



REPUBLIC OF ZAMBIA  
OFFICE OF THE AUDITOR GENERAL

# **Performance Audit on Government Efforts to Ensure Availability of Water Harvesting Infrastructure to Mitigate Water Scarcity in Zambia 2021-2024**

DECEMBER 2024





**Republic of Zambia**  
**Office of the Auditor General**

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## FOREWORD

In accordance with the Provisions of Article 250 of the Constitution of Zambia (Amendment) Act No. 2 of 2016, Public Audit Act No. 13 of 1994 and the Public Finance Management Act No. 1 of 2018, I am mandated to carry out Performance Audits in Ministries, Provinces and Agencies (MPAs). It is in this regard that I am pleased to present to you the Performance Audit on Government Efforts to ensure Availability of Water Harvesting Infrastructure to Mitigate Water Scarcity in Zambia.

The availability and sustainability of water harvesting infrastructure is cardinal for socio-economic development amidst increased water demand, population growth and climate change. Government is therefore committed to actualising the Agenda 2030 by committing to meet the SDG 13 “Take Urgent Action to Combat Climate Change and its Impacts”. Additionally, in the Eighth National Development Plan (8NDP) 2022 to 2026, Government planned to invest in water resource development and management to meet the rising demand and productive use of water, while safeguarding water security.<sup>1</sup>

The recommendations in the Performance Audit Report if implemented by the Ministry of Water Development and Sanitation (MWDS) will ensure strengthened institutional framework, availability and sustainability of water harvesting infrastructure to mitigate water scarcity in the country.

I would like to thank the staff of MWDS and stakeholders for the assistance accorded to my staff during the audit process.



**Dr Ron M. Mwambwa FCMA, FZICA, CGMA, CFE**  
**ACTING AUDITOR GENERAL**

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<sup>1</sup> Eighth National Development Plan (8NDP) Strategic Development Area 3: Environmental Sustainability Development Strategy 1: Strengthen climate change adaptation, Strategic Development Area 1 Economic Transformation and Job Creation - Development Outcome 1: An Industrialised and Diversified Economy Strategy 8:







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## **Acronyms**

8NDP	Eighth National Development Plan
DACO	District Agricultural Coordinator's Office
DGPS	Differential Global Positioning Stations
DWDO	District Water Development Office
DWRD	Department of Water Resource Development
EIA	Environmental Impact Assessment
EPB	Environmental Project Brief
FAO	Food and Agricultural Organisation
GIZ	German Agency for International Cooperation
IDSP	Irrigation Development Support Project
JICA	Japan International Cooperation Agency
LA/s	Local Authority/ies
MoA	Ministry of Agriculture
MoFNP	Ministry of Finance and National Planning
MoU	Memorandum of Understanding
MGEE	Ministry of Green Economy and Environment
MLGRD	Ministry of Local Government and Rural Development
MLNR	Ministry of Lands and Natural Resources
MWDS	Ministry of Water Development and Sanitation
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organisation
NWASCO	National Water Supply and Sanitation Council
NWP	National Water Policy
PACO	Provincial Agricultural Coordinator's Office
PWDO	Provincial Water Development Office
SDGs	Sustainable Development Goals



UN	United Nations
WARMA	Water Resources Management Authority
WEF	Water-Energy-Food
WRD	Water Resources Development
WRM	Water Resources Management
ZEMA	Zambia Environmental Management Agency
ZIP	Zambia Water Investment Programme
ZMD	Zambia Meteorological Department
ZNS	Zambia National Service

## Glossary of Terms

<b>Terms</b>	<b>Definition</b>
Abstraction	Refers to the process of taking water from a natural resource such as a river, lake, spring or groundwater. The water is generally pumped, piped or diverted for use in agriculture or industry or for drinking water supply. <sup>2</sup>
Aquifer	Refers to a body of saturated permeable and porous rock through which water can easily move. <sup>3</sup>
Authority	Refers to Water Resources Management Authority. <sup>4</sup>
Bathymetric Survey	A method used to analyze sediment yield in reservoirs or check dams, providing insights into erosion rates over time. <sup>5</sup>
Breached Dam	A break or opening in a dam which releases impoundment water either deliberately or accidentally. <sup>6</sup>
Catchment	Is a geographical area which naturally drains into a water resource and from which the water resource receives surface or ground flow which originates from rainfall. <sup>7</sup>
Climate Change	Refers to the average change in climatic conditions in a specific region which is additional to the natural changes in the climate that may be expected to occur over time. <sup>8</sup>
Check Dam	Refers to a temporary grade control structure placed in drainage channels to limit the erosivity of stormwater by reducing flow velocity. <sup>9</sup>
Contour Bund	Refers to a type of water harvesting technique in which a small bund is constructed across a slope of land on a contour which acts as a barrier to the flow of water. <sup>10</sup>

<sup>2</sup> [Water resources and abstractions | Environmental Protection Agency \(epa.ie\)](https://www.epa.ie/publications/abstractions/)

<sup>3</sup> [https://www.researchgate.net/publication/337427715\\_What\\_is\\_an\\_Aquifer#](https://www.researchgate.net/publication/337427715_What_is_an_Aquifer#)

<sup>4</sup> Water Resource Act No. 21 of 2011

<sup>5</sup> <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/bathymetric-survey>

<sup>6</sup> Ministry of Water Development and Sanitation Department of Water Resources Development Eastern Province, Surface Water Infrastructure Development

<sup>7</sup> National Water Policy 2010 Ministry of Energy and water Development

<sup>8</sup> Ibid

<sup>9</sup> Urban Drainage and Flood Control District CD-1 Urban Storm Drainage Criteria Manual Volume 3 November 2010

<sup>10</sup> SWC 211 Soil and Water Conservation Engineering

Dam	Any barrier which is capable of impounding or controlling the flow of water, including but not limited to storm water retention or detention dams and flood control structures. <sup>11</sup>
Dam Embankment	An artificial structure typically made of earth rock, built to block or divert the flow of water to create a reservoir. <sup>12</sup>
Dam Failure	The uncontrolled release of water, sediment, or other stored contents of a dam through partial or complete collapse of the impounding dam. <sup>13</sup>
Dam Inspection	A careful and critical observation and examination of all visible aspects of a dam, searching for abnormal visible phenomena on the surface and inside the dam. <sup>14</sup>
Dam Maintenance	The routine work required to maintain an existing dam in a safe and reliable working condition to fulfil its intended designed purposes with routine or regular checking, testing and repair works. <sup>15</sup>
Dam Rehabilitation	Repair or reconstruction of a dam that is carried out to meet applicable state dam safety and security standards. <sup>16</sup>
Dam Siltation	The process by which sediments, such as silt, sand, and clay, accumulate in a reservoir behind a dam and are carried by a river or stream into the reservoir, causing the particles to settle at the bottom. <sup>17</sup>
Dam Surveillance	Routine visual inspection. <sup>18</sup>
Differential Global Positioning Stations (DGPS)	Refers to an enhancement to the Global Positioning System that provides improved location accuracy and is used in detailed topography. <sup>19</sup>

<sup>11</sup> MWDS Department of Water Resources Development Eastern Province, Surface Water Infrastructure Development

<sup>11</sup> Ibid

<sup>12</sup> U.S. Bureau of Reclamation. \*Design of Small Dams\*. Third Edition, U.S. Department of the Interior, 1987.

<sup>13</sup> <https://documents1.worldbank.org/curated/en/376861619156795223/text/Good-Practice-Note-on-Dam-Safety.txt>

<sup>14</sup> Ibid

<sup>15</sup> <https://documents1.worldbank.org/curated/en/376861619156795223/text/Good-Practice-Note-on-Dam-Safety.txt>

<sup>16</sup> <https://damsafety.org/sites/default/files/files/NA%20TIONAL%20DAM%20REHABILITATION%20PROGRAM%20FACT%20SHEET.pdf>

<sup>17</sup> Morris, Gregory L., and Fan, Jiahua. \*Reservoir Sedimentation Handbook: Design and Management of Dams, Reservoirs, and Watersheds for Sustainable Use\*. McGraw-Hill, 1998.

<sup>18</sup> <https://www.bing.com/search?q=dam+surveillance+definition>

<sup>19</sup> <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/dgps#>

Dumpy Level	Refers to a fundamental surveying instrument designed for measuring horizontal and vertical angles to establish points at the same horizontal level. <sup>20</sup>
Ecosystem	Is the biological community of interacting organisms and their physical environment. <sup>21</sup>
Embankment	Fill material, usually earth or rock, placed with sloping sides and usually longer than high. <sup>22</sup>
Erosion	Wear or scouring caused by the abrasive action of moving water. <sup>23</sup>
Groundwater Recharge Pit	The process by which water is added to a groundwater reservoir through infiltration of precipitation, snowmelt, or surface water into the soil. <sup>24</sup>
Integrated Water Resources Management	Is the process that promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. <sup>25</sup>
Ministry	Refers to the Ministry of Water Development and Sanitation.
Rainwater Harvesting	The process of capturing rainwater from surfaces such as roofs, and land for storage and future use. <sup>26</sup>
Spillway	A structure over or through a dam by which normal or flood flows are discharged. <sup>27</sup>
Trench Cum Bund	An earthen embankment constructed with trenches having 5m length, 1 to 1.5 m width, 0.45 to 0.6 m depth and a berm of 0.6 to 1 meter from pit to pit and bund to pit. <sup>28</sup>

<sup>20</sup> <https://testbook.com/civil-engineering/dumpy-level>

<sup>21</sup> Ibid

<sup>22</sup> MWDS Department of Water Resources Development Eastern Province, Surface Water Infrastructure Development Manual on Dam Maintenance

<sup>23</sup> Ibid

<sup>24</sup> Groundwater Recharge: Methods, Factors, and Challenges for Sustainable Resource Management

<sup>25</sup> Ibid

<sup>26</sup> National water policy 2010 Ministry of Energy and Water Development

<sup>27</sup> MWDS Department of Water Resources Development Eastern Province, Surface Water Infrastructure Development Manual on Dam Maintenance

<sup>28</sup> [https://iiswc.icar.gov.in/sites/default/files/bly\\_Folder\\_English\\_02\\_03\\_2021.pdf](https://iiswc.icar.gov.in/sites/default/files/bly_Folder_English_02_03_2021.pdf)



Water	Includes surface water, water which rises naturally on any land or drains or falls naturally on to any land, even if it does not visibly join any watercourse, or ground-water. <sup>29</sup>
Water Resources Development	Is development which facilitates the equitable provision of adequate quantity and quality of water for all competing groups of users at acceptable cost and ensures security of supply under varying conditions <sup>30</sup>
Water Resource	Refers to any river, spring, hot-spring, pan, lake, pond, swamp, marsh, stream, watercourse, estuary, aquifer, artesian basin or other body of naturally flowing or standing water <sup>31</sup>
Water Quality	The condition of water in terms of chemical, physical and biological characteristics with regard to its applicability for various uses. <sup>32</sup>
Water Security	The capacity to ensure the availability of adequate quantities of water of sufficient quality and the ability to utilise the available water resources for multiple productive uses. <sup>33</sup>
Water Supply	Provision of water that is safe to drink primarily to households and communities. <sup>34</sup>
Weir	A type of spillway in which water flow is constricted and caused to fall over a crest. <sup>35</sup>

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<sup>29</sup> Ibid

<sup>30</sup> Ibid

<sup>31</sup> Ibid

<sup>32</sup> Ibid

<sup>33</sup> Zambia Water Investment Programme Supporting the attainment of Vision 2030 towards prosperous middle-income status by 2030 Republic of Zambia 2022 - 2030

<sup>34</sup> Ibid

<sup>35</sup> MWDS Department of Water Resources Development Eastern Province, Surface Water Infrastructure Development Manual on Dam Maintenance

## EXECUTIVE SUMMARY

### 1. Introduction

Water harvesting, the ancient practice of collecting and storing water for future use, has become a vital strategy for addressing the growing global challenge of water scarcity.<sup>36</sup> Water harvesting offers a sustainable solution by harnessing the power of rainwater, reducing stormwater runoff and supplementing groundwater supplies.

The Ministry of Water Development and Sanitation (MWDS) is mandated to develop and manage water resources as well as facilitating the provision of water supply and sanitation services in the country, including water harvesting.

Government in line with the Agenda 2030 and Eighth National Development Plan (8NDP) 2022 to 2026, committed to invest in water resource development and management to meet the rising demand and productive use of water, while safeguarding water security.<sup>37</sup>

### 2. Audit Objective

To assess the effectiveness of measures put in place by MWDS in ensuring strengthened institutional framework, availability and sustainability of water harvesting infrastructure to mitigate water scarcity in the country.

### 3. Specific Objectives

- i. To assess the adequacy of measures put in place by MWDS to ensure strengthened institutional framework in the implementation of water harvesting programmes.
- ii. To establish whether the measures developed by MWDS to ensure availability of water harvesting infrastructure were effective.
- iii. To evaluate whether the measures instituted by the MWDS were effective in ensuring the sustainability of water harvesting infrastructure.

### 4. Audit Questions

- i. To what extent has the MWDS ensured that measures put in place have strengthened the institutional framework in the implementation of water harvesting programmes?
- ii. To what extent are the measures developed by MWDS effective in ensuring availability of water harvesting infrastructure?
- iii. To what extent are the measures instituted by MWDS effective in ensuring the sustainability of water harvesting infrastructure?

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<sup>36</sup>The Power of Rainwater Harvesting; techniques and benefits-April 2024

<sup>37</sup> Eighth National Development Plan (8NDP) Strategic Development Area 3: Environmental Sustainability Development Strategy 1: Strengthen climate change adaptation, Strategic Development Area 1 Economic Transformation and Job Creation - Development Outcome 1: An Industrialised and Diversified Economy Strategy 8:

## **5. Audit scope**

The audit assessed the effectiveness of the MWDS in Zambia in ensuring strengthened institutional framework in the implementation of water harvesting programmes; ensure availability and sustainability of water harvesting infrastructure for the period 2021 to 2024.

## **6. Sources of Criteria**

Criteria was obtained from Sustainable Development Goals (SDGs) 2016-2030; Eighth National Development Plan (8NDP) 2022-2026; Seventh National Development Plan (7NDP) 2017-2022; Zambia Vision 2030; The Water Resources Management Act No. 21 of 2011; National Water Policy (2010); Zambia Water Investment Programme 2022 – 2030; Ministry of Water Development and Sanitation Strategic Plan 2022-2026 and Ministry of Water Development, Sanitation and Environmental Protection Strategic Plan 2018-2021

## **7. Summary of Findings**

### **7.1 Institutional Framework to Implement Water Harvesting Programmes**

The audit established that while the institutional framework which included policies, strategies and legislation governing water harvesting in the country was in place, the legislation did not fully incorporate all water harvesting technologies. Further, the National Water Policy was outdated and did not meet current demands while strategies and plans to enhance water harvesting were not operationalised. Additionally, operational and maintenance guidelines were not domesticated hence different guidelines were adopted impacting on dam maintenance, utilisation and practices that will ensure sustainability of infrastructure.

### **7.2 Availability of Water Harvesting Infrastructure.**

The audit revealed that the MWDS did not conduct research on water development related issues to facilitate the implementation of less complex and cost-effective water harvesting techniques. In addition, MWDS had neither invested in capacity building to capacitate its officers with technical skills for dam construction and rehabilitation nor invested in appropriate tools to implement water harvesting programmes. This was coupled with the Ministry's failure to mobilise resources despite having developed various strategies to implement water harvesting programmes. Further, there was low collaboration in the planning and implementation of water harvesting programmes among stakeholders which resulted in fragmented implementation of water harvesting infrastructure.

### **7.3 Sustainability of Water Harvesting Infrastructure**

The audit revealed that there was low rehabilitation and maintenance of dams as well as delays in the way dams were rehabilitated. In addition, there was low monitoring and inspection of dams which resulted in encroachments, unsustainable tree cutting practices and unlawful utilisation of dams.

## **8. Conclusion**

Efforts towards the construction of dams, research, promotion of climate smart harvesting, resource mobilisation and stakeholder collaboration by the MWDS were not effective in increasing availability of water harvesting infrastructure to mitigate water scarcity. In addition, sustainability of existing water harvesting infrastructure was not assured as there was under-performance by the MWDS in the construction, rehabilitation and maintenance of dam infrastructure.

