	296	86.0
No	48	14.0
Distance to nearby water source		0.0
0 to ≤ 500 meters	138	40.1
>500 meters to 1 km	166	48.3
Above 1 km	25	7.3
Not sure	15	4.4
Quantity of water		
Adequate	294	85.5
Inadequate	36	10.5
Dried up	4	1.2
Quality of water used		
Good	315	91.6
Not good	29	8.4



Figure 2: A research assistant conducting sanitary inspection

6.2.2 Functioning and management status of community boreholes

A total of 32 boreholes were inspected. Thirty-one (96.9%) of the boreholes were community managed and only one (3.1%) was institutionally managed. Over ninety percent of the boreholes 31 (96.9%) were functional and had a water source committee 30 (93.8%). However, the water source committee was trained in only 10 (31.3%) of the bore holes. Figure 1

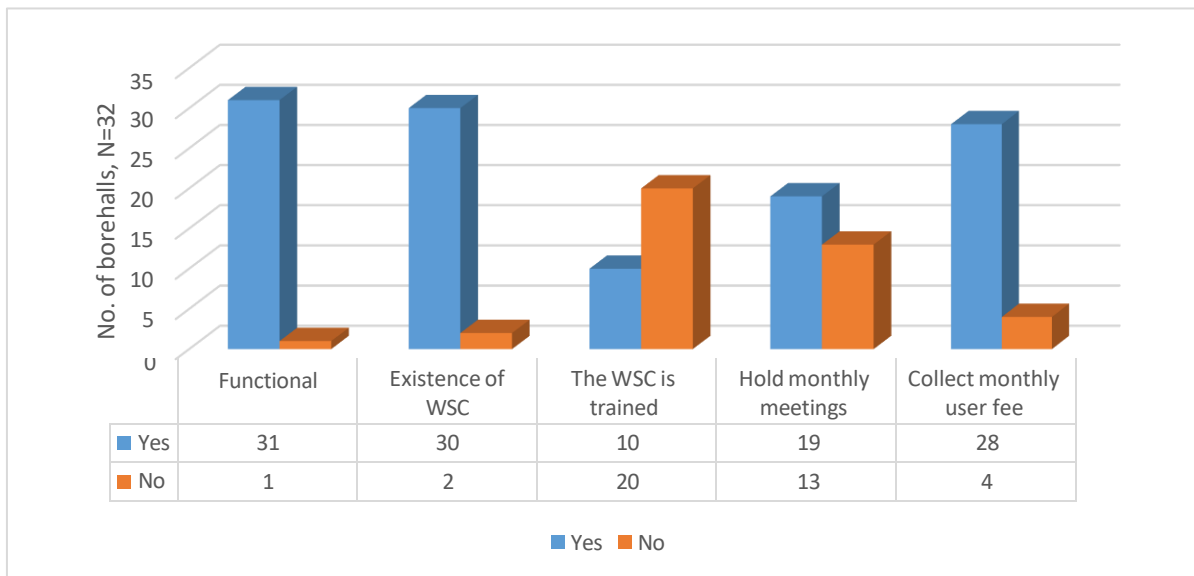


Figure 3: Functioning and management status of water sources Pakele town council

6.2.3 Hygienic status of community boreholes

Majority of the boreholes were protected with masonry work 26 (81.3%) which was not faulty, cracked or dilapidated 29 (90.6%) and were free from surface contamination 28 (87.5%). Over ninety percent of the boreholes did not have silt/animal droppings 29 (90.6%) or wastewater stagnating around them 30 (93.8%). However, only 16 (50.0%) had a clean surrounding and only 22 (68.8%) did not have animal grazing activities around them.

Table 3: Hygienic status of water sources

Variable	No. of boreholes N=32 (%)	
	Yes	No
Protected with masonry work	26 (81.3)	6 (18.8)
Free from surface contamination	28 (87.5)	4 (12.5)
In good sanitary condition	22 (68.8)	10 (31.3)
No silt or animal droppings around it	29 (90.6)	3 (9.4)
Masonry not faulty, cracked or dilapidated	29 (90.6)	3 (9.4)
No latrines within less than 100feet from the source	31 (96.9)	1 (3.1)
No animal grazing activities around	22 (68.8)	10 (31.3)
No refuse dumping around the source	31 (96.9)	1 (3.1)
Surrounding of the source clean	16 (50)	16 (50)
No wastewater stagnating around the source	30 (93.8)	2 (6.3)



Figure 4: Tiolio shallow well with high sanitary risk scores at time of visit

6.3 Knowledge of Pakele town council community members on community management of water sources

6.3.1 Training on to good hygiene practices

Over three quarters of the respondents 253/344 (73.5%) reported to have ever received training related to good hygiene practices. The main topics discussed during trainings were safe excreta disposal 166/253 (65.6%), personal hygiene 130/253 (51.4%), hand washing using soap 100/253 (39.5%), and diseases caused by poor water management 87/253 (34.4%). Figure 2

