

Innovative Community Water Supply Solutions in Malawi. Self-Supply.

Pump Aid



End of Pilot Research Project Report.

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Acronyms used.

ADC	: Area Development Committee
ADWO	: Assistant District Water Officer
AM	: Area Mechanic
CBCC	: Community Based Childcare Centre
CDA	: Community Development Assistant
CBM	: Community Based Management
DCT	: District Coordinating Team
DEC	: District Executive Committee
DHO	: District Health Office
DHS	: District Health System
DWO	: District Water Office
EHO	: Environmental Health Officer
FEWS	: Famine Early Warning System
FGD	: Focus Group Discussion
GOM	: Government of Malawi
JMP	: Joint Monitoring Programme

MFI	: Microfinance Institution
MK	: Malawi Kwacha
NGO	: Non-Governmental Organization
PM	: Pump Manufacturer
RWSN	: Rural Water Supply Network
SHSA	: Senior Health Surveillance Assistant
SNNPR	: Southern Nations, Nationalities, and Peoples' Region
T/A	: Traditional Authority
UNICEF	: United Nations Children Fund
VDC	: Village Development Committee
VSLS	: Village Savings and Loans Scheme
WD	: Well Digger

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Executive summary.

Malawi has made good progress increasing the proportion of its population with access to a source of improved water over the past decades. According to official data, 90% of Malawians had such access in 2015. This does however leave 1.7 million people who don't. Many are in isolated rural areas where the costs per capita for supply are considerably higher. In addition, JMP data masks the interrelated challenges of water point functionality and the sustainability of the systems to manage water points. According to DFID upwards of 30% of all water points in Malawi are 'non-functional' at any one time.¹

To achieve Sustainable Development Goals and ensure universal access to all in Malawi, it is necessary to look afresh at approaches to providing sustainable access to improved water, especially given that 'unserved populations' are more resource intensive to reach using conventional approaches.

'Self-supply', a process of incremental developments of WASH facilities invested in by the user, is a complementary approach that over the last two decades has been gaining momentum and achieving impressive results in many countries across sub Saharan Africa. 'Supported self-supply' is an approach which aims to maximise the utility of self-investment through creating an enabling environment for supply and demand, from technological development to local business support, to national policy framework development.

In Malawi, the Government has explicitly recognised the importance of the private sector to maintain progress and reach long term water supply targets.² It is with this in mind that this pilot project was formulated.

This report summarises the findings of an action research project, 'Implementing Community Water Self Supply Solutions' implemented by Pump Aid, with support by UNICEF and DFID in three Traditional Authorities of Kasungu District, Malawi over the period 2014-16.

The project researched, tested and documented findings and recommendations in order to provide evidence for its potential suitability for scaling up in Malawi. It involved context analysis of the potential for Self-supply in Kasungu; Training 25 'WASH entrepreneurs' in technical and business skills, supporting and providing ongoing marketing; Collecting, analysing and disseminating results on the potential for upscaling a self-supply approach to water and sanitation in Malawi. The pilot took a zero subsidy approach with the entrepreneurs, no start up kits, no soft loans and no fake sales.

Project Findings

Overall, the training and support of 25 entrepreneurs and their active engagement in business has led to new access to improved water for at least 9,660 people and has secured access to improved water for a further 12,000 in three T/As in Kasungu.

WASH Entrepreneurs (*after one year's engagement with the project*):

- More than doubled their year on year sales after engagement with the programme.

¹ DFID, 2014

² Malawi Water Sector Investment Plan, 2013

- Stated customer demand from project surveys (existing and new customers) is significant and indicates major growth opportunities.
- Business and therefore income is predominantly seasonal – linked to the harvest season.
- Access to (affordable) credit is a crucial issue to grow financially sustainable businesses and at present isn't available.

Customers (Households)

- The average distance now travelled to an improved water source is 11 metres. Previously 65% would travel over 500 m to their nearest improved water source.
- 86% have reported an increase in their water use.
- 10% of purchases were made by groups of households, (providing 2,500 additional people access to improved water).
- 90% of purchases were by individual households. As a result of sharing, this equates to an additional 7160 individuals having much more convenient access to improved water. Income for purchasing is overwhelmingly from farm produce and thus seasonal.

Customers (Community Managed Water Points)

- During the pilot Area Mechanics have secured/guaranteed ongoing access to improved water for 11,954 people whose primary water point is a community well and pump (mainly borehole).
- Area Mechanics generate new business through community level marketing, increasing business sustainability.
- Communities want information about services offered, are influenced by a range of marketing/advertising and demand quality service.
- There is demand within communities from individuals for their own water points and thus potential markets for AM's to connect with other entrepreneurs to provide digging, installation and repair services) and develop new profitable business streams.
- Given low functionality rates of boreholes in Kasungu and historical difficulties with operations and maintenance, increased sustainable performance of Area Mechanics is a major opportunity to address systemic problems with CBM water points.
- Area Mechanics improved performance is an outcome of improved capacity through training and crucially an improved business focus ranging from increased effort to raise profile within communities, linking with other WASH services to provide a broader service base to encouraging communities to establish VSLs to finance water point maintenance and repair.

Longer term lessons from other countries to help inform directions in Malawi.

Self-supply is practised by millions of rural households in Sub-Saharan Africa as well as in Europe, USA and other areas of the world. Different countries support self-supply in different ways. Nicaragua, Zambia and Ethiopia have rolled it out on a national scale. Whilst in Sierra Leone, the government is using self-supply to reach hard to remote rural populations. Studies indicate that there is no one size fits all model, but rather generic supportive components which need to be applied in a context specific manner; supportive policies, promotion of appropriate technologies, strengthened private sector, affordable finance mechanisms and a tie in to hygiene promotion³.

Self-supply can be applied singularly, or in areas where there is a greater incidence of communal water supply, it can be applied as a complementary service, bringing improved benefits to populations.

³ Southern Africa Self-supply Study Review of Self-supply and its support services in African countries, RWSN, 2016

There is a wealth of evidence showing the reported benefits of self-supply for populations: convenience, time saving, improved quality, productive activities, better sustainability of service because of ownership, widespread sharing of service and cost effectiveness to budget holders.⁴

Life Cycle Costing in Zambia and Zimbabwe.

Based on a Life Cycle Cost (LCC) analysis of different service delivery approaches, the LCC for communal supplies are approximately U\$40 /capita served in Zambia and Zimbabwe, whereas the LCC for supported Self-supply is about U\$10 /capita.

In sparsely populated areas, communal supplies (e.g. hand pumps) are even more costly (up to U\$ 100 /capita served) as only few people can be served with one additional unit. Serving all rural people with communal supply is therefore not financially viable.⁵

Summary of Conclusions for self-supply scale up in Malawi

Kasungu District and Malawi in general provide many of the conditions for self-supply to take root and thrive: high levels of groundwater, a supply of artisans working at community level, a sizeable population without improved access to water and a generally supportive government. Those conditions it does not possess can be developed. The positive progress of the WASH entrepreneurs and the eagerness of customers to invest, in what was after all only one year of operation, is impressive and bodes well for the scale up of self-supply in Malawi.

Self-supply has significant potential in three market areas, which are major development challenges in Malawi.

- Household water supply
- Water for irrigation for small scale farmers
- Securing water supply for CBM wells through Area Mechanics

Each of these markets offers potential for small scale entrepreneurs, but will require initial support to develop. The focus for the first two is increasing the actual number of water points, at individual household level and for farmers. The focus of the third 'market' is improving the maintenance of community water points through the increased professionalization of Area Mechanics.

Given the current budget climate in Malawi and the focus on value for money amongst the international donor community, the promotion of self-supply on national level offers a substantive opportunity to meet SDG and national goals within a feasible time frame and based on LCC in neighbouring countries, for a reduced level of investment compared to an approach which relies entirely on conventional supply approaches.

Key recommendations for scale up of self-supply in Malawi emerging from the project are:

This pilot has provided strong evidence that with the right balance of support, markets for water and sanitation products in rural Malawi can be developed. The benefits of a supported self-supply approach are well documented across numerous countries. Conducive conditions exist in Malawi.

⁴ See www.RWSN.org

⁵ Southern Africa Self-supply Study Review of Self-supply and its support services in African countries, RWSN, 2016

- Initial and ongoing investment is required in order for self-supply to take root across Malawi. Donors must make financial commitments to exploit the opportunity self-supply offers.
- The Government of Malawi must establish an enabling environment.
 - Policy framework that explicitly promotes supported self-supply;
 - Actively promote the role of the private sector. Better access to credit is key, but there are other potential business promotion mechanisms in order to encourage the growth of WASH entrepreneurs and customer quality assurance measures such as minimum standards.
 - Recognise rope and washer pump technology as a form of improved water delivery for communities;
 - Establish a Working Group to act as a national level coordinating and promotion body. Within government self-supply must be promoted by other Ministries, notably Health.
- Self-Supply initiatives at localised level need to:
 - Ensure a strong focus on business development and avoid market distortions where possible
 - Coordinate and liaise closely with District government structures
 - Ensure that support evolves as markets evolve
- Practically speaking, upscaling in Malawi will require numerous actors. Initially, geographic expansion from Kasungu will allow for a more organic growth, providing for increased customer demand through word of mouth (as this project found, a crucial marketing methods). This is vital in a context whereby there are high levels of externally delivered water points and evolved expectations by local communities of the troll of external agencies.

Testing the Hypothesis: “Whether households are willing to own and use self-supply technologies”.

This project was conceived as an action research pilot. The main hypothesis was tested using a framework of investigating five factors which emerged as key to testing the hypothesis:

1. There is potential for self-supply in terms of groundwater availability.

Finding: The Kasungu Context Report (annex 1) clearly supports this. Over 75% of existing traditional hand dug wells were found to have water within 15m of the surface.

2. There is demand from rural households and/or communities to expand existing water supply provision

Finding: The Kasungu Context report found strong demand from existing well owners to upgrade (71%). Surveys conducted with entrepreneur’s customers during and at the end of the formal implementation period, highlight strong indication for further incremental and additional purchases amongst all customers. Additionally, all entrepreneurs reported pre-orders from an average of 5 customers during the peak season.

3. There is understanding and interest from households / communities to invest in their own supply solutions even in the context where all existing supplies are very highly (totally) subsidised.

Finding: Customer surveys during and at the end of the formal implementation period, highlight key reasons for purchasing products or services as; convenience, access to better quality water, water for small business use, increase the amounts of water available for use and a sense of ownership / status. Convenience (or the reduction in distance to nearest water point) was by far the most

popular response from customers and is the strongest possible evidence to confirm this (sub) hypothesis.

4. There are suitable and interested people to be trained to support this demand and develop the potential.

Finding: The Context Report found numerous well diggers, a network of Area Mechanics, but only one suitable potential pump manufacturer. 25 individuals were selected. All of whom attended all necessary trainings and project meetings. No subsidy has been provided. All have reported significant increases in 'sales.' A cohort of app 10 'entrepreneurs' have made shown exceptionally strong progress.

5. District authorities and the private sector see a benefit in self-supply which leads to them promoting the services and products available, and adopting new ones.

Finding: The Kasungu District Coordinating Team has been very active in its engagement with the project and key to the promotion of the services and products through its networks and relationships. (See comments from DCT members p52). There is evidence of strong relationships developing between entrepreneurs and HSAs focussing around the chlorination of wells.

Introduction

Despite significant volume of water in Malawi coming from Lake Malawi and its various rivers, Malawi is still considered a water stressed country due to a lack of renewable water sources. Water availability in rural areas is dependant on the presence of perennial streams and rivers which are used by various gravity fed water systems to pump water into nearby villages.

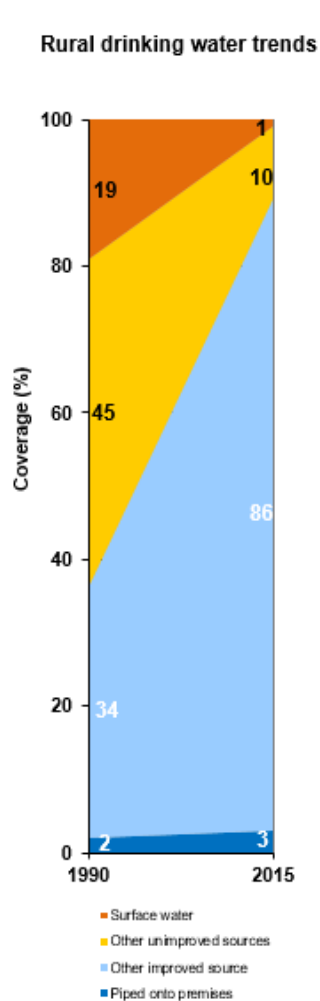


Figure 2 - JMP Figures

JMP 2015 figures⁶ reveal a positive trend to access to improved water. However, these mask significant rural deficits and the major challenge / issue of water point functionality⁷.

However, the interrelated issues of functionality and sustainability remains a huge challenge in the effort to reach universal coverage within Malawi. Following significant investment access to improved water sources rose from 41% in 1990 to 90% in 2015. However these figures for access do not necessarily reflect use, as upwards of 30% of all water points are 'non functional' at any one point in time (DFID 2014). It is also the case that after significant progress, access to improved water has remained relatively stagnant over the past 5 years, reflecting the higher per ration cost of providing improved water to smaller, harder to reach rural communities.

A 2014 statement of commitments published by the Government of Malawi (GOM) identified their long term vision and focus for 2016, as well as addressing a number of the issues expected to arise. They committed to increase :

- safe water from 95% to 97% of the urban and peri-urban inhabitants and from 82% to 85% of the rural inhabitants by 2016;
- improved sanitation from 50% (2011) to 76% of the urban inhabitants and from 53% (2011) to 70% of the rural inhabitants by 2016

Amongst the key issues identified were those of functionality, declining financial support, dwindling water resources and increased demand resulting from predicted population growth. The GOM also re-committed to following a national 10 year Sanitation and Hygiene Investment Plan and Strategy (2012-2022) that would ensure universal access to improved sanitation and safe hygiene practices.

Additionally, the Malawi Sector Innovation Plan (2013) looked at measures to maintain progress, and move towards the 98% coverage aimed for in 2025⁸. It proposes three solutions;

- Low cost drilling and private investment (Self supply) to recoup costs
- Increasing functionality by improved management and also private sector involvement financed by water users

⁶ JMP (2015) *Progress on Sanitation and Drinking Water: 2015 Update and MDG Assessment*, 20 Avenue Appia, 1211 Geneva 27, Switzerland: WHO.

⁷ See www.waterforpeople/malawi

⁸ Malawi Water Sector Investment Plan MIWD 2013.

- Improved quality of water through HWTS, especially chlorination and ceramics

Pump Aid is a WASH NGO and has worked in Malawi since 2008, during which time it has established almost 4,000 water points for smaller communities (mostly smaller than 150 inhabitants) and some institutions such as CBCCs and primary schools. In addition, since 2005 more than 5,000 water points have been constructed in Zimbabwe and Liberia, giving the organisation wide operational experience in water supply provision and sustainability. These water points are shallow wells fitted with “elephant pumps” (a tried and tested adapted design of rope and washer pump) designed to enclose wide shallow dug wells. These provide a low cost standard option for communities of a small size for whom the maintenance costs of conventional piston pumps (Afridev and Malda) often prove to be too much, both financially and technically.

Water quality testing was conducted over the past three years on Elephant Pumps that were fitted as community water points by Pump Aid (serving on average 120 individuals). The testing has shown that fec contamination compliance with GoM standards is 70% in the rainy season and nearly 90% in the dry season. Functionality rates were found to be as good as Afridevs, but had lower ‘down times’ as a result of the simplicity of most repairs meaning pump breakdowns were quickly fixed. (Mzuzu, 2014). Whilst carrying out this work, Pump Aid became aware of the large number of communities (which are even smaller), and of the farms (especially those in tobacco growing areas) which are so dispersed that conventional community supplies do not provide a level of service which is acceptable to many of them. A communal supply is simply too far away when houses are spaced at several hundred metres from each other. Such households can be seen to develop their own supplies, which are convenient and time saving.

The idea therefore arose to see how it is possible to establish a level of support services which can provide services for supply, construction, improvements and maintenance at a cost affordable to rural communities using available technologies.

In this way people can free themselves of donor dependence and, in small steps, incrementally achieve the level of service they desire. Such a level of service generally would be only superseded when a piped supply brings water into the house, and that for most rural people is still not likely prospect for many years to come.

The Self Supply Approach

Self-supply refers to a process of incremental improvements of WASH facilities (commonly known as the water ladder – see below) which are invested in by the user themselves. Key drivers are convenience and functionality. The development of an effective supply chain for this investment is one (albeit important) element of self-supply, however, emphasis is also given to the promotion of people to make improvements themselves as this is regarded as an important first step on the ‘water ladder’.

Self- Supply is an initiative which complements conventional communal supply in rural areas (where such communal supply exists). The two key drivers for self-supply at household level are **convenience and functionality**.

