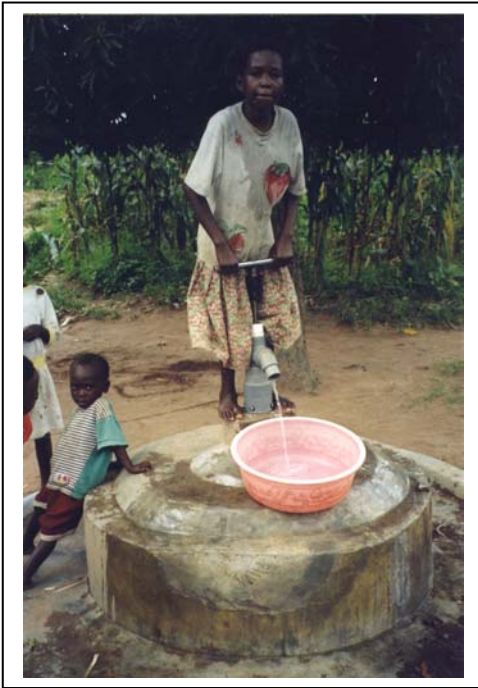


PRELIMINARY DESK STUDY OF POTENTIAL FOR SELF SUPPLY IN SUB-SAHARAN AFRICA



For WATERAID and the Rural
Water Supply Network
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By
Sally Sutton
SWL Consultants UK.



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ABBREVIATIONS

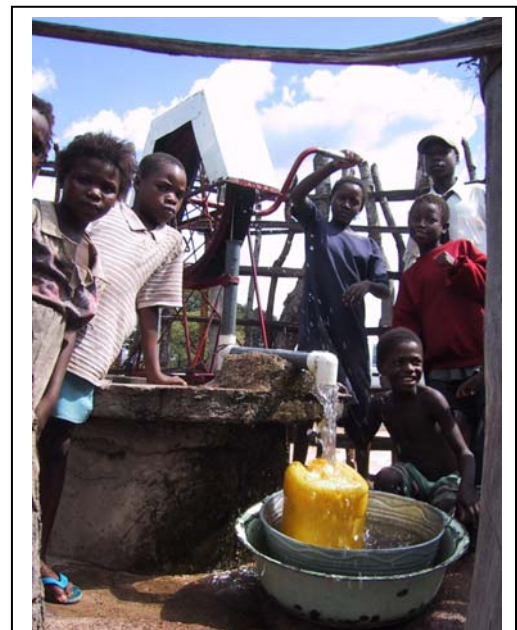
DHS	Demographic health Surveys
DNA	National Directorate for Water (Moçambique)
HDR	Human Development (Index) Ranking/ Report
HHWT	Household Water Treatment
INE	National Institute for Statistics (Moçambique)
MDG	Millennium Development Goal
MICS	Mixed Indicator Cluster Survey
NGO	Non-government Organisation
NSO	National Statistics Office (Malawi)
PRSP	Poverty reduction Strategy
QUIBB	Questionnaire on Basic Indicators of Well-Being (Living Conditions) (Moçambique)
RWS	Rural Water Supply
RWSN	Rural Water Supply Network
UNICEF	United Nations Fund for Children
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation
WSP	Water and Sanitation Program (World Bank)
WSS	Water Supply and Sanitation
DWD	Directorate for Water Development (Uganda)

1. INTRODUCTION TO SELF SUPPLY.

Most of those without access to improved water supply and sanitation (85%) live in rural areas. Typically, rural water supply strategies concentrate on communal supplies, for groups of 200 to 500 people, but many communities are widely scattered and population densities low. Every year thousands of householders and small groups invest in traditionally dug wells and scoopholes to provide convenient supplies which they manage and maintain themselves. Such sources number over 1 million in Africa alone. While many rural people value these sources for their convenience, taste, productive use, and especially the feeling of ownership, policymakers tend to regard them as a liability to be replaced, rather than improved or augmented.

Progress towards achieving the Millennium Development Goal (MDG) for water supply¹ has been slow in rural Africa. Despite a small increase in coverage, the number of rural people without access to safe water has increased in the last 10 years, and investment would need to double or even treble if the number of people without access to safe water is to be halved. Such increases in investment are unlikely, with bilateral aid to the sector having decreased since 1993, and rural water supply featuring very low in most countries' poverty reduction strategies.² This suggests that other strategies are needed to improve the situation, especially considering the fact that, even if the MDG were achieved, some 150 million rural poor would remain without access to safe water in 2015, and the likelihood is that this figure will be even higher. At present all efforts are geared to reaching MDGs without any thought of how to help those who fall outside the target groups. Lower levels of self supply would allow even these access to significantly improved supply, while the higher levels of progressive supply improvement will result in systems which appear no different to the far higher cost conventional systems now being promoted.

