

SUTTON &amp; HARVEY

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**40th WEDC International Conference, Loughborough, UK, 2017****LOCAL ACTION WITH INTERNATIONAL COOPERATION TO IMPROVE AND SUSTAIN WATER, SANITATION AND HYGIENE SERVICES****Making universal access to water affordable in Zambia and Zimbabwe***Sally Sutton (UK) & Peter Harvey***PAPER 2706**

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*As per capita costs of rural water supply escalate, and donor funding cannot keep pace, it will be necessary to look at alternative solutions to achieve universal access in sub-Saharan Africa. Leveraging funds from new sources and minimising costs to government may help to avoid a slow-down in progress to 2030. Results from UNICEF-funded reviews of Accelerated Self-supply in Zambia and Zimbabwe suggest Self-supply is an essential strategy to achieve universal access, especially in remote areas with low population density where many of the remaining unserved reside. Government must adopt complementary or hybrid strategies, incorporating Community Water Supply and Self-supply, if the SDG target of universal and equitable access to safe and affordable drinking water is to be met. Including self-financing in rural water supply strategies will require development of new affordable standards for smaller communities, but could save the two governments almost \$400,000,000, cutting the necessary budget by 35-40%.*

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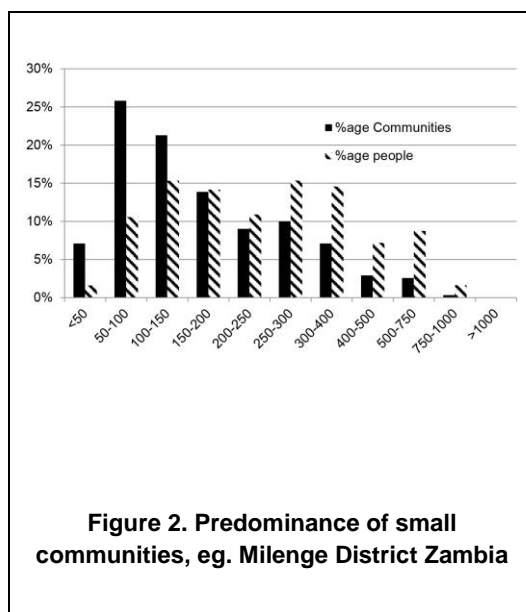
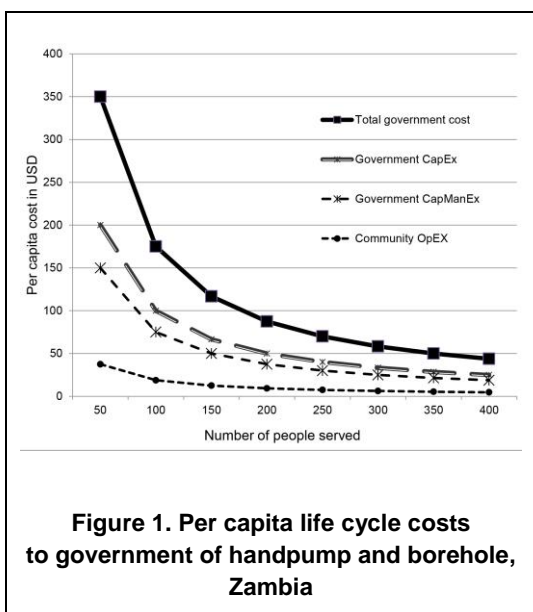
**Introduction**

According to OECD, donor funding to the WASH sector has doubled over the past 40 years (Atwood, 2012), but still remains grossly inadequate to reach the remaining unserved populations of Africa. The OECD report highlights the role of water in national development and adds: 'Delays in capital investment to improve access to water in rural areas of Africa can almost be viewed as tantamount to delays in Africa's adaptation to climate change.' IRC estimates that sector funding would need to increase by a factor of at least three to achieve SDG targets regionally (Rognerud et al., 2016), but does not consider the increased costs arising from the diminishing size and remoteness of the remaining unserved communities.

