BASEflow

2024 - 2030 STRATEGY

GROUNDWATER MATTERS

CONTENTS

ACRONYMS

DCs	District Councils
DWDOs	District Water Development Officers
GMI	Groundwater Management Institute
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
MoWS	Ministry of Water and Sanitation
MWAMIS	Malawi Water Asset Management Information System
NWRA	National Water Resources Authority
NGO	Non-Governmental Organisation
O&M	Operations and Maintenance
RWSN	Rural Water Supply Network
SADC	Southern African Development Community
SDG	Strategic Development Goal
STEM	Science, Technology, Engineering and Mathematics
ToC	Theory of Change
WASH	Water, Sanitation and Hygiene
WESNET	Water and Environmental Sanitation Network
WRM	Water Resources Management
WHO	World Health Organisation

WHO IS BASEFLOW?

We are a Malawian-led NGO and Social Enterprise working at the intersection of Water, Sanitation and Hygiene (WASH) and Integrated Water Resources Management (IWRM) to make groundwater, an invisible resource, visible .

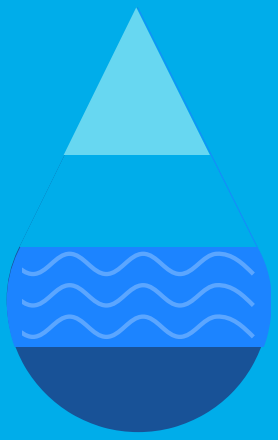
Founded in 2017, BASEflow is dedicated to principles of holistic and inclusive groundwater management. We promote practices and policies that seek to guarantee groundwater for future generations.

VISION

A world where no well runs dry

MISSION

To improve groundwater sustainability for rural populations to access safe drinking water through strengthening of government and community systems to effectively monitor, manage, develop, and harness groundwater for improved livelihoods and resilience



CORE VALUES

BOLDNESS

From research to action, we take calculated risks to address groundwater challenges that few attempt to tackle

INNOVATION

We seek out new technologies and approaches as we cultivate new ways of thinking to find replicable solutions

PRAGMATISM

We do not hesitate to roll up our sleeves and get our hands dirty to work with partners to solve problems

SUSTAINABILITY

We believe in a balanced approach with community collaboration and adaptive strategies to address current and future groundwater needs

TRANSPARENCY

We are open with everything we do and proactively share information as we seek out opportunities to collaborate

> **According to the Notre Dame Global Adaptation Initiative, Malawi is the 25th most vulnerable country to climate change out of 181 countries studied.... Malawi has experienced at least 19 major floods, seven droughts, and repeated cyclones over the past five decades, leading to widespread displacement, food insecurity, and damage to infrastructure.**
>
> **Malawi High-Priority Country Plan, Global Water Strategy 2022-2027,USAID**

WHY DOES GROUNDWATER MATTER?

Experts in the water sector are rallying around the United Nations 2030 Agenda for Sustainable Development, especially Goal Six (SDG 6), which aims to “ensure the availability and sustainable management of water and sanitation for all”. The World Health Organisation (WHO) further advocates for every household to have potable water within 1,000m, with no more than 30 minutes or 5% of income spent on collection. Groundwater is seen as indispensable to achieving these global aspirations.

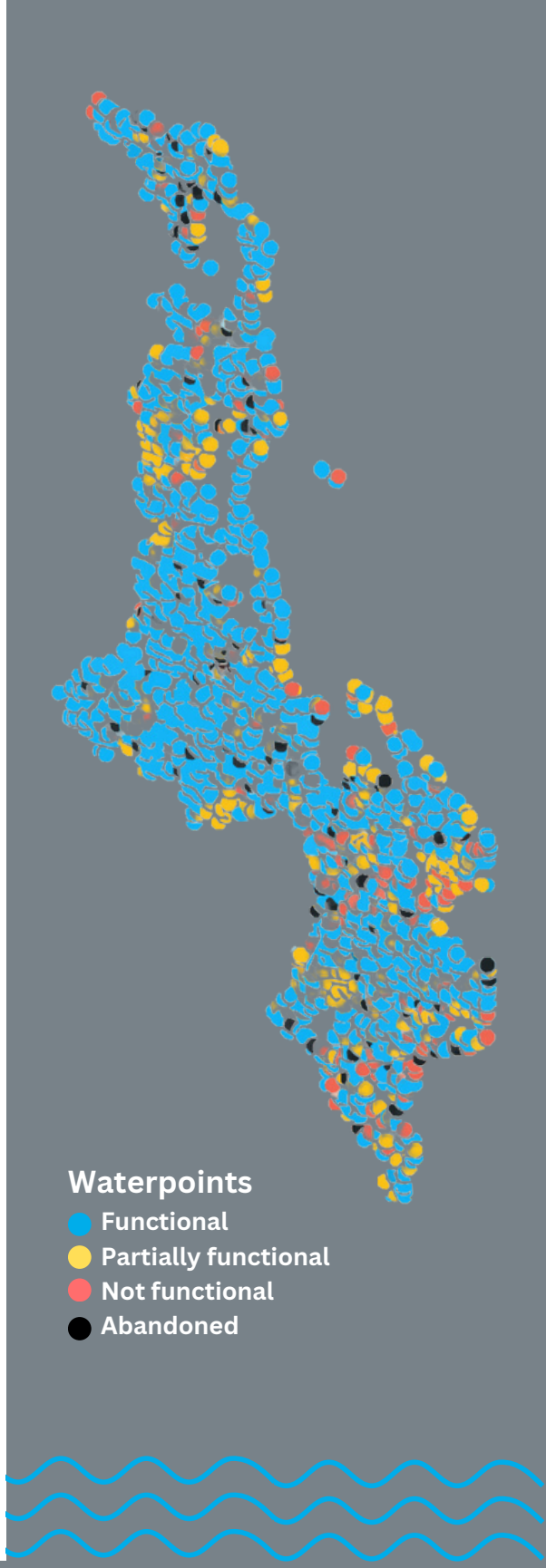
Groundwater is a 'hidden resource’ used for drinking, hygiene, sanitation, agriculture, industry, and mining. Underground aquifers feed lakes and rivers, while groundwater catchments capture rainwater and mitigate against the effects of floods and droughts. Globally, the greatest groundwater challenges arise from extreme weather events, environmental degradation, and increasing demand due to population growth. This story is no different for Malawi.