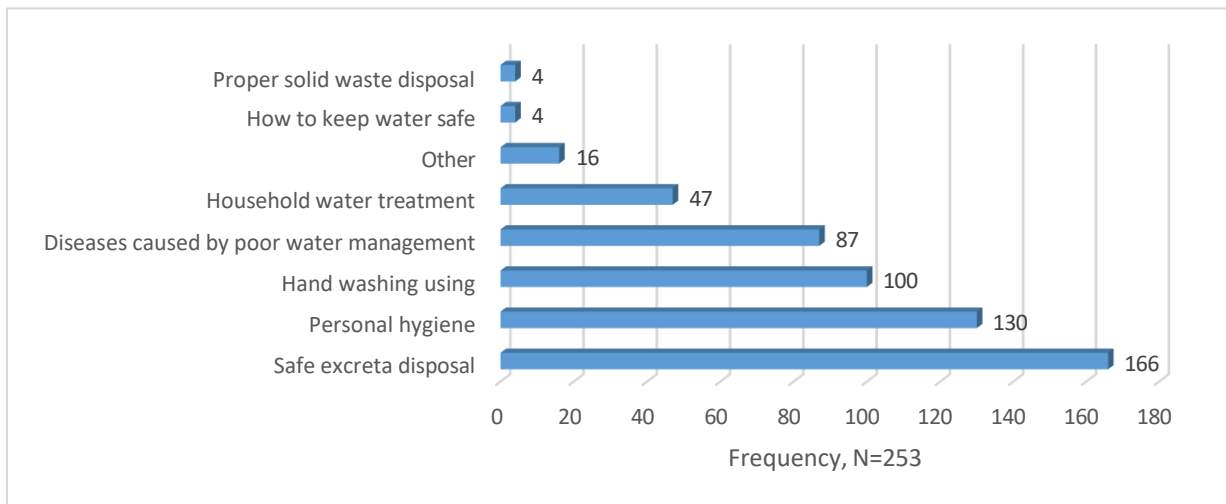


Figure 5: Training related to good hygiene practices.

6.3.2 Knowledge of community management of water sources

More than half of the respondents were aware that safe water involves water with no germs 182 (52.9%), no bad smell 240 (69.8%) and good taste 237 (68.9%). However, majority did not have enough knowledge on how to prevent diseases that results due to poor water, sanitation and hygiene. Only 143 (41.6%) mentioned safe disposal of human excreta, 94 (27.3%) mentioned treating drinking water either by boiling or chlorine tablet, and only 124 (36.0%) mentioned protecting water sources as key ways of preventing diseases that results due to poor water, sanitation and hygiene.

Also, the knowledge of critical hand washing times was poor as only 45 (13.1%) mentioned after visiting the toilet, 14 (4.1%) mentioned before and after eating and only 12 (3.5%) mentioned after cleaning babies bottom as the critical hand washing moments. Table 3

Table 4: Knowledge on community of management of water sources

Variable	Frequency (N=344)	Percentage (%)
What is safe water		
No germ	182	52.9
No bad smell	240	69.8
Good taste	237	68.9
No suspended particles	149	43.3
Don't know	13	3.8
What are some of the diseases related to poor water, sanitation and hygiene		
		0.0
Diarrhea	140	40.7
Dysentery	66	19.2
Cholera	148	43.0
Skin infections	42	12.2
Respiratory tract infections	14	4.1
Others	25	7.3
What are the causes of water, sanitation and hygiene related diseases		
		0.0
Drinking dirty/contaminated water	160	46.5
Inadequate supply of water for household consumption	70	20.3
Eating contaminated food	136	39.5
Not washing hand after visiting toilet	83	24.1
Other	8	2.3
How can you prevent diseases that results due to poor water, sanitation and hygiene		
Safe disposal of human excreta	143	41.6
Treating drinking water either by boiling or chlorine	94	27.3
Protecting water sources	124	36.0
Hand washing in critical times	57	16.6
Other	10	2.9
What are the critical times of hand washing		
After visiting the toilet	45	13.1
Before and after eating	14	4.1
Outbreak of cholera	32	9.3
After cleaning babies bottom	12	3.5
I don't know	31	9.0

6.4 Attitudes of community members towards management of community water sources

6.4.1 Care of public water sources

From qualitative data, respondents had mixed reactions on who should take care of the community water sources. Some said it should be government to manage the water sources while others said it should be community members.

“Government should always employ people to clean the boreholes and take care of them. It is their responsibility” 45-year-old female from FGD 001.

“The local residents use this water, they should always come every month and clean the boreholes” 28-year-old male from FGD 002.

Concerning perceptions towards paying monthly maintenance fee, majority of the respondents reported that they were okay paying monthly fees since they are the ones that use the water.

“We use this water; hence we have to pay some money for keeping the boreholes functional” 60-year-old female from FGD 001

However, respondents reported that they are not sure if the money they pay is properly used by water source committees and requested for accountability of their money.

“We pay money every month and we are willing to pay. But we do not know if these people use our money or they just eat it. Sometimes they even don’t clean the boreholes and we clean them ourselves. We want them to always give us accountability pf our money” 26-year-old male in FGD 003



Figure 6: Principal Investigator conducting a focus group discussion

6.4.2 Roles and responsibilities of the community members

Form the key informant interviews, the major roles and responsibilities of community members when it comes to management of community water sources (as reported by KIIs) are; Contribute money for repairs, select source committee members, apply for new water sources, maintenance of water sources through participating in general cleaning and reporting of faulty water sources.

