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# Safeguarding natural springs through indigenous Vhavenda practices for sustainable water resource use

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## ABSTRACT

African indigenous communities have long used measures to protect springs, vital for domestic and consumption needs. However, amid modern development, springs are increasingly exposed to risks, prompting interest in indigenous safeguarding practices. Natural springs are threatened by deforestation, waste dumps, household litter, drought, mismanagement, and development initiatives. The purpose of this paper is to explore the Vhavenda people's indigenous measures for safeguarding natural springs from threats in the community for Sustainable use in Vhembe District, Limpopo Province. The study adopted a qualitative design; data were collected using semi-structured interviews and were thematically analysed. The population was sampled purposively. Findings showed that springs were protected by restrictions that allowed only elderly women to dig. VhaVenda used stones and strong wood to prevent contamination. Joint efforts for "*u kapa tshisima*" and taboos also protected springs, with libations performed to ask for rain. The paper concludes that Indigenous measures were effective and that the water was safe due to their implementation. The study recommends revitalising the Vhavenda safeguarding measures through a community awareness program to encourage everyone in the community to play their part. Eco-mapping in the Vhavenda indigenous community is another recommendation to ensure that everyone, from leaders to community members, is informed about their rich ecosystem. The study contributes positively to research knowledge through indigenous solutions that can be adopted to ensure water sources' sustainability. When natural springs are protected, they can save indigenous communities from a water shortage crisis; hence the need for this remarkable study.

**Keywords:** Spring Water, Sustainability, Vhavenda, and Indigenous Community.

## INTRODUCTION

Aussie Natural Spring Water defines a natural spring as a special type of groundwater source where pressurized water emerges from the ground in a steady flow.[1] Water is the primary life-giving resource, and collecting and consuming water from natural sources such as springs, streams, rivers, and lakes is a common practice among indigenous people.[2] A lot has been written on the significance of natural springs in cultural and spiritual contexts and their evident biodiversity benefits. This narrates a story of

[1] Aussie Natural Spring Water, " How Are Natural Springs Formed? ," 2014, https://www.aussienatural.net.au/news/how-are-natural-springs-formed/.

[2] Tessa Latchmore et al., "Critical Elements for Local Indigenous Water Security in Canada: A Narrative Review," *Journal of Water and Health* 16, no. 6 (December 1, 2018): 893–903, https://doi.org/10.2166/wh.2018.107.

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a time when communities were relying strictly on the springs for water supply; however, in the presence of modernity, water is accessible from taps in the community, and springs are likely to be left unattended, vulnerable to known and unpredictable threats.

Natural threats have always existed in the community, such as climate change; hence the interest in studying how Vhavenda people safeguarded natural springs, given their significance in the community. This paper seeks to outline possible practices to ensure spring sustainability in the midst of papers that emphasizes contextual descriptions of springs and their significance in the community. Threats that exist may differ depending on geographical areas; hence the need to look into the context of the Vhavenda community coupled with their measures to ensure springs are safeguarded. The study had an objective to identify threats and also to explore measures exercised in the community to ensure springs are protected.

There is a noticeable problem in some indigenous African communities of the Vhavenda people, where natural springs are found to be dry or dirty due to various causes. Hence, the study seeks to explore the indigenous measures adopted by the Vhavenda people to safeguard springs from emerging threats. Eneji indicated that Indigenous natural resource management practices evolved through the historical interaction of communities and their environment, thereby giving rise to practices and cultural landscapes such as sacred forests and groves, sacred corridors, and a variety of ethnic-forestry practices.[3] Many of the world's recognized water problems also stem from mismanagement, a failure of governance, and inappropriate behaviour leading to failure of resource use.[4] Communities can resuscitate the practices to ensure that springs are well managed.

The reduction of water flows in a stream or river will affect the quality of water and therefore affect both aquatic life and human life. Additionally, climate change impacts the water environment in the form of long dry seasons and rising temperatures, which can also affect the water quality due to the increased occurrence of algal and bacterial blooms.[5] The long dry season leads to natural water sources drying; natural springs get water from rainfall and, in the absence of rain, springs start to dehydrate. However, the springs near the river continue to flow because they are supported by the river's water table. This shows how long dry seasons hinder natural water sources, as rivers also get water from rainfall.

Drought can also cause water scarcity, desertification, dust storms, and air dryness in rural and urban areas.[6] This phenomenon in places like Iran has a strong impact on water resources.[7] However, Barqui and Scarsbrook noted that throughout the world, there is a growing recognition of the value of springs, and several initiatives have been implemented to ensure the protection and sustainable management of these resources.[8] For example, customary laws that have been practised in isolated communities have been shown to maintain equitable use of water and long-lasting services.[9] There is natural connectivity between humans and the natural environment, including natural springs in many parts of African Indigenous communities; hence the exploration of VhaVenda Indigenous strategies used to protect natural springs.

Awuah-Nyamekye indicated that among African communities, institutionalized prohibitions such as taboos were thus designed to develop positive societal attitudes toward the environment.[10] One of the key elements in present-day management involves the creation of an institutional and administrative framework fostering and encouraging the involvement of people with different interests

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[3] C.V.O. Eneji et al., "Ethical Basis of African Traditional Religion and Socio-Cultural Practices in Natural Resources Conservation and Management in Cross River State, Nigeria.," 2012.