In 2015 UNICEF commissioned a review study (Olschewski, 2016) to look at options developed in Zimbabwe, and later in Zambia, to address the challenge of how to reach remaining unserved smaller communities in a fashion affordable both to government and families. Accelerating Self-supply has, in part, been achieved in Zimbabwe by enabling households to develop and progressively up-grade traditional family wells, until they reach an internationally accepted level of protected supply. This is a system that is widely available across the country, wherever groundwater is within 15-20m of the surface. It has been part of government strategy since 1995, starting as preventative healthcare through the Ministry of Health, but later included into rural water strategy and waterpoint inventories. It now contributes 21% of rural supply coverage (WHO/UNICEF, 2015a). In Zambia a similar system has been piloted in several parts of the country but is not yet embedded in government strategies or recent inventories. The review forming the basis of this paper, studied two districts in Zimbabwe and one in Zambia.

At present rural water coverage in Zambia and Zimbabwe (WHO/UNICEF, 2015a&b) lies at 51% and 67% respectively. Based on their respective national statistical projections (ZIMSTAT, 2015 and CSO, 2013), Zimbabwe and Zambia will need to provide access to improved water to some 15 million more rural people by 2030 (6.8 and 8.2 million respectively). During the last 25 years 4.6 million were reached, so rates of progress need to accelerate by almost six times to achieve universal coverage in the shorter period to 2030. Rates of progress in the past did not suffer so much from the problem of smaller communities and

isolated households, as most of those served were as large, or larger than, the design population of each handpump (nominally taken as 250 people). Figure 1 shows the effect on expenditure per head as community size decreases, and Figure 2 an example of the situation in Milenge District in Luapula Province, where more than half of communities are smaller than 150 people and user numbers already only average 120 per handpump. The sizeable proportion of communities of less than 150 people (>50%) is typical of the region, and illustrates the additional problems of ‘mopping up’ the remaining unserved communities which tend to be both more disparate and more remote. The population density in rural Zambia (12/km<sup>2</sup>) is less than half that in Zimbabwe (26/km<sup>2</sup>) and scattered housing is common in both countries.



If the effects of small community size are included in the cost of reaching universal coverage within 15 years, it appears that actual annual costs of providing community water supplies to 95% of the population rise by a factor nearer to ten times as much as in previous years for these two countries. As fewer people are covered by each new facility, if budgets remain much the same, rates of progress in coverage will necessarily slow significantly. Progress towards universal coverage can only be maintained if costs can be reduced or alternative sources of funding found (or both). One option is that of providing support to self-financed supply (Self-supply), of which many hundreds of thousands of examples exist, so that the water quality and technology level of supply can be improved and households propel themselves further up the water supply ladder. This is especially suitable for areas with relatively shallow groundwater, where shallow wells can be constructed as an initial step on the ladder. Such an option leverages funds from an alternative source (the household itself) to cover most or all the capital costs, but also implies the need for a more affordable standard of supply for small groups and isolated households. It is emphasized that stimulating more user investment does not take away all responsibility from government and so this paper looks at the implied costs to users and government but also the potential savings this would achieve for the public purse.

**User costs**

If users cover the capital costs their outlay depends on their resources and also on the level of protection, water lifting and storage they choose and can afford. From the UNICEF review studies in the two countries, rough estimates of cost in the two countries can be broken down into different elements which reflect the fact that not all the investment needs to be made at one time. Just as with building a house, most families will commit to the simplest elements first and then proceed as their priorities allow.

A house with concrete floor and zinc roof indicates proven capacity to raise sufficient funds for first steps in well construction. At its most basic this costs \$50-100 but to reach a level of protection satisfactory to authorities which accept covered hand-dug wells with appropriate wellhead protection from inflowing water and seepage, costs a minimum of around \$150-250 but can be achieved in stages (see Table 1).

Some countries now accept rope pumps as a level of service, (Ethiopia, Mozambique) but most require a conventional handpump. However, the cost of a handpump for community level supply is generally similar in cost to a small diesel/electric pump for domestic level supply, which is much preferred by most households. Very few people opt for a handpump as a solution for private investment.

For less than \$1,000 a household can end up with a basic piped supply into their house, with a shared outside tap for their neighbours. This does not need to be through a one-off payment but may be achieved by several progressive steps of \$100-200. However, these steps require support from government services and a well-skilled private sector and these take time and expense to establish.