## **9. Recommendations**

The MWDS should implement the following:

- i Harmonise and develop a deliberate policy to compel stakeholders to engage the MWDS before the construction of water harvesting infrastructure to avoid fragmented implementation of water harvesting programmes.
- ii Revise the National Water Policy of 2010 and National Water Resource Master Plan of 1995 to provide guidance for effective water harvesting in the country.
- iii Prioritise the development of Operational and Maintenance Guidelines to provide guidance on utilisation and maintenance, as well as standardisation in the management of dams.
- iv Explore and foster alternative water harvesting technologies whose implementation maybe cost effective, easier and climate smart.
- v Enhance technical capacity for officers to enable them effectively implement water harvesting infrastructure projects.
- vi Invest in equipment to aid the implementation of water harvesting to reduce the cost of outsourcing and in turn result in savings that could be used to invest in more water harvesting infrastructure.
- vii Work towards improving monitoring through inspections for water harvesting infrastructure to enhance dam safety and avoid encroachment and unlawful usage of dams.
- viii Increase capacity building for Dam Committees to enhance utilisation, maintenance and ownership of dams by communities.

# CHAPTER ONE

## INTRODUCTION

### 1.0 Introduction

The chapter presents the background of the audit and discusses the motivational factors that led to the audit. The report focuses on Government efforts to ensure availability of water harvesting infrastructure to mitigate water scarcity in Zambia.

### 1.1 Background

Water harvesting, the practice of collecting and storing water for future use, has become a vital strategy for addressing the growing global challenge of water scarcity.<sup>38</sup> Water harvesting offers a sustainable solution to the problem of water scarcity by harnessing the rainwater, reducing stormwater runoff and supplementing groundwater supplies. The harvested water is stored in vessels such as dam reservoirs, aquifers and weirs among others.

By capturing and utilising harvested water, communities can enhance water security thereby alleviating pressure on municipal water systems and promote resilient ecosystems.<sup>39</sup> With the increasing water scarcity due to climate change and growing demand for water, harvesting rainwater has seen a resurgence as a vital component of the integrated water resource management.<sup>40</sup>

In Zambia, like many other countries, the availability of water has become increasingly uncertain due to climate change. Zambia is faced with challenges related to drought and water shortages amidst a series of droughts in recent years and 2024 in particular, which has significantly impacted river water levels.<sup>41</sup>

Zambia's potential for water harvesting was identified in 2006, when the country was mapped for water harvesting by United Nations Environment Programme (UNEP).<sup>42</sup> This potential was further recognised by United Nations (UN) during the UN 2023 Water Conference, where African

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<sup>38</sup>The Power of Rainwater Harvesting; techniques and benefits-April 2024

<sup>39</sup> Water Harvesting: A Guide for Practitioners" by the International Water Association (IWA)

<sup>40</sup> Food and Agriculture Organization of the United Nations (FAO). (2003). "Water Harvesting for Improved Agricultural Production". FAO Irrigation and Drainage Paper 61.

<sup>41</sup> Source: Cross Catholic Outreach: <https://crosscatholic.org/blogs/2023/12/catholics-give-water-to-the-thirsty/>

<sup>42</sup> <https://reliefweb.int/report/ethiopia/harvesting-rainfall-key-climate-adaptation-opportunity-africa?OpenDocument=&rc=1&emid=ACOS-635NZ>



countries facing water shortages due to climate change were encouraged to harness water harvesting<sup>43</sup>.

In mitigating water scarcity, the Government through the Ministry of Water Development and Sanitation (MWDS) identified and mapped water harvesting sites.<sup>44</sup> The Ministry also costed and developed the Zambia Water Investment Programme (ZIP) for the advancement of national water security by 2030.<sup>45</sup>

The Government further committed to actualising Agenda 2030 by committing to meet SDG 13, “Take Urgent Action to Combat Climate Change and its Impacts”. Additionally, in the Eighth National Development Plan (8NDP) 2022 to 2026, Government planned to invest in water resource development and management to meet the rising demand and productive use of water, while safeguarding water security.<sup>46</sup> Government further demonstrated its efforts to invest in water by providing a budget line for water resource development and management with a financial allocation amounting to USD 5,750 Million for water security<sup>47</sup>.

## **1.2 Motivation**

The Office of the Auditor General was motivated to undertake the audit to assess Government efforts to ensure availability of water harvesting infrastructure to mitigate water scarcity in Zambia based on the factors:

### **1.2.1 Presidential Pronouncements**

On 29<sup>th</sup> February 2024, the President of the Republic of Zambia, Dr. Hakainde Hichilema, declared a national disaster and emergency after the drought experienced in the 2023/2024 rainy season which adversely affected a population of 9.8 million in eighty-four (84) out of 116 districts in the Country. In response to the disaster, the President stated that he had placed special focus on investments in water development for agriculture, energy production as well as provision of water to households, livestock and wildlife among others.

Similarly, on 20<sup>th</sup> March 2024, during the launch of the early maize harvesting in the Mkushi Farming Block in Central Province, the President highlighted the critical need for water harvesting to enhance irrigation farming, particularly considering the prevailing drought conditions. He

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<sup>43</sup> <https://www.un.org/pga/77/wp-content/uploads/sites/105/2023/05/PGA77-Summary-for-Water-Conference-2023.pdf>

<sup>44</sup> National Water Resources Master Plan 1995

<sup>45</sup> Zambia Water Investment Programme (ZIP) 2022-2030

<sup>46</sup> Eighth National Development Plan (8NDP) Strategic Development Area 3: Environmental Sustainability Development Strategy 1: Strengthen climate change adaptation, Strategic Development Area 1 Economic Transformation and Job Creation - Development Outcome 1: An Industrialised and Diversified Economy Strategy 8:

<sup>47</sup> Water Investment Programme 2022 to 2030 supporting the attainment of Vision 2030 towards prosperous middle-income status by 2030

underscored the need for the country to learn from the current water shortages and prioritise water conservation efforts while warning against wasteful water practices. The President further directed Zambia Environmental Management Authority (ZEMA) and Water Resource Management Authority (WARMA) to prioritise the approval of applications for dam constructions across the country to facilitate the Government's agenda of water harvesting while ensuring adherence to environmental regulations in the approval process.<sup>48</sup>

### **1.2.2 Parliamentary Debates**

On 14<sup>th</sup> July 2024, Chadiza Member of Parliament raised concern over the rate at which dams were dilapidated and vandalised in Chadiza district of Eastern Province. He further reported that from a total of twenty-one (21) dams in the district, twelve (12) were washed away due to vandalism while nine (9) were dilapidated which resulted in considerable costs to rebuild or repair.<sup>49</sup>

### **1.2.3 Media Reports**

On 30<sup>th</sup> January 2023, ZNBC News reported that WARMA estimated that the country needed 12,000 reservoir dams to harvest water especially in flood prone areas for the country to be water sufficient. The Corporation further reported that the country had 2,750 dams (including private owned dams) and that if the required number of dams were constructed across the country, the flood situation would likely be more bearable as water would be harvested.<sup>50</sup>

Furthermore, on 3<sup>rd</sup> October 2024, BBC Africa News carried an article concerning the ongoing power shortage in Zambia which they stated had been significantly influenced by the dwindling water levels in the Kariba Dam. It was further reported that the dam had reached critical levels, exacerbated by severe drought conditions linked to the El Niño weather phenomenon.

In addition, on 7<sup>th</sup> March 2024, Caritas Zambia, a Non-Governmental Organisation (NGO), reported that extreme drought threatened the livelihood of over 70% of the local population as the Country had been facing abnormally dry conditions due to the delayed rainy season and insufficient rainfall since the beginning of 2024.<sup>51</sup>

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<sup>48</sup> <https://www.lusakatimes.com/2024/03/20/dam-construction/>

<sup>49</sup> <https://www.ess.gov.zm/?p=3745> question and answer session in Parliament on July 14th 2023

<sup>50</sup> <https://www.znbc.co.zm/news/zambia-needs-12000-dams-to-harvest-rain-water/30.01.2023>

<sup>51</sup> <https://zambia.charita.cz/news/extreme-drought-in-zambia-is-threatening-livelihoods/> March 7, 2024

## **CHAPTER TWO**

### **AUDIT OBJECTIVES AND QUESTIONS**

#### **2.0 Introduction**

This chapter presents the main and specific audit objectives, the scope, and audit questions to be answered.

#### **2.1 Audit Objective**

The objective of the audit was to assess the effectiveness of measures put in place by Government through the MWDS in ensuring strengthened institutional framework, availability and sustainability of water harvesting infrastructure to mitigate water scarcity in the country.

##### **2.1.1 Specific Objectives**

- i. To assess the adequacy of measures put in place by MWDS to ensure strengthened institutional framework in the implementation of water harvesting programmes.
- ii. To establish whether the measures developed by MWDS to ensure availability of water harvesting infrastructure were effective.
- iii. To evaluate whether the measures instituted by the MWDS were effective in ensuring the sustainability of water harvesting infrastructure.

#### **2.2 Audit Questions and Sub-Questions**

The audit will answer the following questions:

##### **2.2.1 To what extent has the MWDS ensured that measures put in place have strengthened the institutional framework in the implementation of water harvesting programmes?**

- i. Has MWDS ensured the laws, policies, strategies and guidelines are effective for implementation of water harvesting programmes?
- ii. Did MWDS provide operational and maintenance guidelines for water harvesting infrastructure?

##### **2.2.2 To what extent are the measures developed by MWDS effective in ensuring availability of water harvesting infrastructure?**

- i. How does MWDS ensure the construction of water harvesting infrastructure?
- ii. Has MWDS invested in research to promote efficient water harvesting?
- iii. Has MWDS promoted the adoption of various water harvesting techniques?
- iv. Has MWDS ensured that resources are available to implement water harvesting programmes?

- v. Has MWDS ensured effective collaboration with key stakeholders in the implementation of water harvesting programmes?

### **2.2.3 To what extent are the measures instituted by MWDS effective in ensuring the sustainability of water harvesting infrastructure?**

- i. Has MWDS ensured rehabilitation of existing water harvesting infrastructure?
- ii. Is MWDS efficient in maintaining water harvesting infrastructure?
- iii. Has MWDS ensured effective monitoring of water harvesting programmes?

## **2.3 Audit Scope**

The audit assessed the effectiveness of measures put in place by the Ministry of Water Development and Sanitation in Zambia for the period 2021 to 2024. The audit focused on:

- i. Assessing the adequacy of measures to ensure strengthened institutional framework in the implementation of water harvesting programmes;
- ii. Establishing whether the measures developed to ensure availability of water harvesting infrastructure were effective; and
- iii. Evaluating whether the measures instituted were effective in ensuring the sustainability of water harvesting infrastructure.

## **2.4 Limitation**

The audit was limited in its geographical coverage due to resource constraints and as a result, the audit sampled dams that were in close proximity to the Central Business Districts (CBDs). To address the limitation, the audit distributed questionnaires to an additional five districts that were not visited in Northern Province<sup>52</sup>.

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<sup>52</sup> The following districts in Northern Province were not visited: Kasama, Nsama, Mbala, Lunte and Mungwi

## CHAPTER THREE

### AUDIT METHODOLOGY

#### 3.0 Introduction

This chapter describes the methodology used during the audit. The methodology includes an explanation and justification of the audit design. It further explains the sample population, sampling techniques, data collection and data analysis methods.

#### 3.1 Audit Standards

The audit was conducted in accordance with the International Standards for Supreme Audit Institutions (ISSAIs), relevant to performance auditing. These are: ISSAI 100 - Fundamental Principles of Public Sector Auditing, ISSAI 300 - Fundamental Principles of Performance Auditing, and ISSAI 3000. The Standards require that the audit is planned and executed in a manner which ensures that an audit of high quality is carried out and that sufficient and appropriate evidence is obtained to support the audit findings.

#### 3.2 Audit Sampling

The audit team purposively sampled six (6)<sup>53</sup> out of ten (10)<sup>54</sup> provinces as these were worst hit by drought in the 2023/2024 rainy season. Sixteen (16)<sup>55</sup> out of seventy-eight (78) districts in the sampled provinces were also purposively selected based on the presence of dams and proximity to the CBDs. In this regard, thirty-seven (37) out of 1,987 dams were selected based on their proximity to the CBDs. **Appendix 1 refers.**

#### 3.3 Data Collection Methods

The audit employed a combination of document reviews<sup>56</sup>, interviews<sup>57</sup> and site inspections<sup>58</sup> to address the audit questions as detailed below:

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<sup>53</sup> Central, Southern, Eastern, Western, Northwestern and Copperbelt Provinces

<sup>54</sup> Central, Southern, Eastern, Western, North Western, Lusaka, Muchinga, Northern, Luapula and Copperbelt Provinces

<sup>55</sup> Chisamba, Mumbwa, Shibuyunji,imba, Kalomo, Pemba, Lundazi, Chasefu, Kaoma, Nkeyema, Luampa, Solwezi, Kasempa, Masaiti, Mpongwe and Lufwanyama

<sup>56</sup> List of documents reviewed and their respective purposes attached as **Appendix 2.**

<sup>57</sup> List of officers interviewed attached as **Appendix 3.**

<sup>58</sup> List of site visitations attached as **Appendix 4.**



### **3.3.1 Extent to which the MWDS has ensured strengthening of Institutional Framework of Water Harvesting programmes**

The audit reviewed Strategic Plans, Investment Programmes, Master Plans, Dam Inspection Reports and Annual Reports for the period under review; and key provisions in the existing Legal, Policy and Institutional Framework. Further interviews with officers from MWDS and various key stakeholders were also held.

### **3.3.2 Extent to which Measures Developed by MWDS are Effective in Ensuring Availability of Water Harvesting Infrastructure**

To address this audit question, the team examined key provisions in the existing Legal, Policy and Institutional Frameworks and Strategic Development Plans. Further, Annual Work Plans, Dam Inspection Reports, National Wide Inventory Reports, Performance Assessment Reports, Dam Construction Plans and Reports, Estimates of Revenue and Expenditure, Staff Establishment, Organisational Structure and Investment Programmes were reviewed to ascertain the extent to which water harvesting infrastructure is available.

Furthermore, interviews were carried out with MWDS management, provincial and district officers, and Dam Committees. Physical inspections were also undertaken to verify progress made towards the construction of water harvesting infrastructure.

### **3.3.3 Extent to which Measures Instituted by MWDS are Effective in Ensuring the Sustainability of Water Harvesting Infrastructure**

The audit reviewed Strategic Plans, Dam Inspection Reports and Annual Reports for the period under review. Further, interviews were carried out with officers from MWDS management, provincial and district officers as well as Dam Committees. Physical inspections were also undertaken to verify progress made towards rehabilitation and maintenance of dams.

## **3.4 Data Analysis**

Qualitative and quantitative data obtained from document review, interviews, questionnaires and observations made during site visits was analysed using Microsoft Excel and Content Analysis and the results were interpreted using tables, graphs and charts. Below is a description of how data was analysed under each audit question:

**3.4.1 To what extent has the MWDS ensured that measures put in place have strengthened the institutional framework in the implementation of water harvesting programmes?**

**i. Document review**

Data obtained from Policy and Legislation; Water Resource Development Strategies and Action Plans; Annual and Monitoring Reports and Operational and Maintenance Guidelines were themed and analysed using Content Analysis to establish whether there was effective management and implementation of Water Harvesting Programmes.

**ii. Semi Structured Interviews**

Data obtained from interviews with MWDS officials was recorded to corroborate information obtained from document review. Major themes arising from interviews were also recorded and used during report writing.

**3.4.2 To what extent are the measures developed by MWDS effective in ensuring availability of water harvesting infrastructure?**

**i. Document review**

Data obtained from Policies and Legislation; Strategic Development Plans; Water Resource Development Strategies; Annual Work Plans; Dam Inspection Reports; National Wide Inventory Reports; Performance Assessment Reports; Dam Construction Plans and Reports; Estimates of Revenue and Expenditure; Staff Establishment; Organisational Structure and Investment Programmes were analysed using context analysis to ascertain the availability of water harvesting infrastructure. The information obtained was themed in to the following categories:

- Number of dams constructed
- Lack of research
- Implementation of other water harvesting techniques
- Resource mobilisation
- Coordination among stakeholders

Data on the number of dams constructed was analysed using Microsoft Excel and visualized on a chart while information on research, implementation of other water harvesting techniques, resource mobilisation and coordination among stakeholders was also analysed using Content Analysis.

**ii. Semi Structured Interviews**

The data obtained from interviews with provincial, districts and dam committees were recorded to obtain summarised text which was used to confirm the data obtained from document review.

**iii. Physical Inspections**

Data obtained from physical inspections was analysed through a systematic evaluation of the condition and progress of water harvesting infrastructure being constructed.

**3.4.3 To what extent are the measures instituted by MWDS effective in ensuring the sustainability of water harvesting infrastructure?**

**i. Document review**

The data from Strategic Plans, Dam Inspection Reports and Annual Reports were analysed using content analysis to establish the progress made towards the rehabilitation and maintenance of dams.