Local residents are supposed to ensure cleanliness of water sources, they should monitor them and report any faulty water source KII 005



Figure 7: Wanjiri borehole close to main road and poorly managed

6.5 Operation and maintenance practices of community water sources

Over 80% of the respondents reported that government was responsible for construction of public water sources 281 (81.7%) as community members are responsible for repair broken water sources 304 (88.4%). Majority of the respondents reported that their households have ever participated in the communal cleaning of the water source 302 (87.8%).

Table 5: Operation and maintenance practices of community water sources

Variable	Frequency (N=344)	Percentage (%)
Household participated in the communal cleaning of the water source		
Yes	302	87.8
No	42	12.2
Household management of solid waste		
Burnt-pit	305	88.7
Collected by local authority	8	2.3
Buried	50	14.5
Anywhere	10	2.9
Others	2	0.6
Who is responsible to construct water source		
Government	281	81.7
NGO	32	9.3
Individual	23	6.7
Others	8	2.3
Water source ever broken down		
Yes	326	94.8
No		0.0
Person responsible to repair broken water sources		
Community members	304	88.4
Government	10	2.9
NGO	7	2.0
Don't know	23	6.7

CHAPTER SEVEN: DISCUSSION OF STUDY FINDINGS

7.0 Introduction

Water supports all forms of life on the earth and it is a basic human right. Therefore, adequate supply of safe water and basic sanitation is one of the important components of primary health care (PHC) as stated in the declaration of Alma-Ata (WHO, 1978). Having no access to safe water or inadequate quantity of water for domestic use and/or water from contaminated water sources can lead to water related diseases such as; typhoid, cholera, poliomyelitis, amoebiasis, hepatitis A, diarrhea, dysentery, skin and eye diseases including scabies and trachoma.

The aim of this study was to assess the community management of water sources in Pakele town council, Adjumani district. The study found out that over 96.9% of the water sources were community managed, 93.8% had a water source committee although the water source committee was trained in only 31.3% of the water sources. The findings are important as they have helped to isolate the critical factors that hinder community management system of water sources within Pakele town council basing on community's knowledge, attitudes and practices.

7.1 Status of water sources in Pakele town council

In Pakele town council, the major sources of water were public deep boreholes which are accessible to majority of the residents 86.0%. Majority of the public water sources produced adequate (85.5%) and of good quality water (91.6%). The study findings were consistent with Adjumani District report which showed that boreholes are the major source of water among communities of Adjumani District. However, the findings differ from reports done in urban settings where the major source of water is private taps with majority of the public water sources being functional. For example, in a study done by Musoke et al., 2018 in two Urban slums of Kikulu zone in Kawempe division, Kampala district and Kikooza zone in Mukono Municipality, 38% of households obtained water from piped water supply, 30% used protected spring and 20% got their water from unprotected spring. Only 50% of community water points in the area were functional (Musoke et al., 2018).

The study findings imply that people of Pakele town council have access to safe, clean and adequate water. According to 2017 report of the Ministry of Water and Environment, boreholes provide clean, adequate and safe water for human consumption (Etongo et al., 2018).

7.2 Knowledge of Pakele town council community members on community management of water sources

To build engaged community, knowledge on water resource is paramount. The present study found out that more than half of the respondents were aware that safe water involves water with no germs (52.9%), no bad smell (69.8%) and good taste (68.9%). However, majority did not have enough knowledge on how to prevent diseases that results due to poor water, sanitation and hygiene. Also, the knowledge of critical hand washing times was poor as only 13.1% mentioned after visiting the toilet, 4.1% mentioned before and after eating and only 3.5% mentioned after cleaning babies bottom as the critical hand washing moments.

The study findings imply that knowledge of community members on management of community water sources was mixed as it was good in some components and poor in other components. This calls for a need to keep disseminating water related information to address the knowledge gaps among community members. According to a study done in 2016, an individual with poor water-related knowledge may avoid seeking advice about water due to shame, have difficulty processing information limiting engagement with water organizations, or avoid informal conversation about water which will limit informal information sharing or activation of social norms about water uses (Dean et al., 2016).

7.3 Attitudes of Pakele town council community members towards managing their own water sources

In rural and developing urban areas, management of water sources requires active involvement of users. Community contribution inform of cash, labor and locally available construction materials; towards construction and maintenance has been assumed as one of the indicators of a good foundation for sustainability of operation and maintenance (O&M) and functionality of water sources (Kiwauka et al., 201). This can only be attained when the community members have good attitudes towards community involvement in the management of public water sources.

The community members of Pakele town council had mixed reactions on who should take care of the community water sources as some said it should be government to manage the water sources while others said it should be community members. Majority of the respondents reported that they were okay paying monthly fees and willing to contribute money for repairs. The findings of this study are similar to findings of (Cleaver et al., 2021) who reported that community members are always willing to manage their water sources if supported.

Sustainable water supply in a given community is guaranteed by having a strong community which is empowered to manage their existing water source (Cleaver et al., 2021). Community based management system is concerned with; identifying problems with the lower water supply system, the possibilities for and constraints on the management by the communities, including possible solutions that can be tested. The fundamental principles of community water management in this context are; each community develops its own specific management systems, communities own the process of change, facilitators and local researchers participate in the community's project and increased management capacities are the basis for improved water supply systems. Hence communities ought to develop good attitudes in order to effectively manage their water sources.