The water ladder

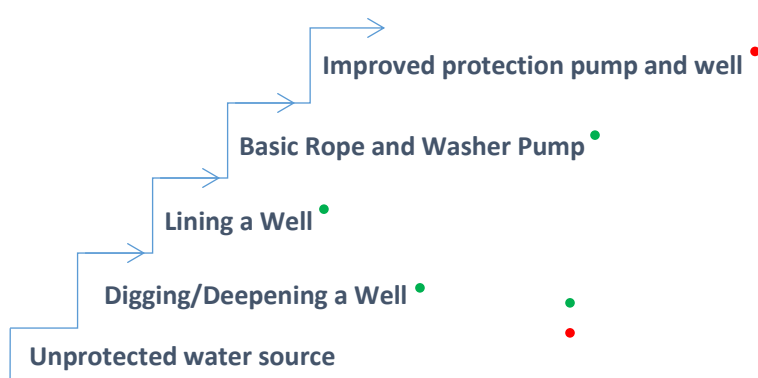
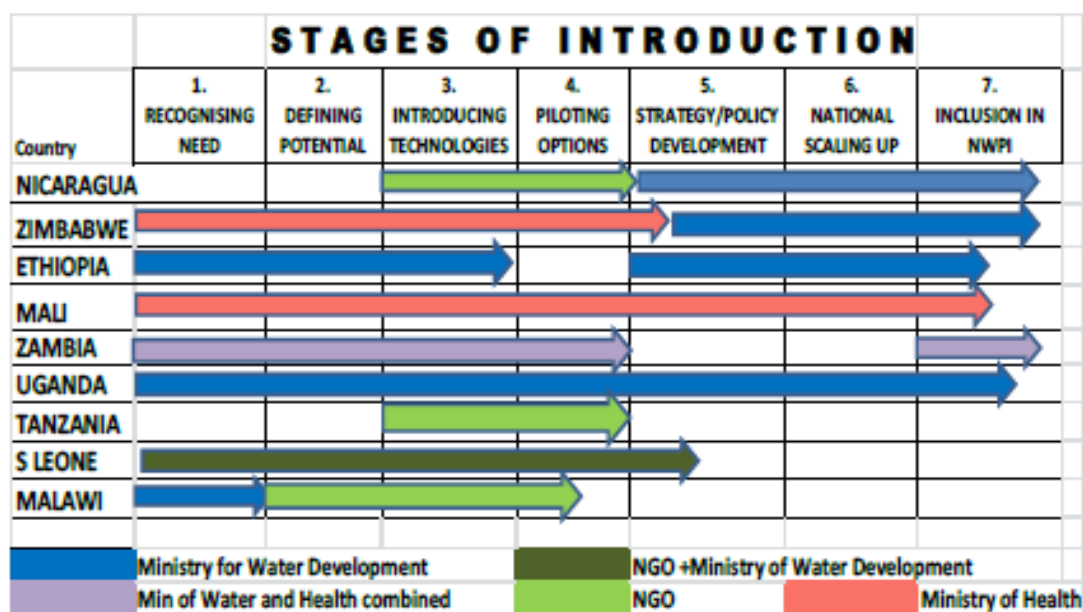


Figure 3- RWSN Water Ladder⁹

Self-supply has been adopted previously in other countries where it forms part of national rural water and health strategies. Personal initiative to provide one’s own water supply can be seen throughout the world from the most developed countries to the poorest. Of the richest, over 22% (14 million) of inhabitants of the United States depend on the self-financed water supplies, whilst even in one of the poorest, more than 50% (6 million) people in rural Mali provide their own supplies from convenient household wells, shared with their immediate neighbours. No country reaches universal coverage without an element of self-provision especially among scattered and remote communities, where per capita costs of providing water become prohibitively high. Also for almost all economic development water is an essential element.

⁹ RWSN (2011) *An Introduction to self supply: Putting the user first*, Available at: http://www.rural-water-supply.net/_ressources/documents/default/Introduction-to-Self-Supply.pdf (Accessed: 2015).



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Figure 4 - RWSN Stages of Introduction

As can be seen from the table above, the GoM has recognised the need for self-supply to play a role in helping to address improved rates of access to water for rural communities and high non functionality rates. The Malawi Sector Innovation Plan (2013) looked at measures to maintain progress, and move towards the 98% coverage aimed for in 2025.¹¹ It proposes three solutions;

- Low cost drilling and private investment (Self supply) to recoup costs
- Increasing functionality by improved management and also private sector involvement financed by water users
- Improved quality of water through HWTS, especially chlorination and ceramics

Whilst these proposals provide a loose framework, much more is required in terms of active promotion of self-supply by the GoM. The findings from this report and experiences of other countries (see Recommendations) will help build the case for more active GoM engagement.

What is lacking in developing countries is the network of skilled artisans, traders and low cost technologies to help people onto the first steps of the technology ladder. Once there, the example of their peers and the wish to continuously improve has been shown to move people on upwards. This upward movement is assisted by the greater productivity possible with a convenient supply, available on the doorstep, for both saving time in water collection and being available for small scale irrigation, brick making, food processing and animal watering. The investment can pay for itself over a relatively short time through increased income.

The research elements of this project were designed to test a certain hypothesis through data collection and piloting. This was framed around five key factors found to be essential to the project

¹⁰ RWSN (2015) *Accelerating Self Supply: Short report on Self-supply Seminar at the "My Water-my business" event, 20th March 2015 in Addis Ababa, Ethiopia*, Available at: <http://www.rural-water-supply.net/ressources/documents/default/1-662-2-1428687312.pdf> (Accessed: 2015).

¹¹ Malawi Water Sector Investment Plan MIWD 2013.

design and process of testing. During the primary research stage, explanations were given about the purpose of the research and the surveys in order to best explain the potential for increasing economic and social benefits from water. Consultations with village headmen and other administrative structures also played a role in sensitising people to the issues surrounding the adoption of a self-supply approach to increase coverage, with the final aim being universal coverage.

This report summarises the findings of piloting the project in the three T/As namely Njombwa, Kaomba and Kawamba in Kasungu District implemented under a **Programme Cooperation Agreement** between UNICEF and Pump Aid with funding from DFID (UK Aid). The project ran from August 2014 to May 2016.

Self-supply experiences from other countries

These are brief analyses, for more in depth research, please see Appendix 1. The resounding conclusion from these experiences and more, was that ***self-supply is a growing and powerful force.***

Ethiopia

- National guidelines for Self-Supply were drafted by a working group and endorsed by the Ministry of Water and Environment in 2012.
- Found 6 elements which were necessary to create a sufficient enabling environment.
 - a. Creating demand through promotion
 - b. Providing technology options and advice
 - c. Strengthening the private sector
 - d. Establishing supportive financial systems
 - e. Building facilitative government policies
 - f. Monitoring progress and learning from research into new options

Mali

- Over 50% of rural based population are served by family wells, which equates to 200,000 wells and a total investment of US\$20 million at household level.¹²
- Further improvement of designs was required to make them more cost effective.

Nicaragua

- \$6 million was invested in Self-supply resulting in \$100 million from productive use.
- Reaching a critical mass took 5 years, reaching full sustainability took 15.

Water Quality and Self-Supply

Traditional or family wells are often not protected sufficiently to be considered safe supplies by experts or officials; nevertheless, they are valued and invested in by people with scarce resources and frequently used by their owners and neighbours as drinking water sources.

Community wells in contrast are widely considered to provide safe water even though this is often not the case. Afridevs, the most common borehole pump in Malawi have a 71% compliance rate to

¹² Sutton, 2006

GoM fc standards. Communal systems are also prone to breakdowns and seldom provide for all domestic needs. Functionality rates in Malawi have been quoted as 70% by DFID. This leads to people collecting water from a poorer- quality or less convenient and more distant source. Significant levels of contamination are also known to affect a proportion of water transported from the source to the house, potentially undermining the quality of all supplies (Wright et al., 2004; WHO and UNICEF, 2010).

Self-supply will not provide Malawi with a gold standard water system overnight. But then decades of investment in communal systems have hardly achieved this. Either from a scale, quality or functionality point of view. Self-supply aims is to provide better supply and quality for many; To promote the gradual improvement of household-level sources that present risks that can be identified with low-cost improvements and behavioural changes possible to reduce risks.

According to Butterworth, the exclusion of self-supply options at a household level is a result of *“...thinking within government and development partners about water supply systems rather than services, a narrow focus on improved communally managed sources which are assumed to be always safe (sometimes ignoring the evidence that communal sources need water-quality improvement too and with frequent breakdowns), and a perhaps unrealistic desire to deliver quick results.”*¹³

Self-Supply and the poorest members of communities

Research undertaken for The Kasungu Context Report (Annex 1) found that well ownership is not as simple as owning a bicycle or even a house. Water is regarded as a commodity which is not like any other, since there are usually social obligations as well as benefits from owning a supply. It might be thought that those who can afford to dig wells are only the richest, however using a simple wealth ranking it would seem that whilst they are people who have disposable income, they are not necessarily the wealthiest of those. The ranking took into account ownership of tin roofs, ox carts, radios, tvs, motor bikes, goats a cement floor and also whether the family had members who could send remittances home. 35% of well owners had two or fewer of these elements of wealth. Relating to countrywide statistics, however, those who have invested in their own wells have above average provision of cement flooring (38% compared with 14.1% nationally)¹⁴ and 84% ownership of radios (compared with 64% nationally in 2011).¹⁵ 57% of them have a tin roof.

Analysis of well owners suggests that wealth plays a part, but also that the wide practice of sharing ensures that the benefits well owners find are also shared with the rest of the community. Thus, such wells tend to act as mini-community water supplies, whether they are community owned or not.

Research undertaken in Ethiopia provides similar conclusions.

“It may be assumed that only the richest people will be able to invest in a well, and that Self-supply is not possible for the poorest or most disadvantaged households. The surveys investigated this access issue relying on woreda-specific wealth ranking of well - owning households and sharers (so comparisons cannot be made between woredas).

In SNNPR, over a third (37%) of well owners fell in the poorest wealth quintile, compared with 18% in Oromia. Some 26% of SNNPR well owners and 10% in Oromia were in the top two wealth quintiles.

¹³ Water Alternatives-2013 Volume 6 Issue 3 Butterworth et al.: Self-supply in Ethiopia

¹⁴ DHS Malawi Survey 2010.

¹⁵ MEAS- extension.org/meas-offers/case-studies/radio-based Referred to Feb 16 2015

The majority of owner households had no, or only one, indicator asset (58% in SNNPR, 61% in Oromia).

Overall, these findings suggest that initiative rather than wealth might be the main enabler in constructing a well. It was also apparent that it is not so much the best educated but the most motivated who have invested in wells. Just under half the number of wells (42% in SNNPR, and 47% in Oromia) were owned by households whose heads are illiterate, and two-thirds have not completed primary education (87% and 58%, respectively).

Overall, it appears that ownership of a well is not at all confined to the richest, but that further investment in the well is linked to greater wealth, without being able to say which leads to the other. Generally, greater access to water allows more income-generation, and so more potential to invest in further improvements to supply and to other aspects of the household.”¹⁶

Project Overview.

Innovative Community Water Self supply is an action research project which has been implementing its activities in three T/As of Kawamba, Kaomba and Njombwa in Kasungu District, Malawi.

Kasungu District because whilst it is one of the wealthier districts in Malawi, it is also the one with the lowest coverage in rural water supply according to the DHS (2010) survey, with only some 63% of the rural population covered. Functionality runs at about 75% according to the 2012 UNICEF water point inventory.

The project was intended to test a clear hypothesis around whether “households are willing to own and use self-supply technologies”. This was done using a framework of investigating five factors which emerged as key to testing the hypothesis:

1. There is potential for self-supply in terms of groundwater availability
2. There is demand from rural households and/or communities to expand existing water supply provision
3. There is understanding and interest from households/-communities to invest in their own supply solutions even in the context where all existing supplies are very highly (totally) subsidised.
4. There are suitable and interested people to be trained to support this demand and develop the potential.
5. District authorities and the private sector see a benefit in self-supply which leads to them promoting the services and products available, and adopting new ones.

The project implementation was divided into three distinct phases to enable the action research findings data to be gathered, analysed, presented and tested. The three phases were:

¹⁶ Water Alternatives-2013 Volume 6 Issue 3 Butterworth et al.: Self-supply in Ethiopia

Phase 1: Greater understanding of, and a clear hypothesis about potential approaches to meeting community and business self-supply needs.

Phase 2: Self-supply models trialled and tested.

Phase 3: A documented self-supply model developed for scalability.

The project used questionnaires (supplemented by other forms of enquiry) to gather evidence from both supply side and demand side. In each phase there were a number of activities which were undertaken in order to gather evidence for the project. The activities included, desk research, primary research, consultation meetings, trainings, developing market strategies and plans, data collection – particularly on the progress the self-supply entrepreneurs were making as well as the views of the customers who bought their products or services - and analysis.

Data was collected from four rounds of business progress surveys and customer satisfaction surveys of 58 individual customers out of (in excess of) 300 who bought the services as well as 25 water point communities out of 139 committees who bought services. This showed that both entrepreneurs and Pump Aid staff have taken a major step towards making self-supply known and accepted and had laid a foundation for further development of self-supply through project implementation. Many communities are not only well informed about self-supply but there is also a corresponding increase in demand for the newly marketed water services on offer. The entrepreneurs have even received enquiries from potential customers living outside the areas of project implementation seeking information about the self-supply services and products.

This has underscored the need to approach self-supply using a dual approach: assessing and actively encouraging demand through marketing; and supporting development of capacity to supply products and services. Ongoing support to the bulk of small scale WASH entrepreneurs: mentoring, marketing, and also promoting an enabling environment are also important for a limited time at least as are the need for continual learning, improvement and consolidation.

Phase 3 of the project (a documented self-supply model developed for scalability) involved documenting the experience to date, testing the data available for whether the self-supply approach modelled and implemented is a viable approach, and whether it can be scaled up.

Project methodology

The general hypothesis being tested is whether “households are willing to own and use self-supply technologies”. This is being done using a framework investigating five sub hypotheses over three phases (outlined above).

The methodology for each phase is outlined at the beginning of the corresponding section.

Section II

Phase 1. Greater understanding of, and a clear hypothesis about potential approaches to meeting community and business self-supply needs

The first phase of this project focused on consultations, primary and desk-based research to ensure that the organisation and our partners have a greater understanding of, and a clear hypothesis about potential approaches to meet community and business self-supply needs in a specific context.

The research was intended to ensure that the organisation and partners would have a greater understanding of self-supply, establish an in-depth understanding of the context in which it was being implemented so that the current efforts on self-provisioning could be recorded. Since self-supply is a concept which builds primarily on user investment to incrementally improve rural water supply using affordable technologies – existing as well as new ones this too was a core part of the research conducted.

Pump Aid held meetings and consultations with local administrations, T/As and district level administrators (such as DEC, DCT, ADC, etc.) in order to inform them about self-supply as an approach, and what it was intended to deliver. It was also to get cooperation in identifying areas to which might have potential for such an approach and where primary research to test its potential could be conducted. It was explained that the purpose was to increase access to water in marginal and hard to reach areas where the cost per capita of other approaches would be prohibitive leaving communities unserved or underserved for a very long time. Also the approach to incrementally improving existing water sources was explained.

During the DEC meeting in Kasungu the project was introduced and explained to the members. At first they thought it wouldn't be workable as they indicated that people in the community are poor so no one would pay for such a technology. But after a thorough explanation, DEC members accepted the project as it was just a pilot to test if people can invest in water related products and services. The DEC members referred the project to DCT to have a further discussion and agree on where to start with the implementation. DCT was very much convinced and gave Pump Aid the go ahead to implement the project in 10 T/As namely Kaomba, Kawamba, Mwase, Lukwa, Njombwa, Chilowamatambe, Kaphaizi, Mangwazu, Santhe and Nthunduwala.

The project conducted 10 ADC meetings which were proposed by DCT during the consultation meeting. The project was accompanied by DCT members in all the ADC meetings which were conducted. The ADC meeting was attended by the T/A GVHs, VH, VDCs, business, women, youth and religious representatives. The project had consultation meetings with District Executive Committee (DEC) District Coordinating Team, 10 T/As in Kasungu and had a water sector stakeholders meeting in Lilongwe.

In addition, consultations were held with stakeholders ranging from local NGOs and INGOs working locally, local businesses, and tobacco estates as well as agencies such as DFID and UNICEF with the purpose of informing them of the concept of self-supply, its potential, the purpose of the project and to get their views and opinions.

Area Selection

Initially ten Traditional Authorities (T/A) in Kasungu District had been chosen in agreement with the Kasungu DCT. The Chiefs of all ten T/As were visited and the project introduced to them. However, it became apparent that it would not be possible to operate effectively in ten T/As and achieve the desired results within the 14 months that would remain once the primary research had been concluded. So using a set of selection criteria the number of T/As was narrowed down to three T/A's.

The selection criteria used were: population of T/A; number of people per functioning water point; number of unprotected sources; level of interest of chief; how active the ADC is; number and quality of area mechanics; number of health posts or other govt. service delivery staff; area with small holder farmers (as against estate dominated agriculture). The number was then narrowed down to three using these criteria and confirmed in discussion with the District Water Office. These were **Kaomba, Kawamba and Njombwa**.

These have a rural population of 133,000, or about 50% of the population of the ten T/As originally selected. They are areas with the highest population density (110-180/ km²), which in turn reflects the quality of the soil and availability of water sources.

Kaomba borders onto Kasungu town, so has some peri-urban areas, but the other two are rural. Their basic characteristics are presented in Table 1 (below). Kaomba appears to have a high number of people per hand pump because a sizeable proportion of the population are actually served by taps. This peri-urban location also leads to a higher than average population density. However, such a situation gives the opportunity to develop self-supply strategies for those on the (often unreliable) periphery of piped supply systems, who as "urban" dwellers tend to be early adopters of new ideas, and often have access to higher disposable incomes than remoter rural dwellers.

Table 1- Population Density 2012

Traditional authority	Population	Households	People/household	Area Km ²	Pop Density
Kaomba	50111	9101	5.5	303	165.4
Kawamba	37240	7691	4.8	583	63.9
Njombwa	50677	9318	5.4	308	164.5
Totals	138028	26110	5.3	1194	

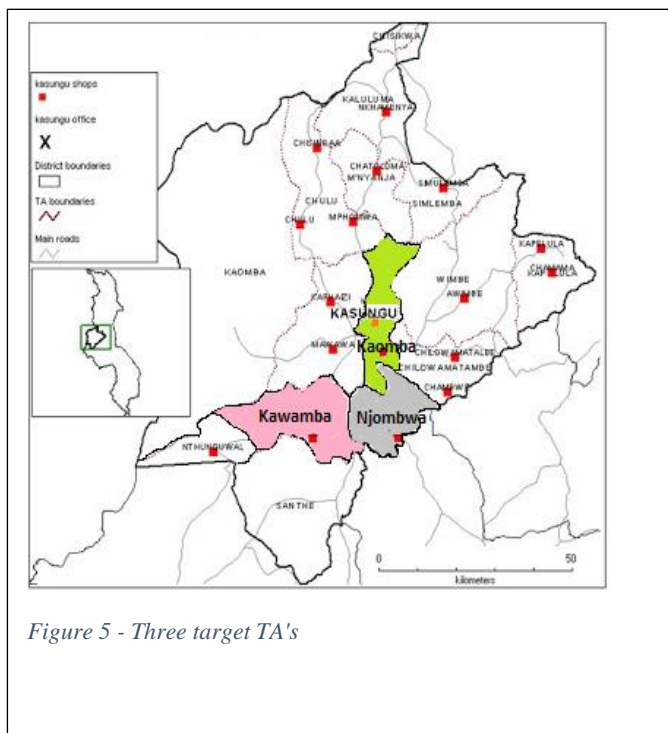


Figure 5 - Three target TA's

Study structure for 3 T/As

Having selected the three T/As, research was designed and conducted by an expert in self-supply, supported by a team of Pump Aid staff. The primary research was conducted covering a total of 156 households of which 97 (62%) were traditional well owners (communally or individually owned) and 59 (38%) were non-well owning households.