**ii. Semi Structured Interviews**

The data obtained from interviews with provincial, districts and dam committees officials were recorded to obtain a written text which was used to confirm the data obtained from document review and was analysed using Microsoft Excel.

**iii. Physical Inspections**

Data obtained from physical inspections was analysed through a systematic evaluation of the condition and progress made towards rehabilitation and maintenance of dams.

## **CHAPTER FOUR**

### **DESCRIPTION OF THE AUDIT AREA**

#### **4.0 Introduction**

The chapter discusses the mandate of the Ministry of Water Development and Sanitation (MWDS), roles and responsibilities, its organisational structure, funding details and key stakeholders. It also describes how systems at the Ministry operate.

#### **4.1 Mandate**

The MWDS is mandated as per Gazette Notice No. 1123 of 2021 to develop and manage water resources and facilitate the provision of water supply and sanitation services in the country.

#### **4.2 Roles and Responsibilities**

The MWDS, through the Department of Water Resources Development (DWRD), provides policy guidance on water resource related issues as well as develops both surface and groundwater resources. This is to ensure adequate water resource availability and equitable access by all users for sustainable national socio-economic development.<sup>59</sup>

##### **4.2.1 Organisation Structure**

MWDS is headed by a Minister who is assisted by a Permanent Secretary who is also supported by Five (5) Directors. There are Five (5) Departments namely: Water Resources Development (DWRD); Water Supply and Sanitation; Human Resource and Administration; Planning and Research; and Finance. The DWRD is responsible for the implementation of water harvesting programmes and has presence in all ten (10) provincial and 116 district centers. Its core functions are as listed below.<sup>60</sup>

- i. Construct, rehabilitate and maintain water resource infrastructure in order to harness water resources for use;
- ii. Formulate and review water resources development strategies and action plans in order to facilitate resource mobilisation and attainment of set objectives;
- iii. Conduct exploratory research and surveys on the availability of water resources in order to facilitate their development;

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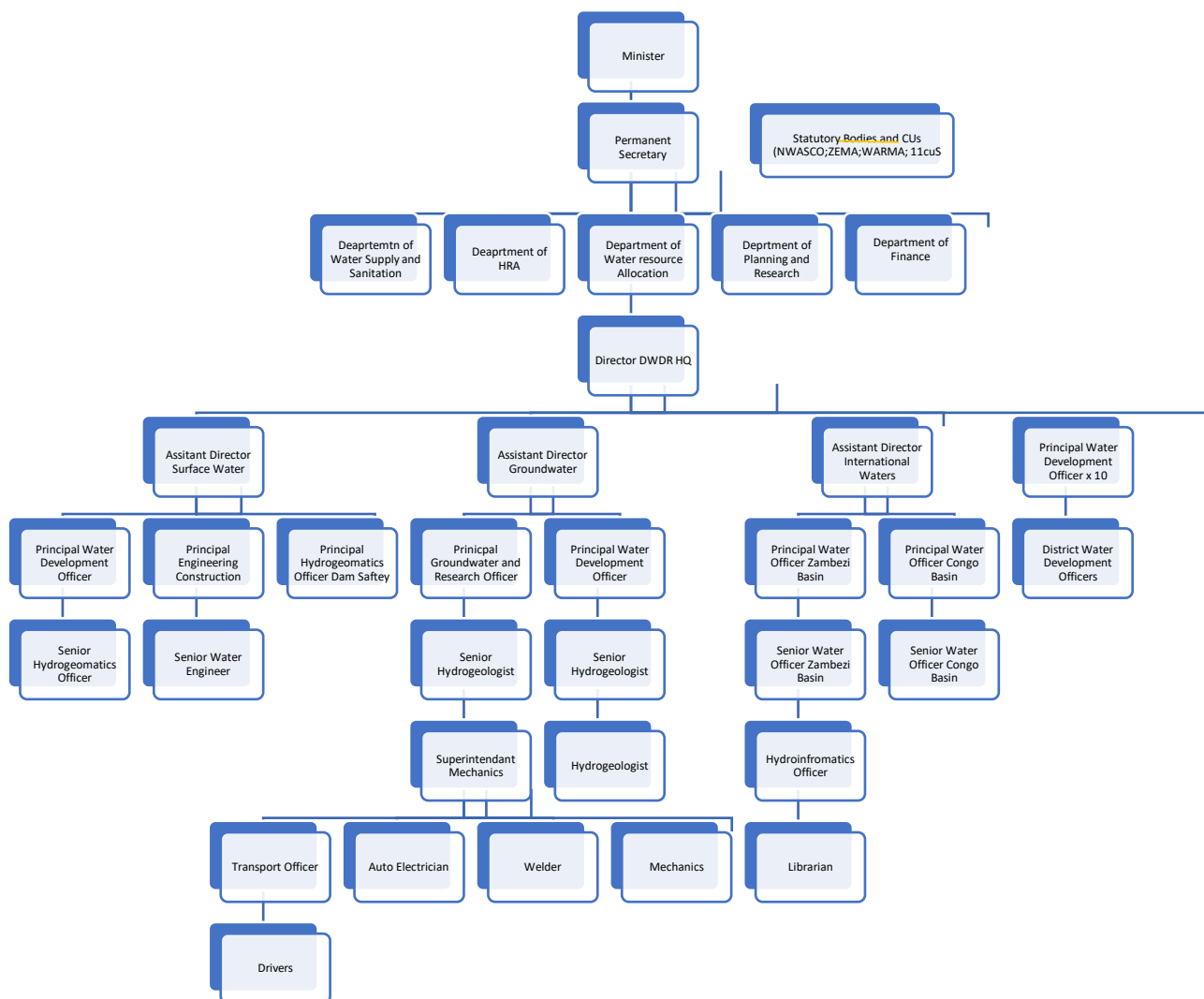
<sup>59</sup> MWDS Strategic Plan 2022-2026

<sup>60</sup> [https://www.mwds.gov.zm/?page\\_id=1079m](https://www.mwds.gov.zm/?page_id=1079m)

- iv. Provide technical guidance and support to stakeholder institutions on matters relating to water resources development in order to ensure effective utilisation;
- v. Collaborate with stakeholders in planning and implementation of water resources development programmes in order to ensure a harmonised approach to programme execution;
- vi. Conduct research on water development related issues in order to facilitate evidence-based planning and decision making;
- vii. Maintain a comprehensive geo-spatial database on dams to facilitate storage and retrieval of information for decision making;
- viii. Facilitate the development and review of policies and legislation on water in order to provide an appropriate framework for the effective management and implementation of programmes; and
- ix. Supervise the implementation of programmes and projects in order to recommend appropriate interventions and ensure attainment of set goals.

The organisation structure for MWDS is as shown at Figure 4.1.

**Figure 4.1: Organisation Structure – Ministry of Water Development and Sanitation (MWDS)**



**Source: MWDS Website**

### 4.3 Funding Arrangements and Budgets

The MWDS receives funding from Government to implement water resource management and development programmes. Table 4.1 below shows the funding details for DWRD.

**Table 4.1: Department of Water Resources Development Budget vs Actual 2021-2023**

Year	Budget K	Funding K	Variance K	Percentage Funding
2021	58,781,274.00	53,168,872.31	5,612,401.69	90.5%
2022	143,476,639.00	143,476,626.05	12.95	99.9%
2023	338,630,604.00	174,179,041.62	164,451,562.38	51.4%
August 2024	537,763,486.00	168,976,317.91	368,787,168.09	31.42%
<b>Total</b>	<b>1,078,652,003.00</b>	<b>539,800,857.89</b>	<b>538,851,145.11</b>	<b>50.04%</b>

Source: Ministry of Water Development and Sanitation Statement C 2021 to 2023

As can be seen in Table 4.1 above, the MWDS had a total budget allocation of K1,078,652,003 to support water resource management and development programs and activities, out of which K539,800,857.89 was funded representing 50.04% during the period under review. This resulted in underfunding of amounts totaling K538,851,145.11.

### 4.4 Key Stakeholders and their Roles in Water Harvesting

MWDS collaborates with key stakeholders such as Ministry of Agriculture (MoA), Ministry of Green Economy and Environment (MGEE), Water Resources Management Authority (WARMA) and Dam Committees among others to implement its mandate on water resource management and development. The above-mentioned stakeholders were engaged during the audit and their roles are as detailed below:

#### 4.4.1 Ministry of Agriculture

The MoA is the major user of water harvesting facilities through farmers who use the facilities for irrigation activities. The Ministry also manages irrigation dams as mandated by Government Gazette Notice No. 836 of 2016.<sup>61</sup>

#### 4.4.2 Ministry of Green Economy and Environment

The MGEE is mandated to promote the effective and sustainable use of the environment, as well as facilitating support for adaptation to, and mitigation of the effects of climate change.<sup>62</sup> It also provides weather information through the Zambia Meteorological Department (ZMD) to inform MWDS on prevailing weather conditions and rainfall patterns used to determine water availability.

<sup>61</sup> [https://www.agriculture.gov.zm/?page\\_id=871](https://www.agriculture.gov.zm/?page_id=871)

<sup>62</sup> [https://www.mgee.gov.zm/?page\\_id=197](https://www.mgee.gov.zm/?page_id=197)

In addition, the Forestry Department under MGEE plays a critical role in protecting water recharge zones.

#### **4.4.3 Water Resources Management Authority**

The WARMA is mandated to manage, develop, protect, and preserve water resources both surface and ground water in the country.<sup>63</sup>

#### **4.4.4 Dam Committee**

Dam Committees are appointed by community members to oversee dam infrastructure. They have a responsibility to take care of the infrastructure and surroundings and report any issues affecting the dam to the MWDS.

### **4.5 Process Description of Dam Construction**

Dam construction is a mitigation measure against rising water scarcity whose benefits include food security and the availability of water for livestock and fisheries among others.

Although there are many water harvesting technologies, the MWDS has predominantly implemented dams. Below is a description of the dam construction as a water harvesting programme.

#### **4.5.1 Needs Assessment**

The selection of the site for construction of water harvesting infrastructure is driven by Government policy direction or pronouncement and outcry from the community.

#### **4.5.2 Site Selection**

Once a district has been identified, a site selection is done taking into consideration several factors which include the watershed properties, such as slope, soil, geology, land cover, and catchment. Further, social-economic factors, such as proximity to roads and rivers/ streams, and potential environmental impacts are also considered. This step involves visiting potential sites to obtain coordinates and where available, use remote sensing techniques.

#### **4.5.3 Reconnaissance Survey**

After site selection, a thorough inspection is conducted to assess suitability for dam construction.

#### **4.5.4 Topographical Survey**

Once the reconnaissance survey is done and environmental impact assessment is approved, a detailed map of the area is created to understand the landscape and collect elevation data. This information is crucial for dam design and construction.

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<sup>63</sup> [https://warma.org.zm/?page\\_id=1545](https://warma.org.zm/?page_id=1545)



#### **4.5.5 Water Demand and Safeguards**

Considering environmental and social impacts, an assessment of the amount of water needed is conducted which involves estimating water requirements, potential effects on ecosystems and communities, and implementing mitigation measures.

#### **4.5.6 Detailed Engineering Design**

After the water assessment is complete, a plan for the dam, including its size, materials, and construction methods is developed. This step also involves community engagement to ensure the project's viability.

#### **4.5.7 Procurement of Works**

Thereafter, bids for the contracts are invited from contractors. The awarding of a contract for construction is done through Government procurement regulations and requires legal approval.

#### **4.5.8 Supervision and Monitoring**

Once the contract is signed and works have commenced, MWDS oversees the construction process to ensure it meets quality and safety standards. This involves regular inspections, progress reports and milestone assessments.

#### **4.5.9 Project Handover**

Upon completion of the water harvesting project, it is handed over to the users (local community) after which they are trained by the MWDS on dam utilisation and maintenance. The local community forms a dam user committee which is responsible for maintenance and utilisation of the dam. Terms of reference for dam management are developed and agreed by the community.

#### **4.5.10 Maintenance and Monitoring**

After the dam handover, the MWDS ensures that the dam infrastructure is well maintained and is in good condition by supervising and monitoring maintenance activities by the community. Beneficiary communities are spearheaded by dam committees to carry out minor maintenance works such as vegetation control along the dam embankments. The District Water Development Officer conducts periodic monitoring to assess the status and condition of the dam over time.

#### **4.5.11 Rehabilitation**

The MWDS conducts assessments to determine the extent of rehabilitation works required once an existing dam shows signs of failure.

## CHAPTER FIVE

### AUDIT CRITERIA

#### 5.0 Introduction

The chapter introduces the criteria that was used to assess the performance of the Ministry of Water Development and Sanitation (MWDS) with respect to its set targets and objectives.

#### 5.1 Criteria

Table 5.1 presents the audit questions, their corresponding assessment criteria and the sources from which the criteria were derived.

**Table 5.1: Audit Criteria**

<b>Audit Questions</b>	<b>Audit Criteria</b>	<b>Source of Criteria</b>
1. To what extent has the MWDS ensured that measures put in place have strengthened the institutional framework in the implementation of water harvesting programmes?	<ul style="list-style-type: none"> <li>i. The MWDS shall improve the operational systems by strengthening Policy and Legal Frameworks.</li> <li>ii. The MWDS shall facilitate the development and review of policies and legislation on water in order to provide an appropriate framework for the effective management and implementation of programmes.</li> <li>iii. The Ministry shall formulate and review Water Resource Development Strategies and Action Plans in order to facilitate resource mobilisation and attainment of set objectives.</li> <li>iv. The Water Resources Department (WRD) planned to provide guidelines on the operations of dams. In addition, the WRD planned to develop water resources regulations and guidelines.</li> </ul>	<ul style="list-style-type: none"> <li>i. MWDS Strategic Development Plan 2022 to 2026 page 19</li> <li>ii. <a href="https://www.mwds.gov.zm/?page_id=1079">https://www.mwds.gov.zm/?page_id=1079</a></li> <li>iii. <a href="https://www.mwds.gov.zm/?page_id=1079">https://www.mwds.gov.zm/?page_id=1079</a></li> <li>iv. National Water Policy 2010</li> </ul>

<p>2.To what extent are the measures developed by MWDS effective in ensuring availability of water harvesting infrastructure?</p>	<ul style="list-style-type: none"> <li>i. The MWDS in its Strategic Development Plan envisaged to increase national water storage capacity through construction of small and large dams.</li> <li>ii. The Ministry shall increase national water storage capacity through construction of dams and mapping.</li> <li>iii. The Ministry shall conduct research on water development and management, including water supply in order to generate information for decision making.</li> <li>iv. The Ministry shall enhance research and development in climate-smart technologies.</li> <li>v. The MWDS shall conduct research on water development related issues in order to facilitate evidence-based planning and decision making</li> <li>vi. The MWDS planned to implement and promote climate smart water harvesting technologies.</li> <li>vii. The Ministry shall build capacity by; Recruiting, training and introducing capacity building programmes of personnel in the relevant fields at all levels.</li> <li>viii. The Ministry shall design and implement water resources development projects in coordination with other related sectors.</li> <li>ix. Additionally, the MWDS shall collaborate with stakeholders on the planning and implementation of water resources development programmes to ensure a harmonised approach to programme execution.</li> </ul>	<ul style="list-style-type: none"> <li>i. Ministry of Water Development Sanitation and Environmental Protection Strategic Development Plan 2018 to 2021, page 5</li> <li>ii. MWDS Strategic development plan 2022 to 2026, under Strategic Objective number 1 – Improve Water Resource Development and Management page 19</li> <li>iii. Ministry of Water Development Sanitation and Environmental Protection Strategic development plan 2018 to 2021</li> <li>iv. MWDS Strategic development plan 2022 to 2026 page 19</li> <li>v. <a href="https://www.mwds.gov.zm/?page_id=1079">https://www.mwds.gov.zm/?page_id=1079</a></li> <li>vi. MWDS Strategic development plan 2022 to 2026 page 19</li> <li>vii. National Water Policy 2010</li> <li>viii. National Water Policy 2010</li> <li>ix. National Water Policy 2010 page 24,</li> </ul>
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<p>3. To what extent are the measures instituted by MWDS effective in ensuring the sustainability of water harvesting infrastructure?</p>	<p>i. The Ministry shall strategise to improve water harvesting facilities by rehabilitating one large dam and increase the number of small dams rehabilitated by 100 % by December 2021.</p> <p>ii. MWDS planned to improve water resource development and management by rehabilitating 40 small dams by December 2026.</p> <p>iii. The Ministry planned to improve water harvesting facilities by rehabilitating one large dam and increase the number of small dams rehabilitated by 100 % by December 2021.</p> <p>iv. MWDS shall improve water resource development and management by maintaining 468 small dams by December 2026.</p> <p>v. The MWDS shall monitor dam safety.</p>	<p>i. Ministry of Water Development, Sanitation and Environmental Protection (MWDSEP) Strategic Plan - 2018-2021</p> <p>ii. Ministry of Water Development and Sanitation Strategic Plan 2022-2026</p> <p>iii. MWDS Strategic development plan 2022 to 2026 page 19</p> <p>iv. According to the MWDS Strategic Plan - 2022-2026.</p> <p>v. National Water Policy 2010</p>
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## **CHAPTER SIX**

### **AUDIT FINDINGS**

#### **6.0 Introduction**

This chapter presents the findings based on evidence gathered to answer the audit questions. In line with the audit objectives, the audit findings are presented under the following headings:

- i. Institutional Framework to Implement Water Harvesting Programmes
- ii. Availability of Water Harvesting Infrastructure
- iii. Sustainability of Water Harvesting Infrastructure

#### **6.1 Extent to which the MWDS has ensured strengthening of Institutional Framework of Water Harvesting programmes**

An effective institutional framework for water harvesting ensures coordinated implementation and sustainability through clear policies, roles, and mechanisms. It also helps to maximise water harvesting benefits, addressing water scarcity and promoting water security.<sup>64</sup> The audit observed the following:

##### **6.1.1 Policy and Legislation Governing Water Harvesting Programmes**

According to the Strategic Plan 2022-2026, the MWDS shall improve operational systems by strengthening Policy and Legal Frameworks.<sup>65</sup> In addition, the MWDS shall facilitate the development and review of policies and legislation on water in order to provide an appropriate framework for the effective management and implementation of water harvesting programmes.<sup>66</sup> The audit, through interviews with MWDS officials, revealed that the Ministry developed several policies and guidelines which governed water resource development, including water harvesting. Examples include the Water Resources Management Act No. 21 of 2011 which regulates and provides guidelines on the construction of water works<sup>67</sup> and the 2010 National Water Policy which provides guidance on water resources development.