7.4 Operation and maintenance practices of Pakele Town council water users

This study found out that over 80% of the water sources were constructed by government and were managed by community members. The community members through water source committees are responsible for keeping water sources clean, repair and maintenance and contributing monthly maintenance fee.

The study findings suggest that after being built by the government, community people actively participate in managing local water sources. A governance tactic known as "community management" offers water consumers, or a group of water users, administrative authority and operational control over their water supply system (Shields et al., 2021).

Good operation and maintenance practices of water sources is a cardinal role of community management system which can be achieved via transparency and accountability by user committees, community taking ownership and awareness of users on matters relating to the water source. The poor maintenance of water facilities can not only result in breakdown, but also contamination of water sources, community will resort to unsafe sources due to non-functionality and exorbitant prices for alternative water sources (IRC briefing, October 2015).

7.5 Study limitations

The study was conducted in only one community and hence the findings of this study may not be generalized to the whole of Uganda. Some local council officials were unwilling to guide the researcher and to disclose problems that hinder their programs as failure would automatically reveal a sign of not being responsible and hard working. This was minimized by explaining to the local council ones (LC1s) this study is for academic purpose and pledge for confidentiality. Also

information bias is possible as some people could have given wrong responses regarding their practices due to fear of embarrassment. This was minimized by conducting key informant interviews so as to verify the responses from community members.

CHAPTER EIGHT: CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

1. The major source of water in Pakele town council was public deep boreholes which are accessible to 8 out of 10 residents with adequate and good quality water.
2. Community management of public water sources was good as over 90% of boreholes were community managed with a water source committee. However, the water source committees were not trained in community water management.
3. The knowledge and attitudes of community members towards management of community water sources was mixed as some had good knowledge/attitudes while others had poor knowledge/attitudes in some aspects of community water management.

8.2 Recommendations

1. Pakele town council authority should carryout community sensitization; capacity building of user committees/hand pumps technicians and support to water users so as to allow community members take full ownership of the water sources through addressing the identified knowledge/attitude gaps.
2. The Authority of Pakele town should conduct quarterly sanitary survey and water quality monitoring for all the water points.
3. Northern Umbrella Water and Sanitation should collaboratively work with Pakele town council authority, the district water office and the community to extend water distribution lines to all the cells within the town area.

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APPENDIX 1: STRUCTURED HOUSEHOLD QUESTIONNAIRE FOR RESPONDENTS

ASSESSMENT OF COMMUNITY MANAGEMENT OF WATER SOURCES IN PAKELE TOWN COUNCIL, ADJUMANI DISTRICT

Consent

Greetings! My name is _____ and I am a student at Makerere University, School of Public Health. I am conducting a study on community management of water sources in a partial fulfillment of the requirements for award of a Bachelor of Environmental Health Science degree of Makerere University and would like your active participation. I would like to ask you a few questions about management of water sources in your area. You are requested to participate in this study for the reason that I think your understandings and knowledge as a community member is very important. This interview will take 10 to 15 minutes. I assure you that the information you will provide will be kept confidential and only be used for academic purpose; recommendations will help design WASH interventions in your area. Your participation is voluntary and you can choose not to answer any question or all of the questions if you don't feel comfortable.

Would you like to participate? Yes No

Date of interview: Division/County:

Name of Interviewer: Ward:

Title of the interviewer: Zone/LC1:

Town: Household No:

Demographic Characteristics

1. Respondent's Age (yrs.): 18-35 36-50 51-65 above 65

2. Respondent's Gender: Male Female

3. Occupation

a. Crop farmer

e. Casual laborer

b. House wife

f. Self-employed

c. Student

g. Livestock farmer

d. Salaried worker

h. Mixed farmer

- i. Others (specify):
4. Level of education
 Primary 'O' level 'A' level Diploma University None
5. Religion
 Roman Catholic Protestant Muslim Other Christian No religion
6. Tribe
 a. Madi b) Langi
 b. Lugbara c) Muganda
 c. Aringa d) Munyankole
 d. Acholi e) Others (specify)
7. Marital status
 Single Married Divorced Widowed

Knowledge

8. Who constructed the water source from which your household collects water?
 a. Government c. Individual
 b. NGO
 d. Others, specify?
9. Who is responsible for maintenance of this water source?
 a) Government c) NGO
 b) Community under leadership of WSC d) Don't know
10. What is safe water?
 a) No germ d) No suspended particles
 b) No bad smell e) Others (Specify):
- c) Good taste
11. Did you receive or attended awareness sessions related to good hygiene practices?
 a) Yes b) No
12. If yes, what are the topics covered in the sessions?

- a. Personal hygiene
- b. Safe excreta disposal and usage of latrine
- c. Hand washing using soap during critical times
- d. Diseases caused by poor water, sanitation and hygiene practices
- e. Household water treatment
- f. How to keep water safe
- g. Proper solid waste disposal
- h. Other, specify

13. In the past 12 months, is there anyone in the household who suffered from water, sanitation and hygiene related diseases?