<b>Table 1. Costs to households – progressive investment</b>	
<b>Supply item</b>	<b>Cost in \$US</b>
Well excavation	50-100
Wellhead protection	30-100
Well lining (brick) Well lining (concrete ring)	15-30, 200-400
Windlass	20-60
Rope pump/low cost	80-150
Diesel electric pump	350-500
Domestic elevated tank (0.5-2.5m <sup>3</sup> )	350-800

### **Costs to government**

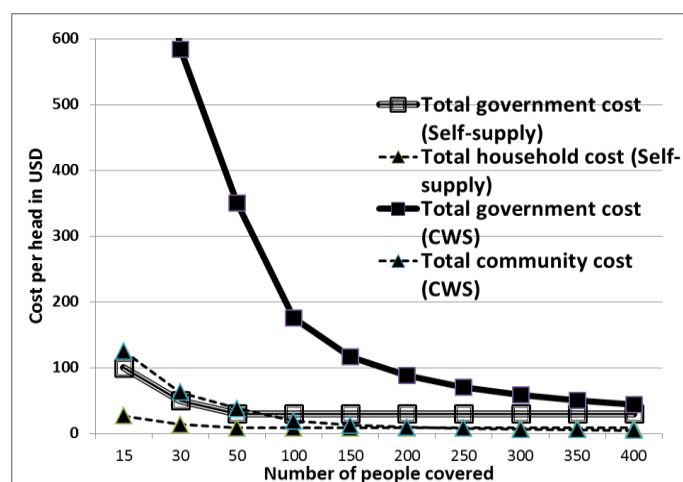
The responsibilities and costs to government in supporting and accelerating Self-supply, are very similar to those incurred through CLTS and other sanitation approaches which put the onus of capital investment on the household. The roles of government (Olschewski, 2016; Smits, 2015) shift towards software support (advice, training, promotion/marketing, microfinance, research, standards review, and monitoring) to accelerate up-take and up-grading. Such support constitutes an indirect subsidy to households which can be achieved partly by expanding the roles of existing extension services in a cost-effective fashion, and partly by empowering the private sector to play a greater part in providing services for water supply. As far as possible these support services have been integrated into the services already available for community supplies (maintenance and advisory systems, waterpoint inventories) in Zimbabwe, but the last piloting phase in Zambia developed the capacities of the private sector capacity more than those of local government, except in the area of social marketing and sanitary inspection. Thus, Zimbabwe is operating at national scale in its support to acceleration, but Zambia is still at a local piloting stage which is more expensive.

In terms of support service provision for accelerating Self-supply the initial cost of establishing the services is high, but even then, this compares favourably among low density populations with community-based alternatives. Over time the costs to government reduce as the private sector takes over marketing and development, and the market expands through neighbours seeing what others have achieved and deciding to copy them. Thus the initial set-up costs become divided between more and more beneficiaries/customers, and only a few recurrent costs remain. The main difference between the costs to government of community water supply (CWS) and Accelerated Self-supply are that the capital costs for the former must be replicated in each community whatever its size, whilst the latter involves only a blanket service provision which covers all households, with capital costs covered (mainly or completely) by householders themselves. Self-supply is therefore relatively independent of user numbers for each facility, and so particularly well-suited to small groups of houses.

Overall it can be seen that Accelerated Self-supply is a particularly cost-effective alternative for communities of less than 200 people (see Figure 3). For instance, average life-cycle costs for community water supply to a group of 80 people (some 12-15 households) average just over \$200 per head. In contrast, the most expensive phase of piloting Accelerated Self-supply in Zambia cost \$20-22 per head, and once

well-established, as in Zimbabwe, this falls to below \$10 per capita. Even in high-income countries governments have not managed to provide water to the smallest communities without resorting temporarily or permanently to supporting Self-supply initiatives, because of the huge disparity in costs.

Whilst Self-supply in its traditional form requires the household or group to cover all the costs, the subsidies governments provide in community water supply (unlike sanitation) are considerable; since communities usually provide cash contributions of 1% or less of the cost, and at most some 10% when payment in kind (labour and materials) are included, almost all the capital cost falls on government, providing a 90-99% subsidy to users. In Zimbabwe and Zambia this equates to around \$45-60 per head. To this must be added the indirect subsidy of support service (promotion, training of area pump mechanics and WASH committees, inventories/monitoring, and usually also pump replacement costs).