Additionally, the Zambia Water Investment Programme (ZIP) 2022-2030 was formulated for the advancement of national water security and sustainable sanitation by 2030. The Ministry, through

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<sup>64</sup> National Water Policy of 2010

<sup>65</sup> MWDS Strategic development plan 2022 to 2026 page 19

<sup>66</sup> [https://www.mwds.gov.zm/?page\\_id=1079](https://www.mwds.gov.zm/?page_id=1079)

<sup>67</sup> Water Resources Management Act No. 21 of 2011; Parts IX and XII

interviews, also stated that they were in the process of developing the Water National Adaptation Plan (NAP) which will address climate change issues affecting the water sector.

Further the Ministry through WRM Act No.21 of 2011, prescribed the creation of the Water Development Trust Fund to be used as a mobilisation tool for resources for the implementation of water resources projects. In addition, to mobilise and accelerate economic utilisation of water resources, the Ministry is in the process of domesticating the SADC Water Energy Food (WEF) Nexus Governance Framework which provides a platform for effective linkages with sectors such as energy and food. Although the Ministry was committed to formulating policies and strategies that would enhance water resource development, the audit established the following:

#### **6.1.2 Rainwater Harvesting Regulations in the MWDS Act**

The audit established, through a review of the WRM Act No.21 of 2011 that water harvesting was regulated through permits to the extent that rainwater was harvested by means of a dam, weir and barrage on a water resource. However, the Act did not regulate other types of water harvesting that were not on a water resource such as roof top, trench cum bund, contour bund, check dam and groundwater recharge pit. Unregulated water harvesting can lead to the depletion of local ground water resources potentially affecting hydrological balance in urban areas which could potentially increase flooding risks.

In response, the Ministry indicated that they had developed a Statutory Instrument (SI) which was approved in November 2024 to address the gaps in the Act. Although the SI had been developed, the Ministry is still unable to regulate other types of water harvesting as the Rainwater Harvesting Strategy that would address rainwater harvesting was still in draft form.

#### **6.1.3 National Water Policy**

The audit established that the MWDS used the National Water Policy of 2010, which was outdated as it did not address the increased demand for water amidst water scarcity; climate smart water technologies; and increased industrialisation and population growth.<sup>68</sup> Interviews further revealed that the Ministry was in the process of revising the policy. There is a risk that policies that do not evolve with changing environmental and social conditions can lead to over exploitation of water resources contributing to scarcity and ecological imbalances.

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<sup>68</sup> MWDS interview minutes; 18<sup>th</sup> June, 2024

In response, the Ministry indicated that the National Water Policy was launched on 3rd October 2024. Although the National Water Policy had been launched, it was only effective from November 2024 and did not address the concerns in the period under review.

#### **6.1.4 National Water Resource Master Plan**

In view of the urgency of water resources development and the need for socio-economic development, MWDS with the help of Japan International Cooperation Agency (JICA) developed the National Water Resources Master Plan in 1995 whose target was to remedy water scarcity and to meet the future needs in the water supply and agricultural sector. The Plan also showed the general direction of water resource development to be actualised by 2015.

The audit established that despite the expiration of the 1995 National Water Resources Master Plan in 2015, it was still in use by the MWDS which was attributed to the non - availability of funds to develop a new Plan. In the absence of an updated National Water Resources Master Plan, the Ministry was not adequately informed on water scarcity levels especially in light of climate change. Further, the Ministry was unable to accurately plan water usage and make decisions based on the current water levels and could not effectively implement measures to mitigate water scarcity.

In response, the MWDS submitted that it was their desire to ensure that the Plan was reviewed and updated to respond to current challenges regarding water resources management.

#### **6.1.5 Actualisation of Planned Strategies**

Interviews with MWDS officials and stakeholders<sup>69</sup> revealed that although the Ministry had made strides to develop plans and strategies for water resource development, including water harvesting, actualising these plans remained a challenge.

The audit established through interviews with MWDS that the Ministry had not implemented all projects as identified in the Master Plan. For instance, Mwomboshi and Kafulafuta Dams which were supposed to have been constructed by 2015, were only constructed in 2018 and 2023 respectively.

The audit further established that, despite the creation of the Water Development Trust Fund, the Master Plan was not fully actualised. The Ministry's failure to actualise plans and strategies was also attributed to lack of institutional capacity and planning to undertake more projects.<sup>70</sup>

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<sup>69</sup> MoA, MGEE, WARMA and JICA

<sup>70</sup> JICA Interview minutes;

Without effective implementation of the Master Plan, communities may be exposed to water insecurity.<sup>71</sup>

#### **6.1.6 Operational and Maintenance Guidelines**

According to the National Water Policy 2010, the Department of Water Resource and Development (DWRD) planned to provide guidelines on the operations by private or public dam owners and operators. In addition, the DWRD planned to develop water resources regulations and guidelines.<sup>72</sup>

Operational and Maintenance Guidelines are necessary for the community as they inform and provide guidance on the utilisation and maintenance of dams to ensure their sustainability. Guidelines also provide standardisation in the management of dams.<sup>73</sup> However the audit through interviews with the MWDS officials revealed that the Ministry had neither developed guidelines nor regulations for the operation and maintenance of dams.

Interviews further revealed that the Ministry used a draft Dam Operational and Maintenance Manual which had been developed with support from German Agency for International Cooperation (GIZ) and World-Wide Fund for Nature (WWF) as well as Food and Agricultural Organisation (FAO) guidelines. For example, DWRD Chipata Provincial Office used GIZ draft Dam Operations and Maintenance Manual while other provinces visited used FAO guidelines. In addition, it was revealed that the Ministry was in the process of domesticating dam maintenance and operational guidelines, however there was no evidence to show that the process had commenced as of August, 2024. Without domesticating regulations and guidelines, the Ministry may continue adopting various guidelines which may result in non-standardisation of process activities. This in turn may lead to process inefficiencies during dam maintenance activities.

#### **6.2 Extent to which measures developed by MWDS are effective in ensuring availability of water harvesting infrastructure**

The MWDS in its Strategic Development Plan envisaged to increase national water storage capacity through construction of small and large dams.<sup>74</sup>

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<sup>71</sup> National Water Policy 2010; Pg i

<sup>72</sup> National Water Policy 2010; pg 24

<sup>73</sup> <https://documents1.worldbank.org/curated/en/376861619156795223/text/Good-Practice-Note-on-Dam-Safety.txt>

<sup>74</sup> Ministry of Water Development Sanitation and Environmental Protection Strategic development plan 2018 to 2021, page 5

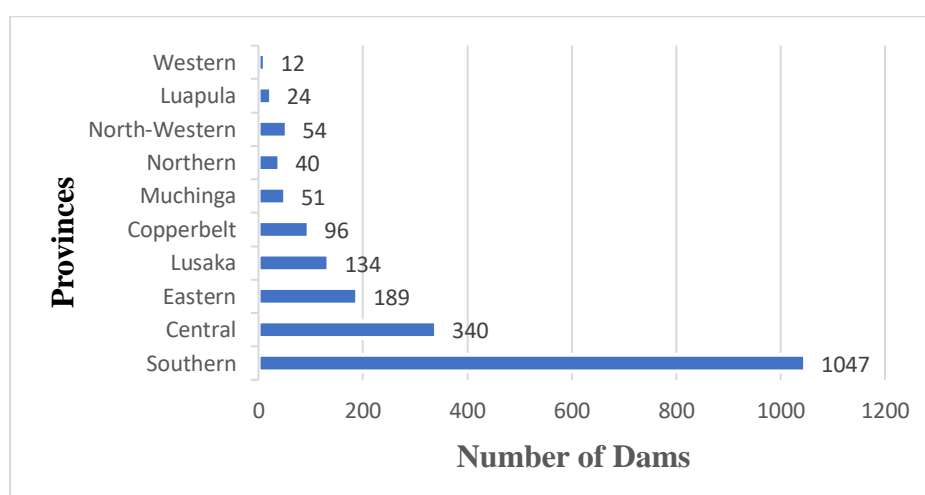


Rain water harvesting infrastructure is increasingly recognised as a crucial solution to address water scarcity and it is important for water resource conservation, flood mitigation and erosion control, climate change adaptation and water security. It is also a cost-effective alternative to conventional water supply systems. The audit observed the following:

### 6.2.1 Number of Dams Constructed

The audit established through document review that the country had a total of 1,987 dams<sup>75</sup> as shown in Figure 6.1 below.

**Figure 6.1: Summary of Dams Per Province**

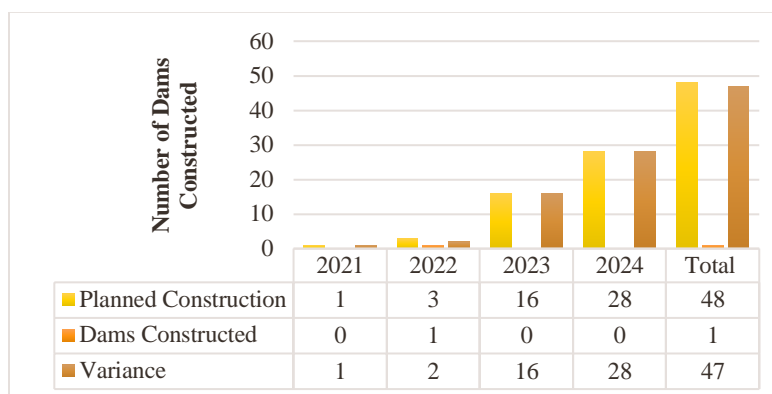


**Source:** MWDS Dam Inventory Report as at June 2024

Further, a review of the Estimates of Revenue and Expenditure for the period 2021-2024 revealed that the Ministry planned to construct a total of forty-eight (48) dams. However, only Kapekesa Dam in Chasefi District was constructed. Figure 6.2 shows the number of planned against actual dams constructed during the period under review.

<sup>75</sup> National Wide Dam Inventory Report - MWDS

**Figure 6.2: Number of Planned Vs Actual Dams Constructed**



**Source:** MWDS - Estimates of Expenditure (Output Based Budgets) 2021 -2024

As can be seen in the table above, there was an increase in the planned number of constructions from one (1) in 2021, to three (3) in 2022, sixteen (16) in 2023 and twenty-eight (28) in 2024 while constructions remained stagnant at one (1) during the period under review. A site inspection of Kapekesa Dam planned for construction in 2021 and constructed between 2022 and 2023, revealed that the contractor had completed works and was issued with Project Completion Certificate on the 27<sup>th</sup> December 2023. Although the contractor handed over the Dam to MWDS, the dam had not been commissioned and handed over to the community as of September 2024, nine (9) months after completion. Figure 6.3 below shows the newly constructed Kapekesa Dam.

**Figure 6.3: Newly constructed Kapekesa Dam in Chasefu District**



**Source:** Performance Audit Photographic Records 2024

A review of the MWDS Performance Assessment Report for 2021 revealed that the Ministry planned to construct four (4) large dams and eighty-five (85) small dams by December 2021. However, three (3) large dams and ten (10) small dams were constructed by December 2021.<sup>76</sup>

Interviews with MWDS Headquarters, Provincial and District officers revealed that failure to construct dams was attributed to the Ministry's non-prioritisation of the implementation of dam construction.

The low number of dams constructed poses a risk that the country may be water insecure due to unavailability of water harvesting infrastructure to harness water. The audit also observed delayed dam construction as detailed below:

#### **6.2.1.1 Delayed Construction of Dams**

A review of MWDS Dam Status Reports for the period 2021 to 2024 revealed that there were delays in the commencement and completion of water harvesting construction projects. The audit further established that physical progress for the outstanding projects ranged between 10% and 80%. In this regard, fourteen (14) dams planned for construction between 2021 and 2023 were delayed, with nine (9) dams delayed by one (1) month, four (4) by (6) months while one (1) was completed. **Appendix 5 refers.**

Delayed construction works were due to discrepancies between the timing of contract approval, release of funds, and lengthy procurement processes. It was also revealed that there was a centralised procurement system of contracts and materials which exacerbated delays further. The officials added that while the approval for water harvesting infrastructure and planning for internal works was undertaken within the second and third quarters of a year, funds for the contract and planned works were only released in the fourth quarter. This delayed project implementation and resulted into funds being returned to Ministry of Finance and National Planning (MoFNP) at the end of the year. It was further stated that, the process of requesting for returned project funds was lengthy thereby delaying project completion timelines.

The risk of delay of completion of dam construction projects may negatively affect the water security status of the country.

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<sup>76</sup> MWDS Performance Assessment Report; August 2021

### **6.2.2 Lack of Research**

According to the MWDS Strategic Plan 2018 - 2021, the Ministry shall conduct research on water development and management, including water supply in order to generate information for decision making.<sup>77</sup>

One of the functions of the DWRD is to conduct research on water development related issues to facilitate evidence-based planning and decision making. The audit however established through a review of Estimates of Revenue and Expenditure 2021-2023 that the Ministry had not planned or budgeted for research in water resources development. Further, interviews with the Ministry, Provincial and District officers also confirmed that there was no research conducted on water development and management which would help provide efficient and effective water harvesting methods. The lack of research by the Ministry was attributed to failure to give prominence to the function due to competing priorities.

The Ministry's failure to conduct research resulted in its inability to identify and implement less complex and cost-effective methods of water harvesting and exacerbated the inadequacy of water harvesting infrastructure.

### **6.2.3 Implementation of other Water Harvesting Techniques**

According to the MWDS Strategic Plan 2018 – 2021, the Ministry planned to implement and promote climate smart water harvesting technologies. In addition, the MWDS planned to improve water resource development and management by having increased volume of national water storage through development and implementation of climate-smart water harvesting techniques and promotion of water harvesting.<sup>78</sup>

The audit established that while the MWDS had planned to implement 100 climate smart water harvesting technologies by December 2021, the Ministry had not achieved the target as envisaged in its Strategic Plan 2018-2021. From the targeted 100 climate smart water harvesting technologies, the Ministry through the AWARE project in 2021, implemented seven (7) technologies which included rooftop, trench cum bund, contour bund, check dam and groundwater recharge pit among others, representing 7% implementation.<sup>79</sup>

Further, a review of the Estimates of Revenue and Expenditure and Annual Work Plans for the period 2021 - 2024 revealed that the MWDS did not plan for the implementation of climate smart

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<sup>77</sup> Ministry of Water Development Sanitation and Environmental Protection Strategic development plan 2018 - 2021

<sup>78</sup> Eighth National Development Plan 2022-2026

<sup>79</sup> MWDS Performance Assessment Report -August 2021.

water harvesting technologies and this was confirmed through interviews held with the MWDS officials.

The Ministry's inability to achieve its targets was attributed to inadequate funds for infrastructure development to support climate smart water harvesting technologies as well as inadequate sensitisation of stakeholders and the general public on climate smart technologies.<sup>80</sup> In addition, there was no law to compel the design and construction of buildings to facilitate water harvesting technologies such as rooftop.