Malawi is rich in water resources. We have the third-largest lake in Africa and more than 120,000 water points—including boreholes, hand-dug wells and surface sources—fed by an annual renewal of 2.5 billion m^3 of groundwater. According to the Ministry of Water and Sanitation (MoWS) 75% of Malawians rely on groundwater for their basic needs and should have access within 500m of their homes.

Despite groundwater being relatively accessible at depths of only 20-40m, Malawi has made slow progress towards SDG 6 and the water targets of Malawi Vision 2063. After three decades of drilling 60,000 boreholes across the country, many rural Malawians still walk long distances to find water. Up to 30% of borehole pumps fail within five years of installation, with only 21% partially functional and 6.5% abandoned due to poor construction or wells are drying up.

The situation is further exacerbated by more frequent and intense cyclones destroying groundwater-dependent infrastructure and trapping millions of Malawians in a vicious cycle of climate change, water scarcity and poverty. This has placed Malawi as 5th on the 2021 Global Climate Risk Index.

Given its strategic importance, sustainable management through regular recharge and dedicated catchment protection are vital for our survival. To face an increasingly challenging environment whilst also sustaining groundwater supply, Malawi needs a systems-strengthening approach with solid infrastructure and planning for community resilience to ensure that *no well runs dry.*



“Although Malawi has abundant surface water and groundwater resources, these are of variable quality and quantity, unevenly distributed in time and space, and are subjected to poor conservation and management.”

National Water Policy 2023

WHAT DID WE DO IN THE FIRST FIVE YEARS?

From 2018-2023, we focused on groundwater conservation, data governance, social accountability, capacity building, borehole drilling, and community operations and maintenance (O&M).

Borehole forensics

We pioneered Borehole Forensics, a diagnostics approach that informed cost-effective rehabilitation, repair or decommissioning of water supply infrastructure. This approach led to the assessment of 580 boreholes and supervision of 139 drilling sites. Several international organizations, such as Habitat for Humanity, WaterAid and Self Help Africa, adopted our method as part of their rehabilitation efforts.

Data management

Malawi Water Asset Management Information Systems (MWAMIS) was established as the most comprehensive water point database in Malawi's history and a regional flagship. Working with the government and partners, we mapped 120,934 water points, 285,635 sanitation facilities, 10,337 waste disposal sites, 163 river gauge stations, 100 groundwater monitoring wells, and 72 artesian wells nationwide.

Artesian well remediation

We championed innovations around groundwater conservations like artesian well remediation and conserved more than 59 million litres of water to date.

Climate resilient handpumps

We introduced climate resilient handpumps and restored water access for 7,000 people after Cyclone Freddy in Mulanje district.

Policy dialogue

We moderated the first policy dialogue on groundwater development which engaged government and civil society stakeholders to address the human rights implications of failed boreholes.

Sound financial management

We built up five years of sound financial management and clean audits as our BASEflow NGO managed $3.3 million through 11 grants from 9 donors, and our BASEflow Social Enterprises generated $460,000 for NGO operations and overheads.

WHAT DID WE LEARN?

Our 2018-2023 strategy focused on five priority issues around groundwater sustainability. Below is a summary of our progress and our outstanding challenges.

1. **Poor catchment projection**
The artesian well remediation project conserved a significant amount of groundwater that would have otherwise been lost. Additionally, our partnership with the government to map all artesian wells in Malawi laid the foundation for future investment plans. However, catchment protection needs more work.

2. **Limited accountability for failed boreholes**
Borehole forensics exposed poor construction in Chiradzulu District and empowered communities and local government to use Malawi's water laws. However, our data-driven approach to social accountability struggled due to the absence of a legal framework or water tribunal to enforce compliance from drilling companies, NGOs, or donors.

3. **Insufficient capacity among sector actors and frontline staff**
Our largest capacity-building initiative was training354 government extension workers to use the mWater app for data collection and analysis. We recognised a local government gap in drilling supervision, and partnered with the MoWS to update the national drilling standards as an initial step to develop training curricula for frontline staff. Lastly, but not least, in collaboration with the Water and Environmental Sanitation Network (WESNET), we successfully advocated for a standalone water ministry.

