

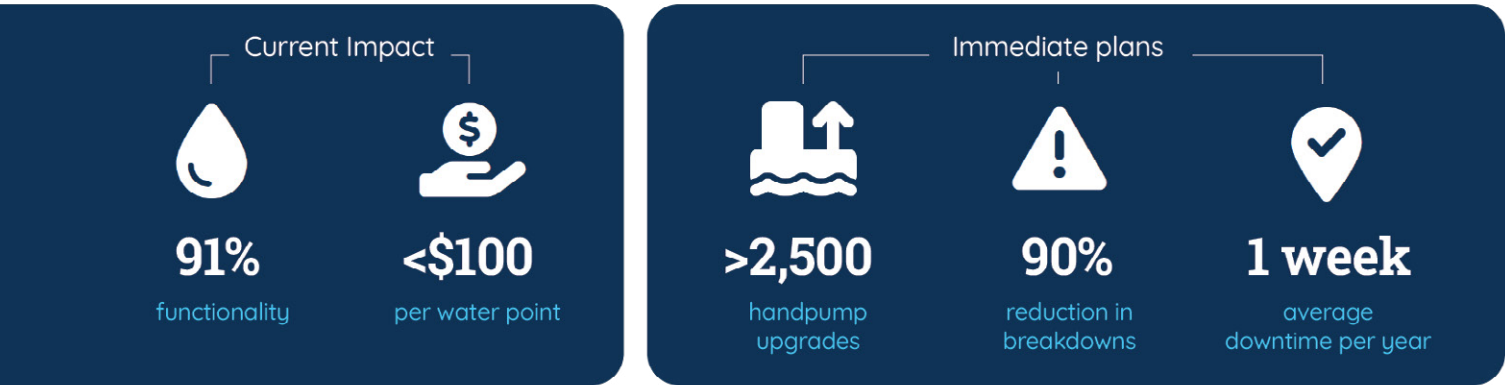


ma^ozi alipo

A **fairer and better** solution to
Malawi's rural water challenges

Key Highlights

The breakdown of water handpumps in rural communities has a significant impact on water supply and health.