- a) Yes
- b) No

14. If yes, which of the following water, sanitation and hygiene disease(s) did the household members suffered from?

- a. Diarrhea
- b. Respiratory diseases
- c. Parasitism
- d. Skin diseases
- e. Recurring fever
- f. Others (specify):

15. Who among the family members got sick?

- a) Child (<5years)
- b) Teenage
- c) Adult in the family

16. What do you think caused the diseases?

- a) Drinking dirty water
- b) Inadequate water supply
- c) Eating food contaminated by hands unwashed after defecation
- d) Others (specify):

17. How can you prevent the diseases?

- a) Safe disposal of human excreta in latrine
- b) Drink clean water
- c) Washing hands before eating and preparing food after handling/contact with stool
- d) Others (specify):

18. If no, what are some of the diseases related to poor water, sanitation and hygiene you know?

- a) Diarrhea
- b) Dysentery
- c) Cholera
- d) Skin infections
- e) Respiratory tract infections
- f) Other, specify

19. Mention the possible causes of water, sanitation and hygiene related diseases?
- a) Drinking dirty/contaminated water
 - b) Inadequate supply of water for household consumption
 - c) Eating contaminated food
 - d) Not washing hand after visiting toilet
 - e) Other, specify

20. How can the household prevent diseases that result due to poor water, sanitation and hygiene?

- a) Safe disposal of human excreta
- b) Treating drinking water either by boiling or chlorine tablet
- c) Protecting water sources
- d) Hand washing in critical times
- e) Other, specify

21. Outline the critical times of hand washing?

Attitude

22. What is your opinion about the quantity of water produced by this source of water?

- a) Adequate
- b) Inadequate
- c) Dried up
- d) Don't know

23. If inadequate, exactly which period of the year does the source produce inadequate quantity of water?

- a) Dry season
- b) Wet season
- c) All year through
- d) Don't know

24. What is the alternative source of water at the period when the source produces inadequate quantity of water?

- a) Public deep borehole
- b) Borehole from private service provider
- c) Public shallow well
- d) Private dug shallow well
- e) Yard tap
- f) Public stand post
- g) Bottled water
- h) Others (specify):

25. What is your take about the quality of water supplied by this source of water?

- a) Good
- b) Not good

c) Don't know

26. If not good, what are the reasons?

a) Bad taste

b) Turbid

c) Bad odor

d) Others (specify):

.....

27. Do water users contribute monthly user fee for management of this water source? Yes/No

28. If yes, how much (in Uganda shillings) is the user fee collection per household?

a) 500

b) 1000

e) Others (specify):

c) 2000

d) Over 2000

29. When was the last time your household paid the contribution?

a) 1 month ago

b) 2 months ago

c) 3 months ago

d) Over 3 months ago

e) Don't know

30. Where is the money kept?

a) Bank

b) SACCO

c) In the house

d) Don't know

31. Do water source committee account to community about income and expenditure?

Yes/No

32. Does the household feel comfortable with the fee?

a) Yes

b) No

33. If No, why?

.....
.....

34. Has the water source ever broken down? Yes/No

35. If yes, when was the last time it broke down?

a. Less than 3 months

b. 6 months

c. 9 months

d. 12 months

e. Others, specify?

36. How long has it taken to get it fixed up?

- a) Within 24 hours d) A year
b) 7 days e) Others, specify?

c) One month

37. Who paid for the repair works?

38. How much was paid per repair?

Practices

39. Where do you get drinking water from?

- a) Public deep borehole d) Private dug shallow well
b) Borehole from private service e) Tap on plot/yard
 provider f) Public stand post
c) Public shallow well g) Buy bottled water

40. If borehole from private community service provider, how much do you pay for it per 20liter Jeri-can?

41. Is the source protected by fence and concrete apron? Yes/No

42. If no, give reason?

43. Is the current water source accessible and reliable throughout the year?

- a) Yes, Accessible and reliable c) No, not accessible during the flood
 throughout the year d) No, not reliable during the flood
b) No, not reliable during the
 dry season
e) Others, specify?

44. What is the distance of the household from the water source?

- a) 0 to \leq 500 meters c) Above 1 km
b) $>$ 500 meters to 1 km

45. How long does it take you on foot to and fro including waiting time (in minutes) to fetch water from the source?

- a) Less than 10 minutes c) \leq 30 meters
b) 10 to 20 minutes d) $>$ 30 meters

46. How many liters of water does the household consume in a day for drinking?

- a) Less than 6 liters b) 6 liters

- c) 8 liters d) 10 liters
 e) Others, specify?

47. How many liters of water does the household consume per day for cooking and hygiene practices?

- a) Less than 20 liters c) 40 liters
 b) 20 liters d) 60 liters
 e) Others, specify?

48. Who collects water in the household?

- a) Father d) Male children
 b) Mother e) Hired
 c) Female children

49. If hired, how much do you pay for it?

50. Does the water source have Committee in place? Yes/No

51. Who selected the members of this committee?

- a) Community members c) Self-appointed
 b) Local council 1 d) Doesn't know

52. Has the household participated in the communal cleaning of the water source surrounding including the drainage channel? Yes/No

53. Where does the household dispose human excreta?

- a) Bush c) Drainage
 b) Dug hole and covered with earth d) Latrine/toilet
 e) Others, specify?