4. **Inadequate information management systems**
We facilitated mapping of WASH assets to form the backbone of MWAMIS. Despite developing data-sharing protocols, access remains limited and MWAMIS is not yet aligned with the SDGs or Vision 2063 metrics.

5. **Weak Operations & Maintenance (O&M) arrangements**
Our primary contribution was the proposal to vertically integrate an O&M model to replace the fragmented service delivery system. This is still under development as the sector experiments with new models. Many actors are engaged in this space.

The major lesson from our first five years is that with our efforts to address a broad range of important issues**, we overextended.** We did not fully address O&M or catchment degradation. Moving forward, we will shift to **depth over breadth,** take a more **targeted approach**, build on strengths and niche areas, and strive to ensure the greatest impact where it matters most.

WHERE ARE WE GOING WITH THE NEW STRATEGY?

STEWARDSHIP

BASEflow firmly believes that groundwater is the threshold resource for Malawi's socio-economic development. We are committed to ensuring that groundwater stewardship is central to development discussions at both national and village levels, with a focus on the complex challenges that hinder groundwater access. We want to leverage our expertise and identify interventions that have the greatest potential to sustain groundwater as a resource.

COLLABORATION

Our new strategy guides us to take on unprecedented challenges threatening community access to rural groundwater. We will promote community-based initiatives that enhance livelihoods and resilience. We will collaborate within government systems, partner with like-minded NGOs, and empower drillers and communities with knowledge, skills, technologies, and innovations for better groundwater resource management.

RESILIENCE

Our approach includes support for smart borehole drilling that is buffered by competent supervision, enhanced groundwater monitoring to inform planning, introduction of resilient infrastructure capable of withstanding climate shocks, and initiatives for catchment protection to boost groundwater recharge. BASEflow will continue to address existing and emerging challenges around groundwater availability.

RIPPLE EFFECT

We aim to create ripple effects by sharing our successes through collaborating with WESNET, the Rural Water Supply Network (RWSN), and the Southern African Development Community Groundwater Management Institute (SADC-GMI). We will be intentional in our communications, advocacy and public education and consistently promote messages on protection and recharge of groundwater. We will have clear targets and milestone reviews to guide our actions and advocacy.

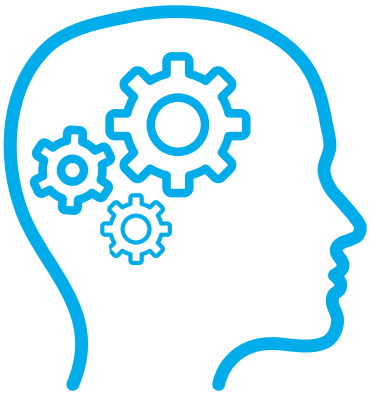
FUNDING

While the BASEflow NGO team remains committed to seeking grants for rural groundwater stewardship, the BASEflow Social Enterprises will generate unrestricted funds to support the work of the NGO by transforming our expertise into marketable services and products.

BASEFLOW AIMS TO BE:

- **The most flexible and dependable partner of choice for groundwater development for government, donors, NGOs, academia, and private investors;**
- **The gold standard for capacity development of industry standards for groundwater stewardship and climate-resilient strategies;**
- **The systems builder connecting drillers, District Councils (DCs), the MoWS and the National Water Resources Authority (NWRA) for better groundwater governance;**
- **The respected resource hub for groundwater knowledge, research and innovations to share through national and regional collaborators like SADC-GMI; and**
- **A Malawian-led, home-grown NGO and Social Enterprises with a vision that goes far beyond 2030 to protect our rural groundwater.**

HOW WILL WE GET THERE?

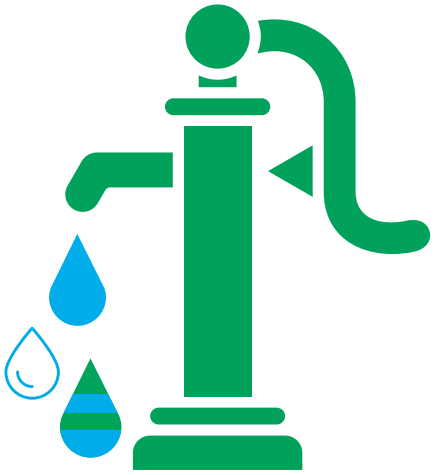


To develop our 2024-2030 Strategy, we did our homework. We honestly assessed the impact of BASEflow operations to date, listened to our partners, reviewed our priorities, and redefined our mission.

Our Theory of Change (ToC) continues to focus on improving access to safe drinking water in rural communities, but leaves O&M to other organisations.