Key Findings of Kasungu Context Report (Annex 1)

The research produced the following key findings:

Data on potential demand for self-supply as well as ability and willingness to pay.

- Of the 76 traditional wells visited it was found that 21 had been dug by their owners, 8 had been dug by a group or by the community without outside help, and 47 had been dug by well diggers. The latter was found to be an indication a good level of willingness to pay.
- In addition to the existence of many hand dug wells, approximately 350 wells are dug each year in the three T/As, which indicates very active self-provisioning.
- The main driver is that people find them convenient.
- 90% of surveyed wells served populations of less than 150, indicating that they are in communities least likely to be served by piped water or similar government or larger NGO interventions.
- 61% of surveyed wells were owned by one household indicating a high level of household investment.
- 39% were owned by the community.
- 46% of surveyed wells had no apron, parapet or raised area above the mouth of the well
- 98% had no lifting device other than a bucket on a rope [indicating a high potential for simple well improvements that would lead to significant water quality benefits].
- 63% of surveyed wells were completely unlined [indicating a high potential for future well lining]. Of those that were lined, only 10% were fully lined, 22% were lined only at the top, and 5% were lined only at the bottom.
- 69% of surveyed wells had been deepened since digging.
- Households want to improve existing sources to make them more reliable and convenient and that they are willing to pay for the improvements.
- Analysing those owning a well it was found that 38% had already purchased a cement floor; 57% had already purchased a tin roof; and 84% had already purchased a radio household *[indicating that well ownership is most attractive to those already investing in their homes and betterment of their lives]*.
- Of those who had dug their own well 69% had stated this was done so for convenience and to increase household consumption *[again indicating that improved lifestyle rather than improved health is the key driver of well investment]*.
- 73% of those sharing a well were thinking of getting their own supply *[indicating a high potential for well digging]*, and 90% of these had a good idea of the cost *[indicating that they had investigated it and were therefore serious about making the investment]*.

- Of those who had paid to have a well dug, 66% had covered the cost by selling crops or livestock, 11% had covered the cost by taking on extra work *[both indicating that funds can be diverted from other income streams if the benefits of well ownership are fully recognised]*. 12% had covered the cost by borrowing from friends or family. 11% had covered the cost by loan, Constituency Development Fund or other grant.
- Of those owning a well and thinking about buying a pump, 31% said they could cover the full cost of a rope and washer pump and 41% said they could cover half of the cost and would need help for the remainder *[indicating a need for some kind of financial support to advance from simple well to complex pump]*

Analysing the results the following opportunities could be identified and conclusions drawn

- The sector review (2012) identified self-supply as one possible solution to maintaining progress in coverage.
- Kasungu is one of the wealthier districts in the country but also has one of the lowest water coverage. Potential to invest and need for more water points make it an appropriate district in which to explore the self-supply model
- A significant number of traditional wells exist already which indicate demand to improve the situation and offer opportunities for up-grading.
- Community members in remoter rural areas are travelling significant distances to communal wells and are expressing a desire for convenience.
- The district has almost 800 communities with less than 150 people, and over half of these have no functioning water point. For this reason other options are required and desired.
- The influence of the Chiefs can lead to good progress if they support the idea, and those in the selected T/As have responded positively.
- Estate management have identified water supply as essential for the well-being of tenant/contract farmers and have provided some with rope pumps. There is an opportunity to discuss putting money into long-term support rather than short term gifts as they have done to date.

However, these opportunities need to be considered against the challenges the Kasungu context represents.

- Malawi as a whole has a high level of public provision of water. Interest to invest for this reason may be lower than in other East African countries, as people look towards government or NGOs for water provision.
- The rural people of this district in particular have a high level of dependence on NGO and estate interventions for accessing services.
- Almost half of agricultural land is tenanted which could deter investment by households in fixed assets (such as houses and wells). Much would depend on the interest of estate management.
- The level of debt to tobacco companies could limit farmers' abilities to invest.

Overall conclusions from the Context Report

Overall there are indications at district and T/A level that there is potential for self-supply and also a need for new options to serve scattered households and the smaller communities.

The selected T/As are very suitable for piloted introduction of a new approach because of the distances travelled to communal wells, desire for convenience and the 'relative wealth' of community members.

Significant numbers of people have already invested in their own traditional supplies which is an indication of the level of self-provisioning and willingness to invest in increasing access to water supplies.

Survey and assessment of entrepreneurs to supply the services that will underpin the self-supply model.

The survey looked at the potential service providers who would provide the sustainable support to self-supply. Some of these are already providing services at a low level, others are yet to be convinced that self-supply has value to the sector and to the rural economy. The survey specifically looked at the availability of well-diggers, hand drillers, masons pump installers, pump manufacturers and the challenges and potential they offer. The findings are outlined below.

i. Well diggers

Challenges.

- The market for well-diggers is fragile and variable.
- Their skills are generally quite limited but a few have considerable experience and could be regarded as professionals.
- Their expertise is generally not widely known and there needs to be a register of them for potential customers at both district and T/A levels.
- There is no network to help them improve skills and learn of new developments.
- They do not like to operate below 15-20 metres maximum.

Opportunities

- Well diggers skills can be expanded to provide them with a less seasonal income.
- Their availability can be advertised more widely through social marketing channels.
- They almost all own mobile phones and can be contacted/ informed of developments which might be useful to them.
- Their costs are low compared with any form of drilling and they can operate in most ground conditions and access almost any site.

ii. Hand drillers.

There is one local contractor, who is based in Kasungu and trained by Mzuzu University, whose drilling team have made 6 boreholes mounted with rope pumps. These have mainly been for institutions. So far here the market is small partly because of the widely varying potential of local aquifers, and the high cost of initial investment. Up-take has been slow partly because of the lack of a communications and marketing strategy and because it represents only a small part of the contractor's general business interests.

The cost of a borehole to 15m with a rope pump is 200,000 MK, and for a lined well with the same 250,000 MK.

So far success rates for hand-drilling have been low, needing several attempts to find sufficient water before boulders or rock are reached. This contractor also manages well-diggers but this increases costs considerably.

Challenges.

- To provide a hardware service with an adequate level of quality control. The contractor is not known for his reliability.
- He takes responsibility also for rope pump installation, but the poor level of expertise is in danger of giving the rope pump a bad name.
- The market for hand-drilled boreholes is confined by the availability and lower cost of hand-dug wells on one side, and the speed, greater flexibility and depth achievable with mechanically drilled wells to cope with a wider range of ground conditions, on the other. Marketing of hand drilling is still very limited but could be better developed.

Opportunity.

- This skill is locally available, and could be developed further.

iii. Masons.

Most communities have a mason who carries out construction and repair of buildings, but these are generally not trained in construction of well head protection or lining. Those who have received training in Sanitation platforms production would be suitable for further training since the technical skills required are similar. In some cases well-diggers also have masonry skills.

Opportunity. Masonry skills are widely available, but usually not to a high level of skill. Those well-diggers who are masons should be given priority in training.

Challenges. Not many masons are skilled in concrete/mortar work. It would be best to train well-diggers either to undertake the work themselves or to be able to supervise a local mason to provide a good job.

iv. Area mechanics

At present these are the people who are responsible for the repair of conventional piston pumps (Malda and Afridev). In the three target T/As there are 8 of them. They receive regular training and support from Inter Aide, and provide an invaluable network of expertise and knowledge at sub T/A level. They consist of both men and women, and provide a very important bridge between T/A, district and village level.

The project partnered with Inter Aide to work with the Area Mechanics as we were not to form another parallel structure of Area Mechanics. We incorporated them and provided training in rope pump installation, repair and maintenance.

Opportunity

- These people can provide much useful information on their areas and can be trained in aspects of Self supply technology and promotion, particularly on pump installation and well protection.
- They are well thought of in the community and can be a focal point for dissemination and collection of information. They form an essential bridge between communities/customers, T/A level and district level authorities and traders and can be motivated to promote Self supply to expand their customer base.

Challenge

- They operate with varying levels of efficiency and cover large areas. They tend only to obtain part of their income from their work on pump maintenance and so have other commitments.

v. Pump manufacturers.

As with hand-drilling there is only one low cost pump manufacturer in Kasungu. The manufacturing can be scaled up as demand grows. So far there has been no marketing of his products and he has only recently been able to set up a demonstration pump outside the workshop to advertise his wares, as the first stage of support from the project and of publicising his products.

At present he charges approximately 60,000 MK for a pump and a further 10-20,000 MK for installation. He can offer a windmill version (around 100,000 MK) and a low cost version (30-40,000). He has been well trained, is very motivated and keen to establish a market and good quality products. He has now been trained by Mzuzu University Centre of Excellence in pump installation as well as fabrication. His experience is so far quite limited (maximum 6 pumps) so the self-supply project offers a real opportunity to support an embryonic business which could not reach a level of sustainability without it.

It is not felt that in the initial stages of the project the market can bear more than one producer if he is to achieve a level of sustainability. The pump manufacturer has not yet received training in marketing and small business development. He has successful experience of taking out a loan to grow his business and is looking to expand.

Challenge.

- This a fledgling small-scale business, which requires considerable support and attention to overcome the teething troubles which face those trying to introduce a new technology and develop the market. The lack of expertise to date to produce the whole operating unit has severely

Opportunity.

- The expertise to produce rope pumps has already been developed to some extent and can form the basis for establishing the starting point of the supply chain which has a large potential market. This project offers the opportunity for medium term support for this small but essential business to achieve sustainability.

Following the survey and assessment of the service providers, who could form the basis for and a part of the supply chain, to establish and accelerate self-supply in the three T/As, the project selected 16 well diggers (one was later replaced by a mason) identified and recommended by communities. 8 area mechanics trained by Inter Aide to provide repair and maintenance services for Afridev and Malda pumps selected. They were familiar with selling their services as entrepreneurs but they were not familiar with the concept of self-supply neither had they been given business and marketing training.

Phase 2. Self-supply models trialled and tested.

In the Phase 2 the following activities were implemented.

25 entrepreneurs were selected from all the three T/As:

- 8 Area Mechanics
- 15 Well Diggers
- 1 Mason
- 1 Pump Manufacturer

The selected entrepreneurs were then trained in various areas their technical requirements but all of them were trained in business skills and marketing.

Box 1 - Summary of phase 2

The area mechanics, the pump manufacturer as well as the well diggers and the mason were given training in running a business and also in marketing to get their services and products known to their relevant audiences/potential customer base. As a part of the latter marketing strategies were developed which included road shows, market day events, attending church and cultural/social events, etc. A catalogue was developed for marketing the services and products from which customers could choose. It was designed, field tested, adopted and printed. It is now in use by the entrepreneur. Also posters for the entrepreneurs were developed and printed and three road shows were conducted, one in each of the TAs.

The area mechanics and the pump manufacturer were given technical training on the installation, maintenance and repair of rope pumps. The training was conducted by the Smart Centre (Mzuzu University). It was classroom based with hands on training in the field. It covered understanding the principles of the rope pump, how to install, how to maintain and how to train communities in maintenance rope pumps. The aim was that, on completion, trainees should be capable of installing the technology with minimal oversight and be officially certified by the training institute. The training also covered technology options with their advantages, disadvantages and costs.

The well diggers and the mason were trained in standard well digging and lining techniques by Machimo Investments. The aim of the training was to train well diggers (plus the one mason selected) from the selected T/As in Kasungu district to better understand the principles of standard well digging and that at the end of the training participants should be able to digging a standard well with minimal oversight.

In addition to the entrepreneurs three Health Surveillance Assistants from the DHO and one partner shop (part of establishing a supply chain for spares and products) were also trained. We included the HSAs to equip them with the understanding of the concept of entrepreneurship, self-supply and the business and marketing skills entrepreneurs needed to make their businesses succeed so that they, the SHAs could provide support at community level at the set up stages of the businesses.

a. Well Preparation Training: For the Well Diggers

Well preparation entails the process of well site identification, digging, and lining. A technical training was conducted by Machimo Investments in August 2015 for the well-diggers in improved techniques and safety enabling them to undertake well siting, standard well digging in a variety of soil types, well lining and health and safety. The training also covered self- supply concept. A practical session on digging and lining wells was also conducted to ensure entrepreneurs acquire practical skills in various areas of their work. Two wells were prepared during the training.

Through this training, the participants were able to gain knowledge and skills required for well digging. Many of the participants were attending this kind of training for the first time and as a result the training fuelled enthusiasm on their part and seemed to fit well in the self-supply approach. Another result is an increased knowledge of self-supply and technologies that fit within the approach. The participants have been challenged to find (business) opportunities for low cost technology in their own area as they do their well digging business.

As a result of the training, sixteen attained knowledge and skills in standard well digging. The participants have been connected to Area Mechanics and Pump Builder, and have been motivated to take up well digging as a business to increase access to safe and reliable water in their respective areas.

During the training, well diggers also discussed some of the **challenges** they normally face when doing their business as follows:

- Difficulties in finding protective/safety gear that protects them during well digging.
- Challenges in finding durable tools and implements that can sustain their work as it is too expensive for them to afford. Most of them indicated that start –up capital to enable them grow their business is difficult to find.
- Mobility to reach out to far customers to meet the demand means that they have to charge more for those customers in order to meet costs of transport for themselves and their tools.
- Well digging according to the training they received is seasonal hence cannot be relied upon for the year round.

b. Technical training Rope & Washer Pumps. For Area Mechanics, Pump Manufacturer and representatives from the Ministry for Water Development

The purpose of the training was to enable trainees to understand the principles of self-supply and their role in it. The selected Area Mechanics were trained in principles of the rope pump, how to install it, and how to train communities in its operation and maintenance. Further trainings for pump mechanics was on how to repair other existing pumps in their catchment areas. These included Malda pumps, Afridev pumps and India Mark V pumps that are common in Kasungu. On completion, the trainees were able to install a rope and washer pump, repair all other pumps available in the area and able to cast concrete slabs for well covers and conduct civil works.

Smart Centre, under the Mzuzu University's WASH centre of excellence carried out the training April – May 2015. The training covered the following elements:

- ☐ Rope pump uses – domestic, small scale agriculture
- ☐ Different models of Rope Pump (model 1, 2 and 3) and target of model
- ☐ Installation of Rope Pump
- ☐ Slab Casting
- ☐ Maintenance of Rope Pump, including the Elephant pump type
- ☐ Maintenance of Mark V pump
- ☐ Training of communities in maintenance of Rope Pump
- ☐ Quality Control of Rope Pump (what is it, how will it be measured)
- ☐ Well head protection/lining of hand dug wells

- ☑ Low-cost apron fabrication
- ☑ Field visits to DAPP and Pump Aid rope pump sites

The training identified the following **challenges**:

- Financing of their businesses. In order to start successfully some investment is needed for tools, marketing and demonstration pumps. For (potential) clients, there is also a financial challenge; despite the low cost of the pumps, most people are not able to finance the pump all at once and needed to buy the pump on a credit base. When such credit is affordable and accessible, the market potential for rope pumps will increase.
- Some of the pump technologies in Kasungu have no spare parts, for example the Mark V. While the Spare parts for Afridev pumps are available through Inter Aide networks, spare parts for rope and washer pump can only be fabricated locally. The team was not yet certain if local fabricators would be able to take this on.
- The distance some area mechanics have to travel from their area to Kasungu to access the rope and washer pump would increase the cost they charge the customer for the pump because of transportation costs.

Through the project, the Pump Aid team has worked to **address these challenges** by:

- Linking entrepreneurs with Village Savings and Loan Schemes to provide a limited form of access to credit.
- Engaging local shops to stock spare parts for rope and washer pumps
- Mentoring entrepreneurs to think about customer segmentation and 'loss leaders' i.e. travelling to a further location in order to establish a foothold in that area with a view to higher levels of future business.

c. Business & Marketing Training. All entrepreneurs

Nova Consultants were awarded a contract to conduct business and marketing training for all the entrepreneurs. Nova Consultants were chosen because they showed the greatest understanding of the target audience and highlighted innovative teaching approaches (role plays, observations, group works etc.)

The following were the modules/topics covered in the training for the entrepreneurs:

Small Business Essentials

- The importance of book keeping and record keeping / Income and expenditure / Cash book / Profit and loss / Use of profit / Buying and selling on credit / Credit book / Pricing and costing / Business plan / Business management.

Marketing

- Introduction to Marketing / Social marketing / Promotions and pricing / Communications and messaging / Marketing Strategies / Monitoring tools / Management of working capital / Forward pricing / Investment decisions / Quality management.

d. Marketing Activities undertaken

After the training, demand was stimulated through community engagement by the entrepreneurs and Pump Aid team through the use of different marketing approaches including catalogue of products and services, marketing road shows, attending special events, posters, etc.

A **catalogue** of products and services was developed to enable customers to choose the technology of their choice based on affordability (financial capacity) among other factors like attractiveness etc. The project developed two catalogues, one for water lifting devices and one for access to ground water.

Furthermore, the project engaged HOHO General Dealers to conduct **roadshows** at three of the biggest markets during market days in the implementation area, TA Kawamba, TA Njobwa and TA Kaomba. The activities during the shows included introduction of the entrepreneurs from the specific TA to the onlookers and entrepreneurs were given opportunity to explain to the gatherings the products they were offering putting emphasis on the quality of the services they offered stating the fact that they were properly trained to provide quality and durable products to the customers. Furthermore, the market roadshows were also used to explain to the masses on why self-supply was a sure way of individuals and small communities to have their own sustainable water supply systems within their door steps. Both entrepreneurs and consultants wore Self-Supply branded T-Shirts with some low cost technology pumps embroidered on them to add colour to the shows but also to help would be customers refer to these pumps to understand better. Furthermore, different self-supply posters were provided to the interested customers. At the end, the gathering were given a chance to ask questions which were answered either by Pump Aid team or the entrepreneurs themselves.