[4] Suzanne Von der Porten and Robert C de Loë, "Collaborative Approaches to Governance for Water and Indigenous Peoples: A Case Study from British Columbia, Canada," *Geoforum* 50 (2013): 149–60.

[5] Peter H Gleick, *The World's Water 2000-2001: The Biennial Report on Freshwater Resources* (Island Press, 2000).

[6] Hugo Carrão, Gustavo Naumann, and Paulo Barbosa, "Global Projections of Drought Hazard in a Warming Climate: A Prime for Disaster Risk Management," *Climate Dynamics* 50, no. 5–6 (March 1, 2018): 2137–55, https://doi.org/10.1007/s00382-017-3740-8.

[7] Mohammad Amin Asadi Zarch et al., "Drought Monitoring by Reconnaissance Drought Index (RDI) in Iran," *Water Resources Management* 25, no. 13 (2011): 3485–3504.

[8] Mike Robert Scarsbrook, José Barquín, and Duncan Peter Gray, *New Zealand Coldwater Springs and Their Biodiversity*, vol. 278 (Department of Conservation Wellington, 2007).

[9] Yacob Arsano, *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics* (ETH Zurich, 2007).

[10] Samuel Awuah-Nyamekye, *Managing the Environmental Crisis in Ghana: The Role of African Traditional Religion and Culture with Special Reference to the Berekum Traditional Area* (Cambridge Scholars Publishing, 2014).

and allowing cross-cultural and cross-issue discussion, cooperation and coordination of management actions.[11] For instance, In Ethiopia, participating in the operation and maintenance of the water systems is the responsibility of all users. There are three categories of good maintenance, namely, daily maintenance of removing dung, seasonal maintenance to clean a sediment deposit after flood season, and major rehabilitation and extension of the well depth following the depletion of the groundwater table.[12] It has always been common to maintain and monitor natural springs for their significant uses in the community; water sources are very important in the community for sanitation and consumption.

According to Ayaa and Waswa, the conservation of watercourses, streams, water pans, and wells, as well as the associated vegetation, was protected by rules that ensured their sustainability.[13] More important were the shrines, caves, and forests that covered the springs, which were never interfered with because of the belief that ancestors or evil spirits lived in such places. Again, reptiles such as snakes, frogs, and toads that inhabited ponds, rivers, and wells were protected from any harm due to the belief that they helped maintain/sustain the lives of these important water points. Also, the community members highly recognized and appreciated the importance of wells and rivers as crucial sources of water for livestock and human beings, as well as a source of fish.

It is a need to consider implementing indigenous strategies where applicable to protect natural springs from challenges they encounter in indigenous communities. These indigenous strategies were effective prior to the natural spring negligence in the communities. It is the monitoring and maintenance system that communities had that kept the natural spring clean and flowing until negligence. The natural environment must be protected for future use, so that generations can continue using the same resources without depletion. Lannas and Turpie highlighted that assessing the value of natural resources like springs to poor communities was a critical consideration in the management of resources because there was a need to strike a balance between livelihoods and conservation.[14] This paper explores threats that hinder the sustainability of natural springs in Vhavenda communities but also provides the indigenous practices exercised to maintain the wellness of natural springs in the community.

## LITERATURE REVIEW

The study reviewed the literature on threats to the sustainable use of natural spring water in communities and measures adopted in communities to protect natural springs. Given the fact that geographical areas where people live differ, even threats to natural springs will vary, and so will the measures to safeguard them. The available literature points to several threats to natural spring water, mainly climate change, mismanagement, and natural disasters. The literature also details measures adopted in some communities to ensure the sustainable use of spring water. Measures such as Taboos, norms, and community efforts ensure that members use natural springs in a sustainable way to ensure their longevity for community use.

### Threats to Natural Springs

The State of the Climate in Africa report shows increasing climate change threats to human health, food and water security and socio-economic development in Africa. Global climate change, with consequences such as redistribution of precipitation, rising sea levels, changes in the CO2 absorption of the oceans and increases in extreme precipitation events, is noted as a threat to water resources.[15] Additionally, climate change in the form of long dry seasons and rising temperatures, which can also affect water quality due to the increased occurrence of algal and bacterial blooms, impacts the water

[11] P. Rogers and A.W Hall, "Effective Water Governance," *Stockholm: Global Water Partnership* 7 (2003); Stacy Crevello, "Dayak Land Use Systems and Indigenous Knowledge," *Journal of Human Ecology* 16, no. 1 (2004): 69–73.

[12] David Layne Coppock, *The Borana Plateau of Southern Ethiopia: Synthesis of Pastoral Research, Development, and Change, 1980-91*, vol. 5 (ILRI (aka ILCA and ILRAD), 1994).

[13] Dominics Dan Ayaa and Fuchaka Waswa, "Role of Indigenous Knowledge Systems in the Conservation of the Bio-Physical Environment among the Teso Community in Busia County-Kenya," *African Journal of Environmental Science and Technology* 10, no. 12 (2016): 467–75.

[14] Kathryn S M Lannas and Jane K Turpie, "Valuing the Provisioning Services of Wetlands: Contrasting a Rural Wetland in Lesotho with a Peri-Urban Wetland in South Africa," *Ecology and Society* 14, no. 2 (2009).