54. How does the household manage their solid waste?

- a. Burnt-pit c. Buried
 b. Collected by local authority d. Anywhere
 e. Others, specify?

APPENDIX II: KEY INFORMANT QUESTION GUIDE

ASSESSMENT OF COMMUNITY MANAGEMENT OF WATER SOURCES IN PAKELE TOWN COUNCIL, ADJUMANI DISTRICT

A. Water Source Committee (WSC) and Water Supply Services Board (WSSB)

Members

1. Who selected you to be a member of this WSC/WSSB?
2. What post do you hold in the committee?
3. What are your roles and responsibilities in the committee?
.....
4. Have you attended any WSC/WSSB training after becoming a member of this committee? Yes/No
5. If yes, (a) When was that?
- (b) Who conducted out the training?
- (c) For how many days?
- (d) How has the training benefited you?
.....
.....
6. Do you think you need additional training? Yes/No
7. If yes, which area?
8. What are some of the supports the WSC/WSSB get and from whom?
.....
9. In the past 12 months, has this water source broken down? Yes/No
10. If yes, who repairs it?
11. Who pays for the repair works?
12. How much is paid per repair on average?

13. Do you feel comfortable with the cost of repair? Yes/No
14. Has the WSC ever failed to repair in past periods when the source broke down? Yes/No
15. If yes, (a) Give reasons for failure?

- (b) Who repaired it?
16. Does the committee have any member who dropped out? Yes/No
17. If yes, (a) Why?

- (b) How does WSC/WSSB replace them?

18. How often does the committee perform preventive maintenance?
19. Who does the preventive maintenance?
20. Does the committee collect user fees? Yes/No
21. If yes, (a) How often?
- (b) How much is collected monthly per household?
22. Where does the committee keep the money collected?
23. Does the committee have records for income and expenditure? Yes/No
24. If yes, how is the record managed?

25. Does the committee give accountability for collections and expenditures to the
 community? Yes/No
26. If yes, how often is this feedback given to the community?
27. How long has this committee been in existence?

B. Hand Pump Mechanic

28. When did you become member of this association?

29. How many years have you practiced the work of hand pump technician?

30. What are your duties as a hand pump technician?
.....
.....

31. Have you ever been trained on repair/maintenance of water systems? Yes/No

32. If yes, on which technology were you trained?
.....

33. How long was the training?

34. How has the training enhanced your performance skills as a hand pump mechanic?
.....

35. Do you get paid for any repair and maintenance work you do? Yes/No

36. If yes (a) who pays you?
(b) How much are you paid per repair and maintenance works?
.....

37. Who supervises you in executing your duties?
.....

38. Where do you normally get spare parts?
.....

39. What are some of the supports you get while carrying out your activities?
.....

40. Who offers you the supports mentioned in (39)?
.....

41. What challenges do you face in line with your duties?
.....

42. How do you think these challenges can be minimized?
.....

APPENDIX III: FOCUS GROUP DISCUSSION QUESTION GUIDE

ASSESSMENT OF COMMUNITY MANAGEMENT OF WATER SOURCES IN PAKELE TOWN COUNCIL, ADJUMANI DISTRICT

Knowledge

1. Who else apart from the central government is responsible for construction and rehabilitation of water sources?
2. Who is supposed to maintain your water source?
3. What are the roles and responsibilities of the community when it comes to water supply?
4. What do you know of safe water?
5. Please tell me how often do you attend sensitization meetings on operation and maintenance and/or safe water management?
6. What are some of the topics discussed?
7. What do you have to say of the diseases related to water (increasing, stagnated or don't know)?
8. What are some of the diseases related to water?
9. Who are mostly affected by these diseases?
10. What are the preventive measures of water related diseases?

Attitude

11. What is your opinion about the quantity of water for the community?
12. Which period of the year do you experience reduced supply of water from water sources?
13. What is the alternative source of water in the event the source produces reduced quantity of water?
14. How much does the community contribute for operation and maintenance?
15. How often is user fee contributed?
16. Who collects the user fee?
17. Where is the money collected kept?
18. Does the water user committee account for the amount collected and used?
19. Do you feel comfortable with the amount of contribution?
20. When was the last time the water source broke down?

21. How long has it taken to get the faults fixed?
22. Who usually does the repair works?
23. What amount of money is paid per repair done?

Practices

24. Where does the community get their water?
25. In the event the source of water is private service provider, how much is charged per 20 liter Jeri-can?
26. Do you think the source is accessible and reliable?
27. What is the average distance from the furthest household?
28. How long does it take the furthest household to get water from this source?
29. What is the average quantity of water used by each household for domestic purposes?
30. Who mainly in this community collect water for the household?
31. In case a vendor, how much do you pay?
32. What do you think are the challenges faced by people involved in fetching water?
33. Who selects water source committee members in this community?
34. What are the key positions occupied by women in water source committee?
35. How often does the water source committee mobilize users for communal cleaning of water source?
36. Where does the community dispose human excreta?
37. What are the ways in which the community manages their solid waste?