Community marketing. Other marketing activities were carried out by the entrepreneurs themselves, community gatherings like weddings, funerals, tombstone unveiling, community meetings etc. All entrepreneurs engaged with relevant Chiefs and also went door to door in homes of potential customers to explain about self-supply.

Newspaper advertising. Pump manufacturer.

Data began to be collected and analysed to track entrepreneur progress, impact of marketing customer satisfaction. The latter formed a part of Phase 3 which is continuing.

Data collection was not simply confined to this but was used as an opportunity to talk to entrepreneurs on how they are faring in their businesses. This was also an opportunity to coach and mentor them in their water services / products business.

e. Partner shop selection.

The project identified Inter Aide as a partner of choice because they already have networks for shops that sell Afridev and Malda pumps spare parts. Most of the Area Mechanics who would be repairing the pumps access the spare parts from these shops hence it would be easier for them to have rope and washer pumps spare parts right there.

f. Assessment on access to finance /credit for entrepreneurs and customers.

The project undertook an assessment on access to finance/credit. All entrepreneurs have access to forms of loans / credit. Village Savings and Loans schemes and relatives are the main source. Some entrepreneurs are members of VSLs and in some situations, their spouses are members so they are able to access loans from these groups either themselves if they are members or through spouses who are members of the groups. The challenge here is that these loans are very limited in size and therefore cannot be used to buy working materials/ tools e.g. protective wear, to expand their business and to buy push bikes and motorbikes to aid them with transportation to their customers

Phase 3. A documented self-supply model developed for scalability.

This section will discuss:

- Methodology for monitoring and research of project outputs.
- Key Findings from monitoring / research of project outputs amongst key stakeholders.
- Assessment of key findings against project hypotheses.

In addition to the monitoring and documentation undertaken during this phase, the project team worked with the entrepreneurs on the demand side, particularly on business and marketing development to stimulate demand. On the supply side the team provided mentoring and coaching to entrepreneurs on business and marketing.

I. Methodology for documentation

The aim of this phase was to develop key findings regarding the output of activities undertaken during the pilot and from this to test results against the 5 hypotheses originally set out. In order to do this the project team divided the project targets / key stakeholders into 4 main groups.

- i. Self-Supply Entrepreneurs
- ii. Individual customers / households
- iii. Community customers (for products and services relating to community water points)
- iv. Local government stakeholders

Surveys were designed for groups 1, 2 and 3. A baseline was undertaken with the entrepreneurs to establish level of sales in the 12 months prior to their engagement with the programme. 4 business progress surveys were then undertaken with the entrepreneurs on a quarterly basis over the period starting from when the project supported training had ended. A single survey was carried out for groups 2 & 3 in February / March 2016. A Focus Group Discussion was undertaken with local government stakeholder in April 2016.

A total of 58 individual customers were surveyed out of 153 individual customers representing 69 sales out of 219 sales and 25 community customers out of 139 community customers surveyed between May 2015 and March 2016 using the questionnaire.

II. Key Findings:

i. Key Findings - Entrepreneurs

Box 2 - Entrepreneur: Key Findings

Customer Demand: Customer survey findings indicate that existing customers are planning to make a further 442 purchases after the next harvest (this excludes community well customers)

6% of sales were made outside of the entrepreneurs 'home TA'

Four business progress surveys have been conducted (covering all of the entrepreneurs) including the first one which was administered covering the period before the entrepreneurs were trained and started selling their products and services. This forms the baseline against which the business progress and development are analysed.

The project had 25 entrepreneurs who were providing different services and products to the community. The entrepreneurs comprised 8 area mechanics, 15 well diggers, 1 mason and 1 pump manufacturer. Well diggers provide well sinking, well deepening and well lining services (commonly called well preparations). Area mechanics provide pump installation and pump maintenance services. They also do well lining sometimes. The pump manufacturer does manufacture the pumps and does installation also. The mason is solely for lining the wells or doing some civil works.

a. Sales results

Table 2 - Sales by product type

Service / Products	Baseline	Quarter 1 May- Jun 15	Quarter 2 Jul-Sep 15	Quarter 3 Oct-Dec 15	Quarter 4 Jan-Mar 16	Total
Well digging		21	25	25	5	76
Well Deepening		9	25	46	3	83
Well Lining		4	7	11	2	24
Pump sales		4	8	5	5	22
Pump Maintenance		28	50	44	17	139
Totals	168	66	115	133	32	346

Note, the baseline was not broken down to specific products/services. A baseline for each product/service was estimated using the yearly averages in order to compare the progress made within the project.

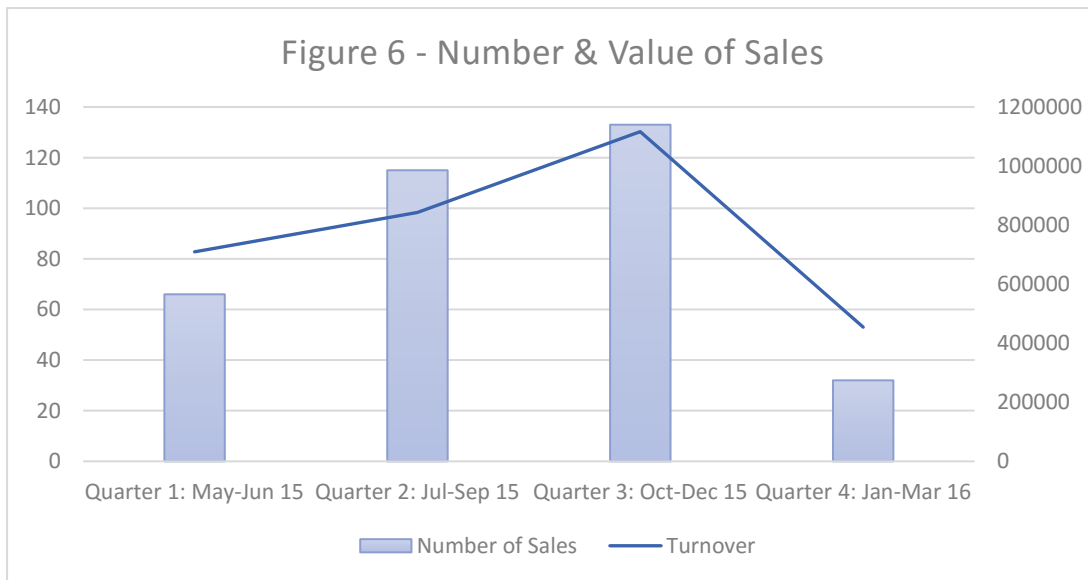
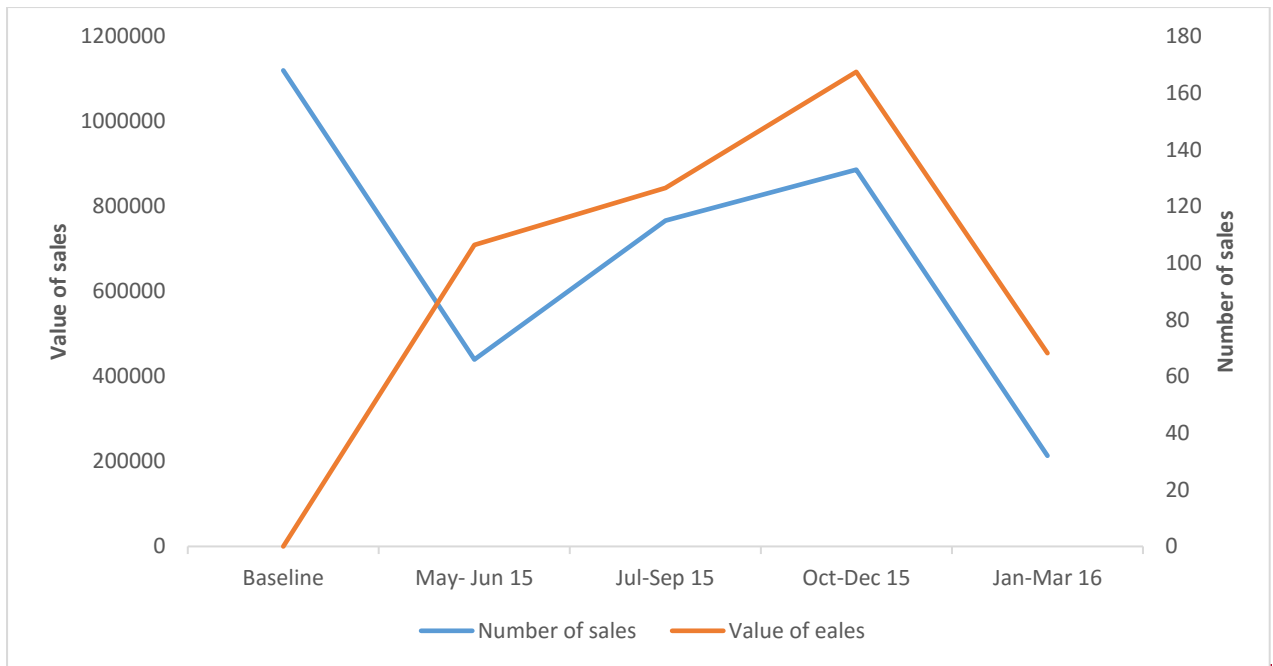


Figure 6 - Number & value of sales



Figure 8 - No. of sales (services/products)

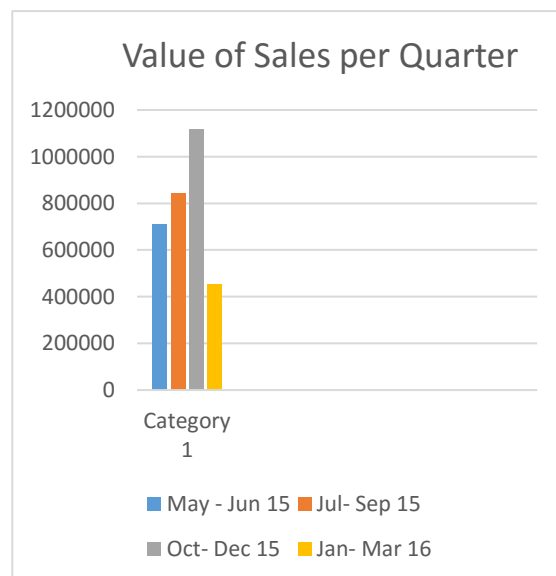
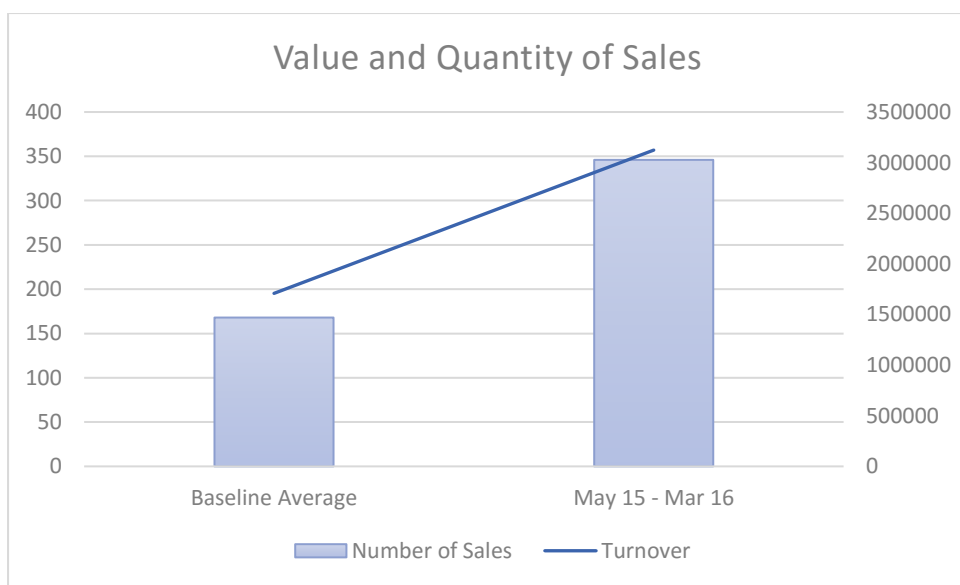


Figure 7 - Value of sales per quarter

Sales by Quantity

Values of Sales (MKW)



Sales by TA

Table 3 - Sales by Traditional Authority

T/A Name	Wells Dug	Wells Lined	Wells Deepened	Model 3 pump installed	No. of Maintenance	Total
Kawamba	43	16	57	3	33	152
Kaomba	13	1	3	1	37	53
Njombwa	20	6	21	3	68	118
Others	2	1	2	15	3	23
Total	76	24	83	22	141	346

Entrepreneurs have delivered a total of 346 products and services from May 2015 to March 2016 (to 153 individual customers and 139 community water points maintenance services). The baseline for sales for the period February 2014 to January 2015 is 164 sales of products and services for the same cohort.

This amounts to in excess of a two fold increase (118% increase) in the number of sales by the same entrepreneurs over a shorter time period (12 months against 11 months).

Sales outside of 'home TA's'.

- 3 well diggers made 5 sales outside of their home TA's.
- Whilst other TAs have their own Area Mechanics, on 3 occasions water point committees from other TAs chose project AMs over their own AMs.
- The pump manufacturer is the only one in Kasungu and through advertising is developing a broad reach.

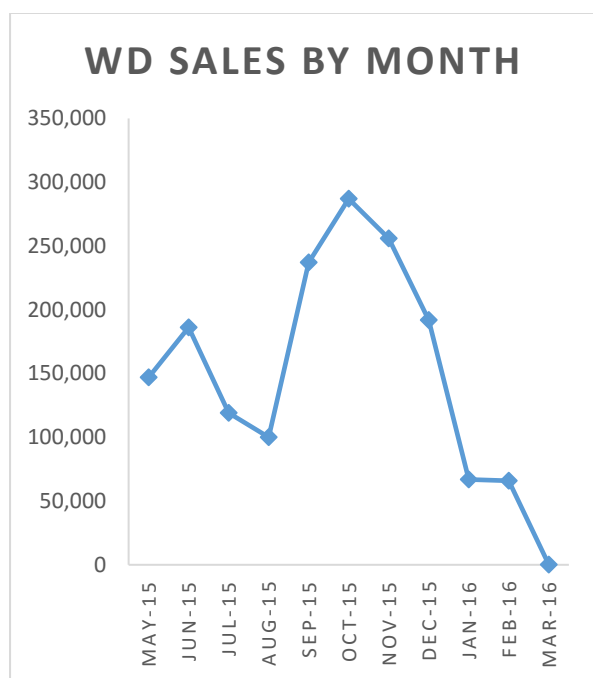


Figure 10 - WD Sales per month

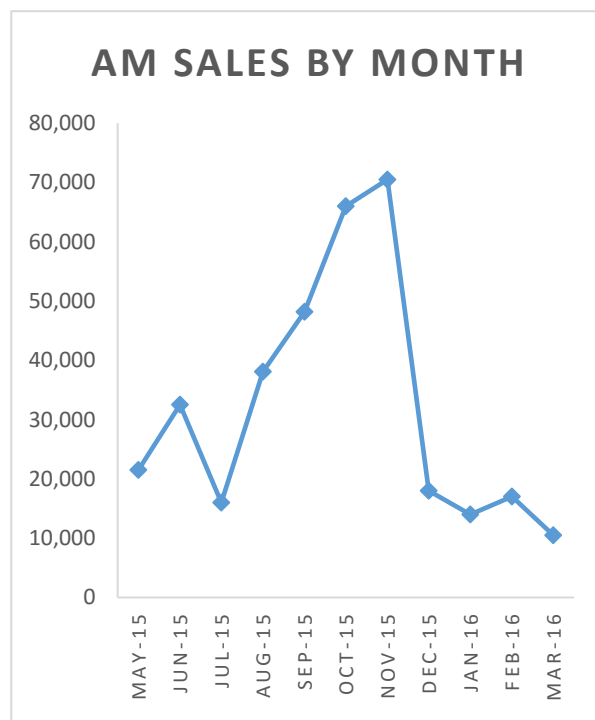


Figure 9 - AM Sales by month

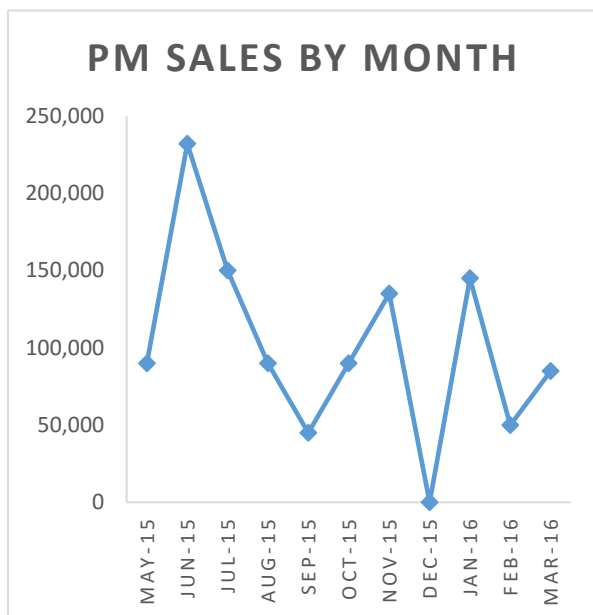


Figure 12 - PM Sales by month

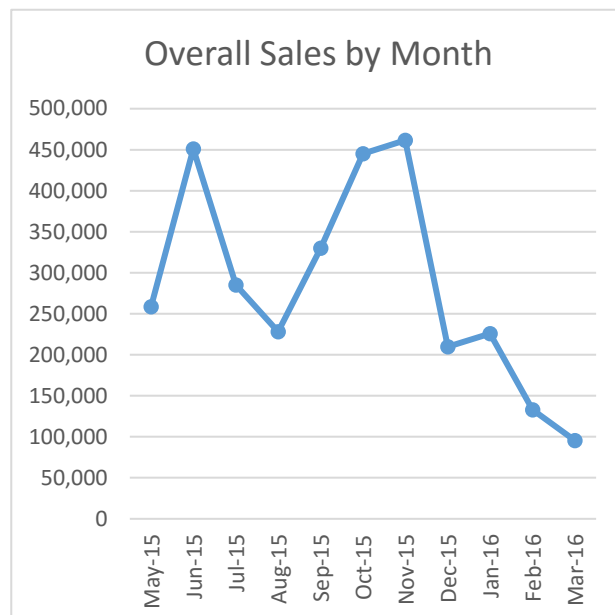


Figure 11 - Sales by month

Seasonality and sales trends:

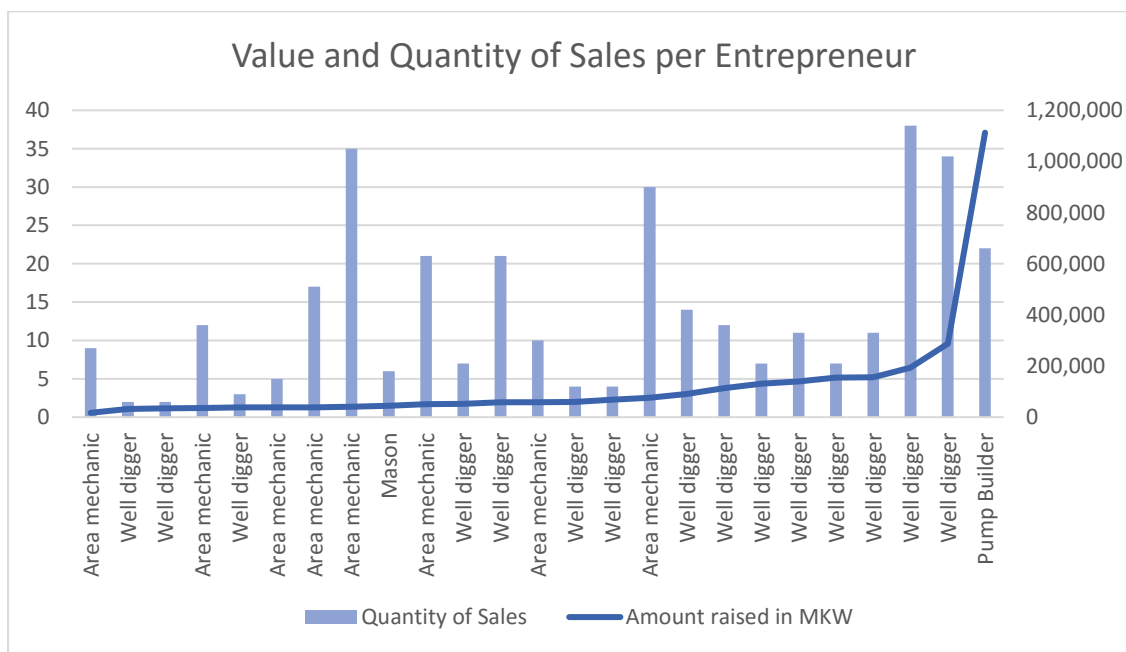
With the exception of the pump manufacturer, there is a clear and unambiguous trend to sales figures. Sales figures peaked in August to November. This is unsurprising as this is the dry season when traditionally (and practically) wells are prepared or repaired. Furthermore, this is the period when most people have just sold their farm produce and have a disposable income. Both of these factors were recognised in the Kasungu Context Report and factored into the project training schedule.

An additional consideration is that well diggers had undertaken technical training in August and whilst this isn't a reason for the sales trend, it contributes to an explanation for the increase in numbers of sales (on the baseline) and also the number of well linings undertaken, which was considered by the well diggers to be higher than in previous years.

Table 4 - Entrepreneur results distinction

Ref	BUSINESS	TOTAL May 15 to Mar 16	
	TYPE		
		Sales	Amount raised
			MKW
1	Area mechanic	9	17,000
2	Well digger	2	32,000
3	Well digger	2	35,000
4	Area mechanic	12	35,500
5	Well digger	3	38,000
6	Area mechanic	5	38,000
7	Area mechanic	17	38,500
8	Area mechanic	35	40,300

9	Mason	6	45,000
10	Area mechanic	21	51,000
11	Well digger	7	52,000
12	Well digger	21	58,000
13	Area mechanic	10	58,500
14	Well digger	4	60,000
15	Well digger	4	68,000
16	Area mechanic	30	75,500
17	Well digger	14	90,500
18	Well digger	12	114,000
19	Well digger	7	131,000
20	Well digger	11	140,000
21	Well digger	7	155,000
22	Well digger	11	156,000
23	Well digger	38	194,000
24	Well digger	34	288,000
25	Pump Builder	22	1,112,500



There is a divergence between entrepreneur's results.

- Some individuals are more business focussed with better capacities (aptitude, capital, networks).
- Differences in population densities between T/A's
- Effectiveness of marketing
- Customer segmentation and value of product / services. Area Mechanics focussed on low cost services relating to community well maintenance.

There is also the consideration of the optimum number of entrepreneurs per geographic area and the level of income that can be derived.

b. Entrepreneurs experiences

All entrepreneurs report satisfaction with the support provided by the programme and with their businesses. Reasons provided:

- It is a source of income that enables them to support their family
- It helps many people have access to safe water
- It is what they like doing and enjoy their line of work
- It is a source of skills and knowledge
- They feel proud to be part of a solution to water problems
- Source of capital for investments
- Growth and establishment of the business

In terms of what entrepreneurs have expended income derived from businesses on:

- Invested in other business ventures, e.g. groceries shop; farming
- Bought brand new working tools in addition to what they already have.
- Bought farm inputs
- Built decent houses
- Some have paid school fees for their children
- The pump manufacturer has been able to expand his line of business and is opening a new branch.

Strength, Weaknesses, Opportunities and Threats

From our surveys we found the entrepreneurs reported the business strengths, weaknesses, opportunities and challenges as follows:

Business Strength

- Ability to provide/deliver quality products/services
- Satisfaction in running the business because of earnings
- Able to offering products and services at reasonable prices
- Ability to provide good customer care
- Able to secure new markets
- Skills and experience that they have gained for the business
- Good relationship with people in the community (personality)
- Timely delivery of products/services

Business Weakness

- Lack of transport means to reach more remote customers
- Inadequate working tools for the business
- Lack of personal protective wear
- Access to loans / credit
- Inability to recover debts in time

Business Opportunities

- Increasing income due to increasing demand for the water products/services
- Advancement of skills and knowledge through experience and further trainings
- Able to provide services and products that were not available before i.e. rope pump installation and maintenance

Business Threats

- Accidents such as well collapse
- Business difficulties as a result of late repayment of debts by the customers
- Geographical uncertainties such as rocks underneath when sinking the well
- Loss of customers due to mobility challenges
- Climate change and droughts which will affect water table (posing challenges)
- Economic situation of communities and their lack of resources to spend on improving water supplies

The ability of the entrepreneurs to evaluate or analyse themselves and their respective businesses through the identification of strengths, weaknesses, opportunities and threats, highlights the potential that they are able to manage their businesses properly so that there is attainment of business growth, stability and sustainability.

The level of awareness of their businesses strengths, weaknesses, opportunities and threats is very encouraging.

Business Understanding

Our surveys found that:

- Most entrepreneurs have a basic understanding of budgeting, although this is variable across the cohort.
- All entrepreneurs have a 'vision' of what their business will look like and have a understanding of key elements of a business strategy.
- An increasing number of the entrepreneurs have a business plan, albeit many are quite basic.
- Entrepreneurs have an understanding of profitability, of what specific tasks are more profitable and of customer segmentation as a means of maximising profit.

Marketing by entrepreneurs

All entrepreneurs are segmenting their customers and understand the concept of the water ladder (both in the abstract and as a basis for repeat business)

All entrepreneurs have undertaken marketing at community level through different means:

- Introductions with and through ADCs, Chiefs
- Local meetings
- Posters
- House to house
- Repeat customers

All entrepreneurs understood the importance of customer recommendations. Approximately 90% of entrepreneurs report that they receive business through recommendation of existing customers.

This highlights the importance of quality of product / service, an issue recognised by the entrepreneurs themselves.

Pre-orders

On average each entrepreneur has pre-orders from 5 customers (the highest has 8 customers and the lowest has 1) to be conducted in the next 6 months, ranging from well digging, well deepening, well lining and pump installation.

Challenges for Entrepreneurs

Start up Costs: Protective clothing and tools were universally viewed as both necessary but expensive

Input costs: Cement processes in Malawi are one of the highest in Africa.

Transport. Most entrepreneurs did not have their own form of transport which limited their scope of operation and meant reliance on alternatives (expensive)

Access to credit: Although many entrepreneurs reported accessing small loans, these were primarily for very short term purchases, such as to pay for transport to a job, or initial inputs. Loans for start-up capital, transport resource and expansion are required if the businesses are to grow. Access to credit is also an issue in terms of extending the season for purchases from a consumer point of view, which in turn will allow entrepreneurs to make secure income over a longer time period.

ii. Key Findings – Individual / Household Customers

Box 3 - Individual/Household Customers: Key Findings

10% of purchases were made by groups of households, clubbing together for an improved water point. This equates to approximately 2,500 additional people having access to improved water.

90% were made by individual households. But our evidence and evidence from other self-supply initiatives shows that these households share with at least 3 other households. This then equates to an additional 7160 individuals having access to improved water within on average 11 metres of their home (extrapolating from the 58 customers questioned to all customers).

Intentions to make further purchases (after next harvest) indicate a desire for better water services and a willingness to pay for them.

Income for purchasing is overwhelmingly from farm produce.

Customer Satisfaction survey

The survey was administered to 58 customers who bought the services and products from the trained entrepreneurs. The following were the results from the survey.

Products and services purchased include: Well sinking, well lining, well deepening, pump repair and pump installation.

Reason for Purchase

The following were the reasons why they purchased a service or a product from the trained entrepreneurs:

- To reduce distance to water source so that it is convenient.
- To have access to clean and safe water, unlike the previous tendency of fetching water from wetlands and streams.
- To have water for business such as livestock, maize meal and farming (irrigation).
- To increase water levels in the well for customers that purchased deepening service.
- To improve the condition of the water point for those that purchased deepening and lining.
- Sense of ownership and social status (respect/ pride of the community).
- One of the customer, among other reasons, purchased the service for security reasons, as fetching water from the river Bua exposed them to crocodiles.

Uses of water

- 100% customers have reported increased water use and convenience (less distance travelled).
- Extra water used for increased domestic use (100%), moulding bricks (60%), market garden (40%). The latter are potential source of income for further improvements on the self-supply ladder.
- In addition, many report reduction in the distance they are having to walk to access water

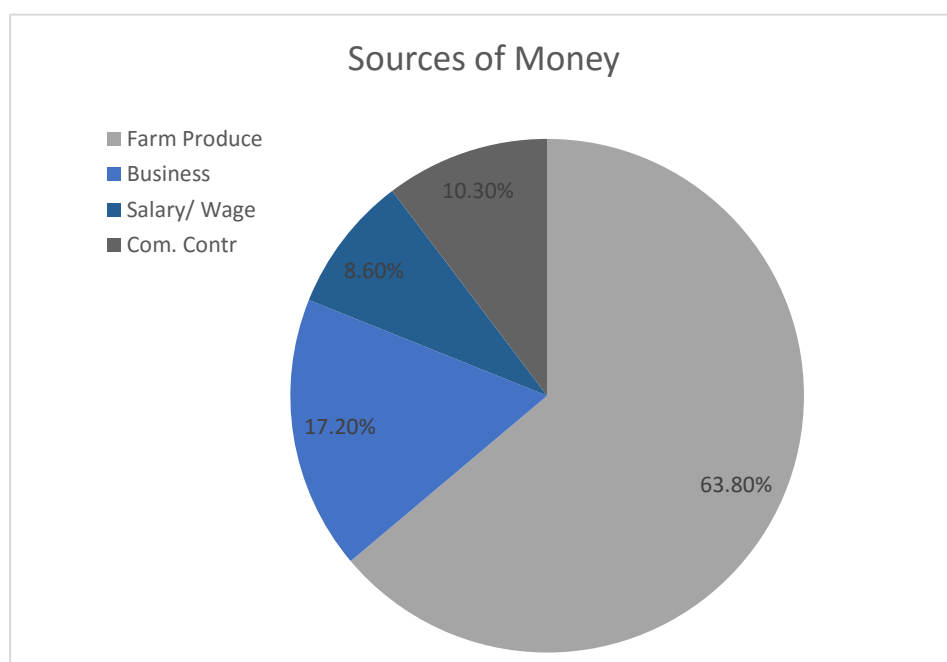
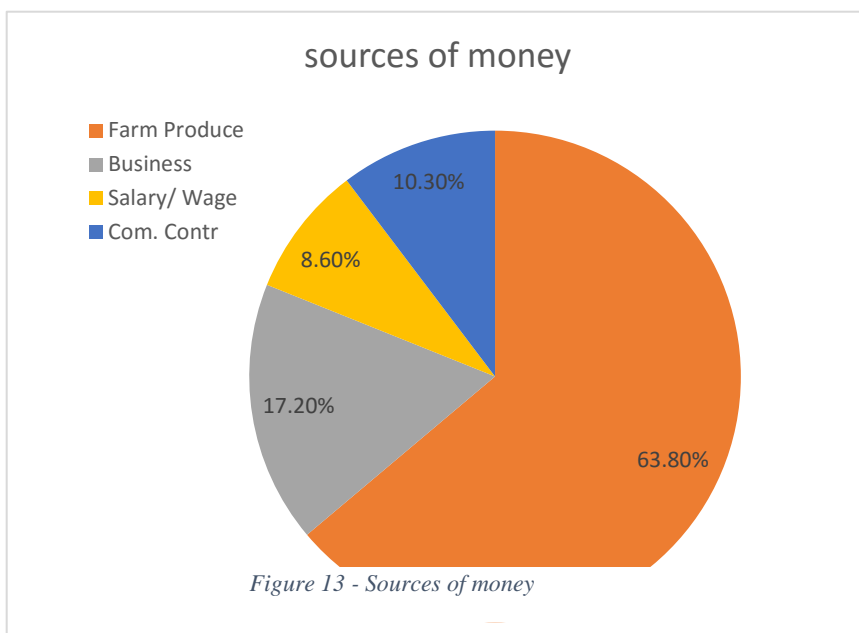
Hygiene and Sanitation

All customers apart from one reported a change in hygiene and sanitation related activity. Changes mentioned by respondents included:

- Improved personal hygiene through more frequent bathing
- Improved cleanliness of environment
- Improved cleanliness of cooking and utensils
- Increased frequency of handwashing

Sources for investment

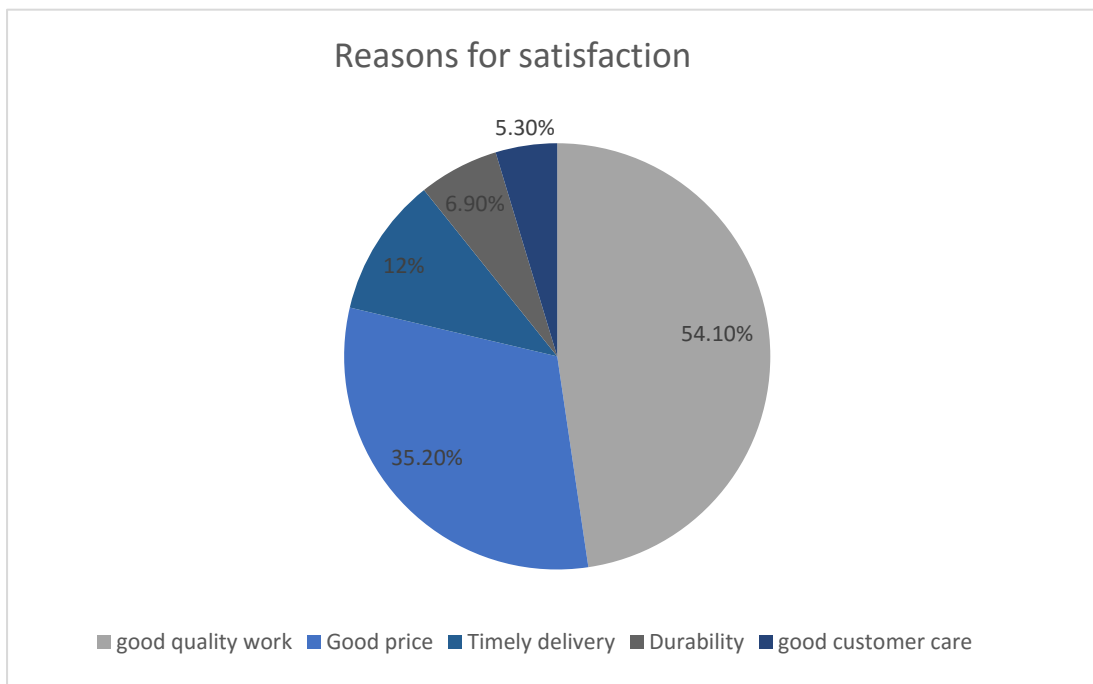
There were four sources of money to buy a service or a product in all the three areas from the 58 Customers which were surveyed. These were from farm produce, other businesses apart from farming, salary/ wages and community contributions as some of the wells are owned by communities. 63.8% of the services were bought using proceeds from farm produce which means self-supply relies much on proceeds from farm produce. The business is seasonal as most farmers have disposable income once in a year after selling their farm produce. Below is a graph indicating percentage of sources of money;



Customer Satisfaction

Out of the 58 customers surveyed 57 indicated that they are satisfied with the services and products (98.3%). Reasons for satisfaction provided by customers;

1. Good quality work (54.1%)
2. Good price (35.2%)
3. Timely delivery of the service (12%)
4. Durability of service/product purchased (6.9%)
5. Good customer care and transparency of entrepreneur (5.3%)



The one unsatisfied customer purchases a new well but it collapsed after a period of time because it was not lined and is yet to see the benefits. The customer was advised by the Well digger to have her well lined to avoid collapsing but she claimed not to have the money to invest in lining. Thus indicates that the services which the trained entrepreneurs are offering are of high quality as such they have a very good market for their products and services. Since they provide good services they are able to grow their customer base capitalising on the quality services compared to untrained entrepreneurs.