Our approach

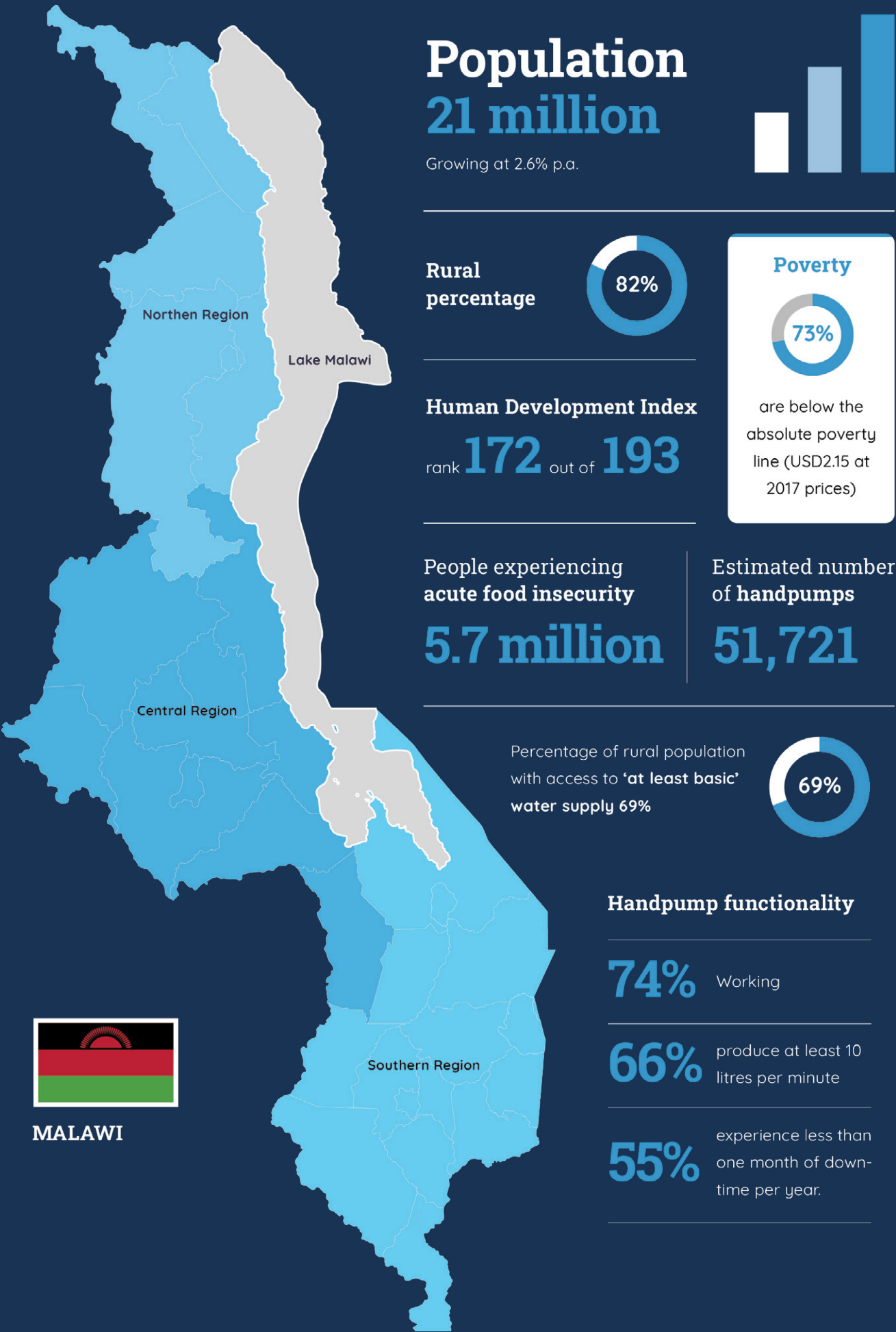
- Madzi Alipo operates a cost effective handpump repair and maintenance programme with communities in rural Malawi
- Our model combines the capabilities of communities with the professionalism of a community support organisation
- The Madzi Alipo model provides a fairer and better solution to Malawi’s rural water challenges
- Our district-wide approach, inclusive of all communities, ensures no-one is left behind
- And as part of the Uptime pilot we are reaching 99% functionality
- And at a cost of <\$100 per water point we are considerably more cost effective

Our plans

- We are now embarking on an exciting 10 year plan to amplify the impact of our programme in Malawi
- Our immediate task is a minor upgrade programme for over 2,500 handpumps across all Blantyre Rural district, upgrading 3 key components with innovative, better quality parts
- From our research and testing to date we estimate this will:
 - reduce breakdowns by up to 90%
 - increase functionality to 98% - the equivalent to just one week downtime across a whole year
 - and provide significant ongoing programme cost savings

Our impact

- We achieve an average functionality of 91% across more than 2,500 handpumps in all Blantyre Rural district, serving more than 500,000 people
- This is compared to the national average of 74%



Background

Rural water supply infrastructure breaks down too frequently, and stays in this state for too long¹. As a consequence, water users have to find alternative sources of water – sources that are usually further from home and of poorer quality. In turn, conflicts may arise within and between communities, water quantities collected may decline, and health may be compromised as a consequence of using unprotected water sources.

Keeping rural water services working is costly. It costs at least as much to keep services working as to construct them in the first place². Water users can and do contribute to these recurrent costs, but their contributions may only cover about 20-30% of the local operation and minor maintenance costs, and less than 10% of the true lifecycle costs of the service³.

Madzi Alipo⁴ is a national NGO which has been working in Malawi since 2012 to address these matters. We operate district-wide in one district (Blantyre Rural) and have undertaken wider interventions in other districts and at a national level in Malawi. Our model has proven itself able to



We help rural communities in Malawi to manage and finance their water services to improve functionality to well over 90%, because this is a fundamental requirement for water security and good health.



raise functionality levels to 91% in the community-managed, district-wide version of the model and over 99%⁵ in the Uptime pilot.