APPENDIX IV: BOREHOLE INSPECTION CHECKLIST

ASSESSMENT OF COMMUNITY MANAGEMENT OF WATER SOURCES IN PAKELE TOWN COUNCIL, ADJUMANI DISTRICT

General information

District: Town:

Ward: Cell/LC1:

Water authority/community representative:

DWD Number:

Management

- a) Community
- b) Institution
- c) Private

Functional: Yes No Other specify:

Existence of WSC: Yes No

WSC trained: Yes No

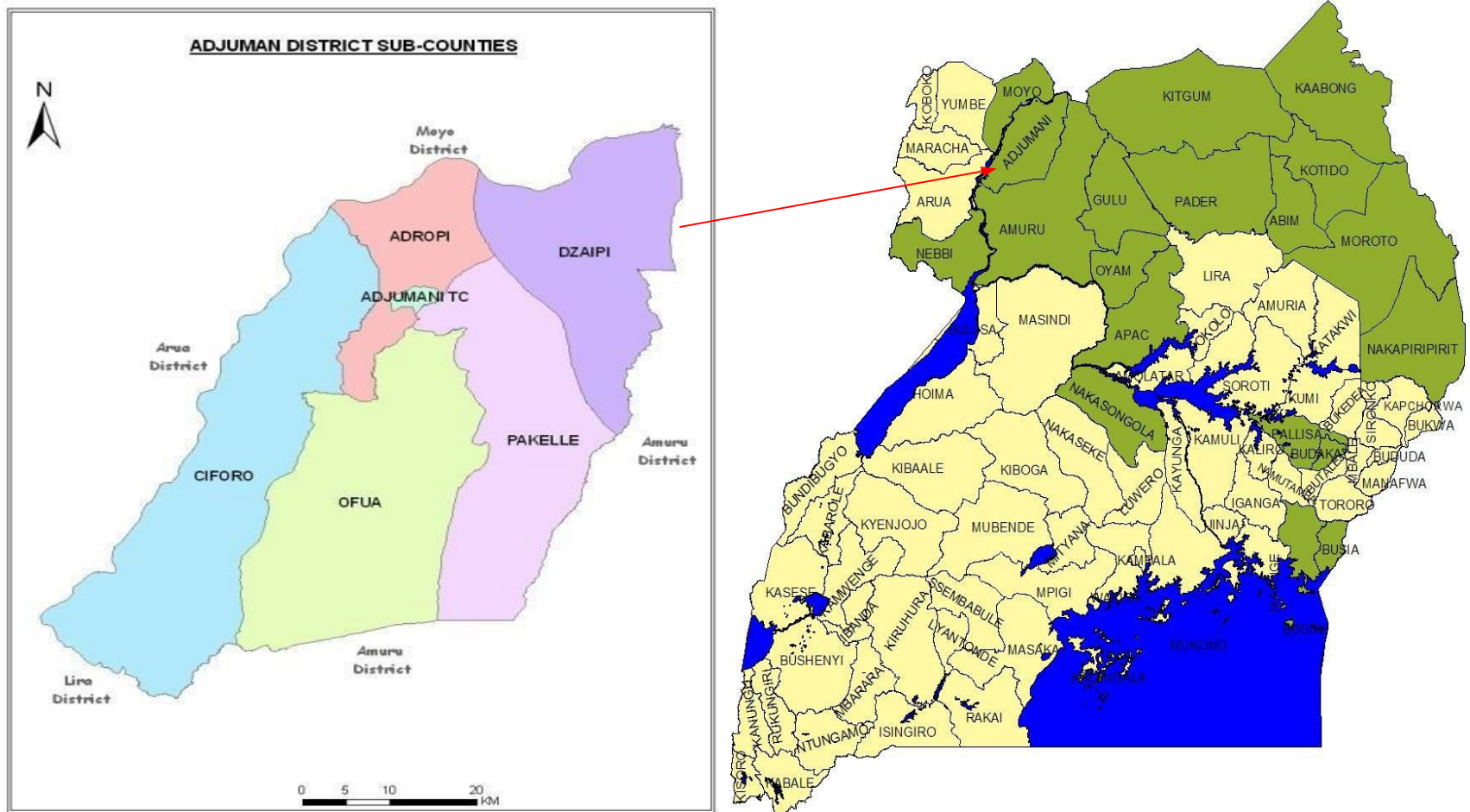
Monthly meetings held: Yes No *(evidence of minutes)

Monthly user fee collected: Yes No *(evidence of up to date contribution list)