The failure by the MWDS to implement climate smart water harvesting technologies poses a risk of continued water scarcity as the Ministry may fail to increase the number of water harvesting infrastructure.

#### **6.2.4 Resource Mobilisation**

Mobilisation of resources for water harvesting infrastructure ensures the availability of financial, human, technological, and material resources necessary to design, construct, operate, and maintain effective water harvesting programmes, thereby securing sustainable water supply and supporting community development. The following were observed:

##### **a. Failure to Actualise Resource Mobilisation Strategies**

According to a review of the ZIP 2022-2030, investments in water security and climate-resilient development required an estimated US\$5.75 billion between 2022 and 2030.

However, interviews with the MWDS officials revealed that there was weak mobilisation of resources despite the Ministry having developed various strategies. For instance, the ZIP had not been implemented as the Ministry had not developed the Implementation Road Map and Resource Mobilisation Strategy as of September 2024. This resulted in failure to undertake planned water harvesting projects such as development of water technologies for saving, recycling, irrigation and sustainable management for household; agriculture and industrial purposes; and improved water storage through artificial recharge. The failure to implement water harvesting projects as provided for in the ZIP poses a risk of increased water insecurity, reduced economic activities as well as negative socio-impact on citizens.

In response, the Ministry indicated that the ZIP Resource Mobilisation Strategy had been developed and was launched in October 2024.

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<sup>80</sup> MWDS Performance Assessment Report -August 2021.

However, despite the Strategy being launched, there was still weak mobilisation of resources during the period under review.

## **b. Capacity Building**

According to the National Water Policy, to implement measures of water harvesting, the MWDS shall build capacity by recruiting, training and introducing capacity building programmes of personnel in the relevant fields at all levels.<sup>81</sup>

The audit established the following:

### **i. Staff Establishment**

A review of the MWDS Organisation Structure Report for 2023 revealed that although the staff establishment of the DWRD was filled, it was inadequate to enable the Ministry fulfil its mandate on water security.<sup>82</sup> A further review of the Report revealed that, a number of key positions that the Ministry required to perform its functions were omitted and that there was need to create these positions. For example, one of the functions of the DWRD is to construct, rehabilitate and maintain water resource infrastructure to harness water for use. However, this function could not be fully executed as the DWRD structure had not provided for personnel to do the actual works such as bricklayers and carpenters but only provided for a district water development officer, engineering assistant and general worker. This resulted in outsourcing of works which poses a risk of incurring considerably higher costs in comparison to having inhouse expertise.

### **ii. Low Capacity Building for Officers**

Interviews with MWDS officials revealed that the district officers were not capacitated for activities such as identifying sites for dam construction and surveillance hence relied on provincial staff. The district officers added that apart from the theoretical know how that most officers possessed from their tertiary education, they were not oriented into their daily activities and responsibilities as the Ministry had not been conducting orientation.

In the case of Western Province, interviews revealed that despite an orientation workshop having been planned for in 2023, it was not held due to inadequate funds. Low capacitation in technical skills to implement water harvesting projects was attributed to the Ministry's failure to create synergies with technical experts to help build capacity in dam construction and rehabilitation.<sup>83</sup>

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<sup>81</sup> National Water Policy 2010. Pg 42

<sup>82</sup> MWDS interview Minutes; 8<sup>th</sup> February, 2024. Pg 4

<sup>83</sup> MWDS interview minutes; 18<sup>th</sup> June 2024.

The failure by the Ministry to invest in capacity building resulted in reliance on provincial staff as well as outsourcing which resulted in under utilisation of district officers.

### **iii. Appropriate Tools**

The audit established that the MWDS lacked appropriate tools to implement water harvesting programmes. Interviews with MWDS officials revealed that only the Ministry Headquarters had survey equipment which included two Differential Global Positioning Stations (DGPS) yet only one was functional. The audit also established that the Ministry had a roller compactor and tipper truck, both in good condition but did not have a bulldozer, excavator, grader and lowbed which constituted a construction and rehabilitation equipment set. The Ministry also lacked sonar equipment for bathymetric surveys and reliable utility vehicles to aid their work.<sup>84</sup>

In the absence of survey and other equipment, provincial and district officers were unable to effectively carry out surveillance and identify new dam sites. The lack of complete construction and rehabilitation equipment forced the Ministry to outsource the aforementioned works. This resulted in delayed construction/rehabilitation works and extra costs incurred for the outsourced works, attributed to long procurement procedures. Interviews with the Ministry representatives revealed that they did not have adequate equipment for water harvesting due to non prioritisation of funds.

The failure by the Ministry to invest in appropriate construction/rehabilitation tools, poses a risk that water harvesting activities will not be implemented efficiently and effectively.

#### **6.2.5 Coordination Among Stakeholders**

According to MWDS National Water Policy 2010, the Ministry shall design and implement water resources development projects in coordination with other relative sectors.<sup>85</sup>

Creating strong community structures before project implementation is key to ensure the success of a project as it builds acceptance and ownership by the local communities.<sup>86</sup>

The audit established, through interviews, that MWDS collaborated with stakeholders<sup>87</sup> in the implementation of water harvesting programmes.

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<sup>84</sup> Ibid

<sup>85</sup> National Water Policy 2010; pg 24

<sup>86</sup> World Vision Interview Minutes; 21<sup>st</sup> May, 2024

<sup>87</sup> MoA, WARMA and MGEE

The audit observed the following:

**a. Low Collaboration at Planning Stage**

The audit established that there was lack of coordination in planning for water harvesting projects among stakeholders. While the MWDS indicated that the dam construction process included stakeholder engagement during the Environmental Impact Assessment (EIA) and needs assessments, interviews with MoA indicated that they were not engaged during the project design stage.

Additionally, interviews with dam committee members<sup>88</sup> revealed that they were not engaged at the planning stage hence dam designs were not accommodative to the activities of local communities which included animal watering, irrigation and various domestic purposes.

For example, due to non-designation of areas for animal watering, animals drunk from the dams as observed at Mwase dam in Lundazi (see Figure 6.4 (a) below). Additionally, community members were observed washing in Lui and Shimboela dams (see Figure 6.4 (b) below). Further, it was observed that there was no provision for water abstraction at Lui dam as shown in Figure 6.5 below.

**Figure 6.4: (a) Animals drinking from Mwase Dam (b) community members washing in dam area at Lui Dam**



<sup>88</sup> Dam committee members from Kimiteto and Mitukutuku dams in Solwezi; Shimano dam in Nkeyema; Lui dam in Luampa; and Mwase dam in Lundazi.



**Figure 6.5: Pupils fetching water from the Lui dam and rolling drums over dam walls**



**Source:** Performance Audit Photographic Records 2024

On the contrary, the audit observed that there was collaboration in selected districts<sup>89</sup> at planning stage. In this regard, physical inspections and interviews confirmed that the dams were designed with canals for irrigation and domestic purposes. Figure 6.6 (a and b) below shows an irrigation system and canal at Nabuyani and Siandwazi Dams.

**Figure 6.6: (a) Irrigation system at Nabuyani dam (b) Canal at Siandwazi Dam**



**Source:** Performance Audit Photographic Records 2024

The low collaboration at planning stage in some districts was attributed to the Ministry's failure to provide for community education and lack of a formal platform for effective stakeholder engagement as these activities were not planned for. As a result, there is a risk of dam wall

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<sup>89</sup> Nabuyani dam in Kalomo, Siandwazi dam in Zimba, Mwomboshi dam in Chisamba and Shishamba dam in Nkeyema Districts.

weakening due to activities such as animal watering, irrigation and various domestic activities. Furthermore, there is a risk of lack of ownership and optimal utilisation of dams by communities.

#### **b. Low Collaboration in the Implementation of Water Harvesting**

The audit established that there was low collaboration in the implementation of water harvesting activities among the following stakeholders:

##### **i. Water Resource Management Authority (WARMA)**

WARMA regulations require an individual/firm agency that intends to construct a public or private dam to apply and await WARMA's approval for the design report, construction drawings and guidance on the size and quantity of the dam.

The audit established that while this requirement was effectively enforced on private individuals/firms, there was no evidence that the MWDS adhered to this regulation. ZEMA also confirmed this status quo that most MWDS projects did not seek WARMA's approval before construction of dams. They further added that there was an improvement in seeking pre-approvals for donor funded projects.

Interviews with WARMA and MoA further revealed that the low response to collaborate with the Authority was attributed to the failure by MWDS to raise awareness among LAs and the lack of WARMA presence in 109 out of 116 districts. Failure LAs by to collaborate with WARMA in the issuance of land poses a risk that areas sited for dam construction or indeed, water protected areas may be encroached upon.

##### **ii. Zambia Meteorological Department**

Zambia Meteorological Department (ZMD) under MGEE collaborated with MWDS by providing weather data which enabled the MWDS make informed decisions on site selection for dam construction based on prevailing weather conditions and rainfall patterns. However, despite strides by ZMD to procure weather stations across the country, they were unable to provide accurate weather data, including rainfall patterns as the weather stations were not sufficient and were geographically spaced. This may compromise the quality, timeliness and consistency with which the data is provided thereby affecting the viability of dam site selection.

##### **iii. Ministry of Agriculture (MoA)**

Although MWDS and MoA had made collaborative efforts to develop water harvesting infrastructure, the audit established that collaboration was low. The audit revealed that while the

MWDS had the mandate to implement water harvesting programmes, MoA also developed water harvesting infrastructure without the involvement of MWDS. For instance, MoA rehabilitated eight (8) dams <sup>90</sup>in four (4) provinces at a total cost of USD 14,465,078.15 through the Irrigation Development Support Project (IDSP). The contract duration of the rehabilitation projects was eleven (11) months, with a start date of 1<sup>st</sup> January 2024 and a completion date of 30<sup>th</sup> November 2024.

The low collaboration was further confirmed during a site inspection of Ndoni and Nachibinga Dams in Pemba District and Nabowa Dam in Kaoma District where project works were supervised by the MoA in the absence of MWDS. It was further noted that extension officers who were non-engineering staff from MoA monitored the project works at Ndoni and Nachibinga Dams. The absence of engineering staff from the MWDS poses a risk that the quality of rehabilitation works may be compromised.

The low collaboration among stakeholders in the implementation of water harvesting programmes was attributed to the lack of Legal Framework to compel stakeholders to engage with MWDS which made it difficult to create synergies as priorities among the players differed. This may result in lack of oversight by MWDS and fragmented implementation of water harvesting infrastructure.

### **6.3 Extent to which Measures Instituted by MWDS are Effective in Ensuring the Sustainability of Water Harvesting Infrastructure**

Regular maintenance and repair of water harvesting infrastructure ensures its sustainability. It also guarantees long-term reliability; minimizes costs; fosters community engagement and ownership; ensures water quality and safety, efficiency and effectiveness in collecting, storing, and distributing water; thereby supporting climate resilience, food security, and community well-being.

The audit observed the following:

#### **6.3.1 Rehabilitation of Dams**

The audit established through a review of the MWDS 2021 Annual Report that approximately, 70% of dams required rehabilitation as they had been in existence as far back as 1960 with

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<sup>90</sup> Ngolongozya Dam in Zimba District, Nachibanga and Ndoni Dams in Pemba District, Makaba Dam in Namwala District-Southern Province; Chikowa Dam in Mambwe District-Eastern Province; Nabowa Dam in Kaoma District-Western Province; Kanyiko Dam in Kasempa District-North-Western Province; and Kawiko Dam in Mwinilunga District-North -Western Province.

structural integrity compromised due to breaches, leakages and damaged embankments.<sup>91</sup> Further the Performance Assessment Report for 2021 revealed that the Ministry had planned to rehabilitate one (1) large dam and fifty (50) small dams by December 2021. The audit however established that, the MWDS did not achieve the targets as they did not rehabilitate the planned large dam, while seventeen (17) small dams, representing 34% were rehabilitated by December 2021.<sup>92</sup> Further, documentary review of the MWDS Strategic Plan 2022-2026, revealed that the Ministry planned to improve water resource development and management by rehabilitating forty (40) small dams by December 2026. An analysis of the MWDS Dam Status Report 2022 to 2023<sup>93</sup> revealed that the Ministry had planned to undertake rehabilitation of two (2) dams in 2021, five (5) dams in 2022, six (6) dams in 2023 and six (6) in 2024. See Table 6.1 below for details of dams planned for rehabilitation.

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<sup>91</sup> 2021 MWDS Annual Report

<sup>92</sup> MWDS Performance Assessment Report; August 2021

<sup>93</sup> MWDS current projects on water harvesting in the country 2021 - 2024

**Table 6.1: List of Dams Planned for Rehabilitation 2022 - 2024**

Year	Dam Name	Province	District	% of Works	Comment
2021	Nabuyani	Southern	Kalomo	100	Completed
	Dimba	Southern	Monze	100	Completed
2022	Akansokoshi	Northern	Luwingu	100	Completed
	Mitukutuku	N/Western	Solwezi	100	Completed
	Singonya	Southern	Monze	100	Completed
	Siazwela	Southern	Sinazongwe	100	Completed
	Mwase	Eastern	Lundazi	85%	WIP
2023	Amose	Eastern	Petauke	57%	Contractor has mobilised at all sites apart from Chibesakunda which was cancelled due to landownership wrangles.
	Lutwazi	Eastern	Petauke	25%	
	Chibesakunda	Muchinga	Shiwangandu	0%	
	Nangoma	Central	Mumbwa	30%	
	Chitindi	Northern	Mbala	90%	
	Kabombwa	Western	Nkeyema	75%	
2024	Kabulamwanda	Southern	Namwala	0%	The Ministry is in the process of engaging a consultant to undertake feasibility studies.
	Sikalelwa	Southern	Monze	0%	
	Kabanga	Southern	Choma	0%	
	Bulanda	Southern	Pemba	0%	
	Kandesha	Central	Mumbwa	0%	
	Lupande	Eastern	Katete	0%	

**Source:** MWDS current projects on water harvesting in the country 2021 - 2024

As can be seen in Table 6.1 above, during the period under review the Ministry planned to undertake a total of nineteen (19) rehabilitation works on dams out of which, six (6) were completed by 2022, six (6) were work in progress while seven (7) dams were outstanding.

The delay in rehabilitation was partly caused by non-availability of contractors on site due to funding delays.<sup>94</sup> For example, field inspection in March 2024, of Mwase dam in Lundazi district revealed that rehabilitation had been ongoing for the past three years, even though the contract

<sup>94</sup> Planned Dam Rehabilitation Report 2024



duration was only one year. It was further observed that the contractor was not on site and that all equipment had been withdrawn by the contractor.

The low rate of dam rehabilitation poses the risk of high cost of rehabilitation and dam failure which may result in reduced number of operational dams to harvest water. Further, dam failure may also result in flooding which poses a risk of destruction to both life and property. Figure 6.7 below shows examples of dam failure at Kabukafu and Muzya dams.

**Figure 6.7: (a) Kabukafu Dam in Kasempa District (b) Muzya Dam in Zimba District**



**Source:** Performance Audit Photographic Records 2024

### **6.3.2 Maintenance of Dams**

According to the MWDS Strategic Plan 2022 - 2026, the Ministry planned to improve water resource development and management by maintaining 468 small dams by December 2026.<sup>95</sup>

The MWDS was responsible for the overall maintenance of dams by ensuring the formation of Dam Committees, sensitisation of users and provision of working tools.<sup>96</sup>

Proper maintenance of dams reduces the chances of structural deterioration and enhances the sustainability of the dam. In addition, the cost of maintenance is minimal compared to the costs of major repairs, loss of life and property, and litigation.<sup>97</sup>

#### **6.3.2.1 Number of Dams Maintained**

Documentary review of thirty-nine (39) Dam Inspection Reports for 2021 to 2023 submitted by seven (7) MWDS Provincial Offices showed that maintenance works which included fixing of

<sup>95</sup> MWDS Strategic Plan 2022-2026 Pg 17

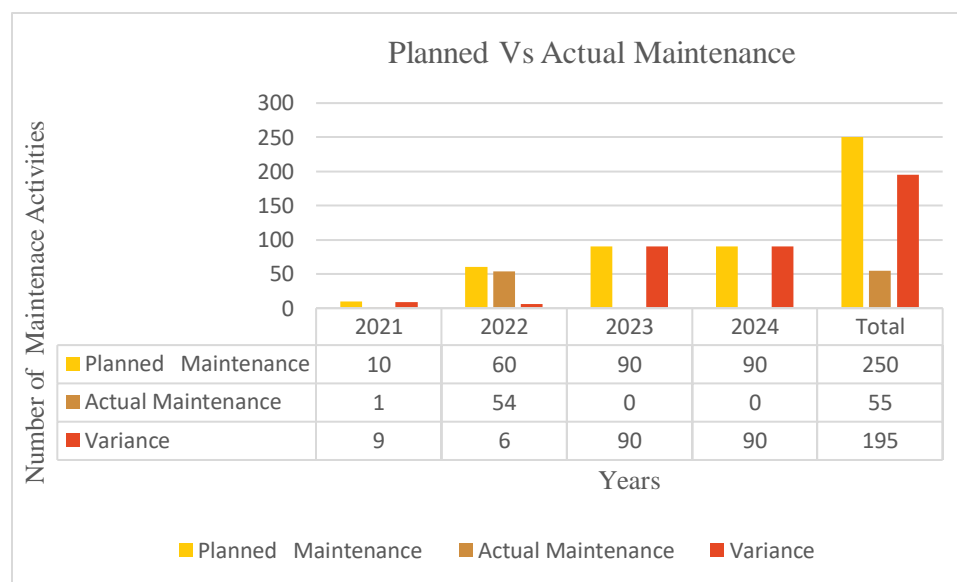
<sup>96</sup> Working tools refer to shovels, slashers, sickles, axes, wheelbarrows and sometimes cement and sand.