In both cases we do this in a highly cost-effective manner⁶. Our publicly accessible near-real-time database of water point status⁷ is a model of monitoring effectiveness and transparency, providing the basis for accountability to water users, local and national governments, and funding partners.

Fairer and better. We are able to show that our model performs as well as private sector approaches (in terms of functionality and uptime), at a lower cost, and in a way that avoids cherry-picking of financially better-off communities. Our district-wide approach leaves no community and no household behind. We thus claim to offer a **fairer** alternative to private sector approaches because we reach all communities in an operational administrative area (starting with traditional authority areas, and ultimately scaling up to cover the entire district).

We claim to be **better** for two main reasons:

first, because we can be more cost-effective than a private service provider that removes all significant decision-making and repair responsibilities from communities.

Second, because we support communities to carry out their own repairs - we estimate that three-quarters of all repairs are carried out by the community, and only one quarter (the most difficult) by Madzi Alipo - we afford communities the dignity and self-determination to manage their own water points rather than creating or perpetuating dependence on an external service provider.



Who should read this?

We are actively seeking larger and more strategic funding partnerships. Madzi Alipo has enjoyed supportive partnership and funding from a variety of valued sources, but as our programme expands, and as we further innovate and reach more districts in Malawi, we now seek further partnerships and increased funding. New partnerships will enable this imaginative, locally-led, district-wide programme to reach many more people – extending reliable, inclusive, affordable and sustainable rural water services for many more years.

If you work in government, research, education, practice, philanthropy or the media and you are interested in how the challenge of sustainable service for all can be achieved in the rural water sector, then this is for you. The document summarises some of the extensive evidence for our claims, and it outlines the main components of our approach.

If your organisation is interested in partnering with Madzi Alipo in order to extend this achievement to many more people in Malawi and potentially elsewhere, then you are our target readership.

We are particularly keen to meet new funding partners who can help to make the dream of reliable rural water supply a reality.

What is the problem?

When the time between water point breakdowns is unnecessarily short, and when the time taken to make repairs is unnecessarily long, this is reflected in low functionality statistics. A published recommendation made as far back as 1999⁸ was that **average downtime should not exceed 7 days per year**. This implies an average functionality of 98.1%. (The results-based programme, Uptime, sets a minimum target of 96% for functionality). Functionality at this level obviates the need for households to revert to poor quality water sources, so protecting them from regressing to poor health outcomes⁹.

We know that communities can do a lot to manage their waterpoints and that they can contribute significantly to the costs of repairs. However they cannot do everything, and strategic external support is needed to empower and assist them. There is no need to remove communities' decision-making responsibilities completely (as in the private service provider model), and indeed the latter may represent an effective but unnecessarily expensive solution.



Lowering handpump pipe with threaded socket into borehole

We are seeking to expand both the number and size of our partnerships.

We seek:

- New funders who are willing to join us in the endeavour of ensuring sustainable rural water services;
- Relationships which extend beyond funding to embrace also further evaluation of the approach and its dissemination to others as a replicable, scalable and cost-effective model.

We are also interested in forming consortia with other like-minded organisations in order to implement the model more widely in and beyond Malawi.

Our Mission

We wish to see all rural water services across entire districts with functionality of at least 98% so that everyone has access to clean, safe water.

We go about this in four ways:

- ✓ By acting as a direct professional support to communities in their management of water points and services;
- ✓ By considering each community as a separate entity with its own specific capabilities and needs;
- ✓ By gathering and documenting robust evidence about what works and how well; and
- ✓ By encouraging others to replicate the solution.



Training is a central component to strengthening community capabilities

Our general approach

Here we outline our philosophy and approach. The final section of the prospectus covers the model in greater detail.

Communities have capabilities. We know¹⁰ that communities can contribute significantly to the management and financing of their water services, but that they cannot do this entirely alone. Consequently a collaboration between communities and a professional support organisation represents a potentially (and actually) effective and efficient approach. There is no need to remove all management responsibility from communities – as in private service provider approaches – and in fact by empowering communities through skills training and long-term support, a more cost-effective solution is found. We know and understand the communities that we work with, and do recognise their varying capabilities to maintain and repair their water supply infrastructure.