Water Use (Additional)



The customers use extra water for different purposes such as increased domestic use, irrigation, making bricks and for business purposes. For all the 49 customers whose domestic use has increased this has been things like taking baths twice a day instead of once or one bath in 2 days previously, washing extra plates, washing hands after latrine use and other critical times (it was noted that some villages have been triggered for sanitation and hygiene behaviour change but they were lacking enough water supply to practice the new hygiene behaviours). For those that have not experienced water increase it is because the water point was dry at the time of interview.

Table 5 - Water use

Domestic	49
Irrigation	14
Bricks	10
Business (maize mill)	1

Contribution to improved incomes.

36% of customers stated that they felt their income had increased since the purchase.

Income has increased because of the following ranked reasons:

1. Water is used for agricultural activities such as irrigating fields and/or gardens which is a source of income.
2. Customers save time to fetch water and have adequate time to concentrate on their farming activities which increases their income through harvest sales.
3. Some customers used to buy safe water but now that expenditure is no longer there because they have their own water source

Income not increased because of the following ranked reasons:

1. The water is not used for agricultural activities
2. Some customers are yet to observe income increase because crops not harvested

Note: This question was asked as an open question with no leading structure. It is felt that time saving and loss of productive capacity due to illness from unsafe sources are major contributors to livelihoods and thus this question required further investigation. It is also the case that water use for irrigation may not have been fully realised (as indicated above) and this re visiting this question after the next harvest may well show much improved outcomes.

Distance covered to previous water source

We know that 65% of customers used to travel in excess of 500m before purchasing their new water point.

Table 6 - Distance covered

	Frequency	Minimum	Maximum	Mean	Median	Std. Deviation
what distance covered now (in meters)	57	2	135	11.42	10	18.286

The distance for all household is now at a minimum of 2 meters and a maximum of 135 meters. Mostly the 135 meters are households which shares the well with others away from their household. This is within recognised recommended JMP guidelines which quote a 30 minutes round trip (equating to approximately a 500m round trip).¹⁷

With reduced distance comes increased use and benefit to the user.

This is evidence that Self supply clearly contributes to improved access to water (SDG 6).

¹⁷ <https://washdata.org/monitoring/drinking-water>

iii. Key Findings – Community Customers

Community customers are a distinct group of customers. These are mainly water point committees or the like that have engaged (primarily) Area Mechanics who have been trained under the self-supply programme.

These are all new ‘customers’ for the Area Mechanics and were largely sourced as a result of marketing and profile efforts of the AMs and the project staff. The products sold to these customers are mainly repairs and servicing.

The project conducted 25 Focus Group Discussions (FGDs) with different community water point committee members. In total there were 139 purchased from 139 community well water point committees.

Box 4 - Community Customers: Key Findings

Area Mechanics can and do generate new business through marketing at community level, increasing their business sustainability.

Communities who want information about services offered, are influenced by a range of marketing / advertising routes and demand a good service.

There is a clear demand within communities for individuals to have their own water points and thus a potential market for AM's to link up with other entrepreneurs to provide the range of digging, installation and repair services and develop new and profitable business streams.

In 10 FGDs participants reported that they fetched water from the next nearby borehole after their borehole developed a fault. In 6 FGDs participants reported fetching unprotected water from rivers and streams because that was the only nearby water, and participants of 1 FGD were using the same water point because it was working properly but just a security lock which was faulty.

The following were the services which were purchased:

- Well sinking 2 (8%)
- Deepening 1 (8%)
- Pump repair 22 (84%)

Among the community water points there are 22 boreholes and 3 community wells

In addition to conventional water points repairs we also found other communities who sunk, lined and deepened wells.

These communities use wells for their day to day water use as boreholes are very far from their communities. The settlement pattern in Kasungu also propelled these communities to have a well as their source since some communities have not more than 15 households mainly on estates.

The customers use extra water for different purposes such as domestic, irrigation, making bricks and for business purposes. Some committees charge huge sums of money for irrigation and bricks making as a restriction measure for using the borehole for such purposes.

Table 7 - Distance to alternative water source

	Frequency	Minimum	Maximum	Mean	Median	Std. Deviation
What distance do you cover to water point mentioned above?	25	200	3000	1160.00	800	989.107

Table 12: Distance to alternative sources for community customers

Table 8 - Distance to own water point

	Frequency	Minimum	Maximum	Mean	Median	Std. Deviation
What distance are you covering now to your water point?	25	3	500	84.92	30	120.740

Table 13: Distance to own water source for the community

From the statistics above it shows that after the community bought the service from the entrepreneurs the round distance to a source of water was a maximum of Government recommendation (500 metres round trip). This is evidence that self-supply can contribute significantly to universal access to portable and safe water.

The communities were also asked whether they would like to own their own water source under self-supply, the response was overwhelming as 100% said yes and below are the reasons why;

- To reduce distance to water source so that it is convenient (36%).
- To have water for irrigating gardens and flowers (24%).
- To have sense of ownership and be honoured (20%).
- To save time used for fetching water to spend on agricultural activities (20%).
- To take care of the water point (cleanliness and operation) easily (12%).
- To avoid scrambling at the public water point (8%).
- To protect women from being attacked by crocodiles when fetching water from the river (4%).

This suggests a demand for water services and therefore there is potential for self-supply. On the other side, the sales for water businesses are promising all times of the year except during the rainy season (December – March). Most of the population of Kasungu is dependent on farming proceedings as a source of income, such that entrepreneurs expect more business after the harvest as evidenced by the sales in the previous quarters. There is no single entrepreneur that has not made sales since the

beginning of the project. If entrepreneurs are making sales in the water business then there is potential for stability, sustainability and growth of business.

In the previous quarters there have been more sales of well sinking services and customers are looking forward to purchase next services, as evidenced by customers' responses to the question what did they intend to purchase next.

Table 9 – Next planned purchase

Type of service/ product	No of service/ product
Well sinking	1
Well lining	44
Well deepening	12
Pump installation	34
Pump	34

Some customers mention multiple services that they intend to purchase in 2016. This is an indication that households/communities are willing to move up steps in the water ladder. For wells that were dug in 2015, the owners would like to line them and install a pump on them in order to improve their water sources thereby moving up the steps of the water ladder.

Whilst it might be expected that people who have made an investment in water supply are keen to make further investments to improve this supply, it is promising that such a high number are in fact motivated to do so and not to see their investment as a one off.

Sharing

The Context Report found that sharing of water points is the cultural norm in Kasungu. Phrases like 'water is life', and 'there is no need to deny others' were common comments.

Our surveys indicated that at least 7 other households will share a household water point.

iv. Key Findings – Local government stakeholders

-One of the key hypothesis that was being tested in the project was that district authorities and the private sector see a benefit in self-supply which leads to them promoting the services and products available, and adopting new ones. Therefore, we engaged the DCT through field monitoring visits and in depth feedback meetings so ~~us~~ we could learn from them on how they have observed the progress of the research project this far. The following were some of the notable observation~~s~~ made by the DCT and other stakeholders;

- a. *"The pilot study was a complete success and I am overwhelmed by the results. I have witnessed this myself as I went to the field with Pump Aid team to see their works on the ground."*

That is one of the observations made by the monitoring and evaluation officer for the district. She however, reasoned that a price of MK 100,000 is still higher for the poorer communities but much better than the common Afridev and Malda pumps. She however recommended if the pump could be further modified to reduce the price. In a similar thought, one of the GVH's from one of the areas where the pilot study was being carried out requested if it might be possible for the government or any other organisation to step in and help them in subsidising these products. In reaction to ideas like those, one participant of the meeting had the following to say pertaining to subsidies;

- b. *"I think it's high time the communities learn to do things for themselves. The government has tried subsidies in other sectors but that hasn't helped. I support their (self-supply) approach as it will promote a total sense of ownership and henceforth responsibility towards management of these products."*

In the same vein, it was also explained to the participants during the meeting that the self-supply approach entirely requires the full commitment of individuals or communities in meeting each and every cost of the product they want to purchase and without that then it won't be self-supply. The incremental approach was a key one in making sure it is still achievable.

Other feedback included:

- c. *"The technology is indeed very good for communities as it shows to be easy to manage and maintain"*

This observation was made in reference to the Afridev pumps which it was noted that are very sophisticated and their spare parts are expensive.

- d. *"You need to increase the number of pump manufacturers because it seems like you only have one individual for that task."*

Notably, the pilot engaged one welder to be involved in the production of pump building equipment. The participants noted that one welder is not enough to meet the eminent demand for pump building products. Such observation was noted and it was agreed that it will be taken into consideration in the next implementation phases.

- e. *"There has been a good working relationship between Pump aid and the communities."*

This reaction was made by one of the members of the DCT team who took part in the field monitoring visit. He observed that the communities were very able to explain the operation of the technology and many of them were receptive of it. In his observation that alone showed that Pump aid has indeed been on the ground, mentoring and promoting the self-supply project to the communities.

- f. *"The project has been centred on safe water supply alone therefore you need to consider issues of sanitation and hygiene when you are implementing next time"*

It is now universally agreed that water supply project is not complete without incorporating issues of sanitation and hygiene. The participants thus noted that the pilot study did not include sanitation and hygiene package. Agreeably it was accepted that those aspects were not part of the pilot study as the first phase was basically centred on safe water supply. It was however, communicated that we already have those issues in mind and we will consider them for implementation in the forthcoming phases.

- g. *“Am pleased by the project success. We have been shown from the presentation that it’s a possible innovation and it can indeed contribute towards access to safe water. My appeal goes to the participants present here that we need to get this technology for our communities.”*

This comment comes from the background that the participants are basically living in town and hence enjoying the benefits of town life with its access to tap water. She however mentioned that the participants have their own home villages from where they originally come from whereby they have safe water supply problems. She therefore said that the participants can get this technology to their communities. Many participants were interested in the idea and requested contacts details of the Pump aid staff and how they can reach to the entrepreneurs.

III. Testing Against 5 Hypotheses

In the course of implementation of Phases 2 and 3, we have used the data collection as well as findings from implemented activities to do indicative testing of these 5 identified key factors or hypotheses on a continuing basis.

The five hypothesis are outlined below as well as our findings and conclusions against each one.

1. There is potential for self-supply in terms of groundwater availability

The findings indicated there is potential for Self-supply in terms of groundwater availability, in Kasungu. The groundwater in Kasungu is reasonably accessible. In the three target T/As over three quarters of wells were found to have water within 15 metres of the surface, even at the height of the dry season. Only two wells out of 78 had a depth of over 20 m. The average depth of already existing wells was 8.5 metres. Average rainfall in this area is below average for Malawi. In Kawamba and Njombwa around 60% of wells do not dry up, while in Kaomba this figure drops to 29%.

This presents an opportunity for entrepreneurs who through well sinking and lining will be able to improve the reliability of these existing wells as well as being able to access groundwater at relatively low depths when digging new wells.

However, it was discovered that most people cover longer distances to access safe water supply systems. Some cover as much as 5km (5000m) round trip to collect water. (See table below);

Table 10 – Distance covered to access safe water

	Frequency	Minimum	Maximum	Mean	Median	Std. Deviation
what distance covered before (in meters)	56	50	5000	1101.79	1000	938.033

Table 4: Distances covered to access safe water

The statistics from the table above clearly shows that the recommended 500m round trip maximum standard is not met. This in itself means that conventional water points alone have failed to address issues of distances travelled to access safe water supply systems for most households. Often distance places have had a very big bearing on the lives of infants and households as a whole as often the longer the distance to the water point the less the water is collected to meet the minimum requirements for a person, for Malawi its 27 litres/person/day. Furthermore often far away water points have disadvantaged women and girls who have often fallen prey to gender based violence including rapes. Thus with self-supply, we see a potential for a reduced distances to access safe water points as most households or small community clusters, who are often left out from communal water points (often targeting 250 people) will have a potential to own their own water supply systems within the proximity of their households.

2. There is demand from rural households and/or communities to expand existing water supply provision

From the baseline, over two-thirds of well owners (72%) in the project area feel that they could cover a half or more of the cost of a household rope pump, and almost a third (31%) feel that they could

cover all the cost. Those sharing wells were generally less satisfied with their supply, and almost three quarters of them (73%) were thinking about constructing their own water supply system. Of these 90% could correctly define the likely cost of digging, suggesting that they had actively explored the idea.

People have invested their own funds to have a well dug, lined, and deepened and pump installed. All the wells which were dug (78), lined (24), deepened (81) and Pumps manufactured (22) in this project were done by the trained well diggers, Mason, area mechanics and pump manufacturer. Community members employed these trained and skilled entrepreneurs as individual household or community members (group of households). The cost varies with the expertise of entrepreneur, the competition in the area and also the type of customers to whom the services is rendered. For the 346 services/products which were reported from the four rounds of business progress surveys the average cost is as the table below:

Table 11 - Average price for services/products

Service /product	Average cost of different types of service / product (MKW)
Well sinking	16,091
Well lining	4,382
Well deepening	3,460
Pump Maintenance	2,493
Pump	54,313

The incremental approach is also evident here as most people during this first year have tended to either purchase a well digging service or a well deepening service for those who already owned a well than lining or installing a pump.

On average each entrepreneur has pre-orders from 5 customers (the highest has 8 customers and the lowest has 1) to be conducted in the next 6 months, ranging from well digging, well deepening, well lining and pump installation.

From the customer survey which the project conducted to 58 customers who either already bought one or more or are potential customers, they indicated that they intend to purchase the following services after the next harvest:

Table 12 - No. of products/services

Type of service/ product	No of service/ product
Well sinking	1
Well lining	44
Well deepening	12
Pump installation	34
Pump	34

The project has conducted 30 community meetings from the three T/As which were demand driven. In some cases the community sent representatives to enquire about the projects while others called the project office in Kasungu to go to their respective community and conduct a meeting. The project has currently received 25 more enquiries from different communities in Kasungu, a sign that the self-

supply approach is gaining ground and is evidence enough that there is demand from rural households/ communities to expand existing water supply provisions.

3. There is understanding and interest from households/ communities to invest in their own supply solutions even in the context where all existing supplies are very highly (totally) subsidised.

As mentioned above those sharing their supply are more dissatisfied. It matters greatly to families that they can access water when they want it, and without having to go any distance for it. ***The overwhelming driver for self-supply amongst existing and potential customers is convenience something subsidised/externally funded community supplies often fail to fully provide.*** For example if a family of 6 in most circumstances wants to have 27litres per person per day (which is the national minimum standard for water needs), they would have to take 7 trips both ways for water collection. In this environment only a household supply offers convenience. After taking out a wealth ranking we found the existing well owners are not necessarily the very wealthy, but are those who have begun to move up from being the poorest.

Community members purchased more than one service/product such that all the services couldn't equal to the number of customers. This indicates that some customers climbed two steps or three steps on the water ladder as some have deepened, lined and installed a pump on an already existing family well. This is also the evidence that households/ communities have the understanding and interest to invest in their own supply solutions even in the context where all existing supplies are very highly (totally) subsidized.

4. There are suitable and interested people to be trained to support this demand and develop the potential.

There are a large number of well diggers operating locally at village level whose services are affordable to most of the rural families in the areas they serve. Some well diggers just dig one or two wells a year to supplement their income, or to help a family member, while others regard themselves as more professional and gain most of their income from this activity, returning to farming only in the wet season when well digging is not possible anyway. Some turn to being a mechanic or small trader only in bad years when harvests have been poor and so demand for wells dies off. A casual well-digger may earn MK20-40,000 / year, a 'professional' (trained) one MK100-300,000 a year or more if he can also line the well. Over the past two years number of wells completed has varied by a factor of relating to harvest incomes. This affected the trade of trained well-diggers to pick up in the year of the project's implementation of Phase 2.

There is only one low cost pump manufacturer in Kasungu. He has a small workshop which limits the production of pumps, but can move to manufacturing more if demand grows sufficiently. Initially there had been no marketing of his products and he has only recently set up a demonstration pump outside the workshop to advertise his wares. This was under the first stage of support from the project and of publicising his products. At present he charges approximately MK60, 000.00 for a pump. After this publicity and marketing done by pump mechanics and diggers his business has picked up manufacturing 22 pumps between May 2015 and March 2016. He had only manufactured and sold 7 pumps between the same periods May 2014 to March 2015.

Kasungu is rich of entrepreneurs with different skills. There is a network of trained Area Mechanics which were trained by Inter Aide and District Water Office. In almost every T/A in Kasungu there are Area Mechanics who were trained in piston pumps (Afridev and Malda) who were also very willing to be trained in other technologies including low cost technologies. The project received calls from Area Mechanics from T/A Mwase, Lukwa, Kaphaizi, Mangwazu ,Mdunga, Santhe just to mention a few to be trained in Rope Pumps. This is an evidence that there are suitable and interested people to be trained to support this demand and develop the potential.

Self-supply entrepreneurs already exist with the foundation skills and attitude to develop and grow businesses with the right level of training and support.

5. District authorities and the private sector see a benefit in self-supply which leads to them promoting the services and products available, and adopting new ones.

As mentioned above the private sector is engaging, though at a low, nascent level. District authorities have shown interest in the project so far and have engaged and offered advice to our team in Kasungu. They have taken out a number of joint field visits with us and were key data collectors in the production of this report. It will be a key role of Pump Aid to nurture this enthusiasm and disseminate tangible results from this project.

Kasungu District Coordinating Team has been key to the promotion of the services and products. The DCT has been visiting our sites and giving advice and also chlorinating wells which have been installed by the entrepreneurs. There is a good working relationship between the entrepreneurs and the SHSA in the community as the HSAs are the ones who are chlorinating the installed well and also provide chlorine to the households who have dug wells. CDAs are also promoting the technology by advising their community members to own their own water point which they can contribute as a small community rather than waiting for Government and NGOs to provide them with conventional water points.