**Figure 3. Costs to government and households/ communities of community water supply (CWS) and self-supply**

### A question of subsidy

The question is often raised as to whether government should not provide an equal subsidy to Self-suppliers. But the whole reason that not all households are yet covered is because funds are inadequate to provide more than a certain number of facilities a year. Thus providing the same per capita subsidy for individual Self-supply households would mean even more delay in achieving full coverage. As a result, several countries are developing different policies for such small communities and even changing policy over time. The bigger the subsidy, the higher the level of technology that can be reached, but the greater the constraint on numbers.

In Zimbabwe, initially the Up-graded Family wells (UFW) Programme provided each family with some \$50-60 (Olschewski, 2016) in cement, windlass, and metal well cover but as this was shared between an average of 15-20 people the direct per capita subsidy was some \$3-4. The subsidy was removed by the year 2000, but the up-take of digging and up-grading family wells while slowing briefly, continued to expand. Indeed it increased more than four-fold in the subsequent ten years, reaching a total of over 180,000 up-graded family wells by 2010. During this period government support services were very limited, but pressure of demand for reliable and convenient supplies meant that the private sector grew to provide the necessary skills. However, without having reached a critical mass of well-trained service providers and replicable/affordable Self-supply facilities through direct and indirect subsidy, it is doubtful whether a spontaneous generation of the private sector would have occurred. Despite widespread grassroots demand it has still not done so in other countries of the region.

In Zambia, initial piloting was without any subsidy, but although interest was high, up-take proved limited until loan schemes were introduced. This allowed investment in well-protection and up-grading. Loan schemes in poor remote rural areas speed up up-take and allow people to reach higher levels of investment especially when harvests often do not coincide with most suitable times for work on supplies (low water

levels, no rainfall). This is effectively a subsidy which falls between direct and indirect as a form of revolving fund. However, such funds are difficult to administrate effectively over a long period without additional top-up funds, or absorption into larger micro-credit schemes for agriculture/ rural development. Schemes achieved high repayment levels when linked to community guarantors. Average loans were of \$125 but ranged up to \$250.

Developing on from the earlier results of Supported Self-supply in Zambia, the Ethiopian government has now instituted small group schemes (5 houses) which are 50% subsidised. Individual households can also avail themselves of the support services but must cover all the capital costs themselves.

### **Challenges for government**

In terms of cost-effectiveness there are certain challenges in putting Accelerated Self-supply alongside community water supply and certain barriers to its up-take.

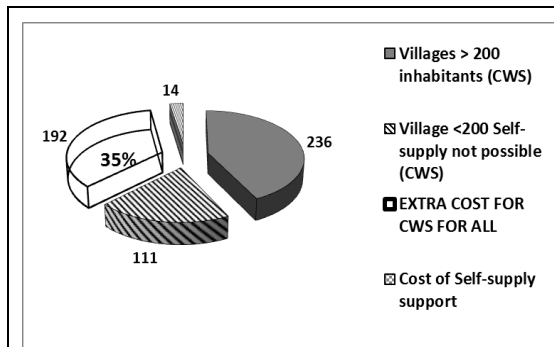
- Operational funds for government support services require a high level of cooperation between Ministries of Local Government and Health, since the latter will do much of the promotion and day-to-day monitoring of water safety.
- Outcomes from initial investment in developing support services are, unlike CLTS services, not likely to give immediate and definable results. The demand and need for it are obvious, but results are less predictable in the short term.
- Whilst CLTS impact is sometimes ephemeral, impact of Self-supply support tends to grow over time but slower in the initial stages until people become aware that they can actually improve their access to and quality of water supply.
- The support services developed are available to everyone but unless promotion and subsidies are very specifically targeted those in smaller and more remote communities may not be the ones given priority in up-take. Initially the biggest market for the private sector is usually peri-urban households with unreliable piped water.
- Self-supply support offers very limited opportunity for misuse of funds, which in some cases may lead to reluctance to adopt it as an option at higher levels. Conversely the low cost makes it possible for lower level administrative units (small rural district councils and chiefdoms) to make effective use of their small funds to generate real change with their constituents.