We act as a bridge between failing unsupported community management (the predominant model) and a fully privatised service delivery approach. Our model combines the capabilities of communities with the professionalism of a community support organisation, under the aegis of district local government and traditional authorities, to deliver high levels of functionality across extensive geographies.

“**We know communities can contribute significantly to the management and financing of their water services, but they cannot do this entirely alone.**”



Collaboration. Madzi Alipo works closely with national and local governments, various NGOs, a range of universities both within and beyond Malawi, and the private sector. This allows for an understanding of the importance of their differing roles and capabilities; and especially in the case of the public sector, it takes into account their resources, and other constraints.

By taking a **district-wide approach**, Madzi Alipo includes all communities within a local government administrative area. Through its innovations around credit and savings, Madzi Alipo ensures all members of the community are included. Consequently **no-one need be left behind** in terms of sustained access to safe drinking water.

We believe that it may be possible for private sector service providers to break even or even turn a small profit – but only by targeting (or cherry-picking) communities that are able to pay the necessary tariffs. Those that cannot, or which do not wish to join a subscription-based scheme, risk being left behind. There may be an incompatibility between the Government’s declared desire for **‘sustainable WASH services that are available and accessible to all, all the time’** and a private sector approach which may not be able to serve all.



The approach requires us to:

- ✓ know the real-time or near-real-time status of all water points in the area of operation;
- ✓ strategically target support to communities and clusters of communities;
- ✓ constantly innovate in infrastructure design, information and communications technology, water user payment modalities, and more;
- ✓ introduce new features to the model as a consequence of such experimentation;
- ✓ drive the costs of support services down as far as is feasible;
- ✓ continuously collaborate, communicate and cooperate with government and organisations that share similar interests.

These components are further described below. Overall, our watchwords are:

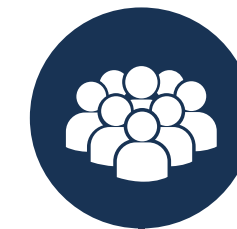
 Professionalism

 Innovation

 Collaboration



Our results



We have been gradually expanding our reach in Blantyre Rural district. Starting with one Traditional Authority (TA) in 2013, we have now expanded our interventions to all eight TAs. We are now achieving over 91% functionality averaged across more than 2,500 handpumps in the district that together serve more than 500,000 people¹². This reflects the success of the community-managed, professionally supported version of our model.



In 2023 Madzi Alipo signed a results-based contract with Uptime¹⁷, as part of a pilot intervention in Malawi. Madzi Alipo, along with three other NGOs, took responsibility for 250 handpumps each. Each handpump had to achieve at least 96% uptime over the previous three months in order to trigger payment. In our case, our results were Q4 2023: 99.6%; Q1 2024: 99.8%; Q2 2024: 99.8%; Q3 2024: 99.5%.



Uptime payments per handpump amount to USD200 annually (paid on a quarterly basis). This is not necessarily the total cost incurred by a service provider to guarantee >96% functionality, with some private sector / social entrepreneurial players estimating that their true costs amount to nearer \$500 per handpump per year.

In our community-managed district-wide model the cost is less than USD100 per water point per year (averaged across the entire district) to deliver functionality of 91%, on a rising trend.

Q4 2023

99.6%

Q1 2024

99.8%

Q2 2024

99.8%

Q3 2024

99.5%

The Ask

Having enjoyed a small number of partnerships with grant-awarding bodies over the period of our existence, we are now seeking to expand both the number and size of our partnerships.

Our plans

Our immediate task (by the end of 2026) is to upgrade all 2,542 handpumps in Blantyre Rural district, by introducing three key design improvements, namely more robust centralisers, bush bearings and cup seals. We estimate that this will reduce the number of breakdowns by 80-90%. This in turn would increase functionality to 98%, the equivalent of just one week of downtime per waterpoint per year. *Please see following page for more on the impact of reducing handpump breakdowns.*

When a major breakdown necessitates replacement of pipes and cylinder, we will carry out full upgrades that include threaded (rather than glued) pipes and modular cylinders, significantly simplifying and reducing repair costs and obviating the need for repair vehicles to carry long pipes to site in future.