[15] German Advisory Council on Global Change (WBGU), *World in Transition: Fighting Poverty through Environmental Policy* (London and Sterling, VA: Earthscan, 2005).

environment.[16] Reduction of water flows in a stream or river can affect the quality of water and therefore affect both aquatic life and human life.

Eneji indicates that the indigenous natural resource management practices evolved through the historical interaction of communities and their environment, thereby giving rise to practices and cultural landscapes such as sacred forests and groves, sacred corridors and a variety of ethno-forestry practices.[17] These sources of water supply exist in developing countries with often insignificant improvement, whereas developed countries are served by sophisticated modern water supply systems, making the traditional water systems historical. Many of the world's recognized water problems also stem from mismanagement, a failure of governance and inappropriate behaviour leading to failure of resource use.[18]

Principal threats to water resources for humans include water pollution, the contamination of surface water and groundwater reservoirs with chemicals and microorganisms, water scarcity influenced by changes in runoff regimes and changes in the groundwater table.[19] Earthquakes, droughts, volcanic eruptions, or landslides, as types of natural disasters, can also affect springs. Some locations may shift, and yields might rise or fall. For example, earthquakes could damage structures related to spring protection and the pipelines transporting spring water to villages, including pipeline breakages.[20] Water scarcity, desertification, dust storms, and air dryness can all be the result of drought in rural and urban areas.[21] This phenomenon in places like Iran has a strong impact on water resources.[22] In 1995, Montserrat, a Caribbean island, experienced a volcanic eruption that caused heavy ash falls. Consequently, two springs, which supplied 35% of the island's water, were in the area most exposed to the volcano. As the volcanic activity intensified, the reliance on these springs had to shift to other sources across the island. Water catchments were also affected by acid rain and ashfall resulting from the volcanic activity. There were concerns that movement along joint lines could alter spring locations and lead to changes in quality.[23]

**Indigenous Measures for safeguarding Natural Springs water**

Scarsbrook et al. pointed out that different traditional water technologies and management practices have been used in various parts of the world since time immemorial.[24] It is noted that worldwide, there is increasing recognition of the importance of springs, leading to various initiatives aimed at protecting and sustainably managing these resources. Customary laws practiced in isolated communities have been shown to maintain equitable water use and long-lasting services.[25]

Awuah-Nyamekye notes that among African communities, institutionalized prohibitions such as taboos were aimed at promoting positive societal attitudes towards the environment.[26] Today, effective management includes establishing an institutional and administrative framework that encourages the participation of people with diverse interests, facilitating cross-cultural and cross-issue discussions, and fostering cooperation and coordination of management efforts.[27]

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[16] Gleick, *The World's Water 2000-2001: The Biennial Report on Freshwater Resources*.
[17] Eneji et al., "Ethical Basis of African Traditional Religion and Socio-Cultural Practices in Natural Resources Conservation and Management in Cross River State, Nigeria."
[18] Von der Porten and de Loë, "Collaborative Approaches to Governance for Water and Indigenous Peoples: A Case Study from British Columbia, Canada."
[19] German Advisory Council on Global Change (WBGU), *World in Transition: Fighting Poverty through Environmental Policy*.
[20] Oxfam, " Dziviriro YeChitubu [Spring Protection]," n.d., https://www.oxfamwash.org/sn/spring-protection/.
[21] Carrão, Naumann, and Barbosa, "Global Projections of Drought Hazard in a Warming Climate: A Prime for Disaster Risk Management."
[22] Asadi Zarch et al., "Drought Monitoring by Reconnaissance Drought Index (RDI) in Iran."
[23] S J House and R A Reed, "Emergency Water Sources: Guidelines for Selection and Treatment. Water Engineering and Development Centre (WEDC). Loughborough," 1997.
[24] Scarsbrook, Barquín, and Gray, *New Zealand Coldwater Springs and Their Biodiversity*.
[25] Arsano, *Ethiopia and the Nile: Dilemmas of National and Regional Hydropolitics*.
[26] Awuah-Nyamekye, *Managing the Environmental Crisis in Ghana: The Role of African Traditional Religion and Culture with Special Reference to the Berekum Traditional Area*.
[27] Peter Rogers and Alan W Hall, *Effective Water Governance*, vol. 7 (Global water partnership Stockholm, 2003).

According to Ayaa and Waswa, the conservation of watercourses, streams, water pans, and wells, along with their associated vegetation, was maintained through rules that promoted their sustainability.[28] Equally important were the shrines, caves, and forests that covered springs, which were never disturbed because of the belief that ancestors or evil spirits inhabited these places. Reptiles such as snakes, frogs and toads living in ponds, rivers, and wells were also protected from harm, as they were believed to help sustain these vital water sources. Moreover, community members highly valued and appreciated the role of wells and rivers as essential sources of water for livestock and people, as well as sources of fish.

In Ethiopia, all community members share the responsibility of operating and maintaining water systems. Well maintenance is carried out at three levels: daily tasks such as removing animal waste, seasonal cleaning to remove sediments that accumulate after floods, and major rehabilitation work, which involves deepening the well when the groundwater level drops.[29]

Several scholars have identified threats to natural spring water in specific geographical areas, but it may be misleading to assume that threats in the Caribbean, for instance, are similar to those affecting natural springs in the Vhembe District of South Africa, where many Vhavenda people live. Although there may be common threats across countries, this study aims to pinpoint challenges unique to Vhavenda communities, recognizing that the distribution of natural resources and human behaviours vary significantly worldwide. Different communities have developed their own strategies to protect natural spring water based on local threats, and it cannot be assumed that strategies adopted in one area apply to others. This research intends to explore indigenous strategies specifically within Vhavenda communities, contributing insights to global environmental protection efforts.