Other NGOs i.e. Evangelical Lutheran Development Services and CADECOM have referred their communities to Pump Aid for a low cost technologies since they have problem to access portable and safe water. Care Malawi organised a community meeting and invited Pump Aid to talk about the self-supply project. Water Development Office have also been referring people to project office.

This is evidence that District authorities and the private sector see a benefit in self-supply which leads to them promoting the services and products available, and adopting new ones.

But there is also need to explore more on how the private sector can be engaged and see a benefit in self-supply mainly the businesses that can support the low cost technologies on offer. Apart from safe and portable water there is also need to explore how small holder farmers can use the pole model for irrigation thus requires working hand in hand District Agricultural Development Office. The Agriculture Office should take responsibility in low cost irrigation techniques using the low cost pole model.

III: Challenges, Lessons and Opportunities

Lessons Learnt

- It is possible for people to have their own water supply using their own resources – initial findings tend towards confirming the hypothesis that “households are willing to own and use self-supply technologies”.
- Even at the limited scale related to this intervention, self-supply is making a significant contribution to access to improved water for hard to reach rural communities.
- The self supply approach is producing promising results in 3 areas of significant interest and potential
 - Individual households supply
 - Increased water for irrigation for small scale farmers
 - Securing water for CBM water points through increased M+M provided by entrepreneurs
- Some entrepreneurs are doing significantly better than others. This is because they have more capital, experience, drive and started from a higher base. However we will learn more as a result of further analysis of the business they have transacted to date, the order books, whether they have accessed significantly new customer base, whether the customers are willing and able to progress to the next level of improving their water source (and how many?), etc.
- Customers of water related services and products depend on income from farming proceeds to purchase a services and products.
- Even those entrepreneurs with some capital see (lack of) access to loans as a hindrance to growth of their business.
- At present business is seasonal - if loans to customers were available, business could be more spread throughout the year. The survey findings show that all of the entrepreneurs save money on a regular basis so could be linked to sources credit in the future. The development of VSLs are more embryonic and tend to lend mostly to women for “productive” purposes so linking customers to credit may take longer.
- However, the FEWS Net report: Livelihood Zones and Baseline Malawi (2005) suggests that 25% of the population in the Kasungu plains zone grow barely enough for six months and rely on labour for survival, 20% are in the top income and wealth bracket and the remaining 55% fall in the middle. This suggests that up to 75% could form a potential customer base.
- Many people are engaged in self-provisioning initiatives as evidence by 350 new shallow wells being dug each year using own resources and labour. This can be transformed into seeing self-supply and the WASH entrepreneurs as providers of goods and services in improving their water sources incrementally.
- The opportunity for linking self-supply to increased irrigation is strong. It does however require a shift of focus in outreach and marketing to appeal specifically to small scale farmers with an economic rationale for investment. Eg Investing abc MKW (in a pump and basic irrigation kit) will result in on average an increased yield of xyz, meaning the initial investment will pay for itself after x harvests.

- The relatively high number of services accessed by communities from Area Mechanics in particular suggests are able and willing to mobilise resources on their own for community owned water points if they see a need. So self-supply can also work in smaller communities too.
- Whilst entrepreneurs are making more income from their businesses, even with the doubling seen over the short life of this project (or the 12 months when they were practising after intervention support), there is a need to make businesses more profitable. Economies of scale will be required. To achieve economies of scale entrepreneurs will need to work with greater numbers of customers and over larger geographic areas. This will likely require and mean less lead entrepreneurs in a geographic area.
- Quality is a key concern to customers. Feedback from entrepreneurs has strongly indicated that the fact they have been officially trained has been a benefit when marketing their services.

Challenges

- The entrepreneurs have indicated very strongly that without loans, entrepreneurs will not be able to expand their businesses. The well diggers for instance do not have all the recommended tools for standardised well digging and both they and the area mechanics that mobility without a dependable bicycle is very difficult and a brake in reaching more potential customers.
- Business still remains seasonal and needs one full year/agricultural cycle to understand the seasonal nature of the demand and the businesses.
- Customers too find that lack of available credit constrains them from being able to invest in improving their access to water resources and limits them to investing after the harvest when they have disposable “surplus” income. They would like to be able to borrow and repay from farming and other income such as income from sale of vegetables.
- Another challenge is the “gestation period” for WASH entrepreneurs. From other self-supply studies the indication is that it is likely to be at least 24 months. During this period external support is required. How does one provide it after exiting from the research project?
- The entrepreneurs have challenges such as transportation to meet the customers on time, inadequate working tools/materials and lack of protective wear. Pump Aid can brainstorm on the ways of helping the entrepreneurs on these aspects so that they can work effectively and motivated to work hard in their businesses. Different ideas can be explored on this one, such as give them some working tools, protective wear or/and possibly a bicycle on loan or freely.

Overall conclusions

The Kasungu Context Report concluded:

- Overall there are indications at district and T/A level that there is potential for self-supply and also a need for new options to serve scattered households and the smaller communities.

- The selected T/As are very suitable for piloted introduction of a new approach because of the distances travelled to communal wells, desire for convenience and the 'relative wealth' of community members.
- Significant numbers of people have already invested in their own traditional supplies which is an indication of the level of self-provisioning and willingness to invest in increasing access to water supplies.

Results from the piloting of support to entrepreneurs and stimulation of demand has shown that:

Both entrepreneurs and Pump Aid staff have taken a step further to market Self Supply in the areas of project implementation. Water Products/services are advertised in community meetings (e.g. ADC and VDC meetings), traditional leaders' meetings, religious gatherings, road show campaigns, traditional centres, door to door and markets places among others.

Many communities are now informed about Self Supply and there is increasing demand for water services. Pump Aid Office has received even potential customers from outside the areas of project implementation seeking information and services of Self Supply. It is anticipated by the customer, as customer satisfaction surveys tells, that after the harvest customers are going to purchase more services/products .

Increasing of sales from quarter to quarter is a sign of significant progress for the project because if the entrepreneurs are making more sales then there is evidence that the project is making strides in making improvement in access to water in the district.

The training and support to 25 entrepreneurs and the active engagement of these entrepreneurs in business has led to new access to improved water for at least 7,000 people and has secured access to improved water for a further 12,000 in 3 Districts in Kasungu.

- There is a large potential (as yet latent) demand for self-supply looking at the preliminary analysis of supply and demand factors as well as the success of the marketing strategies in expanding the customer base. Many people are approaching Pump Aid and entrepreneurs with enquiries and some entrepreneurs have found business opportunities outside the three current T/As.
- Self-supply has significant potential in 3 market areas, which are themselves significant development challenges in Malawi.
 - Household water supply
 - Water for irrigation for small scale farmers
 - Securing water supply for CBM wells through Area Mechanics

Each of these markets offers potential for small scale entrepreneurs, but will require initial support.

This project has not measured the increase in people digging their own wells as a result of influence from the project. This could be a fruitful further area of analysis to assess the knock on impact of self-supply.

VI. Recommendations

Report Recommendations

- General recommendations for replicability and scalability
- Specific Recommendations for the Kasungu pilot project.
- Specific Recommendations for rapid scalability and replicability
 - *National Governments*
 - *Local Governments*
 - *NGOs*
 - *Financing Options*
 - *Technology*
 - *Supply Chain*
 - *Skills Gap*
 - *Conclusions*
- Self-supply experiences from other countries

Outline

Whilst the pilot has shown a great deal of interest and success from both households and district administrations, there is additional work to be undertaken to scale up this project from a pilot to a viable social enterprise. Overall there are three main areas which are currently not working sufficiently well enough to sustain Self-supply in Malawi as a long-term solution to water poverty. They are; a lack of clear and efficient governance at both national and local level, a lack of financing options for entrepreneurs to start or increase their business, and logistical obstacles such as supply chain issues and a skills and product gap. In this section, each of these areas will be analysed to show the current situation, what the ideal situation would be, and then recommendations of how to achieve the latter.

Recommendations: Self-Supply For Replicability / Scalability in Malawi.

Self-supply is a complementary approach to meet Malawi's rural water needs. Based on the work undertaken during our pilot project, self-supply, in basic and sometimes improved forms, already plays a significant role in people's access to water. Across Malawi, communities and individuals within these communities have dug and maintained their own wells and their own sanitation facilities since time immemorial.

The aim of a supported or accelerated 'self-supply' approach is to drastically improve the scope and quality of the facilities being installed and maintained. The ladder approach of incremental improvement based on investment by the user. This is the approach within this rather broad remit that this pilot project has taken is to promote self-supply through a small business approach. Stimulating market demand and upgrading the supply side, with an emphasis on equipping local entrepreneurs with the tools to establish financially sustainable businesses in the WASH sector.

As indicated in the findings section, three main self-supply markets emerged from the work of the pilot project:

- o Household water supply (potentially including HHWT)
- o Water for irrigation for small scale farmers
- o Securing water supply for community wells (community managed) through Area Mechanics

The focus for the first two markets is in increasing the actual number of water points, at individual household level and for small scale farmers. The focus of the third 'market' is about improving the maintenance of community water points through essentially a more professional service from Area Mechanics.

For the first two markets – increasing the quantity and quality of water points - the product to be invested in by the user needs to be affordable and reliable if it is to reach sizeable numbers of the population. To this end, the project focused on variations of the rope and washer pump, which is used in other successful self-supply countries and which has been successfully installed in over 4,000 communities (using a CBM approach) by Pump Aid since 2008. Rope and washer pumps work on shallow wells, can be manufactured locally, cheaply and is easily repaired.

I. General recommendations for replicability and scalability

- i. A key driver for self-supply uptake in the pilot project and from experience in other countries is convenience (see section 8). Bringing water (or sanitation) facilities to your door is a strong motivation for investment. A further significant factor is that of self-improvement or aspiration. Aspirational focussed marketing highlighting the convenience of products for individual households is a fundamental element of a self-supply approach. Additionally, quality of product is essential for confidence in purchase. These general principles of marketing products which people should want to buy and ensuring quality (customer confidence) need to be imbued in (prospective) entrepreneurs through training and mentoring, and should form a foundation stone of the approach by the organisation offering external support. To create and sustain demand, marketing must recognise factors of convenience, aspiration and quality.
- ii. Self-supply must always be pursued using dual track strategy: assessing and encouraging demand and supporting development of capacity to supply products and services. One without the other is a recipe for failure.
- iii. Increasing the number of water and sanitation products and services isn't only met by individuals paying artisans / businesses for a service. Promoting / encouraging local populations to dig their own wells, make basic improvements to sanitation facilities etc. that for example have been triggered by mobilisation by NGOs and the government using CLTS approach. This improves access to water / sanitation and most crucially it also acts as a basis for transforming these people into potential customers for WASH entrepreneurs. Digging one's own well is the first crucial step on the water ladder.
- iv. Support and coordination from local government level (ADC, DEC, DCT) is important to ensure self-supply has the best possible chance of taking root. The projects experience in Kasungu has highlighted a great deal of interest and enthusiasm from local government structures, including a willingness to engage and support where necessary and feasible, even suggesting advocating for government support to both entrepreneurs and customers in form of loans.

II. Specific Recommendations for the Kasungu pilot project.

Developing the Kasungu experience from introduction phase to sustainability. The crucial element of this pilot project – entrepreneurs putting into practise the approaches and techniques toward their businesses learnt from trainings and exploiting the support provided by Pump Aid has been

happening for less than 12 months. This is too little time to firmly state that these businesses are sustainable. Whilst essential 'pre-conditions' are in place (customer demand, available and willing artisans, ground water etc) the 25 entrepreneurs' businesses are still at very early and mixed stages of development. Experience from other countries shows that a time window of three to five years is a more realistic timescale to judge business success.

Through discussions with project stakeholders on how to embed the self-supply approach in Kasungu, the key message was focussed on ensuring entrepreneurs develop financially sustainable businesses.

1 Ongoing support to the bulk of small scale WASH entrepreneurs: mentoring, marketing, promoting an enabling environment. Continuing learning, improvement and consolidation will be needed for a period after exiting from the research project as a period of less than a year from training and becoming active as entrepreneurs is simply not long enough to see even the strong ones become established and expand their businesses.

2 A more intense package of support and development to those entrepreneurs who have shown strong progress over the past 12 months. This phase II support is outlined below under developing a sustainable business model. It is envisaged that these 'stronger' entrepreneurs will employ some of the other entrepreneurs, thus developing and expanding their businesses. This will contribute to economies of scale and improve likelihood of financial sustainability.

Over the next 12 months, Pump Aid will provide ongoing support to all the entrepreneurs at a basic level (opportunities for mentoring, low cost joint marketing, bringing the entrepreneurs together etc) to keep the initiative ticking over. However, to grow Self-supply in Kasungu, further investment is required along the lines mentioned above. Pump Aid is currently actively seeking funding for this.

Additionally, Pump Aid is supporting the pilot project pump manufacturer over the next 6 – 12 months to develop a small loan scheme arrangement with small scale farmers in order to increase options for irrigation. Pump Aid will not engage in the relationship between the pump manufacturer and the farmer, but we will offer the farmer support in sustainable agriculture techniques and monitor crop yields so that the benefits of irrigation can be publicised locally to attract more business to the pump manufacturer.

Discussed below are suggestions for the how to take self-supply to scale in Malawi.

III. Specific Recommendations for rapid scalability and replicability

i. Expanding Self supply initiatives in Malawi. Basic conditions:

On a general level, it is widely assumed that self-supply is particularly suited to smaller potentially isolated rural communities who are generally underserved in terms of access to improved water sources provided by government or NGOs.

Experiences from other countries show there are very rarely conditions which preclude self-supply. The question is what conditions and contexts can help to generate maximum impact for take up and establishment, which can then be expanded to scale.

The Rural Water Supply Network (RWSN) which has mapped and observed self-supply initiatives and experiences globally states 4 foundational pillars for an acceleration of self-supply;

- Policies which encourage individual initiatives
- Technology and technical advice for consumers
- A developed private sector
- Access to micro-credit or savings mechanisms

(Sutton, 2009)

In certain areas, because of the lack of availability of readily accessible ground water through shallow wells, options for technology become more limited, more expensive and will therefore prove more difficult circumstances for widespread coverage. Therefore, in order to provide the best chances of success for self-supply to take root it makes sense to focus on areas where certain conditions are in place. Where it is most likely to take root.

The following are conditions which were taken into account during the establishment of the pilot project;

- Accessible groundwater (so that rope and washer pumps can be used)
- Existence of private sector (well diggers, area mechanics and a pump manufacturer. The latter can be a mechanic of any sort, but will need basic metal fabricator equipment)
- Existence of 'family' hand dug wells.
- Reasonable levels of population density.
- Lower levels of communal well accessibility per head.
- Interested and supportive local government structures, including TA Chiefs.

The first two conditions are arguably the most important. The remaining conditions can be assessed on a scale of favourability. Such conditions are to be found across Malawi and as such there are no clear cut arguments as to why self-supply cannot take root in most areas of Malawi. The question is where to start, how and who should be involved.

ii. A model for rolling out Self-supply in other Districts across Malawi

The logical progression from pilot project District of Kasungu is into neighbouring Districts. This has a number of benefits;

- There may well be some awareness amongst potential customers of self-supply entrepreneurs / activities because of proximity.
- Similarity of context / conditions to the (successful) pilot project
- Existence of project capital (hard and software) which is easily transferrable to new areas.

The pilot project went through three main phases of implementation.

1, Context research

2, Selection, training, marketing relating to entrepreneurs and customers

3, Write up and dissemination of results.

Suggested roll out of self-supply into new areas / Districts:

1. Initial context research and gaining buy in from local structures.
Whilst it can seem a little academic to undertake detailed research in proposed project areas, this phase is crucial. Although the level of research need not be as detailed as undertaken in this project, it is still important to undertake it as it serves as an excellent opportunity to engage key local stakeholder, get their buy in and as an opportunity to begin the process of explaining to communities that self-supply is about user investment and not a 'gift' from an outside body. The research also acts as a baseline.

2. Selection and training for entrepreneurs as per pilot.
The number of entrepreneurs should be lower (per TA) in order to allow entrepreneurs greater opportunities for profitability.
More of the training should be carried out 'on site' by mobile training providers.
Business training content should be as hands on as possible and expectations in line with the nature and scale of the business and its potential market.
3. Mentoring scheme in place including options for entrepreneurs to meet and share experiences.
4. Structure for continual monitoring should be in place from day one. The nature of the monitoring needs to be agreed by implementing parties. For example should the focus be on the business growth element or the health impact of the improved access to services.
Funding for this needs to be appropriately allocated.
5. Phase 2 level of support for successful entrepreneurs in order to develop economies of scale and establish financial sustainability.

iii. Who is best placed to support the scalability of self-supply

Much water provision in Malawi is undertaken by (I)NGOs. Many coordinate with government structures and some don't. However, support to self-supply should not just be limited to (I)NGOs and government. In fact the role of (I)NGOs and government should be carefully defined for the outset. Whilst (I)NGOs in coordination with government provide much of the water facilities in rural Malawi, the vast majority of these are supplied free of charge with conditionality for the community on usage based on a water point management scheme.

Accelerating self-supply leading to upgraded and improved sources of water and sanitation requires a large degree of private sector involvement and investment. In order to be sustainable the artisan entrepreneurs and the supply chain need to react to and work within the parameters of the market. Direct or indirect subsidy can have the effect of either acting as an income replacement and thus the nature of the business and its reaction to the market become side-lined. Subsidy can also put other (non-subsidised) businesses, in the supply chain for example, out of business or reduce their profits to the point where they remove themselves from a specific market. In the long term this can harm the customer as once a subsidy ends (e.g. they are left with no suppliers).

On the other hand, the structure of the Malawian economy is such that for the majority of small scale entrepreneurs, accessing capital to allow for basic initial investment is exceptionally difficult. Inputs are relatively expensive and access to credit over and above small scale savings and loan schemes is also difficult and expensive. Malawi is not generally an economy that offers a great deal of opportunity to small scale businesses. In reality a model of accelerated self-supply going to scale will require substantive investment. This investment is likely to come primarily from the international donor community.

The key question then is how do non-profit agencies and the state support a market driven initiative without damaging its long term viability or adversely affecting other businesses. This pilot project did not offer subsidy to the spent a considerable amount of time assessing whether and what sort of subsidy could be offered without exacting damage on the market.