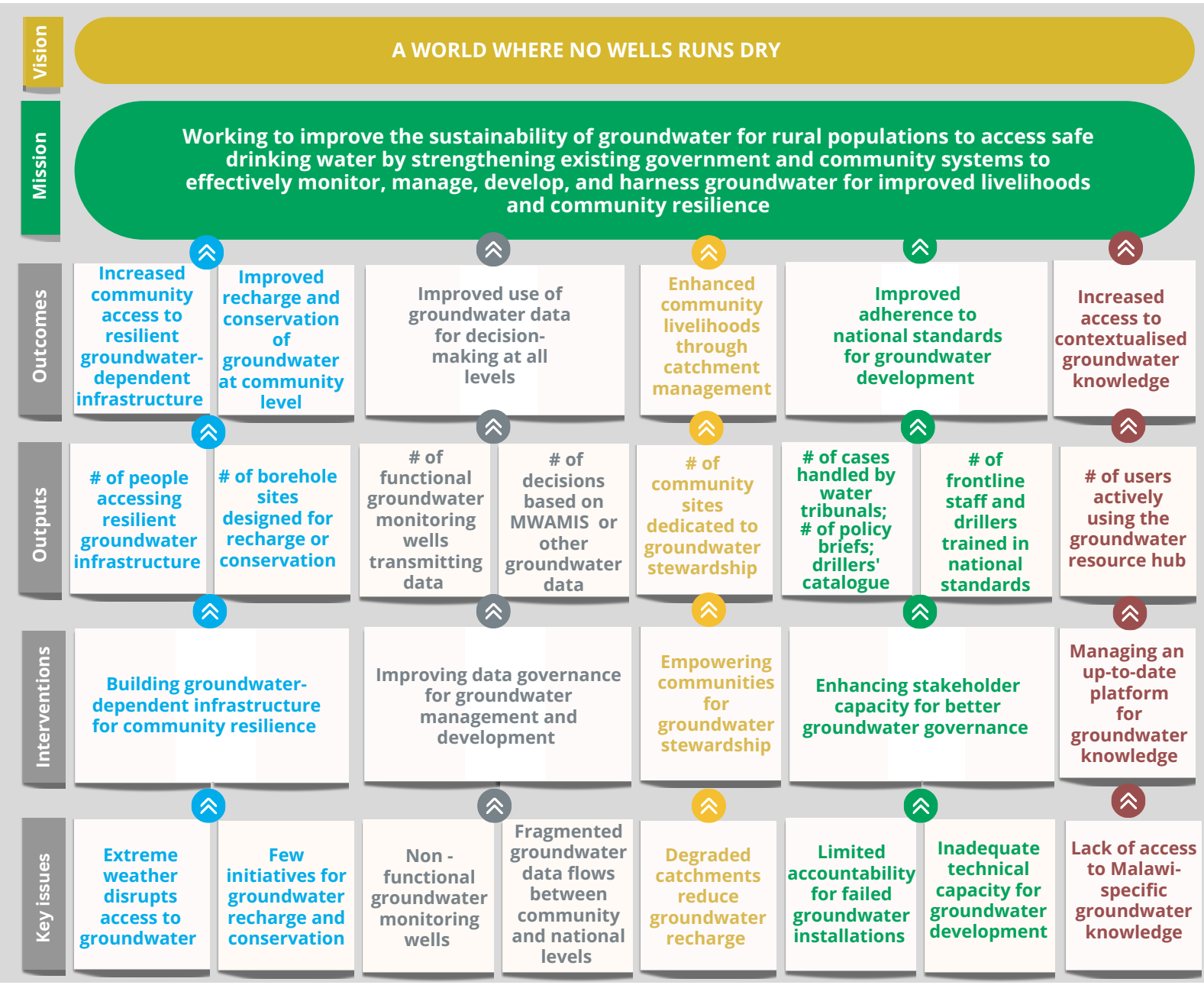
BASEflow will concentrate on improving installation quality through rehabilitating or decommissioning dysfunctional boreholes and piped systems. We will intensify community-level catchment protection through locally appropriate recharge efforts.

We aim to increase access to groundwater data for decision-making by supporting the MoWS, NWRA and stakeholders to improve sector accountability for groundwater infrastructure. Our work will be documented and widely shared through an expanded information hub.



Priority areas in the 2024–2030 Strategy are informed by and aligned to international commitments, especially the SDGs and national frameworks like the Water Resources Act 2013, National Water Policy 2023, National Resilience Strategy 2018-2030, and Malawi's Vision 2063.

THEORY OF CHANGE



BASEflow

OUR PRIORITY INTERVENTIONS

BASEflow's new 2024-2030 Strategy is based around five priority interventions to improve groundwater sustainability, enhance rural access to safe drinking water, and contribute to community livelihoods and resilience.

PRIORITY INTERVENTION 1: BUILDING RURAL GROUNDWATER-DEPENDENT INFRASTRUCTURE FOR COMMUNITY RESILIENCE

WHY:

While many stakeholders recognise the utility of groundwater, very few of their initiatives consider recharge. Flood damage to water infrastructure is worsening and we cannot continue to drill new boreholes and install pumps or piped systems unable to withstand climate shocks. Additionally, our investigations show 25% of boreholes do not meet minimum standards for yield or construction quality.

HOW:

· ***Increase Groundwater Access:*** Borehole forensics will continue to inform rehabilitation of handpump-fitted boreholes or piped systems to increase the number of rural households with access to groundwater within 500m – the Malawi target. Groundwater-dependent infrastructure must meet quality, flow and yield standards.

· ***Support Groundwater Recharge:*** Low-cost, locally appropriate initiatives and technologies will be promoted to increase groundwater levels, including converting abandoned boreholes into recharge wells.