<sup>97</sup> <https://oklahoma.gov/content/dam/ok/en/owrb/documents/dam-safety/DamMaintenanceGuidelines.pdf>

cracks and leakages on dams and removing deep-rooted trees on embankments were conducted during the period under review. **Appendix 6 refers.**

A further review of the Estimates of Revenue and Expenditure for the period 2021-2024 revealed that the Ministry planned and conducted maintenance activities as shown in Figure 6.8 below.

**Figure 6.8: Number of Planned Vs Actual Dam Maintenance Activities**



**Source:** Estimates of Revenue and Expenditure (Output Based Budgets) 2021 -2024

As can be seen in Figure 6.5 above, the Ministry planned to maintain 10, 60, 90 and 90 dams in the years 2021, 2022, 2023 and 2024 respectively. From the total planned activities, the Ministry conducted maintenance of one (1) dam representing 10% and fifty-four (54) dams representing 90% in 2021 and 2022 respectively. In 2023 and 2024 no maintenance activities were conducted. In response, the Ministry indicated that 770 dams were planned for maintenance under the Drought Emergency Response Plan out of which, ninety-seven (97) dams were maintained representing 12.6% as at November 2024.

Additionally, physical inspections revealed that out of thirty-seven (37) dams inspected, twenty (20) were maintained while seventeen (17) were not maintained. **Appendix 7 refers.**

For example, as depicted in Figure 6.9 below, there was overgrown vegetation, trees on embankments and weeds in and around Kantolo Weir.

**Figure 6.9: (a) Overgrown vegetation on embankment (b) Overgrown weeds**



**Source:** Performance Audit Photographic Records 2024

The low number of dams maintained was attributed to the following:

**a. Inactive Dam Committees**

A physical inspection revealed that out of the thirty-seven (37) dams visited, sixteen (16) had Dam Committees, fifteen (15) had none while six (6) were work in progress. **Appendix 8 refers.** The audit through interviews with Dam Committee members established that there was low community participation in the maintenance of dams which was attributed to lack of incentives and inactive Dam Committees.

Further, physical inspections revealed that twelve (12) out of sixteen (16) dams with inactive Dam Committees were observed to be in a bad state of repair, for example, Kimiteto Dam in Solwezi and Membe Dam in Chasefu Districts.

**b. Lack of Maintenance Tools**

Interviews with the MWDS revealed that despite the Ministry having tools such as shovels, axes, machetes, hoes, wheel burrows and slashers for maintenance purposes, they were inadequate to maintain the total number of dams in the country.

Interviews with Dam Committees revealed that four (4) committees had maintenance tools, nineteen (19) had none, while the audit was unable to establish the availability of working tools at four (4) dams, as there were no committee member/s found at the time of the audit in June, 2024. The balance of ten (10) were either dams under construction or rehabilitation. **Appendix 9 refers.** Low dam maintenance poses a risk of dam failure and high maintenance costs ultimately reducing the number of operational water harvesting infrastructure.



### **6.3.3 Monitoring of Water Harvesting Infrastructure**

According to the National Water Policy 2010, the MWDS shall monitor dam safety.<sup>98</sup>

Monitoring dam safety is a critical practice to ensure the stability of a dam and protect downstream communities and is used to assess dam safety and develop appropriate maintenance or remediation plans.

The audit established that there was lack of surveillance and low inspection of dams.

#### **6.3.3.1 Dam Inspections**

The audit established that the Ministry did not regularly conduct dam inspections. Interviews with MWDS officials revealed that monitoring activities were conducted at least once annually. Review of MWDS Annual Report for 2021 revealed that the Ministry had neither planned nor conducted inspections in 2021 due to non prioritisation of inspections and lack of transport. Further, a review of Annual Report for 2022 revealed that target of seventy (70) dam inspections were exceeded as ninety-seven (97) dams/weirs were inspected while no information was availed for 2023 as of September, 2024.

Furthermore, the audit established that the Ministry had no equipment such as dumpy level and DGPS to carry out inspections which would provide the Ministry with continuous data on dam performance and enable early identification of potential problems.

In the absence of regular dam inspections, actions of community members were left unchecked and resulted in unsustainable dam practices such as gardening activities within the 50-meter dam buffer zone and sand mining which may pose risks of ecological disruption; increased sedimentation; water scarcity; water quality degradation; economic losses and food insecurity.

Site visitations also revealed the following:

#### **a. Dam Encroachment**

The audit through physical inspections revealed that some members of the community had encroached and constructed private properties around some dams. For instance, the audit observed several constructions such as dwelling houses at Mahilo Dam in Kaoma, a fish pond and resort at Katembula Dam in Lufwanyama and constructions at Mitukutuku Dam in Solwezi. Figure 6.10

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<sup>98</sup> National Water Policy 2010; pg 24

shows fishponds constructed on the banks of the Katembula Dam and Figure 6.11 shows constructions at Mitukutuku Dam below.

**Figure 6.10: (a): Fishponds and a shelter at Katembula Dam**



**Figure 6.11: (b): Constructions at Mitukutuku Dam**



**Source: Performance Audit Photographic Records 2024**

#### **b. Unlawful Dam Utilisation**

Community members were seen washing laundry on the banks of the dams while gardening activities were observed upstream and taking place within the fifty 50m buffer zone contrary to best practices. Figure 6.12 below shows overgrown vegetation at Chilimulilo Dam (a) and gardening activities within 50m buffer zone at Kantolo Wier (b).

**Figure 6.12: a) Overgrown vegetation at Chilimulilo Dam b) Gardening activities within 50m at Kantolo Weir**



Source: Performance Audit Photographic Records 2024

### **c. Unsustainable Cutting of Trees**

The audit established, through interviews with MWDS officials, that unsustainable forest management practices such as tree cutting, inappropriate forest harvesting as well as non-planting of trees had increased runoff water. This in turn increased siltation and consequently reduced reservoir size.

Additionally, among others, indiscriminate cutting of trees contributed to reduced levels of water in the dams. For example, at Siandwazi Dam in Zimba District, gardening activities were halted due to reported reduced water levels. Figures 6.14 (a) and (b) below show reduced levels of water in Shimboela and Siandwazi Dams. Similarly, Figure 6.16 below shows a dried Shimano Dam in Nkeyema District.



**Figure 6.13: (a) Reduced water levels in Shimboela Dam in Kaoma District b) Siandwazi Dam in Zimba District**



**Figure 6.14: Dried up Shimano Dam in Nkeyema District**



**Source:** Performance Audit Photographic Records 2024

## **CHAPTER SEVEN**

### **CONCLUSION**

#### **7.0 Introduction**

This chapter highlights the conclusion made by the audit after considering the overall objective of the audit and the role of the Ministry of Water Development and Sanitation (MWDS) to ensure strengthened Institutional Framework, availability and sustainability of water harvesting infrastructure.

#### **7.1 Overall Conclusion**

The audit concludes that efforts towards the construction of dams, research, promotion of climate smart water harvesting technologies, resource mobilisation and stakeholder collaboration were not effective in increasing availability of water harvesting infrastructure to mitigate water scarcity.

The audit also concludes that MWDS did not effectively and efficiently ensure sustainability of existing water harvesting infrastructure as there was under-performance in the construction, rehabilitation and maintenance of infrastructure.

#### **7.2 Specific Conclusions**

##### **7.2.1 Strengthening of Institutional Framework in the implementation of water harvesting programmes**

While there is an existing Regulatory Framework and Strategies for water harvesting, the Framework is outdated hence has not provided for climate smart water harvesting technologies and the Ministry has not actualised its planned Strategies to mitigate water scarcity.

##### **7.2.2 Measures developed by MWDS in ensuring availability of water harvesting infrastructure**

The Ministry has made ambitious plans for the construction of dams during the period under review without accompanying resources for implementation resulting in low and delayed construction. Further, the MWDS has not made strides in conducting research to enhance evidence-based decision making for adopting new and cost-effective water harvesting technologies. MWDS has not placed importance on building technical skill among its staff and acquiring equipment to increase availability of water harvesting infrastructure. While the Ministry has made efforts to engage with stakeholders in the implementation of water harvesting programmes, efforts are not supported by updated regulation.

### **7.2.3 Effectiveness of Measures Instituted by MWDS in ensuring the Sustainability of Water Harvesting Infrastructure**

The Ministry has not made significant efforts to rehabilitate dams as and when required as rehabilitations were characterised by delays and low implementation thereby threatening the sustainability of water harvesting infrastructure. Maintenance of dams is not consistent and effective as MWDS has not made efforts to provide requisite tools and foster ownership to the Dam Committees to whom the responsibility to maintain dams is given.

Low prioritisation is given to dam surveillance and inspections which ensures dam safety, correct utilisation and sustainability.

Overall, the availability and sustainability of water harvesting infrastructure is cardinal for socio-economic development and water storage amidst increased demand, population growth and climate change hence the Ministry must give it the priority it deserves.

## **CHAPTER EIGHT**

### **RECOMMENDATIONS**

#### **8.0 Introduction**

Based on the root causes of the audit findings and conclusions, the Office of the Auditor General (OAG) recommends the following practical measures to enhance the implementation of water harvesting. The Ministry of Water Development and Sanitation (MWDS) should:

#### **8.1 Extent to which the MWDS has ensured strengthening of Institutional Framework of Water Harvesting programmes**

- i. Consider a deliberate policy to compel stakeholders to engage the MWDS before the construction of water harvesting infrastructure to avoid fragmented implementation of water harvesting programmes.
- ii. Consider revising the National Water Resource Master Plan of 1995 to provide guidance for effective water harvesting in the country.
- iii. Prioritise the development of Operational and Maintenance Guidelines to provide guidance on utilisation and maintenance, as well as standardisation in the management of dams.

#### **8.2 Extent to which measures developed by MWDS are effective in ensuring availability of Water Harvesting Infrastructure**

- i. Explore and foster alternative water harvesting technologies whose implementation maybe cost effective, easier and climate smart.
- ii. Enhance technical capacity and collaboration with other institutions to build capacity for officers to enable them effectively implement water harvesting infrastructure projects.
- iii. Invest in equipment to aid the implementation of water harvesting to reduce the cost of outsourcing and in turn result in savings that could be used to invest in more water harvesting infrastructure.

#### **8.3 Extent to which measures instituted by MWDS are effective in ensuring the sustainability of Water Harvesting Infrastructure**

- i. Enhance surveillance of water harvesting infrastructure to promptly identify dams that require maintenance and rehabilitation.
- ii. Increase capacity building for Dam Committees to enhance utilisation, maintenance and ownership of dams by communities.

- iii. Improve monitoring and inspections of water harvesting infrastructure to enhance dam safety and avoid encroachment and wrong usage of dams.



## 9.0 APPENDICES

### Appendix 1: Sample Size and Population

Province	Provincial Office	District	Name of Dam
Central	Kabwe	Chisamba	Mwomboshi
		Mumbwa	Nongoma
		Shibuyunji	Changula
Southern	Choma	Zimba	Muzya
			Siambelele
			Siandwazi
		Kalomo	Nabuyani
		Pemba	Chibwe Ntholo
			Nachibanga
			Ndondi
Eastern	Chipata	Lundazi	Mwase
		Chasefu	Kapekesa Dam
			Membe Dam
Western	Mongu	Kaoma	Mahilo Dam
			Shimboela Dam
			Nabowa
		Nkeyema	Kabombwa Dam
			Mungulungwa Dam
			Shishamba Dam
			Kalale Dam
			Shimano
		Lwampa	Lui Dam
Northwestern	Solwezi	Solwezi	Kyafukuma wier
			Mitukutuku
			Kamiteto Dam
		Kasempa	Kabukafu dam
			Kanyika Dam
			Kabusenga Dam
Copperbelt	Ndola	Masaiti	Mishikishi Dam
			Nyenyezi B Dam
			Chilese dam
			Kafulafuta Dam
		Mpongwe	Chilimulimo Dam
			Chisapa Dam
			Kantolo Weir

Province	Provincial Office	District	Name of Dam
		Lufwanyama	Kankunko Dam
			Katembula

## Appendix 2: List of Documents Reviewed and their Respective Purpose

Document	Purpose
a. Agenda 2030 - Sustainable Development Goals - SDG 13 “Take Urgent Action to Combat Climate Change and its Impacts”	To understand the global goals relating to the availability and sustainable management of water and combating climate change and its impacts. The SDGs will also be used to identify assessment criteria for the audit.
b. Eighth National Development Plan 2022 – 2026	To understand the plans of the Government in the implementation of water harvesting during the plan period.
c. Water Supply and Sanitation Act No.28 of 1997	To understand the clauses in the Act and ascertain the extent of operationalisation of the Act. To consider if the ACT can be used as criteria
d. Zambia Water Investment Programme 2022 - 2030 (Supporting the attainment of Vision 2030 towards prosperous middle-income status by 2030)	To understand the strategies the Government has developed to implement water harvesting.
e. Zambia Comprehensive Agriculture Transformation Support Programme April 2023	To understand the programs the Government has developed to implement water harvesting.
f. Ministry of Energy and Water Resources National Water Policy 2010	To gain an understanding of the policies that govern water management and conservation. To consider if the guidelines can be used as criteria
g. Ministry of Water Development and Sanitation Strategic Plans 2018 - 2021 and 2022 – 2026	To understand the objective and milestones the Ministry planned to achieve in the strategic period To consider if the Strategy can be used as criteria

Document	Purpose
h. Ministry of Water Development and Sanitation Annual Work Plans for 2021,2022 and 2023	To obtain information on planned activities and activities implemented pertaining to water harvesting during the period under review.
i. Dam construction project files for 2021,2022 and 2023	To understand the objectives of the construction, the project cost and intended number of beneficiaries, including volume capacity of dams for the period under review

**Source:** Performance and Environmental Audit Directorate 2024

### **Appendix 3 (i): Ministry of Water Development and Sanitation Officials Interviewed**

Province	District	Position of Interviewee
Lusaka	Lusaka	Director - Water Resource Development Department
		Assistant Director-International Waters Section
		Assistant Director-Surface Water Section
		Principal Water Officer-International Waters Section
		Senior Hydro geomatics Officer-Surface Water Infrastructure
		Senior Water Engineer-Geotech
		Senior Water Engineer-Design
		Senior Hydro geomatics Officer-Dam Safety
		Senior Water Engineer-Construction
		Senior Water Engineer-Lusaka Provincial Water Development Office
		Senior Water Engineer-Survey
		Hydro informatics Officer-Groundwater Section
		Hydro informatics Officer-Surface Water Section
		Senior Hydro geomatics Officer-Aquifer mapping
		Acting Director of Planning
		Monitoring and Evaluation (MEAs)

Province	District	Position of Interviewee
		Principal Inspector EAs
		Acting Senior Inspector EAs
Southern	Choma	Provincial Water Development Officer
	Zimba	District Water Development Officer
		Engineering Assistant
	Kalomo	District Water Development Officer
	Pemba	District Water Development Officer
		Engineering Assistant
Central	Kabwe	Provincial Water Development Officer
		District Water Development Officer - Kabwe
	Shibuyunji	District Water Development Officer
		Changula Dam – Village Headman
	Mumbwa	District Water Development Officer
Eastern	Chipata	Provincial Water Development Officer
		Senior Hydrogeologist
	Lundazi	District Water Development Officer
	Chasefu	District Water Development Officer
Western	Mongu	Provincial Water Resource Development Officer
	Nkeyema	District Water Resource Development Officer
		Engineering Assistant
	Kaoma	District Water Resource Development Officer
		Engineering Assistant
	Luampa	Engineering Assistant
North Western	Solwezi	Senior Water Engineer
	Solwezi	District Water Resource Development Officer
	Kasempa	District Water Resource Development Officer
Copperbelt	Ndola	Senior Water Engineer
	Masaiti	District Water Resource Development Officer