Self supply builds on the widespread desire of the rural poor to invest in solutions which benefit their small group or household directly, rather than as members of what are often scattered or discordant communities. Its components include improved availability of water from increased numbers of supplies (traditional source promotion, rainwater harvesting), improved water quality (source protection, improved water collection and storage practices, household water treatment), and improved water lifting for productive use. Self supply offers choice of technology, progressive upgrading, and replicability with little, if any, dependence on outside funds, enabling it to bring rapid and significant improvements to the lives of millions of people. It is complementary to communal supplies, allowing response to the communities which are too small to qualify for expensive protected supplies, and for those people in areas where groundwater is plentiful and most houses have their own convenient and 'personal' water source, which



Low cost source improvement and handpump. Total cost \$350, but just as protected as one costing \$3 500

¹ To halve, by 2015, the proportion of people without sustainable access to safe drinking water.

² For a scored assessment of developing country and donor progress in poverty reduction strategy papers see <http://www.panda.org/downloads/freshwater/csd12casescorecardreport.pdf>.

they are reluctant to abandon in favour of communal supplies over which they have no control and which are further from their homes.

Whilst self supply includes technologies for low cost source protection, water lifting, household water treatment, the main aspects are not hardware. Self supply promotes enabling policies and government and NGO support to households and small communities which wish to invest in their own supplies, and the provision of unbiased and simply presented information to allow families to select solutions appropriate to their own circumstances and preferences. It also includes the development of management skills for maintenance of the supply and of standards of hygiene practice around it, and the building up of local artisan skills and entrepreneurship to provide long-term back-up to households and the ability to replicate good quality affordable supplies whenever there is demand. It encourages step by step improvements so that people can decide on what level they can afford to reach (either on their own or with small subsidy), but within the context of future progressive improvements rather than a fixed horizon. The 60,000 or more source up-gradings which have been completed to date have proved both sustainable and popular with users, but still encounter political



Over 120 million people still drink from sources like this in sub-Saharan Africa.

Table 1. Some characteristics of conventional communal supplies vs. up-grading

Conventional communal systems	Self supply source up-grading
Best suited to nucleated, homogeneous communities, with good leadership	Suited to individual households and small groups
Technologies available for wide variety of conditions, greater flexibility in siting	Easily established where water is within 15 meters of surface or rainwater adequate
Focuses on outside knowledge and remote technologies	Builds on local knowledge, attitudes, and skills
Serves large numbers of people, who may or may not form a community	Serves households or small groups forming natural management units
Safety and quality of water usually assumed, not always correctly; perceived value among users may be less than assumed	Significant improvements in water quality, comparable to fully protected communal shallow wells but at much reduced cost; high perceived value among users
Generally marketed for health benefits; income generation often difficult because of communal ownership	Often generates multiple benefits including income, improved nutrition, and local employment
Depends on committee management which is not traditional and may take time to develop	Well-defined ownership and management by individual or well-established group
Provides good water within 0.5 to 1 kilometers, but households may have nearer alternative sources	Provides good water, usually within household boundary or within 100 meters
Requires large investment per unit, and very high subsidies (usually around 95 per cent; typically US\$15–30 per capita)	Low unit cost means that subsidy can be less than 50 per cent (Zimbabwe 20 per cent) (typically \$3–5 per capita)
Rapid construction, but construction teams not usually involved in maintenance unless with outside funding	Rapid small changes, slower process to reach final product, construction teams also do maintenance
Long-term maintenance is expensive, requiring heavy equipment and transport	Regular and long-term maintenance can be carried out by local artisans, including progressive re-deepening at low cost
Higher standards from the start but sustainability may be low	Gradual steps towards high standards, each bringing sustainable improvement
Often donor driven	Develops directly from local demand

resistance in many countries where they are regarded as retrogressive, rather than being appreciated as expanding choice and filling a gap which communal supply have so far proved unable to fill. Bringing together the disparate experiences of household level solutions to date and combining these with assessments of local and regional potential could help to change attitudes. Such an approach has been found to offer greater sustainability, and improved water quality, opportunity for growth of the rural economy and of individual households. It complements communal supply initiatives, and offers certain real advantages. The advantages for source up-grading are outlined in Table 1.