Beyond this, our medium-term goal (by 2030) is to establish the community-managed, professionally supported model in two more districts, so providing assurance of reliable water services to an additional (approximately) one million citizens. At the same time we wish to see the model adapted, further developed, and extended by other organisations as well as ourselves in other parts of Malawi.

We estimate this will reduce the number of breakdowns by 80-90%

We have shown that it is possible to achieve very high functionality of rural water points through a highly cost-effective approach which provides targeted support to community management. We operate on a district-wide basis, so enabling all communities to enjoy reliable and safe drinking water.

We are constantly innovating and evolving in how we monitor water points, how we enable greater consistency in revenue generation for repairs, and in the nature of improvements to physical infrastructure.

Join us in extending the approach, and achieving reliable domestic water services across entire districts and ultimately nationwide!

We are seeking:

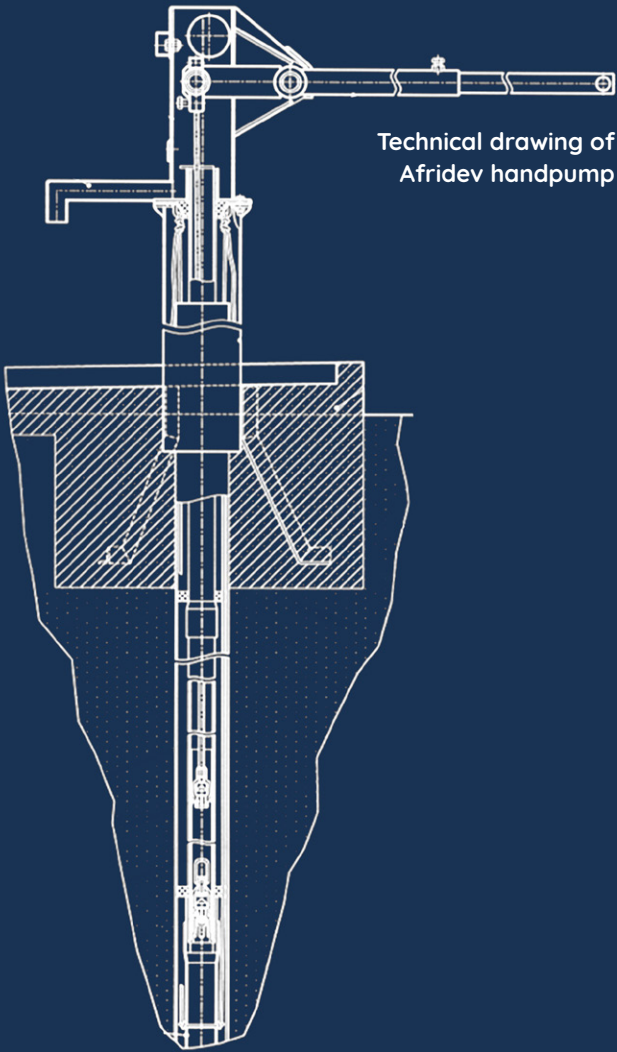
- ✔ relationships with new funders who are willing to join us in the endeavour of ensuring sustainable rural water services;
- ✔ relationships which extend beyond funding to embrace also further evaluation of the approach and its dissemination to others as a replicable, scalable and cost-effective model.
- ✔ We are also interested in forming consortia with other like-minded organisations in order to scale up the model within and beyond Malawi.

The impact of reducing handpump breakdowns

In the absence of highly efficient proactive asset management (including replacement of components before they fail), all physical infrastructure breaks down from time to time. The frequency of breakdowns and the time taken to repair together generate functionality and uptime/downtime statistics.

Behind these statistics are real consequences for water users: poor functionality statistics reflecting frequent and/or long downtimes mean that water points are unreliable. If a woman or child sets out to fetch water and finds the handpump broken, (s)he has to find an alternative water source. If the nearest available water is a surface water body, it is likely that this will be used despite its inferior, and possibly dangerous water quality. Even if an alternative improved (i.e. engineered) water source is available nearby, the breakdown of one water point puts additional pressure on others, and this can lead to conflict between water user communities. All of this provides a strong case for minimising the number of breakdowns and times to repair, and so maximising functionality.