## METHODOLOGY

For this study, the researcher adopted a qualitative design methodology. The target population was sampled using the purposive sampling method: five participants who are knowledge holders in the community, two males between 50 and 60 years old, and 3 women between 45 and 60 years old. The participants were selected from a non-governmental organisation existing in the community based on their experience in springs safeguarding, amongst other interests of the organization. They are members of the community who are concerned about the neglect of the springs and have joined efforts with other members to ensure that springs are conserved and monitored for threats. Semi-structured interviews were conducted with the aim of getting detailed responses from the participants. The data analysis method adopted in this paper was thematic analysis. The researcher followed the traditional ethical procedure in entering the community through a civic member of the community who introduced the researcher to the royal council so that the purpose of the visit could be explained and permission was granted. The Study was conducted with the agreement of the participants, given the fact that the study has no related risks or other ethically sensitive issues. The participants were interested in participating in this research based on the mutual interest of protecting natural springs. Participants were given informed consent forms, which were clearly read to participants and they agreed to participate on the basis that their names would be kept anonymous. The study was designed within the framework explained above to address the research question.

## PRESENTATION OF FINDINGS

The study details participants' responses about threats observed and experienced in the community to the Natural Springs water. There was a need to find out if threats exist that necessitate measures to safeguard natural springs, rather than just assume threats exist without seeking confirmation. In the responses given, the researcher was able to note several challenges mentioned in the following. The responses highlighted deforestation, littering, unattended livestock, development infrastructure, modernisation of springs, and drought as observed threats to natural springs in Vhavenda communities. The study also explored measures adopted to protect natural springs from threats, which included some

[28] Ayaa and Waswa, "Role of Indigenous Knowledge Systems in the Conservation of the Bio-Physical Environment among the Teso Community in Busia County-Kenya," 471.
[29] Coppock, *The Borana Plateau of Southern Ethiopia: Synthesis of Pastoral Research, Development, and Change, 1980-91.*

preventive measures and some for maintenance purposes. The identified participants had the following to say regarding the subject at hand.

**Threats to natural spring water in the Vhavenda Community**
Interviewed participants had the following to say on the subject at hand.

**Participant A:** *"U remiwa ha ḓaka ḽi re tsini na swisima. Na zwifuwo zwi ngaho dzi nguluvhe dzi si tsha valeliwaho, na kholomo dzi si tsha liseliwaho zwi tshikafhadza tshisima. Tshihulwanesa ndi ulaṱela maḽeri a ma pampers zwisimani a no maḓuvha. Na magoṱigoṱi, vha vho laṱela mmbwa dzofaho fhethu ha zwisima. Na mveledziso, ngauri u wana vha tshi dzhia fhethu hu re na zwisima vha vho hu ita dzi Park, fhethu ha u ḓimvumvusa, zwine vha vhulaha maroroma na zwisima."*

**Translation:** "Cutting down the forest around the spring is dangerous. Animals such as unattended pigs and cows are contaminating spring areas with dirt. The main challenge is the dumping of diapers, used cans, and dead dogs near the spring site. Developments are also affecting springs as the place is turned into parks or recreational places. Consequently, it kills wetlands and springs."

**Participant B:** *"Hu na fhethu hune vhathu vha vho fhatela zwisima nga semennde vha fhedza vha puḽasitela, zwine zwa ita uri tshisima tshixe kana tshi pfuluwe, zwa ita na uri ṋowa ya tshisimani I pfuluwe hanefho tshisimani. Maitele a u semendela zwisima ndi khaedu kha vhutshilo ha zwisima. Zwisima zwi khou xa na u nga sa na ha dzi mvula, ngauri musi hu na gomelelo mvula a i ni zwine zwa ita uri zwisima zwi si wane maḓi."*

**Translation**: "There are places where people are plastering springs with cement, and that causes a spring to eventually die or relocate, and the snake that lives in the spring area also relocates. The practice of plastering springs is a challenge to the life of springs. Lack of rain is also contributing to springs drying up because during drought, there is poor rainfall and consequently springs do not get enough water."

**Participant C:** *"Ndi vhona a no maḓuvha vhathu vha tshi vho rema miri ya tsini na zwisima ngauri a vha tsha thonifha milayo ya kale ya tshisimani. Hafhu vhathu vha vho fhaṱa mabindu na midi maroromani hu re na zwisima, zwine zwa vhulaya tshisima. Vhathu ndi vhone vha ne vha vha khombo kha zwisima."*

**Translation:** "Nowadays, I see people cutting down the trees near springs because they no longer respect indigenous norms associated with a natural spring. Some people are also building their businesses and households in a wetland area where there is a spring, which can destroy the spring. Humans are a big threat to natural springs."