Based on experience from the pilot project the following are **Key areas for (I)NGO and Government support to self-supply initiatives.**

- As discussed below, government and (I)NGOs need to provide initial support and coordination to establish self-supply markets. In order to do this they need to talk to each other, plan and coordinate roll out. Numerous agencies will need to be involved in order to reach most areas of the country. Guidance and standards will need to be developed and monitored.
- Publicising and marketing the benefits of the self-supply approach nationally in order to stir interest, particularly from the private sector.
- Establishing an enabling local environment (in potential areas). Ensuring that initial sensitisation of target areas is undertaken and local government structures are supportive of the initiative.
- Establishing a framework for training provision stipulating minimum standards and providing funding for the initial training costs (NGO/donor).
- Technical Training brokers. Technical skills for entrepreneurs are vital. However, existing training providers are limited in number and expensive. Investment into organisations willing to establish mobile training facilities for well digging and pump building could increase capacity and reduce training costs.
- Business skills training. Facilitate and organise. Ensure that the training is practical in focus and undertaken in the field. The function of a Business Support within NGOs to be adequately resources and staffed by appropriately experienced persons.
- Marketing. Although entrepreneurs need to be responsible for their own local marketing, District and even national level marketing – newspapers, radio, roadshows, celeb endorsement - are initiatives to build awareness and establishment of self-supply.
- Monitoring and evaluation. Small business records will not be recording health outcomes of customers. It is essential that if NGOs or government are interested in measuring specific outputs or outcomes, that the necessary inputs to measure are funded and that they do not interfere with the everyday business of the entrepreneurs.

After addressing these as the key areas for concern, the following section outlines the current positions of each actor, followed by the ideal conditions for each, in order that Self-supply would best succeed in Malawi.

National Government

Current

- In general, the national government in Malawi do not officially recognise rope and washer pump as suitable technology to invest in as they want to see more significant improvements and bigger jumps up the water-ladder instantly.
- However, the government has acted on the pressing issue of water scarcity and, because of large gaps in access to water for rural communities and high non-functionality rates, the

Malawi Sector Innovation Plan (2013) looked at measures to maintain progress, and move towards the 98% coverage aimed for in 2025¹⁸. It proposes three solutions;

- Low cost drilling and private investment (Self supply) to recoup costs
- Increasing functionality by improved management and private sector involvement financed by water users.
- Improved quality of water through HWTS, especially chlorination and ceramics
- Whilst these proposals provide a loose framework, they do little to actively promote self-supply. Taking the example of the Ethiopian government, the GoM should consider developing specific targets for self-supply reach as part of a comprehensive WASH framework including implementation plan. The plan should be developed in conjunction with self-supply This should be supplemented by a Self-supply working group, led by the Ministry of Agriculture, Irrigation and Water Development to enhance sector coordination and implementation.
- The experience of Ethiopia is important here. In the Growth & Transformation Plan of Ethiopia specific sector targets are defined for improving access and services for WASH. A comprehensive implementation framework has been developed and endorsed, the One WASH National program, which guides all actors of the Ethiopian WASH sector in their collective efforts for implementation of WASH related activities towards the defined targets. Within the One WASH National Programme Self-supply is listed as an option additional to communal water supply to provide access to water for households or group of households. The approach is expected to fill gaps left by other service delivery models including community water supply, and provides one means to help achieve universal access to safe water. Major Self-supply acceleration programmes are underway in two regions, and other regions and programmes are picking up the approach now that it is included in national policies.

Ideal

- Ideally, the national government would create and promote a national policy framework which supports Self-supply and most importantly, supports the nation-wide roll-out of Self-supply.
- Different departments would work together to deliver a co-ordinated and holistic approach.
- The lead Ministry for self-supply is clearly the Ministry of Agriculture, Irrigation and Water Development. Within this Ministry, it is essential that the Agriculture, Irrigation and Development coordinate and collaborate around a joint implementation plan for self-supply.
 - In support of the recent Self-supply initiatives, UNICEF and WSP in collaboration with the MoWR, organised a national consultative workshop on Self-supply in Ethiopia in June 2008. The workshop was organised by a wide spectrum of sector policymakers and professionals from federal and regional government offices, private sector, development partners and international practitioners. This was a first step in exploring and pooling together local and international experiences. It also helped identify the key success factors of Self-supply and adapt it to the Ethiopian context. The starting point of the discussion was to agree on the basic definition of Self-supply, shown in Box 1 below and add clarity to it. The workshop also gave the opportunity for the Ethiopian government to officially confirm that Self-supply will be strongly pursued as one of the approaches to achieving the UAP target for safe water supply.¹⁹

¹⁸Malawi Water Sector Investment Plan MIWD 2013.

¹⁹ http://wedc.lboro.ac.uk/resources/conference/34/Workneh_P_LOCAL.pdf

- Standards of guidance should be introduced and circulated, including clear recognition of rope and washer technology as a form of improved access to water as a result of a significant amount of experience in the use and reliability of this pump.²⁰
- The experience of Ethiopia has shown that the attitude of sector professionals and local political leaders towards low cost options is critical. There are some anecdotal evidences here in Ethiopia and elsewhere in Africa that low cost options are seen as going backward. Their attitude needs to change favourably if the approach is to become more successful.²¹

Local Government

Current

- The projects experience in Kasungu has highlighted a great deal of interest and enthusiasm from local government structures, including a willingness to engage and support where necessary and feasible, even suggesting advocating for government support to both entrepreneurs and customers in form of loans.
- However, there is very little framework in place at local level to monitor and evaluation self-supply and the supply chain.
- There can be difficulties working with many different local leaders where there has been a history of tension or conflict.

Ideal

- The Self-supply option needs to be duly recognised as contributing to coverage targets of MDG and UAP provided it satisfies specific criteria that indicate acceptable water safety. This is to encourage and motivate sector professionals and local political leaders to support the option.²²
- As with the National Government previously mentioned, a national workshop would provide the opportunity for local government offices to identify the key success factors.²³
- The effective promotion of self-supply across Malawi requires proactive support from other Ministries. Crucially, the Ministry for Health. This can and should play a key role in self-supply promotion through for example, health extension workers promoting and advising on Self-supply in communities. Other ministries which may play a role at different stages of self-supply roll out are;
 - Local Government and Rural Development
 - Gender, Children, Disability and Social Welfare
- Promotion and advice through relevant ministry extension workers will be key. This is a strong learning from other countries who have successfully supported self-supply. It is important however, that this advice is consistently of a high quality.
- A self-supply working group as suggested above can act as a coordinating function for liaising between government Ministries, especially water and health.

²⁰ http://wedc.lboro.ac.uk/resources/books/Water_From_Sand_Rivers_-_Ch_07.pdf - page 103

²¹ http://wedc.lboro.ac.uk/resources/conference/34/Workneh_P_LOCAL.pdf - page 2

²² http://wedc.lboro.ac.uk/resources/conference/34/Workneh_P_LOCAL.pdf - page 2

²³ Ethiopia example

- But there are also functions for Departments which cover training and certification such as Industry and Trade and Education, Science and Technology.
- In the north of neighbouring Zambia, an SNV initiative has led to loans being provided by a state backed bank for customers to invest in sanitation. Primarily small-scale farmers linked to the local farmer's cooperative, which acts as a guarantor and only provides loans initially to those small-scale farmers with a solid track record of repaying fertilizer loans (SNV Zambia).

NGOs

Current

- Whilst on the theme of governance, NGOs also play a significant role in Malawi which needs to be addressed with regards to Self-supply. There are currently lots of different NGOs with different schemes and technologies all trying to be the most prominent.
- This becomes problematic when some models are undermining others. For example, when trying to scale-up self-supply, having another NGO provide the same service for free upholds aid dependency and goes against the self-supply model.
- NGOs are also highly involved in supplying water in many areas within Malawi and Self-supply does not fit with the common practices of building as many pumps as possible for the lowest cost.

Ideal

- A government backed access to credit scheme aimed at low level small businesses needs to be developed urgently. There are numerous global models for developing such schemes.
- International agencies such as UNICEF have global reach and access to expertise and as such should play a role in developing an appropriate scheme.
- There needs to be an overriding support for self-supply which prevents other NGOs from 'stepping on the toes' of those involved with the project. NGOs must be willing to change their strategy to either support self-supply or to allow self-supply to flourish without interjecting.

Financing Options

Current

- Current rates of interest and collateral required are beyond the abilities of all bar one of the entrepreneurs in our pilot project. Without access to affordable credit schemes, small scale WASH businesses will remain hostage to the budgets of donor and NGO budgets.
- The current popularity of Village Savings and Loans schemes is encouraging, but the size of loan available is usually far too small for the sorts of investments required by these WASH entrepreneurs. There is a potential that VSLs could be supported to provide larger loans through injections of collateral.

Ideal

- Access to Credit needs to be improved a great deal. Community credit schemes (VSLs) are useful for small scale short turn around loans for entrepreneurs. However, loans for longer term capital focussed investment are problematic. MFI's and commercial banks are simply not appropriate. The context of a trade grouping might offer a joint guarantee that could be attractive from a surety point of view to a commercial bank or MFI. Options for access to credit for entrepreneurs need to be found if their businesses are to expand and meet the (potential) demand for products and services indicated in this pilot project.
- Start-up kits (tools, protective clothing) and transport could be provided in loan form, as entrepreneurs progress through the project.

Technology

Current

- Rope and washer pumps are not currently recognised by the government as improved water sources for communities (for communal wells). Water quality testing undertaken by Pump Aid over the last three years shows protected community rope and washer pumps (Elephant pumps) have contamination levels as good or better than those of Afridev borehole mounted pumps, which are the most common communal pumps in Malawi and recognised by the government. This is important because the installation and maintenance of Elephant pumps is a potentially lucrative opportunity for self-supply entrepreneurs.

Ideal

- A national understanding of the water ladder theory is needed throughout levels of leadership, from governments to remote communities. It needs to be a more commonly known and accepted principle that technology must evolve and not simply jump from one extreme to the other. Whilst the ultimate goal is a clean, safe and piped water source, this cannot be instantly achieved. Therefore, any step, however small, up the water ladder should be encouraged.
- Rope and Washer pumps should be officially recognised as improved water sources for communities in line with water quality research that has been carried out by Pump Aid over a number of years.
- Improving access to credit for customers will allow for larger purchases which will lead to further movement up the water ladder with increased technology.
- This is also true for the entrepreneurs as they will be able to learn new technologies as the average population progresses up the water ladder.

Supply Chain

Current

- The current supply chain is weak in Malawi which prohibits entrepreneurs from being able to provide customers with the best possible service.
- There is a current lack of quality control on products which are being bought and sold in Malawi. This results in sometimes poor-quality items being sold to entrepreneurs which in turn devalues the quality of their own work.
- Often pumps are already fitted in areas where our entrepreneurs were working, however as these had been built by other NGOs, the spare parts were not easy to access in Malawi as the supply chain for these projects went through larger organisations who didn't need to source parts locally which makes it difficult for Self-supply to work efficiently.

Ideal

- Building on the potential for a trade group, another function in addition to quality control / assurance exists in the area of bulk buying discounts for commonly required inputs: Tools, protective clothing and cement. The prohibitive cost of these items acts as a barrier to entry and expansion for many entrepreneurs. Reducing costs through bulk purchase will allow entrepreneurs to make additional profit without market distortion.
- There needs to be more options for customers. For example, this could be in the form of a Product Catalogue. The existence of a catalogue allows potential customers at large marketing events to show customers the variety of options available. The catalogue has been used by a number of entrepreneurs. The pump manufacturer for example uses the catalogue both at his shop premises and also when visiting customers.

Skills Gap

Current

- Quality of workmanship and management of the scheme have a very critical bearing on water quality. Communities would be discouraged to use the Self-supply schemes if these issues are not properly addressed.²⁴
- As people are willing to invest their own money into a water supply, it is essential that it is well-built to prove that the investment was worthwhile.
- It is also important that entrepreneurs have a basic understanding of business and marketing principles in order to be able to correctly price up their work, and be able to plan for a more long-term approach. For example, a loss leader, where an entrepreneur would travel further at a cost to himself to build a pump, but would then receive job offers from neighbouring communities which would ultimately result in a profit.

Ideal

- Standards and guidance provide a framework of accountability for actors and importantly a degree of quality control and thus reassurance for the customer.

²⁴ http://wedc.lboro.ac.uk/resources/conference/34/Workneh_P_LOCAL.pdf - page 2

- Certification of training providers and certification of entrepreneurs should be explored as these will in theory provide a guarantee of quality and a level of confidence for the customer.
- Quality is a key driver for investment. Customers and entrepreneurs have reported that the fact that entrepreneurs can say they have been formally trained, increases their business and even allows for a small premium. Formalising the quality assurance and control aspects of the supply chain within self-supply would add to the potential for improved profitability and thus greater economies of scale. In this respect a formal trade grouping of WASH entrepreneurs, with government engagement is an opportunity to be explored. Branding for WASH entrepreneurs and quality assurance checks are two practical and relatively low-cost interventions.

Conclusions

In order to make Self-supply a successful social enterprise in Malawi it is necessary for there to be input and interest from governments at national and local level, NGOs and the private sector. When these three can see the benefits both of Self-supply and of the rope and washer pump, and invest their time into this scheme, then there is no reason why Self-supply cannot thrive in Malawi.

International Experiences of self-supply

Ethiopia

The Government of Ethiopia strongly recognises the importance and the role of a self-supply system operating with low cost technologies in accelerating progress to achieve the Growth and Transformation Plan / Universal Access Plan. A Self Supply Working Group, led by the MoWE was established to enhance sector coordination and implementation. National Guidelines for self supply were drafted by the Working group and endorsed by the MoWE in 2012.

Recently, two baseline studies have been undertaken in the regions of Oromia and SNNPR in order to gauge the performance of family wells and the opportunities and challenges inherent in developing a government backed Self Supply program in Ethiopia.²⁵

The key findings from the survey indicated that:

- Traditional wells can provide safe water, but often do not. During the wet season and with no protection 19% of traditional wells had low bacteriological levels, with this figure rising to 34% when simply measures were taking to improve the well.
- Much of the contamination of traditional wells is easy to prevent. None of the TW's surveyed were found to have protected headworks and the owners had little advice on simple measures of protection. However they were actively seeking technical advice and idea on what to do. Indicating that that the desire for self supply is there as well as the potential for meaningful aid.
- Family Wells were more reliable than many communal wells. 81% of family wells had provided water over the past 5 years compared with 56% of communal sources.
- Family wells are cost effective with capital investments in well ranging from as little as US\$ 10-40 compared with the cost of a communal well being 4 times greater.
- Incentive to build a well appears to be more important than wealth or education
- Family wells usually provide a free service to the community as their owners share the service with their neighbours
- Family Wells bring major advantage in increased food security, health, school attendance and better childcare to owners.

The report found six elements which were necessary to create a sufficient enabling environment for self-supply.

- Creating Demand through promotion
- Providing Technology options and advice
- Strengthening the private sector
- Establishing supportive financial systems
- Building facilitative government policies
- Monitoring progress and learning from research into new options and more effective impact.

²⁵ *International Experiences of Introducing Self Supply Acceleration, Dr Sally Sutton. Addis Ababa March 20th 2015. World Water Day, Govt of Ethiopia. www.rwsn.org.*

Mali

Over 50% of the rural based population (6 million) are served by family wells in Mali (see figure 1). It is estimated that there over 200,000 family wells in Mali were constructed by the people themselves representing over a total of US\$20 million invested at household level (Sutton, 2006).

- Ministry of Health is leading through primary health care services.
- District officers given Training of Trainer to pass on extensions workers
- Health posts provide social marketing of CLTS, HWTS and Self Supply as a household package, through model households and community health workers.
- Village revolving funds used by households to purchase HWTS equipment (storage buckets with taps)
- Technology levels limited by lack of inputs from Ministry of Water, but included in NWPI

Lessons Learnt in Mali:

Technical Issues:

- Further improvement of designs for well heads required. Current designs were deemed not cost effective.
- Requirement for proper monitoring of impact required. The information gained on monitoring could guide further marketing of the technologies.

Planning Issues:

- New constructions, pump maintenance and self-supply need to be combined.

Policy issues:

- The government of Mali has not developed a cut-off point for the self- supply technology acceptable to it.
- Equity issues need to be included in a policy in order not to leave out the disadvantaged.

Social and Financial issues:

- Water is shared freely among neighbours in Mali so maintenance costs lies solely on the owner of the well.
- The government and donors are still funding up to 60% of the cost of community supplies. There is need for stable sources of self-supply financing.

Nicaragua

- Self-financed shallow wells with rope pumps now provide 35% of rural water supply coverage.
- \$6 million invested in establishing Self supply resulted in \$100 million from productive use.
- Reaching a critical mass took 5 years, reaching full sustainability in 15.
- Most supplies provide domestic and irrigation water. They are only replaced when piped supply reaches into houses.

Uganda

- National Water Point Inventory found 10% of rural coverage (hand pumps and piped supplies) funded by private investment.
- Rainwater harvesting is also major form of Self-supply promoted by government.
- Private sector is well developed, district officers trained to give advice and monitor progress.
- However, it has been observed that there can be a reluctance amongst District Officers to include self-supply as it cut the size of their grants

Zambia

- WASHE committees at district level provide inter-disciplinary coordination

- WASHE activities including well protection are written into job description, training and budgets of district officers and extension workers.
- Introducing a new approach needs respected champions, but requires continuity of inputs.
- Improved traditional sources included as an acceptable service at household level, and in the national rural water strategy.

Conclusions

- Self-supply is a growing and powerful force, important for economic development.
- Each country works out its own strategy for Self-supply acceleration, but each can learn from others.
- Different Ministries can be involved in different stages of the process.
- It is essential for productive use and for improving food security.
- Reduces pressure on community water supplies.
- There is no quick fix and no silver bullet solution but an investment for long term sustainability; it takes time to become self-generating.
- Regardless of policies Self-supply is and will happen as it is based on demand of households and families who need water for their homes for domestic and productive use.
- It neither replaces nor challenges community supplies as it will only grow if there is a need.