Many breakdowns involve component parts which are cheap and easy to replace. However, quite often the failure of such a component can have knock-on effects, which necessitate more complex and expensive repairs. A common example of this is the failure of sub-standard pump rod centralisers which disintegrate, sinking to the bottom of the water column, clogging the pump cylinder. In such a case it may be that the entire below-ground pump assembly needs to be removed to carry out a repair. Communities usually require outside assistance to effect such repairs. By replacing such components with high-



quality, inexpensive parts, breakdowns can be significantly reduced. Similar arguments apply for the bush bearings at the top of the pump rod, and for the cup seals inside the pump cylinder.

Based on our collaborative research and development work in part of Blantyre Rural district, we estimate that minor upgrades to handpumps, consisting of replacement of these three components, will reduce the number of breakdowns by 80-90%. The impact of this, first on functionality (raising this statistic to about 98%), and consequently on the consistent use of safe borehole water means that the foundations of good health, regular school attendance and other social benefits are maximised.

An improvement in overall functionality from our current achievement of 91% to 98% means that each water point's downtime improves from about one month per year to one week per year.

Key components of our approach

The Madzi Alipo model consists of seven main components. All depend on a high degree of collaboration with government and many other players, and all are characterised by constant innovation, with successful experiments going rapidly to implementation at scale. The seven components are:

- A. Near-real-time monitoring of infrastructure condition and performance;

B. Understanding demands at each waterpoint;

C. Design improvements in regard to physical infrastructure;

D. Targeted training of water user committees, NGOs and government;

E. Targeted water quality testing and treatment;
- F. Enabling and empowering communities to contribute financially to repairs;

G. Enhancing climate resilience.



Our implied and simplified theory of change

Programme components →	Intermediate outcomes →	Impact
- Monitoring of physical infrastructure - Gauging demands at each waterpoint; - Physical infrastructure improvements - Training of Water User Committees, NGO and government - Water quality testing and treatment - Enabling communities to contribute financially to repairs - Enhancing climate resilience	- Improved understanding of physical infrastructure functioning in relation to water demand and technology - Increasingly robust design and reliability of physical infrastructure - Increasing capacity of communities and collaborating organisations - Improvements in water quality - Increased revenues - Increased climate resilience	Sustained high functionality at over 98% providing the foundation for a wide range of social impacts



Infrastructure monitoring

Any organisation providing support to communities or acting as a service provider across a geographical area has to have up-to-date information about the condition and performance of physical infrastructure. In our early days, we gathered this information primarily through physical surveys recorded onto paper and the data transcribed onto spreadsheets. As we expanded our capabilities and introduced our telephone call centre, it soon became clear that a bespoke and dedicated database would be needed, and MAMS (Madzi Alipo Management System)¹³ was born.

MAMS enables near-real-time monitoring of water point functionality, so enabling strategic decision-making about targeting of support to communities and trouble-shooting of problems with individual water points. Data entry is captured through the call centre and in the field via a mobile phone app.

In recent years we have actively participated in testing and development of handpump sensors through our partnership with charity:water. A lot of useful experience has been gained, and although

the technology has some way to go before it is sufficiently reliable, the potential for real-time monitoring and operational management is clear.

We continue to innovate in this fundamental component of our operations, and we are at pains to ensure that our monitoring system and data are made available to government partners in readily accessible forms. Numerous other NGOs also have access to the database.

Understanding demand

The water demand, and the corresponding stress on water infrastructure and the communities it serves, depends on the actual population surrounding the water point, and the distances that water users walk to fetch water. Often such data is hard to ascertain with much certainty. As a consequence, we have been undertaking original and innovative research using published digital high-resolution grid-based population estimates combined with georeferenced waterpoint data from MAMS and sensor data.