Province	District	Position of Interviewee
		Engineering Assistant
	Lufwanyama	District Water Resource Development Officer
	Mpongwe	District Water Resource Development Officer

### Appendix 3 (ii): Table of Stakeholders Interviewed

Province	District	Institution	Position of Interviewee
Lusaka	Lusaka	MoA – HQ	Acting Permanent Secretary
			Deputy Director - TS
			Principal Irrigation Engineer
		IDSP	Project Coordinator
			Irrigation Engineer
			Communication Strategist
			Project Assistant
			Project Coordinator
		MGEE	Director – Forestry Department
			Director – ZMD
			CCCO – GECCD
			Senior Engineer – ZMD
		JICA	Chief Representative
		JICA	Senior Country Representative
		JICA	Senior Program Officer
		JICA	Chief HR/Administration
		WARMA	Director - WRMI
		World Vision	Waters Supply Director
		World Vision	Lively Hood
Southern	Choma	PACO – Choma	Provincial Agricultural Coordinator
	Zimba	DACO – Zimba	District Agricultural Coordinator
		DACO-Zimba	Senior Agriculture Specialist
		DACO-Zimba	Agriculture Specialist

Province	District	Institution	Position of Interviewee
		Siyandwazi Dam	Committee Member
		Siyandwazi Dam	Committee Member
		Siyandwazi Dam	Committee Member
	Kalomo	DACO - Kalomo	District Agricultural Coordinator
		DACO-Kalomo	Senior Agricultural Officer
	Pemba	DACO – Pemba	District Agricultural Coordinator
		Nabuyani Dam	Committee Chairperson
		Nabuyani Dam	Maintenance Chairman
		Nabuyani Dam	Member
		Nabuyani Dam	Member
Central	Kabwe	PACO – Kabwe	Provincial Agriculture Coordinator
		PACO-Kabwe	Principal Agriculture Officer
		PACO-Kabwe	Provincial Agriculture Planner
		PACO-Kabwe	Senior Field Crops Officer
		PACO-Kabwe	Senior Irrigation Engineer
	Chisamba	Mwomboshi Dam	Chairman CLT
		Mwomboshi Dam	Schemes Manager
		Mwomboshi Dam	Admin / Finance
		Mwomboshi Dam	CLT Agronomist
		Mwomboshi Dam	Operator
	Shibuyunji	Changula Dam	Village Headman
	Mumbwa	DACO – Mumbwa	District Agricultural Officer

Province	District	Institution	Position of Interviewee
		DACO- Mumbwa	Irrigation Engineer
		DACO- Mumbwa	District Marketing Development Officer
Eastern	Chipata	PACO – Chipata	Provincial Agricultural Coordinator
		PACO-Chipata	Acting Principal Agriculture Office
	Lundanzi	DACO – Lundazi	Senior Agricultural Officer
		Mwase Dam	Committee Chair Person
		Mwase Dam	Committee Member
	Chasefu	DACO - Chasefu	District Marketing Development Officer
Western	Nkeyema	Kabombwa Dam	Vice Chair
		Shimano Dam	Vice Secretary
		Kalale Dam	WDC Zone Representative
		Kalale Dam	Past Chairperson
		Kalale Dam	Committeef
North Western	Solwezi	Mitukutuku Dam	Chair person
		Mitukutuku Dam	Member
		Kimiteto Dam	Chair person
		Kimiteto Dam	Member
	Kasempa	Kabusenga Dam	Section Chair person
Copperbelt	Mpongwe	Chisapa Dam	Teacher
		Kantolo Dam	Farmer
		Chilimulilo Dam	Farmer

#### Appendix 4: Site Visitations

No.	Name of Dam	Province	District	Category
1	Ndondi Dam	Southern	Pemba	Rehabilitation
2	Nachibanga Dam	Southern	Pemba	Rehabilitation

No.	Name of Dam	Province	District	Category
3	Chibwe Ntholo Dam	Southern	Pemba	New Construction
4	Muzya Dam	Southern	Zimba	Maintenance
5	Siambelele dam	Southern	Zimba	New Construction
6	Siyandwazi Dam	Southern	Zimba	Maintenance
7	Nabuyani Dam	Southern	Kalomo	Rehabilitation
8	Changula Dam	Central	Shibuyunji	New Construction
9	Nangoma dam	Central	Mumbwa	Rehabilitation
10	Mwomboshi Dam	Central	Chisamba	New Construction
11	Membe Dam	Eastern	Chasefu	Maintenance
12	Kapekesa Dam	Eastern	Chasefu	New Construction
13	Mwase Dam	Eastern	Lundazi	Rehabilitation
14	Chisapa Dam	Copperbelt	Mpongwe	Maintenance
15	Kantolo Weir	Copperbelt	Mpongwe	Maintenance
16	Chilimulimo Dam	Copperbelt	Mpongwe	Maintenance
17	Kafulafuta Dam	Copperbelt	Masaiti	New Construction
18	Mishikishi Dam	Copperbelt	Masaiti	Maintenance
19	Nyenyezi B Dam	Copperbelt	Masaiti	Maintenance
20	Chilese dam	Copperbelt	Masaiti	Maintenance
21	Kankunko Dam	Copperbelt	Lufwanyama	Maintenance
22	Katembula	Copperbelt	Lufwanyama	Maintenance
23	Kabukafu dam	North Western	Kasempa	Maintenance
24	Kanyika Dam	North Western	Kasempa	Maintenance
25	Kabusenga Dam	North Western	Kasempa	Maintenance
26	Kyafukuma wier	North Western	Solwezi	Maintenance
27	Mitukutuku	North Western	Solwezi	Rehabilitation
28	Kamiteto Dam	North Western	Solwezi	Maintenance
29	Nabowa	Western	Kaoma	Rehabilitation
30	Mahilo Dam	Western	Kaoma	Maintenance
31	Shimboela Dam	Western	Kaoma	Maintenance
32	Lui Dam	Western	Luampa	Maintenance
33	Shishamba Dam	Western	Nkeyema	Maintenance
34	Mungulungwa Dam	Western	Nkeyema	Maintenance
35	Kalale Dam	Western	Nkeyema	Maintenance
36	Kabombwa Dam	Western	Nkeyema	Rehabilitation
37	Shimano	Western	Nkeyema	Maintenance



Year	Project Name	Project Cost	Province	District	% of Work Done	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Contractor	Comments	Delay in project completion (mths)
2021	Construction of Upper Lundazi Dam	15,000,000.00	Eastern	Lundazi	0.00%				Not done due to funding	0
2022	Construction of Upper Lundazi Dam	15,000,000.00	Eastern	Lundazi	0.00%				Not done due to funding	0
2022	Construction of Kapekesa Dam	15,508,460.00	Eastern	Chasefu	100.00%	16/12/2022	15/04/2023	Shachitari Contractors Limited	Completed	Completed
2022	Construction of Kacholola Dam	10,630,863.20	Eastern	Nyimba	25.49%	15/12/2022	15/04/2023	Integrity Enterprises Ltd	Completion of dam project in 2024	6
2023	Construction of Mbaswa Dam	12,906,644.30	Central	Serenje	20.00%	18/08/2023	17/08/2024	GNM Projects Limited	Completion of dam project in 2024	1
2023	Construction of Changula Dam	9,167,131.34	Central	Shibuyungi	20.00%	04/09/2023	03/09/2024	Myrex Business Solutions	Completion of dam project in 2024	1
2023	Construction of Kawawa Dam	11,362,588.60	Eastern	Kasenengwa	92.00%	18/08/2023	17/08/2024	Sable Transport Limited	Completion of dam project in 2024	1
2023	Construction of Muyembe Dam	8,823,876.97	Luapula	Kawambwa	60.00%	16/08/2023	15/08/2024	Shachitari Contractors Limited	Contract resumed and works are underway	1
2023	Construction of Luing'a Dam	15,498,066.32	N/Western	Ik leng'i	25.00%	18/08/2023	17/08/2024	KDW Engineering Limited	Suspended work due to unfavorable weather conditions	1
2023	Construction of Chief Mpande Dam	10,779,010.00	Northern	Senga Hill	30.00%	22/08/2023	21/08/2024	Brenum Zambia Limited	Completion of dam project in 2024	1

2023	Construction of Chisuta Dam	11,818,869.61	Southern	Chikankata	38.00%	16/08/2023	15/08/2024	Creative Team Construction and General Dealers	Completion of dam project in 2024	1
2023	Construction of Mutwewamuntu Dam	10,454,962.43	Southern	Kalomo	30.00%	12/5/2023	12/4/2024	ZNS	ZNS is yet to mobilise on site	6
2023	Construction of Chileya Dam	11,870,534.58	Southern	Kazungula	30.00%	12/5/2023	12/4/2024	ZNS	ZNS is yet to mobilise on site	6
2023	Construction of Hajamba Dam	10,579,596.72	Southern	Pemba	59.00%	23/08/2023	22/08/2024	Reliance Limited	Completion of dam project in 2024	1
2023	Construction of Chibwe/Ntolo Dam	10,309,406.27	Southern	Pemba	55.00%	16/08/2023	15/08/2024	Lubways Enterprises Limited	Completion of dam project in 2024	1
2023	Construction of Siakalinda Dam	20,942,158.60	Southern	Siavonga	77.00%	15/08/2023	14/08/2024	Construction for Africa	Completion of dam project in 2024	1
2023	Construction of Chuundwe Dam	10,559,725.69	Southern	Zimba	82.00%	12/5/2023	12/4/2024	ZNS	ZNS is yet to mobilise on site	6
2023	Construction of Tambana Dam	13,598,142.12	Southern	Zimba	42.00%	12/5/2023	12/4/2024	ZNS	ZNS is yet to mobilise on site	6
2023	Construction of Siambelele Dam	9,719,475.59	Southern	Zimba	72.00%	15/08/2023	14/08/2024	Visha Supplier Limited	Completion of dam project in 2024	1
2023	Construction of Jongolo Dam	9,784,201.55	Southern	Kalomo	82.00%	15/08/2023	14/08/2024	ZNS	Completion of dam project in 2024	1
2024	Munganama/Mkushi Lower		Central	Luano						Procurement process
2024	Mwanavumba		Central	Mumbwa						Procurement process
2024	Mwembeshi		Central	Chitambo						Procurement process

2024	Mzewe 2		Eastern	Chipata							Procurement process
2024	Kalambakuwa		Eastern	Nyimba							Procurement process
2024	Mphomwa 1		Eastern	Mambwe							Procurement process
2024	Upper Lundazi		Eastern	Lundazi							Procurement process
2024	Mwasemphangwe		Eastern	Lumezi						Parley Assurance	Procurement process
2024	Mpala Hill		Eastern	Chama						Parley Assurance	Procurement process
2024	Matabishi		Luapula	Mwansabombwe							Procurement process
2024	Lusinde		Eastern	Petauke							Procurement process
2024	Shangobeka		Lusaka	Rufunsa							Procurement process
2024	Katongo Kapala		Muchinga	Mpika							Procurement process
2024	Kapatu		Northern	Lunte							Procurement process
2024	Lufupa		N/Western	Kasempa							Procurement process
2024	Kashambana		Western	Nkeyema							Procurement process

2024	Lwakela		N/Western	Ikeleng'i							Government Assurance,	Procurement process
2024	Dongo		Southern	Kalomo								Procurement process
2024	Shimukuni (Silokwiya)		Southern	Choma								Procurement process
2024	Ngwezi/Ticki Hanene		Southern	Mazabuka								Procurement process
2024	Lusiya		Southern	Gwembe								Procurement process
2024	Luyaba dam		Southern	Monze								Procurement process
2024	Masaanzya		Southern	Zimba								Procurement process
2024	Mulolobela		Southern	Chirundu								Procurement process
2024	Shanabwato		Southern	Namwala								Procurement process
2024	Kamuseka		Southern	Gwembe								Procurement process
2024	Mubita		Western	Mulobezi							Parley Assurance-Luamuloba area	Procurement process
2024	Namakala/Ngandu		Western	Mulobezi							Parley Assurance-Machile area	Procurement process

#### Appendix 5: Delayed Construction of Dams

## Appendix 6: Dam Inspection Reports

No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
						<b>Dam utilisation</b>	
1	North Western	Kabompo	Chiweza dam maintenance report	Jan-23	Community engagement and sensitisation. Vegetation control, maintenance of foot bridge and general surveillance of dam.	Has potential to maximise usage of dam - fish farming and irrigation development to benefit over 5000 people.	Continuous surveillance, thorough assessment on dam once a year and concrete works to improve the safety.
2	North Western	Kasempa	Dam maintenance and community mobilisation Kabusenga dam	Feb-23	Vegetation control, cleaning of outlet valve	Potential for caged fish farming through cooperatives and committees'.	Consider concrete works on outlet valves
3	North Western	Solwezi	Kimilombe dam maintenance	Apr-24	community mobilization and vegetation control	Need for more community sensitisation on water	Need to uproot the stamped trees, and need to reconstruct the Dam wall and transverse cracks.
4	North Western	Chavumaa	Chikongole Earth fill Dam Report	Feb-24	X	X	Consider under Dam rehabilitations and inspection regularly.
5	North Western	Mwinilunga	Nyamgombe dam maintenance report	Dec-22	community mobilization, vegetation control, erosion control and damming	X	Consider major works such as reconstruction of wing walls and backfilling.
6	North Western	Musele	Musele Dam maintenance Report	May-24	X	5200 people will benefit from the dam	Need to uproot the stamped trees, and need to reconstruct the Dam wall and transverse cracks.
7	North Western	Solwezi	Mitukutuku Dam Rehabilitation Report	May-24	Environmental management task	The Dam is likely to benefit the region	Enhance coordination and Efficiency in material procurement process to avoid delays.
8	North Western	Ikelenge	Samahina Weir and Conal	Dec-22	Irrigation of Crops	Potential to benefit 300-350 farmers	Materials should be provided so that work is completed.
9	North Western	Kasempa	Maintenance of Kabukafu Dam	May-24	vegetation control on the embankment	X	Consider concrete works and

No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
					and spillway, and cutting down trees		vegetation control after rain season.
10	North Western	Solwezi	Kabilangwe Dam Maintenance Report	May-24	community engagement and sensitisation vegetation control and general surveillance	Likely to have direct positive benefits for over 1000 people	Thorough assessment of the Dam once water levels reduce. Continuous vegetation control exercise. Sensitize the community on importance of utilizing the facility.
11	North Western	Zambezi	Vegetation control on Kanyilaba Dam	Apr-24	Vegetation control on the dam crest reservoir foot print and general surveillance	450 households in 4 villages to potentially benefit.	Continuous surveillance educating the community
12	Western	Nkeyema	Maintenance of Kalale Dam	Nov-21	Vegetation Control, Termite control	Reservoir capacity of 55,000 m3 to benefit over 1000 people	Rehabilitation by constructing rip-rap. Filling up the gullies on the spillway. shifting of the pedestrian crossing point. Continuous maintenance works.
13	Western	Kaoma	Maintenance of Lunyati Dam Report	Nov-23	Agriculture activities, vegetation control, termite control stone pitch the excavated portion of the spillway	About 1,200 households to benefit from 809,399m3 reservoir capacity	Establishment another benchmark further north above five (5) meters away.
14	Western	Kaoma	Monitoring of Shimboela Dam	Oct-22	Vegetation control, termite control and embankment protection	X	Full rehabilitation of the dam, conduct bathymetric survey. Conduct for possible design and construction of an irrigation system.
15	Western	Kaoma	Monitoring of Shimano Dam	Sep-22	Vegetation control, termite control and filling up of the depressions	X	Regular engagement with the dam committee. Regular maintenance works to safeguard the structure.