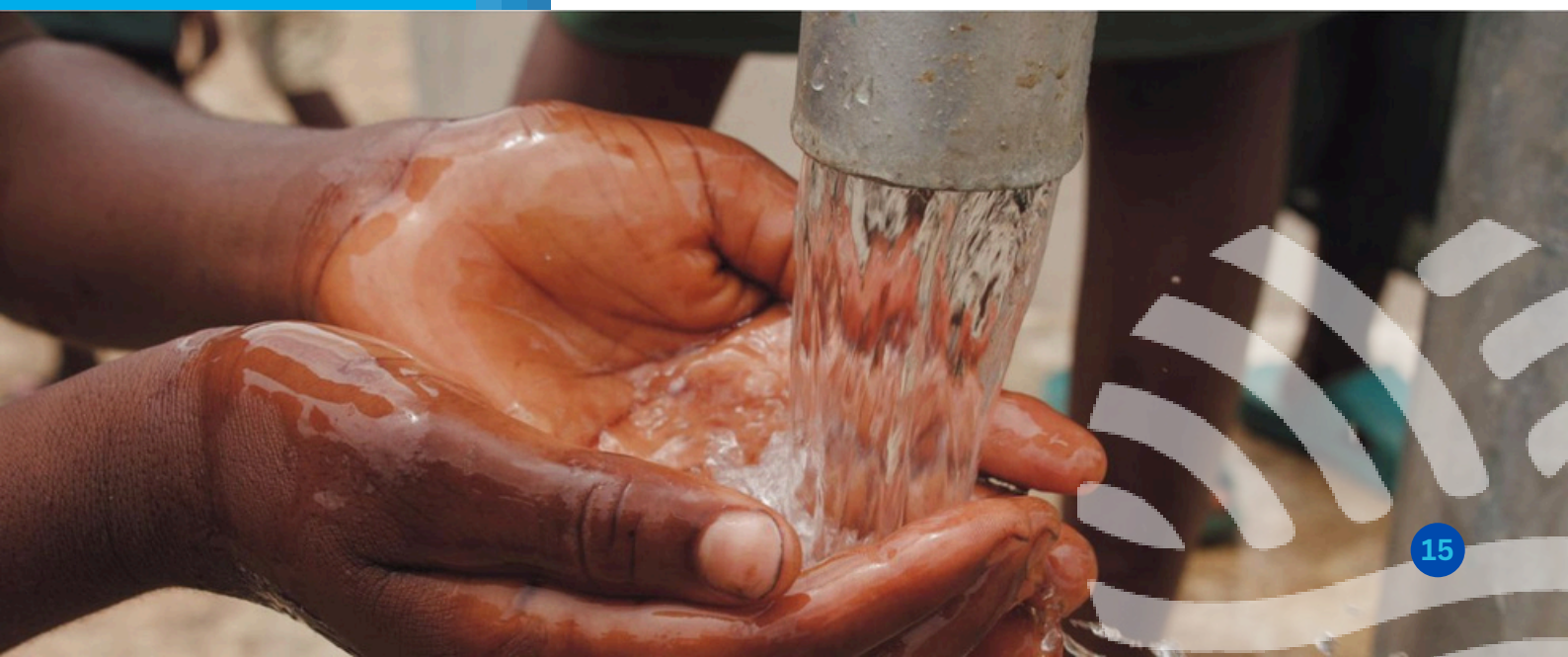
· ***Promote Multiple Uses of Artesian Water:*** Capping the free flow of groundwater from artesian wells and, where appropriate, redirecting it for multi-purpose use will improve livelihoods for up to 72 communities by using an adapted version of our Jordani Model.

· ***Reinforce Sanitation*:** Groundwater protection and resilience will be integrated into latrine design. Additionally, we will promote fair financing arrangements for construction of lined pits to prevent groundwater contamination through seepage.

· ***Invest in Climate-Proofing:*** For the rural water supplies most at risk of damage from climate shocks, BASEflow will explore the best ways to strengthen or adapt the infrastructure. We will also explore climate-disaster insurance to secure the upgraded infrastructure in case future of natural disasters.

OUTCOME:

Increased community access to resilient groundwater supply in rural areas; improved groundwater recharge, protection, and conservation; and WASH infrastructure resilient to climatic shocks.



PRIORITY INTERVENTION 2: IMPROVING DATA GOVERNANCE FOR GROUNDWATER MANAGEMENT AND DEVELOPMENT

WHY:

A 2022 technical assessment conducted with the MoWS confirmed that 84 of Malawi's 100 groundwater monitoring wells are either non-operational, vandalised or inaccessible for data retrieval. Additionally, insufficient information sharing between national and community levels hinders coordinated responses to changes in groundwater conditions. Moreover, MWAMIS is not yet accessible to the broader water sector and lacks localised data or metrics to align with national or global commitments.