### **Savings to government**

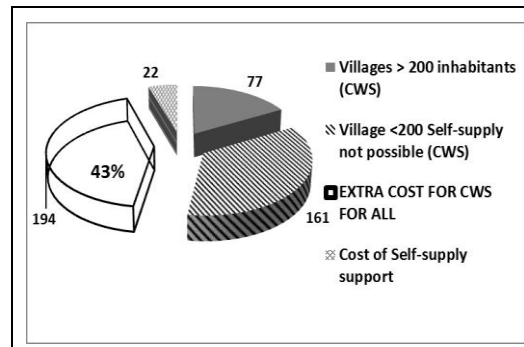
Taking all the above factors into account and the number of people who need to be reached by 2030, Accelerated Self-supply has the potential to save governments very significant sums of money and help to reach universal access in 13 years' time. This is not to suggest that Accelerated Self-supply should replace CWS, but that whilst support services would be available everywhere, promotion and any subsidies or incentives should be targeted at those which are hardest and most expensive to reach with CWS. This means concentrating the promotion of private investment through government services in those areas of dispersed and remote households, especially where they are in groups of less than 150 people. This is also the environment in which it is most expensive for the private sector to market its products and so needs to combine with the social marketing by the public sector. The most cost-effective solution in the two countries would appear to be a hybrid approach, in which:

- Communities of over 200 people will continue to be served by CWS unless they specifically opt for developing their own supplies (subsidised or not);
- Smaller communities without shallow groundwater will continue to be served by CWS; and
- Smaller communities with shallow groundwater will be encouraged to develop their own supply through the development of support services.

The provision of such support services to accelerate Self-supply can be seen to be a very small proportion of the total cost compared with all households being provided with CWS. In the two countries savings of between 35 and 43% (see Figure 4 and 5) can be achieved. However these support services will be available to everyone, so where CWS is inadequate, of poor quality, or unreliable, there may also be a considerable number of households who opt to develop their own auxiliary supply, filling other gaps CWS may leave.



**Figure 4. Zambia. Government costs to reach universal access with CWS (Total \$553 million) and savings with Self-supply. Costs in million US\$**



**Figure 5. Zimbabwe. Government costs to reach universal access with CWS (Total \$455 million) and savings with Self-supply. Costs in million US\$**

Information on community sizes is scarce at national level and generally limited to areas surveyed by specific projects. As the remaining unserved communities are the smaller ones, the baseline surveys in these two countries and also in Sierra Leone, Liberia, Malawi and Ethiopia suggest that whilst 20% of people live in these small communities, at least 30% of the unserved live in them. If these are covered primarily by Self-supply with appropriate support services, the potential savings from not having to provide for them with standard CWS for Zambia and Zimbabwe together will be approximately \$373 million or over a third of the total cost to government of employing community water supply alone, to cover smaller communities.

The ratio of household investment to government costs varies depending on the stage of scaling up support to Self-supply. In Zambia during the early phases of the introduction of support services and promotion of self-financing, the contribution of households was 65-75 cents for every US dollar of government funds. However in Zimbabwe, with well-established support services for Self-supply, long-term leverage rises to over 3USD for every dollar from the public sector. This should be contrasted with leveraging for CWS where community contributions seldom exceed 10%, or for every dollar from government, the community contributes 10 cents only.

### Lessons learnt

- Self-supply is a cost-effective auxiliary solution to community water supply, which will result in enormous savings in reaching small rural communities and scattered households. Even based on the highest rates of progress achieved so far, such communities will not be reached by 2030 unless alternatives to community water supply are considered.
- Governments must rapidly adapt water supply strategies to ensure that Self-supply is incorporated into long-term SDG planning. Zimbabwe shows that getting the concept absorbed into government strategy and family mentality takes time to develop to the most cost effective level. Supported Self-supply already contributes a third of rural coverage, but has potential to increase by the same amount again (21% of population is already using now but this could be nearer 40%).
- Piloting in Zambia has shown that there is enormous grass roots interest from households to improve their own water supplies but scaling up in other areas still requires major donor and NGO inputs. Whilst costs per head remain relatively high (\$20-25) such costs are still a fraction of those for community water supply, especially in the large areas of low density population.
- The resources of households provide a largely untapped resource in expanding access to safe water and given that the poorest households commonly use their neighbours' improved sources free-of-charge, Self-supply automatically leads to more equitable access to affordable drinking water.

### **Acknowledgements**

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