No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
							Conduct bathymetric surveys. Install gauge plates.
16	Western	Nkeyema	Monitoring of Shishamba	Dec-23	Vegetation control, Termite control and Replacement of Rip-Rap on the Embankment	Financial benefit from fishing activities only benefit a few members of the committee	Back filling the gullies on the spillway and lining the base with stones, comprehensive bathymetry survey, strengthen the dam committee to be able to carry out seasonal maintenance work.
17	Western	Nkeyema	Maintenance of Mungulungwa Dam Report	Jan-23	Sensitise the dam maintenance committee, clear the spillway, control vegetation on the embankment, expose, treat and fill in termites holes	X	Maintenance of the dam to be conducted during dry season remove weeds manually, continuous maintenance to preserve the dam's infrastructure, and regular vegetation and control tasks.
18	Western	Nkeyema	Maintenance of Kabombwa Dam	Jan-23	Vegetation control, clearing the Spillway, exposing, treating and backfilling the termite hole and Sensitise dam maintenance committee	X	full rehabilitation of the dam, conduct bathymetric surveys for possible design and construction of an irrigation system, conduct regular maintenance works.
19	Western	Luampa	Monitoring of Lui Dam Report	Dec-22	Vegetation control and termite control	X	Regular maintenance, comprehensive bathymetry survey to ascertain the volume of water, strengthening the dam committee, purpose of construction of

No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
							the irrigation facility and rehabilitation.
20	Western	Mulobezi	Kanyimba Dam Status Report	Jan-24	Vegetation control on the embankment, clearing the spillway, identifying treating, and filling termite holes	X	Full rehabilitation to protect the hydraulic structure, frequent maintenance works every year, comprehensive bathymetry survey, construction of water impounded by the Dam, and strengthening the Dam committee to carry out seasonal works.
21	Nothern	Luwingu	Akansokoshi Earth fill Dam Report	May-23	inspect and verify the alleged completion of the rehabilitation project, Attend the ninth and fifth site meeting, and provide onsite technical support	X	Ripping the embankment crest by about 1m deep levelling, spreading and compacting the materials. Dealing with water from the saturated ground by installing PVC pipes. Remedying the gullies on the floor of the discharge channel between the reno-mattresses on the first and second drop structure.
22	Central	Shibuyunji	Minutes for the site meeting on the construction of Changula Dam	Dec-23	construction of the changula dam	X	Project manager advised the contractor to pay particular attention to the general and specific conditions on site possession be done within 28days. The contractor to submit a revised work schedule.
23	Southern	Pemba	progress and site Handover	Jan-24	Commencement of excavation of the	Local communities	Contractor proceeds to equip



No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
			Report for the construction of Hajamba, Chibwentolo and Siambelele Earth Dam		spillway, removal of unstable river sand, cleaning of the river bed. Construction of the a zoned earth fill dam, installation of law flow pipe and irrigation channel, construction of site office.	will benefit since Southern Province is one of the provinces that has been hit hard with climate change and water scarcity.	the borehole to ease access to clean safe drinking water not only for the employees but the surrounding household.
24	Nothern	Senga	Activity Report Handover of Chief Mpande Dam to Brenum Zambia Limited Service	Sep-23	Officially Handover the Chief Mpande Dam site to Brenum Zambia Limited	The local people will benefit through employment. After work is complete the local people will use the dam for fish farming and gardening.	The contractor to procure the project vehicles as soon as possible, undertake community sensitization at Chief Mpande Dam, Undertake a Rapid social-economic data collection to capture the current demographics of the beneficiaries of the Dam.
25	Southern	Chikankata	Chisuta Dam Construction Project	Jan-24	X	The Dam to impound a volume of about 380,000m3 at full supply level to enable it to service the water demand needs of the community for a designed period of 30years.	Contractor must drill a borehole on site for easy access to water, provide a utility vehicle on site to enable workers run errands and emergencies, need for the revised work schedule, work on the road in a serious way using proper machines.
26	Southern	Monze	Status Report for Dimba Dam Rehabilitation	Oct-23	Site clearing and removal of topsoil, excavation of borrow materials, back filling the core trench, putting up riprap, rebuilding the embankment, constructing the	13 villages benefit from the facility	Engaging the contractor to reduce on down time for the machinery and consider doing dams in dry season.

No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
					concrete sill on the spill of 1m height.		
27	Southern	Monze	Status Report for Singonya Dam Rehabilitation	Jan-24	Site clearing and removal of topsoil, Excavation of borrow materials, setting out centre line and excavation of core trench, constructing the outlet pipelines and ancillary works	X	Engaging the contractor to reduce on down time for the machinery, engage the contractor to increase machinery at site to quicken the earth works.
28	Southern	Sinazongwe	Status Report for Siazwela Weir Rehabilitation	Jan-24	Contraction of coffer dam, clearing and removal of top sil from the dam, setting out of the centre line and excavation of the core trench, backfilling the downstream of wing wall, constructing the outlet pipelines, and construction of ancillary work.	Support the implementation of an integrated framework for development and management of water resources.	Engaging the contractor to reduce on down time for the machinery, engage the contractor to increase machinery at site to quicken the concrete works, consider doing dams in dry season, consider having the source of aggregates nearer the site and consider suspending the works when the water levels is high and work later when the water level reduce.
29	Southern	Siavonga	Construction of Siakalinda Dam	Jan-24	Construction of an Earth Dam and small irrigation network.	X	Delivery of sheep's foot roller compactor, delivery of grader, material testing, preparation of the reports according with Government format, reduction of moisture content in the clay-core material, purchase of project vehicle, increase safety

No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
							drills and training exercises.
30	Copperbelt	Mpongwe	Dam Inventory Report on Chisapa Earth Dam	Sep-23	Vegetation control and maintenance works on the dam embarkment	X	Full spillway construction, clearing the entire embarkment by cutting down trees and putting ant termites.
31	Copperbelt	Mpongwe	Field Report on the work Done at Chilimulilo Earth Dam	Jul-23	Field visit to assess the status of the Earth Dam	X	Full rehabilitation on spillway and culverts. Maintenance on the fabrication of safety trusses on the footbridge, vegetation and termite control, and tree embankment.
32	Copperbelt	Mpongwe	Field visit to conduct Dam Inventory Exercise on Luansombe	May-22	Field to access the status of the Earth Dam	X	X
33	Eastern	Lundazi	Inspection and Monitoring Report on Mwanse Dam	Nov-22	Checking the progress of works, Evaluating the works with those in the invoice of claim by contractor, Control the quality works, Come up with the works schedule,, and give an instruction to the contractor on works	X	ZNS to continue stock piling the aggregates, core and general materials, the contractor, ZNS had not yet shared the schedule of works after it has been drawn up, project officer from ZNS to travel for spot checks being executed.
34	Central	Mumbwa	Chibuluma Dam Maintenance Completion Report	Mar-24	Rehabilitation on the main spillway, Raising the dam wall, and Seepage control	X	Rehabilitation on the spillway and seepage control intervention, continuous maintenance, expediting the process of maintenance of the dam, raise the dam to increase the reservoir capacity, and de-

No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
							silting of the reservoir.
35	Central	Shimbuyunji	The construction of proposed Changula Dam site	Sep-23	construction of spillway, Dam embankment, laying of the flow pipe and construction of the access road.	X	X
36	Central	Kabwe	Hambachi Community Dam Maintenance	Jan-24	Form the dam maintenance committee, sensitize the community on the importance of dam maintenance works	100 plus household with 6000 women, 2500 plus cattle, and 800 plus livestock benefit from the dam	The dam need urgent attention (maintenance, repair and rehabilitation) to make it sustainable.
37	Northern	Kasama	Misamfu Earth Dam	Nov-22	Engagement of the traditional leadership (Chief) where the dam is located. Mobilization of workers/community to work on the site. Vegetation control. Removing vegetation along the spillway channel. Installation of poster along Mbala-Kasama road. Extension of a training wall on the spillway to avoid water draining toward the embankment. Extension of two (2) outlet canals to disallow water learning on the embankment. Establishing of temporal bench marks on both left and right banks.	X	Mobilization and engagement of the community to continue.
38	Northern	Mungwi	Chonya Earth Dam	Nov-22	Engagement of traditional leadership (Chief) where the dam is located. Mobilisation of	X	Mobilization and engagement of the community to continue.

No	Province	District	Name of Report	Year	Scope of work	Findings	Recommendations from report
					workers/ community to work on the site. Vegetation control. Trimming of tall grass on the embankment. Construction of 0.6m x 1m x 18.2m masonry sill on the spillway. Placing of 8mm-19mm crushed stones on the foot path on the embankment. Installation of dam poster on the roadside. Establishment of bench marks on both left and right banks of the dam.		
39	Northern	Mbala	Mwandwizi Earth Dam	Nov-22	Engagement of the traditional leadership (Chief) where the dam is located. Mobilization of workers/community to work on the site. Vegetation control. Repair of eroded drop structures along the spillway channel. Installation of dam poster on the road side. Establishment of bench marks on both left and right banks of the dam.	X	Mobilizing and engaging the community should continue. The Dam require fencing to prevent animals trading on the embankment.

## Appendix 7: Dam Maintenance Status as Observed During Physical Inspections

No.	Name of Dam	District	Maintenance undertaken	Overgrown vegetation	Trees on embankment	Weeds in the dam	Reason for non-maintenance
1	Mishikishi dam	Masaiti	No	Yes	Yes	No	
2	Chilese Dam	Masaiti	No	Yes	Yes	No	
3	Kantolo Wier	Mpongwe	No	Yes	No	Yes	
4	Membe Dam	Chasefu	No	Yes	Yes	Yes	
5	Nyenyezi B Dam	Masaiti	No	Yes	Yes	Yes	
6	Mwase Dam	Lundazi	Yes	No	No	No	Dam under Rehabilitation
7	Kabombwa Dam	Nkeyema	Yes	No	No	No	
8	Kalale Dam	Nkeyema	Yes	No	No	No	
9	Mitukutuku Dam	Solwezi	Yes	No	No	No	
10	Katembula	Lufwanyama	Yes	No	No	No	
11	Mwomboshi Dam	Chisamba	Yes	No	No	No	
12	Nabuyani	Kalomo	Yes	No	No	No	
13	Siandwazi dam	Zimba	Yes	No	No	No	
14	Shimboela Dam	Kaoma	Yes	No	No	No	
15	Lui Dam	Lwampa	Yes	No	No	No	
16	Shishamba	Nkeyema	Yes	Yes	No	No	
17	Mungulungwa Dam	Nkeyema	Yes	Yes	No	No	
18	Nangoma dam	Mumbwa	Yes	Yes	No	No	
19	Chilimulilo Dam	Mpongwe	Yes	Yes	No	No	
20	Chisapa Dam	Mpongwe	Yes	Yes	No	No	
21	Kabusenga Dam	Kasempa	Yes	Yes	No	No	
22	Kimiteto Dam	Solwezi	Yes	Yes	No	No	
23	Kankuko Dam	Lufwanyama	Yes	No	No	Yes	
24	Kyafukuma wier	Solwezi	Yes	Yes	No	Yes	
25	Shimano Dam	Nkeyema	N/A	N/A	N/A	N/A	Dam dried up
26	Nabowa Dam	Kaoma	N/A	N/A	N/A	N/A	Dam under Rehabilitation

No.	Name of Dam	District	Maintenance undertaken	Overgrown vegetation	Trees on embankment	Weeds in the dam	Reason for non-maintenance
27	Mahilo Dam	Kaoma	N/A	N/A	N/A	N/A	Dam not functional - Breached
28	Kabukafu Dam	Kasempa	N/A	N/A	N/A	N/A	Dam not functional - Breached
29	Changula earth dam	Shibuyunji	N/A	N/A	N/A	N/A	New dam under construction
30	Kapekesa Dam	Chasefu	N/A	N/A	N/A	N/A	New dam awaiting handovers
31	Chibwe Ntholo Dam	Pemba	N/A	N/A	N/A	N/A	New dam under construction
32	Ndondi Dam	Pemba	N/A	N/A	N/A	N/A	Dam under Rehabilitation
33	Nachibanga Dam	Pemba	N/A	N/A	N/A	N/A	Dam under Rehabilitation
34	Muzya Dam	Zimba	N/A	N/A	N/A	N/A	Dam not functional - Breached
35	Siambelele dam	Zimba	N/A	N/A	N/A	N/A	Dam not functional - Breached
36	Kanyika Dam	Kasempa	N/A	No	No	No	Dam under Rehabilitation
37	Kafulafuta Dam	Masaiti	N/A	N/A	N/A	N/A	New dam under construction

## Appendix 8: Analysis of Presence of Dam Committees

No.	Name of Dam	District	Presence of Dam Committee
1	Ndondi Dam	Pemba	WIP (Dam Under Rehabilitation)
2	Nachibanga Dam	Pemba	WIP (Dam Under Rehabilitation)
3	Nabowa	Kaoma	WIP (Dam Under Rehabilitation)
4	Kafulafuta Dam	Masaiti	WIP (New Dam under Construction)
5	Chibwe Ntholo Dam	Pemba	WIP (New Dam under Construction)
6	Changula Dam	Shibuyunji	WIP (New Dam Under Construction)
7	Kyafukuma wier	Solwezi	No
8	Mahilo Dam	Kaoma	No
9	Kabukafu dam	Kasempa	No
10	Muzya Dam	Zimba	No

No.	Name of Dam	District	Presence of Dam Committee
11	Kanyika Dam	Kasempa	No
12	Mishikishi Dam	Masaiti	No
13	Kankunko Dam	Lufwanyama	No
14	Nyenyezi B Dam	Masaiti	No
15	Chilimulimo Dam	Mpongwe	No
16	Shimboela Dam	Kaoma	No
17	Lui Dam	Luampa	No
18	Membe Dam	Chasefu	No
19	Kapekesa Dam	Chasefu	No
20	Nangoma dam	Mumbwa	No
21	Siambelele dam	Zimba	No
22	Mwase Dam	Lundazi	Yes
23	Katembula	Lufwanyama	Yes
24	Chilese dam	Masaiti	Yes
25	Shishamba Dam	Nkeyema	Yes
26	Mungulungwa Dam	Nkeyema	Yes
27	Chisapa Dam	Mpongwe	Yes
28	Kantolo Weir	Mpongwe	Yes
29	Kabusenga Dam	Kasempa	Yes
30	Mitukutuku	Solwezi	Yes
31	Kamiteto Dam	Solwezi	Yes
32	Kalale Dam	Nkeyema	Yes
33	Kabombwa Dam	Nkeyema	Yes
34	Shimano	Nkeyema	Yes
35	Mwomboshi Dam	Chisamba	Yes
36	Siyandwazi Dam	Zimba	Yes
37	Nabuyani Dam	Kalomo	Yes
	<b>Summary</b>		
	New Dam under Construction	3	
	Dam under Rehabilitation	3	
	<b>Summary Committees</b>		<b>%</b>
	Dams with no Committee	15	48
	Dams with Committees	16	52
Key: Yes represents presence of Dam Committees No represents absence of Dam Committees			



## Appendix 9: Distribution of Maintenance Tools

No.	Name of Dam	District	Maintenance equipment provided
1	Chilimulimo Dam	Mpongwe	No
2	Kankunko Dam	Lufwanyama	No
3	Kanyika Dam	Kasempa	No
4	Kapekesa Dam	Chasefu	No
5	Kyafukuma wier	Solwezi	No
6	Lui Dam	Luampa	No
7	Membe Dam	Chasefu	No
8	Mishikishi Dam	Masaiti	No
9	Nangoma dam	Mumbwa	No
10	Nyenyezi B Dam	Masaiti	No
11	Shimboela Dam	Kaoma	No
12	Chisapa Dam	Mpongwe	No
13	Kabombwa Dam	Nkeyema	No
14	Kabusenga Dam	Kasempa	No
15	Kantolo Weir	Mpongwe	No
16	Mitukutuku	Solwezi	No
17	Mwase Dam	Lundazi	No
18	Nabuyani Dam	Kalomo	No
19	Siyandwazi Dam	Zimba	No
20	Kalale Dam	Nkeyema	Yes
21	Kamiteto Dam	Solwezi	Yes
22	Mwomboshi Dam	Chisamba	Yes
23	Shimano	Nkeyema	Yes
24	Chilese dam	Masaiti	Not Confirmed - Committee members not available at the time
25	Katembula	Lufwanyama	Not Confirmed - Committee members not available at the time
26	Mungulungwa Dam	Nkeyema	Not Confirmed - Committee members not available at the time
27	Shishamba Dam	Nkeyema	Not Confirmed - Committee members not available at the time
28	Nachibanga Dam	Pemba	Dam under rehabilitation
29	Ndondi Dam	Pemba	Dam under rehabilitation
30	Nabowa	Kaoma	Dam under rehabilitation
31	Changula Dam	Shibuyunji	New Dam under construction
32	Chibwe Ntholo Dam	Pemba	New Dam under construction
33	Kafulafuta Dam	Masaiti	New Dam under construction
34	Kabukafu dam	Kasempa	Dam not functional - Breached

<b>No.</b>	<b>Name of Dam</b>	<b>District</b>	<b>Maintenance equipment provided</b>
35	Mahilo Dam	Kaoma	Dam not functional - Breached
36	Muzya Dam	Zimba	Dam not functional - Breached
37	Siambelele dam	Zimba	Dam not functional - Breached