FISHERMAN'S REST COMMUNITY PROJECTS REPORT FOR ALL AGENCIES									
Functionality report filters: Afridev									
TABLE 1 Afridev Functionality in Malawi, Southern Region, Blantyre									
WIP FOR SUMMARY OF FUNCTIONALITY OF (AFRIDEV: HANDPUMPS) IN BLANTYRE RURAL AT DATE 09/09/2024									
All Afridev excluding abandoned & flagged	Working		Working but require servicing		Not working		Abandoned	Flagged	Status Unknown
2429	1791		440		165		134	137	33
Percentage	73.73%		18.11%		6.79%		Not counted	Not counted	1.36%
TABLE 2 Data age functionality status from TABLE 1									
Aged Data Blantyre Rural	Working		Working but require servicing		Not working		Abandoned	Flagged	Status Unknown
<1 Week	155	6.38%	44	1.81%	12	0.49%	6	4	0
<1 Month	122	5.02%	10	0.41%	1	0.04%	3	0	0
<3 Months	989	40.72%	205	8.44%	66	2.72%	4	9	0
<6 Months	89	3.66%	14	0.58%	10	0.41%	1	3	0
<1 Year	79	3.25%	26	1.07%	20	0.82%	0	3	0
>1 Year	359	14.78%	139	5.72%	57	2.35%	119	118	33
	1793		438		166		133	137	33

Example of a functionality report to local Government

Water infrastructure

We have been working for many years to assess and assure the quality of spare parts used in repairs of handpumps. All spare parts supplied are individually numbered so that their longevity or otherwise can be monitored. Consideration is being given to the establishment of a free-standing quality-assured spare parts supply business. We are working with external partners in a systematic attempt to improve designs of public domain handpumps. Early results suggest that relatively simple and low-cost improvements can significantly increase the robustness of existing rural water supply technology.

In particular, we believe that replacement of the existing centralisers, bush bearings and cup seals with more robust designs can significantly reduce the number and severity of breakdowns.

Training / capacity development

MAMS reveals actionable data on waterpoints that repeatedly break down or stay broken for too long, and it can help to identify communities that struggle to keep their waterpoints working. All of this permits us to target training of water user committees and so enhance their capacity to undertake their own repairs with minimal recourse to outside help.

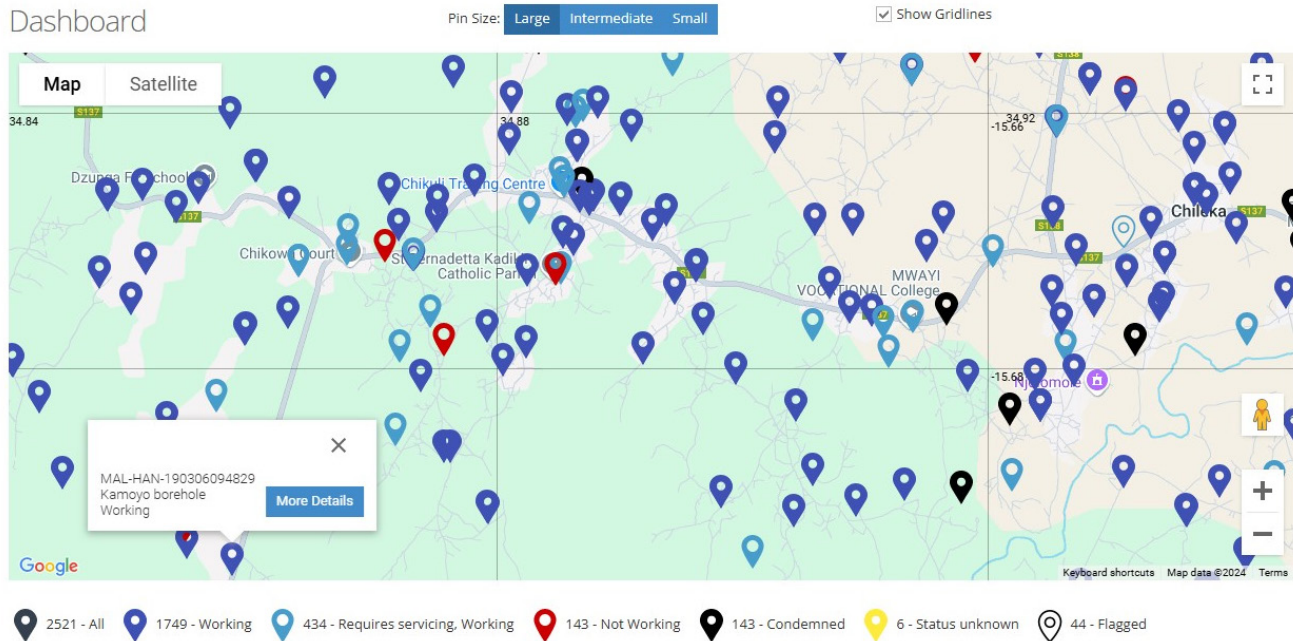
We regularly provide training for other organisations that wish to use MAMS or understand the model used by the organisation. In recent times we have provided such training to Malawi Water Projects, Self Help Africa, Beyond Water, Welthungerhilfe, Orant Charities, Feed the Children, Formidable Joy, and Design Outreach. In a similar way, we regularly work with government to increase its awareness and understanding of the model.