HOW:

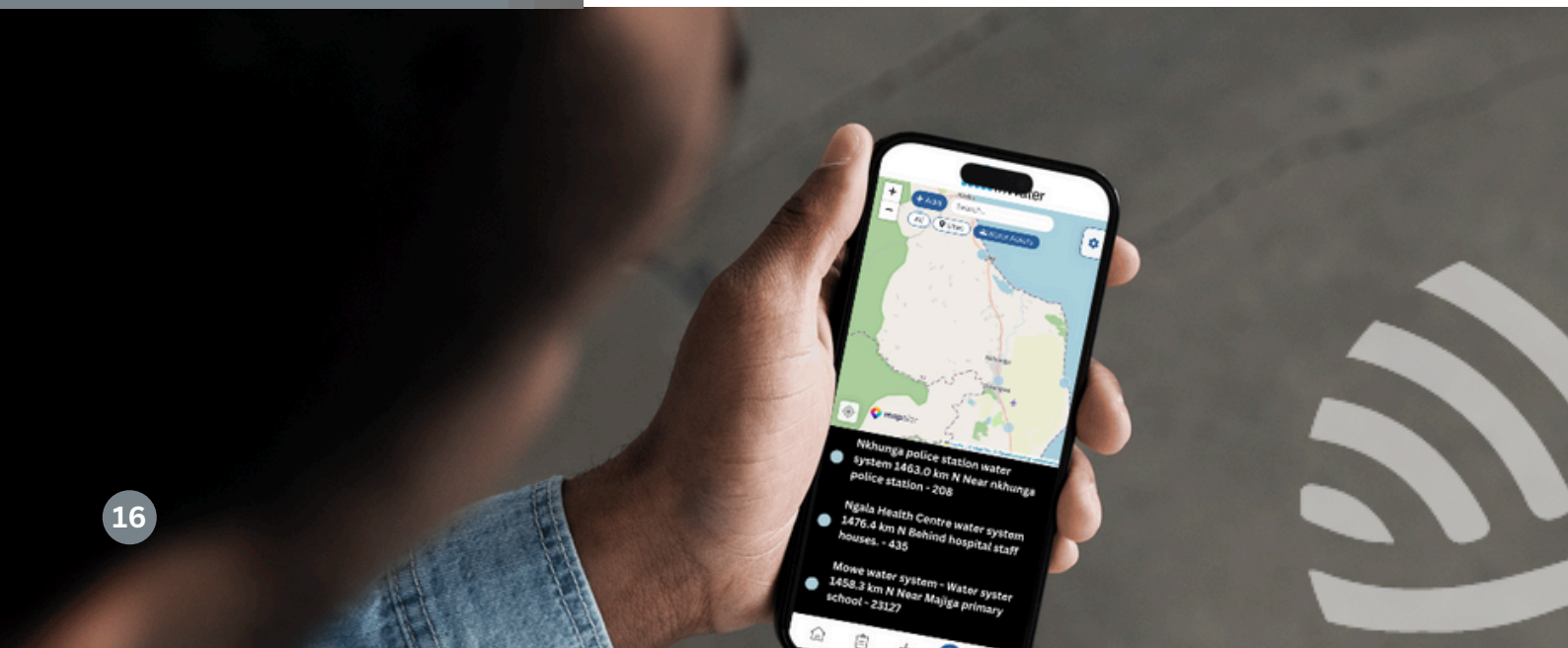
· ***Extend sector use of MWAMIS:*** We will support MoWS to promote access, sharing, expansion, and updates for a single harmonised database for all water sector stakeholders. We will work to ensure that relevant data is readily available and discourage development of redundant systems.

· ***Revitalise Groundwater Monitoring:*** Malawi's 100 monitoring wells will have hardware rehabilitated and digital transmission capacity improved by involving citizens in data collection. Where necessary and in consultation with MoWS, new monitoring wells will be installed in high-risk areas or strategic aquifer systems. Other WASH stakeholders will also be encouraged to allocate resources within their budgets to rehabilitation / construction of monitoring wells.

· ***Strengthen Data Flows:*** Data exchanges will be promoted between community, district and national levels to facilitate evidence-based decision-making and prioritise investments, particularly for guiding drilling locations and catchment protection interventions.

OUTCOME:

Improved access to WASH information from a centralised database that is regularly updated by government, NGOs and community agents; and enhanced flow of groundwater data between national and community levels for better planning of investments and interventions.



WHY:

Malawi loses 33,000 hectares of forest and 22 million tonnes of topsoil annually through runoff to neighboring countries. This severe degradation reduces the infiltration of rainwater into the soil, hindering groundwater recharge and leading to dry wells over time. Combined with inadequate adoption of Integrated IWRM, Malawi has become a water-stressed country with renewable water resources below 1,100 m^3 per capita per year.

HOW:

· ***Integrate Citizen Science in Groundwater Monitoring:*** Training and mentorship programs will be organised for District Water Development Officers (DWDOs) and community groups. In areas where digital groundwater data transmission is not possible, communities will be empowered to collect groundwater data, and alert authorities when data loggers are damaged.

· ***Strengthen Artesian Water-Dependent Reticulation Systems:*** Where multiple uses of artesian water are feasible, overflow will be diverted for community activities like agricultural irrigation, fish ponds or groundwater recharge. Surrounding communities will be trained and mentored on how to maximise artesian water for long-term use, improved livelihoods and increased incomes. We will track any additional incomes generated from harnessing artesian water.