**Participant D:** *"Mashango manzhi ha tshe na zwisima ngauri zwisima zwi khou fa. Zwivhangi zwa uxa ha zwisima zwi katela u sa na ha mvula, na zwifuwo zwi sin a vhalisa zwino dzhena zwi tshi nwa maḓi zwisimani, na vhathu vhane vha vho reḓa khuni kha ḓaka ḽa tshisimani. Inwe khaedu ndi uri Zwisimani hu vho laṱeliwa mashika ofhambananaho sa maḽeri oshumaho na maboḓelo, zwine zwa ita uri hu si tsha vha fhethu ho kunaho kana ho tsireledzeaho."*

**Translation:** "In many villages, there are no more natural springs because they are drying up. Factors leading to springs drying up include poor rainfall, livestock without a shepherd that goes and drinks water in the spring site, and people practicing deforestation for firewood in the forests near spring sites. Another challenge is that people are turning the spring site into a dumping area, and they are throwing used diapers and empty bottles, and that causes the spring site to be unclean or unsafe."

**Participant E:** *"Musalauno ri wana zwisimani ho no vha na vhuaḓa ngauri vhathu a vha tsha londa zwisima. Ri wana zwisimani ho laṱeliwa na mashika na maboḓelo. Kha zwiṅwe zwisima a hutshe na*

*nḓila ya u dzhena nga ḓaka sa izwi vhathu vha si tsha ya zwisimani. Haḽhu u dovha wa pfa vhathu vha tshi ri maḓi a tshisimani ha ngo kuna ngeno a maḓi a mupo o kunaho. Zwisima zwi khou vhulahiwa na nga u sa na ha mvula vhuponi ha mahayani sa minwahani ya kale."*

**Translation:** "Nowadays, we find natural springs full of dirt because communities are no longer taking care of springs. We find dumped dirt and bottles in the natural spring area. In some other springs, there is no other way to get inside because of weeds that have grown on the way, since people are no longer going to the springs. People are also saying spring water is unclean, whilst it is naturally clean. Springs are also drying up due to lack of rain in the indigenous communities, like years ago."

Participants mentioned that there are several threats to natural springs, mainly drying. From the views shared by the participants, the researcher could note several aspects that challenge the sustainable use of natural springs in the indigenous community of Vhavenda. Like the issue of climate change, which can lead to drought that can eventually affect the spring water pressure. The researcher had to explore threats to natural springs to identify factors leading to a crisis of natural springs drying up. Most of the threats outlined are just developing with modern society; hence, they were not experienced in the olden days. Due to these numerous threats, the researcher became curious if there were indigenous strategies to protect natural springs from various threats. It was clear that some threats are man-made, while others are climate change-related. Moreover, it is important to note that threats may differ from one place to another, although some may be commonly shared, hence the diverse geographical landscape and socio-cultural factors.

**Vhavenda indigenous strategies for safeguarding natural spring water.**

Another objective was to find out if there are indigenous strategies to safeguard natural springs in the Vhavenda people community as a crucial and significant natural resource. This was done out of curiosity about how the Vhavenda indigenous community ensured the sustainable use of natural spring water. The study noted that there are measures adopted to ensure the sustainable use of natural springs, including strict delegation, Taboos, community-designed rules, afforestation, and consistent monitoring. Participants indicated the strategies in their responses below.

**Participant A:** *"VhaVenḓa vho davhuka vha na milayo yavho ya Tshivenḓa. Nga Tshivenḓa tshisimani hu kapiwa nga vhakegulu fhedzi a tshi kapiwi nga vhabvana ngauri tshiaxa. Tshisima tshi fhaṱeliwa nga vhakalaha. Ṋowa ya tshisimani a i vhulahiwi. Tshisimani a hu yi bodo ya midziru, tshisimani a hu yi mvuvhelo yo fhiraho muliloni, ngauri wa tou tuwa na tshithu tshi na midziru tshisima tshiaxa. Tshisima tshikapiwa murunzuni, kanzhi hu vha hu na miri mihulu tsini na tshisima ifanaho na mutu, na mihuyu. Mihuyu, Mitulume, Minzere, Mitu, Minengeledzi ndi miri i no shumisiwa u tsireledza tshisima. Sa tsumbo tshisima tsha Sheshe na Mukhase tshifhasi ha miri mihulu."*

**Translation:** "The Vhavenda have survived with their indigenous Venda norms. Vhavenda culture only allows elderly women to dig a spring well; active women are not allowed to dig springs because springs can eventually die if they are dug by young women. A spring site is safeguarded by elderly men. It is not allowed to kill the spring snake. It is not allowed to take things like pots that were on fire to the spring, because things with black ash can kill the spring. The spring is mostly dug near a shadow; mostly, there are trees such as *muhuyu* and *mutu* near the spring. *Mitulume*, *Minzere*, *Minengeledzi*, *Mitu, Mihuyu* are trees used to protect springs. For example, the spring in Sheshe village and *Mukhase* sacred place are under big trees."