Simplest level of source improvement. Near to house for all uses. costs less than \$250

In terms of household water treatment, there are now numerous examples of the very high impact of chlorination or filtration on diarrhoeal disease in many different cultural and physical environments, and under emergency and development conditions, especially for most vulnerable groups. This turns on its head, the received wisdom of the past 20 years, promoted by Esrey³ et al, which suggests that water quality has much less influence on health than hygiene behaviour, water quantity for washing, and sanitation. The results of providing higher quality water alone or with hygiene education suggest that simply improving drinking water quality, particularly for under 5's appears to lead

to a significant reduction in diarrhoeal disease (up to 40%).

Household water treatment does not, on its own, contribute to MDGs, but reduces risks as a public health benefit. Paradoxically many of those taking up HHWT are in the group which is counted as 'served' in the global assessment, having access to piped water supply, underlining the fact that defining coverage by levels of technology includes false assumptions of 'safe water' being delivered by a particular technology, and that fulfilling MDGs as the objective discourages the promotion of progressive improvement for all.

2. FACTORS WHICH AFFECT POTENTIAL FOR SELF SUPPLY

A preliminary scoping study such as this has to rely on easily available information and indicators which may not be ideal. However existing work on self supply systems provides some indicators of those who would most benefit from the approach and where it would be most in demand.

2.1 Indicators for source up-grading potential .

2.1.1 **Water within 15 m of the surface** especially in slightly to well-consolidated ground. Many households opt to dig their own supplies in these conditions, and to deepen them successively when they go dry. Such sources usually therefore become progressively more reliable over time. They are however generally the most polluted type of groundwater supply. Surprisingly enough shallow scoopholes, where water is within 1.5m of the surface are usually the best since the small storage in them means high turn-over of water. Where ground is poorly consolidated, wells are not traditionally constructed, as lining is a foreign concept,

³ Health benefits from Improvements in water supply and sanitation. S.A. Esrey et al WASH report no. 66 July 1990

Interventions for the control of diarrhoeal disease in young children: Promotion of personal and domestic hygiene. R.G Feachem Bull WHO 62467-476 1984

but it can be undertaken at low cost using the same low cost rings as for normal protection but with the caisson method of installation, so allowing new areas with improved access to water. Generally hydrogeological maps show the areas where recent deposits contain groundwater with low dissolved solids.

2.1.2 High numbers of wells serving small groups of houses or individual families.

The establishment of wells to serve particular families (which are often then shared with neighbours) tends to be an 'infectious' practice, and is regarded as a sign of progress (especially as men then often feel able to draw water themselves, and also because it allows more productive water use). It does tend therefore to be concentrated among the better off, in poor communities, but there is generally a tradition of sharing the benefit with extended family/ neighbours.

The statistics for this are mostly indirect, being a combination of the proportion of people using unprotected shallow wells (see Table 1 col. 10) and the proportion who have a water supply within a short distance of the house (see col.11 Table 1.) (or average time spent on water collection). This helps to identify relevant rural areas. In towns peri-urban unlined wells are common but the contamination of aquifers by pit latrines generally makes household water treatment a safer option than source up-grading, except where household densities are low.

2.1.3 Low functioning of conventional systems.

This is both an indicator of reluctance or inability to maintain higher technology options, and often a stimulus to people to demand lower technology options they feel they can manage and afford. At present when people are asked to accept a particular option or even sometimes given a choice, the aspect of how other similar systems are operating in the same environment is seldom brought up, or honestly described. Where over one in three systems is not working (true for most of the region) smaller communities may be even less likely to be able to keep such systems operating than the larger communities which are generally the first to be targeted. However this would also depend on management efficiency and family-run systems generally operate better than community based ones.

Most countries have statistics on percentage of handpumps which are functioning, but not on what type of communities are most prone to let them fall into and remain in disrepair.

2.1.4 Population density

Those countries with lowest rural population density (see col. 5 Table 1) generally have the most problem in keeping conventional handpump supplies operational. The distance between systems for provision of maintenance back-up causes problems as do the distances communities must go to find spare parts. However density does not reflect the likelihood of small groups sharing a supply. This is as common in the dense populations of peri-urban areas as it is in areas of very sparse population, since census data does not give an idea of how scattered households are within a community, or if in low density areas people form conglomerations of households or prefer to live in isolated households (especially common in livestock-based rural economies). In the latter case distance or time to water is especially good as an indicator of whether people are sharing a supply or have developed their own.