· ***Promote Managed Aquifer Recharge:*** Women's groups, youth networks, traditional authorities, and district leadership will be empowered to lead groundwater conservation and catchment protection efforts in collaboration with catchment management committees. This will involve more than just planting trees and include scalable solutions tailored to communities, including deep-bed farming, sand dams, check dams, contour bunds, infiltration ditches, box ridges, retention pools, percolation ponds, riverbank protection measures, and/or promoting agroforestry and conservation agriculture.

OUTCOME:

Communities with improved livelihoods will become more self-sufficient through a better understanding of IWRM, groundwater stewardship and catchment management.

PRIORITY INTERVENTION 3: EMPOWERING COMMUNITIES FOR GROUNDWATER STEWARDSHIP

PRIORITY INTERVENTION 4: ENHANCING STAKEHOLDER CAPACITY FOR GROUNDWATER GOVERNANCE

WHY:

Malawi's 'gold-standard' policies and guidelines for water installations are often underfunded, ignored or not used to hold stakeholders to account when systems fail. There is limited collaboration between people, conflicts of interest, inadequate drilling supervision, and a lack of regulatory enforcement to ensure transparency and accountability. Additionally, frontline staff have limited training in drilling supervision and often lack resources to perform their duties effectively.

HOW:

· ***Support NWRA to Establish a Water Tribunal:*** We will build on previous lessons learnt to actualize a tribunal that serves as the primary legal framework to hold stakeholders to account for failed water installations or not adhering to national standards.

· ***Promote Drilling Standards:*** Stakeholder understanding and capacity will be strengthened to adhere to national guidelines with targeted training for drilling companies and government extension workers. Additionally, drillers will be encouraged to register with the NWRA for regulatory compliance and technical advice.

· ***Enhance Transparency in the Drilling Sub-Sector:*** Various governance mechanisms will be supported to ensure drilling companies adhere to national policies and regulations. This will primarily involve developing a publicly accessible catalogue of qualified drillers, organising a coalition of drillers to advocate for better contracts, supporting a grievance reporting mechanism for poorly constructed boreholes, and conducting studies on how kickbacks incentivise substandard construction.

· ***Advocate for Policies, Standards, and Laws:*** Groundwater stewardship and adherence to standards will be promoted by partnering with like-minded organisations to advocate for implementation and enforcement of policies related to the development, management, recharge, extraction, and protection of groundwater. BASEflow will compile advocacy materials, such as policy briefs and videos, to promote best practices in groundwater stewardship and adherence to national standards.

· ***Train Communities on Water Rights and National Standards:*** Communities will be educated on relevant water laws, rights and standards to comprehend how the legislation protect their access to safe groundwater. This will empower them to demand that drilling companies, NGOs and other stakeholders follow due process in bringing water investments to their homes.

OUTCOME:

Improved adherence to national standards for groundwater development among all stakeholders; qualified drillers deliver quality engineering work certified by qualified hydrogeologists and competent frontline staff.

WHY:

There is limited access to information on groundwater science and practice, compounded by widespread assumptions about the availability of groundwater supply. Additionally, despite the presence of a BASEflow resources webpage this is currently underutilised and there remains no publicly accessible central repository for localised groundwater-related information.

HOW:

· ***Maintain a Groundwater Knowledge Hub:*** The BASEflow website will be repurposed to optimise the 'Resources' tab into a comprehensive knowledge hub for groundwater-related information. This hub will not only provide access to documents and videos, but will also be designed to guide non-technical users through the basics of groundwater issues and progress to clear explanations of complex topics. The Hub will leverage materials from partners like RWSN and adapt them to local languages where needed.