**Participant B:** *"Vho vha vha tshi shumisa matombo u tingeledza zwisima. Na u sa rema miri i no mela tsini na zwisima sa muri wa Mutu. VhaVenda vho shumisa na zwiila u tsireledza zwisima. Sa tsumbo, Zwi ya ila u vhulaha ṋowa ya tshisimani ngauri ya vhulahiwa tshisima tshi a fa. Ho vha hu tshi vheiwa khali tshisimani i sa fariwi. Hone maḓi a tshisimani o vha a tshi kiwa nga khavho fhedzi, hu si ri nga bigiri ya tsimbi. A Hu remiwi khuni kana mageda tsini na tshisima ngauri daka la tsini na tshisima lo*

*fara tshisima. Fhedzi a no maduvha vhanwe vha vho rema, zwine zwa ita uri vha zwinwe zwiimiswa vha dovhe vha tavhe Muṋadzi."*

**Tradition:** "VhaVenda used stones and strong wood to safeguard the spring area, so it does not get contaminated. They restricted deforestation near the spring area; trees like "Mutu" that normally grow near the spring were not allowed to be cut. They also used taboos to protect their springs. For example, it is taboo to kill the snake said to live in the spring area, for if it is killed, the spring dies too. They used to put the clay pot in a place where it was not allowed to be touched. Moreover, only the traditional mug "khavho" was allowed to be used in the spring and not the modern steel mug. Everyone was not allowed to cut firewood, dry or wet, near the spring, for the forest near the spring is very vital for sustaining the spring. However, nowadays, people even look for firewood and cut near the spring, although other organizations continue to replant the trees they are cutting down."

**Participant C:** *"Zwo tsireledzea ngauri tsho vha tshi sa kapiwi nga vhathu vhatuku, fhedzi nga vhaaluwa vha vhakegulu vha si tsha vhonaho ṅwedzi. Zwisima zwo vha zwo tsireledziwa na nga miri, hafhu vho vha vha tshi tingeledza na nga matombo lune hu si kone udzhena tshithu. Na zwiila zwo tsireledza zwisima, ho vha hu tshi pfi a ri di na tshithu tsha midziru tshisimani, hafhu zwo vha zwi tshi ila u vhulaha nowa ya tshisimani ine kanzhi yo vha i tshi vha i ntswu."*

**Translation:** "Springs were sustained because it was not the young ones who dug the spring place but the elderly women in their menopause. Springs used to be protected by trees and the surrounding stones, and no contamination was possible. Also, taboos protected the springs; it was not allowed to bring anything with "midziru" in the spring area. It is also taboo to kill a snake that lives by the spring area, which is said to be black in colour."

**Participant D:** *"Ṋowa ya tshisimani yovha i sa vhulahiwi. Maḍi a tshisimani o vha a tshi kiwa nga khavho fhedzi. Hafhu zwisima a zwi kapiwi nga muthu muṅwe na muṅwe, fhedzi nga vhakegulu vha si tsha vhonaho ṅwedzi."*

**Translation:** "It is a taboo to kill the snake that lives in the fountain. One could only drink spring water with a traditional jug, "have." Elderly women are the only people who are allowed to clean the spring site, especially those in menopause already."

**Participant E:** *"Zwisima zwa kale zwo lalama ngauri zwovha zwi tshi thonifhiwa nga vhathu vhothe lune ho vha hu sina muthu a ne a nga ṱambela kana u ita vhuada tshisimani. Tsho dzireledzaho zwisima kale ndi u tevhedzela ndayo dza vhakale ngauri vhathu vha kale vho vha vha tshi tevhedzela ndayo na vhaswa vhahone. Ndayo idzi dzi katela zwiila zwa tshisimani zwe zwa vha zwihone zwine munwe na munwe o vha a tshi zwi thonifha. Zwinwe zwa zwiila izwo ndi uri nowa ya tshisimani a i vhulahiwi, na daka la tshisimani a li remiwi. Zwisima zwa kale zwo tsireledziwa na nga vhudele, vhathu vho vha zwa tshi fara zwisima zwavhudi ngauri vho vha vho themba tshisima sa tshiko tsha madi o kunaho."*

**Translation**: "The natural springs in the olden days survived because everyone had respect for springs to an extent that no one would misuse or ill-treat natural springs. Obeying the teachings of the elderly protected natural springs; hence, everyone, including the youth, used to obey the ancient people's teachings. The teachings include taboos associated with natural springs that existed and which every community member used to respect. It is taboo to kill the snake known for staying in the natural spring and to cut down trees in the natural spring. The olden-day natural springs were also protected by neat treatment; people used to maintain natural springs, for they relied on natural springs for clean water.

The researcher concurs that Vhavenda has been able to protect natural springs from threats at present, as indicated by the participants. The conservation of watercourses, streams, water pans and wells, as well as the associated vegetation, was protected through rules that ensured their sustainability,

and this is related to some responses given by participants about taboos. The VhaVenda strategies were to ensure the sustainability of natural springs as a water source they relied on for centuries. Due to the significance of natural springs in the VhaVenda community, they have adopted several techniques to save the life of natural springs so they can continue to use natural spring water. Researchers gained insight into the relationship between the VhaVenda indigenous communities and natural springs. Now, VhaVenda have cared for their natural environment, particularly the natural springs in this case.