Water quality and water treatment

Although most water supply boreholes in Malawi supply good quality water¹⁴, there is a significant number of cases of high salinity and some in which microbiological quality is compromised. In view of the risks of diarrhoeal disease in general, and typhoid and cholera in particular, a programme of strategic monitoring and action is undertaken to ensure the safety of water supply.



Fitting a Madzi Alipo floating centralizer





continued from page 17

We have established our own government-recognised water quality laboratory. The lab carries out water quality testing in a strategic manner, in other words focusing on known hotspots and not attempting to undertake the surveillance function of government. We are innovating in testing methods, especially through our partnerships with the Universities of Birmingham, Liverpool and Dundee.

Water testing reveals potential quality issues that may affect health. However without appropriate responses to reduce sanitary risk or to treat water, it is of limited value. An important part of our community training therefore includes teaching waterpoint sanitation and hygiene. We are also developing our own in-line chlorinator for the Afridev handpump initiated through MSF.

Savings and credit

Households have limited cash income and savings, but the little that they do have can add up significantly if savings arrangements are encouraged and secure banking is readily

accessible. We are working with DreamSave¹⁵ to help communities to set aside funds for waterpoint repairs and for other beneficial purposes.

For several years we have extended loans to communities to permit repairs that require expensive spare parts. This has the advantage of limiting times to repair (TTR), one of the key determinants of functionality. There is a trade-off here between relatively low loan repayment rates and the adverse health impacts that would arise because of excessive TTRs.

Climate resilience

Malawi's catchments, forests and soils are becoming progressively degraded as a consequence of population pressures and climate change¹⁶. The impacts of this degradation are extensive, spanning food security, water security, livelihoods and opportunities. We are working to restore selected catchments through soil and water conservation practices that will assure groundwater resources and bring many other benefits too. In this endeavour we are working closely with the Ministry of Natural Resources and Climate Change.

The Madzi Alipo Model

Innovation and design improvements

- Working to improve infrastructure performance through design of high quality, innovative spare parts

Experienced in-house repair teams

- Experienced and competent repair team able to tackle all repairs that are beyond the ability of the community

Understanding waterpoint demand

- Sophisticated, near-real time monitoring of waterpoint demand, condition and functionality
- Supported by a call centre and handpump sensors

Water Quality Testing

- Routine and on-demand water quality testing, supported by own laboratory

Climate resilience and water security

- Collaborating with the Ministry of Natural Resources and Climate Change to improve climate resilience and improve water security



Targeting training

- A proactive training programme, targeting water user committees, NGOs and government
- Empowering communities and building capacity to undertake pump repairs competently, rather than creating or perpetuating dependence on an external service provider

- Data Monitoring
- Empowering Communities
- Professional Support

Document information

This prospectus was prepared in 2024 by the Madzi Alipo team and their consultants. Publicly available data presented in this document are for the most recent years available; data from Madzi Alipo's monitoring are from 2024. **For all enquiries and questions please contact Wiktor Chichlowski or Harlod Zaunda at prospectus@madzialipo.org.**

End notes

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