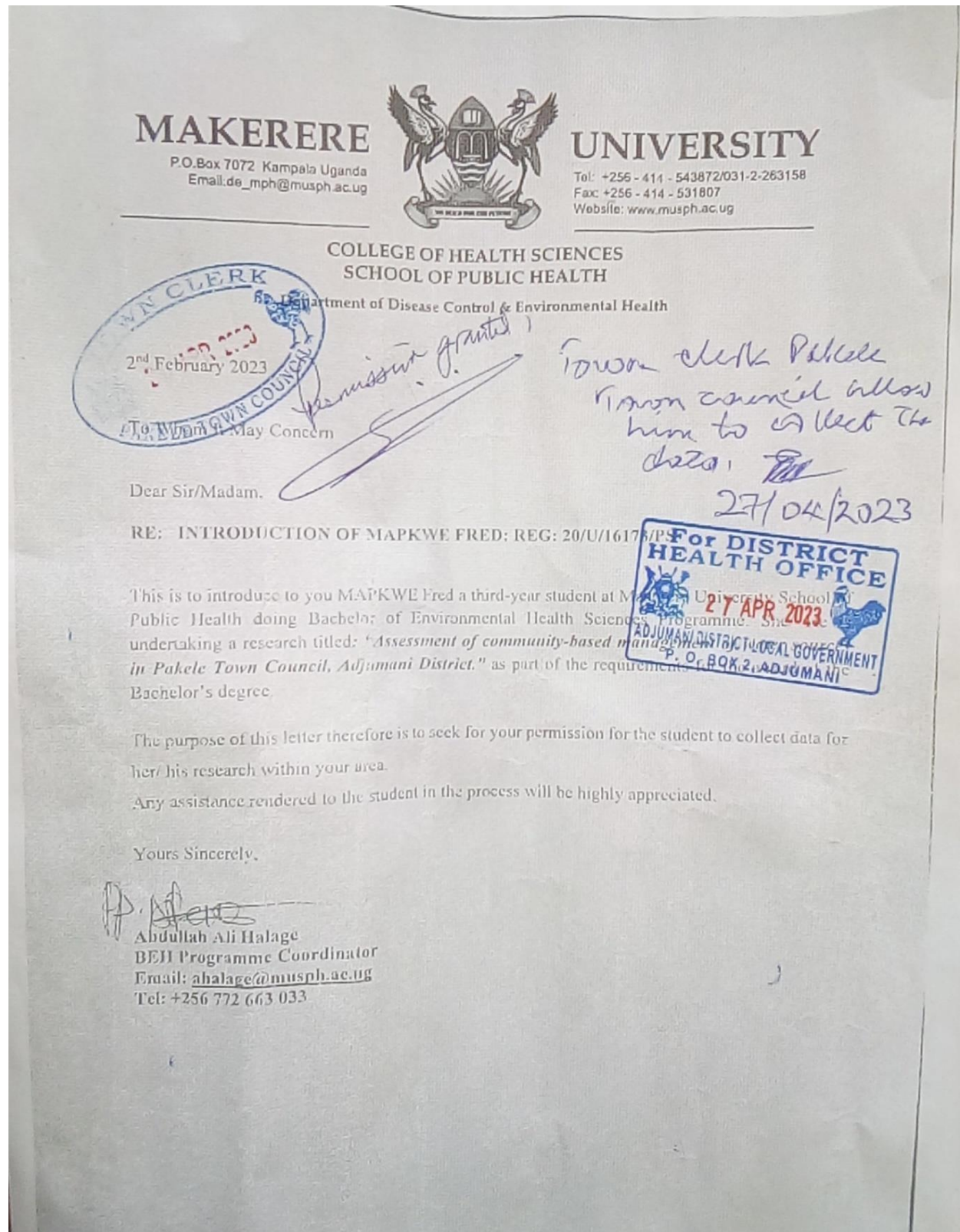
Specific diagnostic information

1. Is the facility protected with masonry work? Yes No
2. Is the facility not open to surface contamination? Yes No
3. Is the source in good sanitary condition? Yes No
4. Doesn't the facility contain silt or animal droppings around it? Yes No
5. Is the masonry not faulty, cracked or dilapidated? Yes No
6. Are there no latrines within less than 100feet from the source? Yes No
7. Are there no animal grazing activities around the source? Yes No
8. Is there no refuse dumping around the source? Yes No
9. Is the surrounding of the source clean? Yes No
10. Doesn't the wastewater stagnate around the source? Yes No

APPENDIX V: THE MAP OF ADJUMANI DISTRICT AND ITS LOCATION ON THE MAP OF UGANDA



APPENDIX VI: THE ADMINISTRATIVE LETTER FOR PERMISSION TO COLLECT FIELD DATA



MAKERERE

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**COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH**

Department of Disease Control & Environmental Health



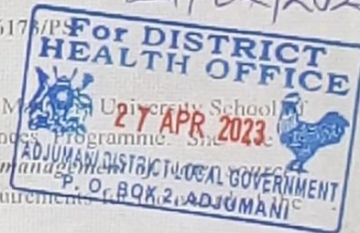
permission granted

*Town clerk Pakele
Town Council allow
him to collect the
data.*
27/04/2023

Dear Sir/Madam,

RE: INTRODUCTION OF MAPKWE FRED; REG: 20/U/16176/PS

This is to introduce to you MAPKWE Fred a third-year student at Makerere University School of Public Health doing Bachelor of Environmental Health Sciences Programme. She is undertaking a research titled: "Assessment of community-based management in Pakele Town Council, Adjumani District." as part of the requirements for her Bachelor's degree.



The purpose of this letter therefore is to seek for your permission for the student to collect data for her/his research within your area.

Any assistance rendered to the student in the process will be highly appreciated.

Yours Sincerely,

Abdullah Ali Halage
BEH Programme Coordinator
Email: ahalage@musph.ac.ug
Tel: +256 772 663 033