## DISCUSSION

Clearly, natural springs are facing critical challenges. These challenges are hindering the wellness of natural springs, hence the loss of interest in natural spring water. It seems like the dirt emerging near the natural springs is stopping Indigenous community members from going and fetching water from the natural springs. The researcher understands that the challenges faced by natural springs are leading to the drying up of natural resources. However, Natural springs had never encountered such challenges prior to the modern era in the Vhavenda indigenous community. Knüppe observed that the decline in water quantity and quality, together with the negative impacts of climatic variability, has increased the demand for spring waterscape utilization, sometimes leading to their overuse and eventual degradation.[30] Dixon posits that in many spaces of the Global South, there was disregard for the importance of ecosystem services provided by springs.[31]

Deforestation is a threat to natural springs because cutting trees disturbs the safety of natural springs, and the forests surrounding natural springs protect the water from direct sunlight and animal contamination. Exposure of natural springs to direct sunlight leads to dehydration. It seems like the surrounding trees protect the natural spring from direct sunlight, and cutting down trees severely hinders the natural spring. Trees also protect the natural spring from domestic animals scattered in the forests and mountains, such as cattle and pigs. It was indicated that these scattered domestic animals contaminate the natural springs. There is also a need to prevent and resolve conflicts between humans and water resources, as well as conflicts among humans themselves.[32] An effective management strategy should account for the natural state of the spring, considering whether grazing animals are included or excluded and the limitations posed by introduced plant and animal species. Implementing a rotation program that involves grazing or non-grazing periods could be an effective approach for managing spring habitats successfully in arid regions.[33]

The trend of plastering the spring site was thought of as a solution. However, it turns out to be another challenge, leading to the natural spring drying up. Plastering disturbs the water flow, and natural springs change their flow direction. Further, it destroys the surrounding wetland and interrupts the natural flow of the springs. The wetland surrounding the spring site plays a vital role, as it enriches the plants around the spring with enough water to survive even when there is not enough rain. Plastering does not allow any weeds to grow around the spring because it paves the ground where weeds must grow, and that disturbs the ecosystem around the spring site. According to Bascik et al., the greatest problem facing spring conservation is the possible degradation and contamination of the spring waterscape.[34] Spring cavities are most often damaged when they are built up or altered for drinking water abstraction.

Despite all the barriers to the natural springs, the value of indigenous knowledge of the natural environment is seen in the VhaVenda strategies used to protect natural springs. Barqui and Scarsbrook noted that throughout the world, there is a growing recognition of the value of springs, and several initiatives have been implemented to ensure the protection and sustainable management of these

[30] Kathrin Knüppe, "The Challenges Facing Sustainable and Adaptive Groundwater Management in South Africa," *Water Sa* 37, no. 1 (2011).
[31] Alan Dixon, "Wetlands and Indigenous Knowledge in the Highlands of Western Ethiopia," in *Mountains: Sources of Water, Sources of Knowledge* (Springer, 2008), 197–210.
[32] Demetris Koutsoyiannis, "Scale of Water Resources Development and Sustainability: Small Is Beautiful, Large Is Great," *Hydrological Sciences Journal* 56, no. 4 (2011): 553–75.
[33] T J Fatchen, *Mound Springs Management Planning: Managememnt Issues, Strategies and Prescriptions for Mound Springs in Far North South Australia* (South Australia Department for Environment and Heritage, 2000).
[34] Maria Bascik, Wojciech Chelmicki, and Jan Urban, "Geoconservation of Springs in Poland," *Episodes Journal of International Geoscience* 32, no. 3 (2009): 177–85.

resources.[35] Management and conservation of spring waterscapes and the services that they provide, such as biodiversity, have been argued to be an important area for intervention at key international conventions and in regional and national policies.[36] The importance of sustainable management of springs and their services, though still in its infancy, has been increasingly recognized in the wide-ranging debate on managing the world's water resources.[37]

Scarsbrook et al. highlighted several initiatives that have been implemented to ensure spring protection and sustainable management.[38] For example, participants indicated the use of taboos as one means used to protect natural springs. There were indigenous taboos implemented to maintain the wellness of natural springs. It was not allowed to kill the snake known to stay near the natural spring site, for if it was killed, the spring would also die. VhaVenda was also strict about who was supposed to dig and safeguard the well; only elderly women were allowed to dig the well, and elderly men were to safeguard it with stones and strong wood. Bascik et al. argue that the cultural significance of springs has been the major driving force behind the first attempts at their conservation and protection from overuse or modification.[39] They observed that in the spiritual dogma of clans and societies, some springs were sacred and untouchable, which facilitated their survival undamaged over time.

Water trees such as *the Muhuyu, Munadzi, and Mutu trees play* a vital role in natural spring protection. Vhavenda is used to plant fig trees and other trees to ensure the natural spring never dries; the roots help to store water, and the trees' shadows protect the water site from direct sunlight. Natural springs have a long life when these trees are near water, and it is common to see such trees in some natural springs. Erman argued that planting or permitting native riparian vegetation, such as woodland plants or grasses, can help restore sediment and nutrient filtering and stabilize springs.[40] Groever et al. highlighted the importance of developing a springs database as a key step for effective management.[41]

The area where natural springs are located also determines the safety of the spring. For example, most natural springs in the Venda community are in wetlands, along riverbanks, and under trees. The mud in the wetlands stores enough water to keep the surrounding area wet, even when it is sunny, whilst the trees provide shade that protects the spring from the sun and contamination. Further, springs by the riverside flow unceasingly regardless of the lack of rainfall in the community because the river water supports the spring water table. Zandi et al. have also observed that assessing spring occurrence potential is a major concern for authorities responsible for water resource management, regional land-use planning, and environmental protection for sustainable development.[42] The location of groundwater spring potential zones was identified by ICIMOD as an important tool for performing successful groundwater determination, protection, and management programs.[43]

There are three categories of good maintenance, namely, daily maintenance of removing dung, seasonal maintenance to clean a sediment deposit after flood season, and major rehabilitation and extension of the well depth following the depletion of the groundwater table.[44] The Vhavenda used to maintain their natural spring, for they knew its significance in their community. They used to refrain

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[35] Scarsbrook, Barquín, and Gray, *New Zealand Coldwater Springs and Their Biodiversity*.