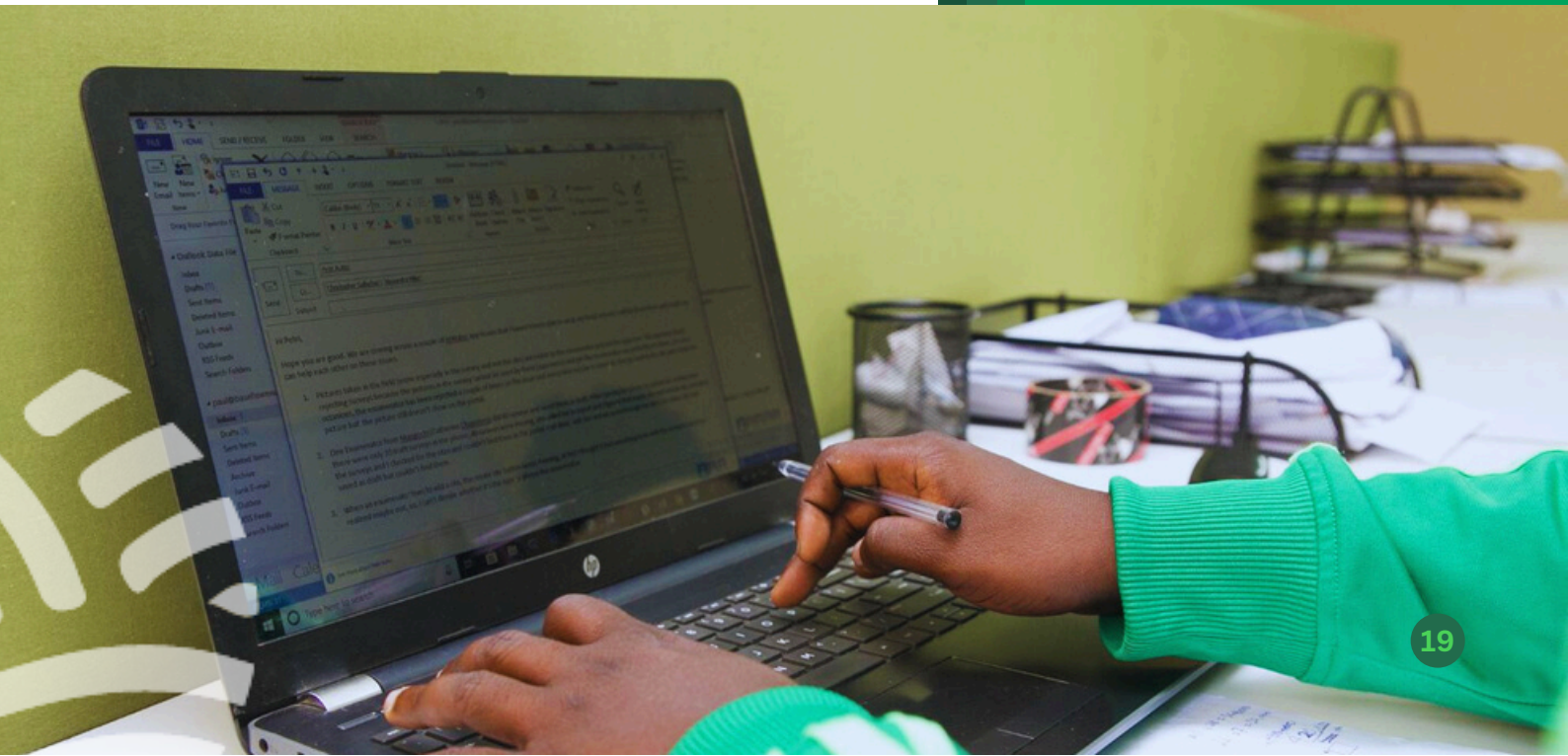
· ***Raise Groundwater Awareness on Social Media*:** Through our various social media platforms, BASEflow will actively engage online audiences through webinars, chatrooms and podcasts on groundwater subjects of public interest.

· ***Advance groundwater research:*** Our field experience will be more systematically recorded and shared through research publications we will do ourselves or in collaboration with academi. These will highlight our hands-on experience on groundwater practices and innovations that can contribute to local, regional and global understanding. Where applicable, evidence will be used to drive adoption of best practices in groundwater stewardship.

OUTCOME / OUTPUT:

The general public will have increased access to reliable and contextualised groundwater information to make groundwater less of a 'hidden resource'; and field experience will be recorded and shared through validated channels.

PRIORITY INTERVENTION 5: MANAGING AN UP-TO-DATE PLATFORM FOR GROUNDWATER KNOWLEDGE



ENABLING FACTORS

BUILDING STRATEGIC PARTNERSHIPS

- ***Complementarity for Scale and Impact:*** We will collaborate with like-minded organisations who share our vision and can either replicate our approach in areas where we are not present or have a comparative advantage in complementary niches (e.g., Tiyeni's deep-bed farming approach).
- ***Optimise the Localisation Agenda:*** Recognising the growing interest of donors in partnering with local organisations, BASEflow will proactively position itself as the preferred in-country WASH partner for support and collaboration.

DEVELOPING PEOPLE FOR IMPACT

- ***Respect:*** We strive to be a great organisation that treats our staff well. We will implement new policies and team development practices that foster a safe working environment where staff can freely express their ideas and talents, ensuring BASEflow's continued success.
- ***Skills Development:*** We will continue investing in our people for long-term retention by actively supporting staff to seek out training opportunities that enhance skill sets needed to deliver on our new strategy and achieve greater impact.
- ***Organisational Realignment:*** We will shift from a donor-centric, project-based model to a programmatic one, aligning each team member's role with the key organisational priorities outlined in this strategy.
- ***Empowerment of Young Women:*** We will encourage and support young women to take on leadership positions, fostering their interest in studying and working in the hard science of groundwater and, therefore increasing their participation and voice in Science, Technology, Engineering and Mathematics (STEM) fields.

DIVERSIFIED SOURCES FOR UNRESTRICTED FUNDING

- ***Social Enterprise Growth:*** BASEflow's social enterprises operate under the same Vision, Mission, and Values as the NGO. In addition to traditional funding channels, we will commercialize our innovations, knowledge and expertise to support our NGO activities. We will streamline our services and products, focusing only on those with the highest return on investment. The aim is for the Social Enterprises to contribute a minimum of 30% to annual operations budget.
    - **BASEflow Services:** Based on market trends and customer demand, our offerings will include:
        - Hydrogeological services: borehole siting, drilling supervision, and borehole forensics
        - Baseline/Endline/Feasibility studies, primarily within the WASH sector
        - Development of Management Information Systems
        - Management of public water supply systems
        - Water quality testing kits (H2S vials)
    - **BASEflow Construction:** Launched in November 2023, our services include:
        - Rehabilitation of handpumps informed by forensic data
        - Rehabilitation/Construction of climate-resilient WASH facilities, especially in flood-prone areas
        - Remediation of artesian wells
        - Installation and maintenance of solar-powered reticulated pipe systems

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