[36] Marco Cantonati, Ermanno Bertuzzi, and Alessia Scalfi, "CRENODAT (Biodiversity Assessment and Integrity Evaluation of Springs of Trentino (Italian Alps) and Long-Term Ecological Research): Project Design and Preliminary Results," in *Integrated Watershed Management: Perspectives and Problems* (Springer, 2010), 121–32; D W Webb et al., "The Macroinvertebrate Biodiversity, Water Quality, and Hydrogeology of Ten Karst Springs in the Salem Plateau Section of Illinois, USA," *Studies in Crenobiology: The Biology of Springs and Springbrooks*, 1998, 39–47.

[37] C M Finlayson and N C Davidson, "Global Review of Wetland Resources and Priorities for Wetland Inventory," *Preface Iv Summary Report* 15 (1999): 1–15.

[38] Scarsbrook, Barquín, and Gray, *New Zealand Coldwater Springs and Their Biodiversity*.

[39] Bascik, Chelmicki, and Urban, "Geoconservation of Springs in Poland."

[40] Nancy A Erman, "Lessons from a Long-Term Study of Springs and Spring Invertebrates (Sierra Nevada, California, USA) and Implications for Conservation and Management," in *Conference Proceedings. Spring-Fed Wetlands: Important Scientific and Cultural Resources of the Intermountain Region* (Citeseer, 2002), 1–13.

[41] W Groever, T Bierbaum, and I Homburg, "Erfahrungen Mit Der Umsetzung Des Quellschtzkoncpets Im Kreis Guetersloh (Experiences with the Application of the Spring Protection Concept in Guetersloh District)," *Crunoecia* 5 (1996): 161–66.

[42] Jalal Zandi et al., "Mapping of Regional Potential Groundwater Springs Using Logistic Regression Statistical Method," *Water Resources* 43, no. 1 (2016): 48–57.

[43] ICIMOD, "Reviving the Drying Springs Reinforcing Social Development and Economic Growth in the Midhills of Nepal" (International Centre for Integrated Mountain Development Lalitpur Nepal, 2015).

[44] Coppock, *The Borana Plateau of Southern Ethiopia: Synthesis of Pastoral Research, Development, and Change, 1980-91*.

from littering near the spring and monitor whether no dirt was thrown in the area. Their maintenance used to include cleaning whenever contamination was observed at the water site. Those with domestic animals were advised to take care of their animals, such as cows, to avoid animals contaminating the spring site. The strict maintenance of natural springs really ensured that they are less contaminated and flow abundantly.

## RECOMMENDATIONS

### Community Awareness Program

With the use of VhaVenda indigenous solutions in the protection of natural springs, the study recommends a community-based spring-cleaning program. Community members can start a program to clean the dirt in the natural spring site and encourage others to stop littering in the spring site for the cleanliness and sustainability of natural springs. The negligence of natural springs will lead to contamination and natural springs drying up in number if not addressed in the communities. If natural springs are revived and monitored, they can help save the water crisis acknowledged in some indigenous communities. The awareness program will educate the masses about the need to safeguard the springs, highlighting their significance in the community beyond just domestic use.

### Environmental Eco-mapping

This recommendation highlights that eco-mapping is essential to protect natural springs for sustainable use by African indigenous communities. By visually pinpointing spring locations, eco-mapping helps communities and traditional leaders accurately identify and mark these critical water sources. This helps to make informed decisions about land use and development, thus minimizing the risk of encroachment or damage to springs. As a result, eco-mapping encourages the preservation of natural springs, securing their availability for future generations and supporting sustainable resource management within indigenous communities.

## CONCLUSION

Exploring VhaVenda indigenous practices for safeguarding natural springs for sustainable water resource use is the main purpose of this study. What gave this study interest is the identified neglected and dried springs in the community. This study found that natural springs face several challenges in the indigenous community, including the act of cutting down trees around the spring area, dirt caused by unattended livestock, littering of household dirt, dead animals and diaper waste, lack of rainfall, drought, taboos, negligence, business developments on the spring area, and spring plastering with cement. The paper also concluded that the VhaVenda indigenous people have an impact on the natural environment; hence, their indigenous strategies are used in the protection of natural springs. Participants indicated that the VhaVenda culture only allows elderly women to dig a spring well; active women are not allowed to dig springs because springs will eventually dry up. VhaVenda use stones and strong wood to safeguard the spring area, so it does not get contaminated. Taboos are also used to protect natural springs. For example, participants indicated that it is forbidden to kill a snake known to live in the natural spring site because the VhaVenda believe the spring will dry up. The findings are evidence that the VhaVenda have indigenous strategies for natural spring protection. It seems natural springs never experienced the contemporary contamination crisis prior to modernity, hence the implementation of indigenous protection strategies.

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