2.2 Policy environment

2.2.2 Technology standards. Some governments have standardised on boreholes and handpumps, or may include shallow wells if with a handpump, others regard shallow wells with pulleys or windlasses as equally acceptable. 65% of sub-Saharan countries allow

rope and bucket as improved supplies⁴. Generally the countries with higher HDI ranking (see Table 1. col 8) are less likely to accept bucket and windlass supplies, but Moçambique is an anomaly in being low down the HDR scale but still only accepting handpumps, and at present only two types of these. On the other hand even though South Africa has a policy which does not accept the windlass level of supply, several of the remoter and poorer district councils have taken the pragmatic approach in accepting it. However since low cost pumps may be as cheap or cheaper to maintain, there are alternatives which households can afford to sustain where only handpumps are acceptable (rope pump, elephant pump, Canzee among others).

2.2.2 Technology choice. Most countries now are moving towards a demand driven approach and greater community consultation, partly as a result of their PRSP development and partly as a result of the de-centralisation process. This will eventually allow greater choice by users of the technologies and management systems they want to adopt, but at present they are generally fixed by government or donor policies. Mali allows communities to choose whether to up-grade what they have or go for a higher level of supply, and Zambia and Zimbabwe, Sierra Leone and Liberia all have acknowledged the high level of grass roots demand for up-grading alongside the demand for replacements, and have been able to carry out thousands of source improvements with owners as the lead player. The experience of these needs to be evaluated and the lessons learnt to be disseminated in a way that encourages other policy makers to look at the potential to incorporate it as an alternative where communal supplies are less sustainable under present economic conditions.

2.3 Indicators for household water treatment.

2.3.1 Type of supply. There is potential for contamination of water anywhere, but it may be assumed that for those with household connections that is a relatively low risk. All those obtain water from intermittent piped supplies, or who carry water to the house and store it, and those who buy from vendors, although the water comes from a piped and often treated supply, may be counted as served in statistical terms but are likely to have considerable risk from contamination. These are in addition to all those who are counted as taking water from unprotected sources. Less than 10% of urban households have house connections and only some 1% of rural ones.

2.3.2 Disease incidence and awareness of /priority given to risks. Water quality considerations for those without household connections may be regarded as a luxury which few can afford, but low cost treatment methods such as SODIS are offering significant risk reduction for vulnerable groups, especially in peri-urban and urban environments prone to cholera, dysentery and other diarrhoeal disease⁵. In these, emergency chlorination is already often practiced, but other more long-term alternatives are available, depending on whether the aquifer itself is contaminated or only the source.

Other household treatments such as those necessary for guinea worm eradication have been widely promoted and adopted, so if the necessity is acknowledged the behaviour change can follow. However it is in the rural environment such fine tuning of water quality is unlikely yet to be a high priority for people with so many other calls on their limited

⁴ Joe Narkevic WSP Country policies on water lifting devices. Paper given at RWSN Durban Forum June 2003

⁵ *"The Impact of the Safe Water System on Health in Rural Western Kenya"* Philip Makutsa Project Manager Nyanza Healthy Water Project, CDC-CARE Health Initiative

"The impact of a safe water system (SWS) on household water quality and diarrhea among persons with and without HIV in rural Uganda, John Ronald Lule, MB, Ch.B. Msc. MmedMedical Epidemiologist, CDC-Uganda

resources. It is more likely to be taken up by those already paying for water on a regular basis either from standposts or vendors.

Main indicators.

- Proportion without HH connections
- People taking water from vendors and standposts
- Those using unprotected sources in urban/rural environment

2.4 Indicators for rainwater harvesting.

2.4.1 Roof types. For household water supply, it is generally necessary (except in areas of highest rainfall) to have zinc or (inert) asbestos roof types, since their run-off ratio is four times that for grass roofs. This restricts the proportion of people who could install household-level rainwater harvesting. For instance in Kenya 67% of rural households have zinc-type roofs (DHS 2003) but in Moçambique less than 1% have roofs made of other materials than grass (QUIBB 2001).

2.4.2 Rainfall Using 400mm of annual rainfall as a guideline, most parts of sub-Saharan Africa can support some level of rainwater harvesting, although design needs to allow for variability and may not always be able to provide year-round saving from carrying bulk water from distant sources. However it can make a large difference both to reduce the period over which people have to go far for drinking water in areas of saline groundwater, and for bulk water transport where groundwater is scarce or very deep, so points of access are few and far between.

2.5 General indicators.

Using existing information from national, provincial and district statistics can help narrow down the areas where there is greatest potential, but there is then need to collect more local information to see where there may be demand for and capacity to establish household level solutions. Factors include -:

- Areas where people invest in own supply, and have the willingness to invest more
- Availability of local well-diggers who are receptive to and can promote new ideas, and traders who identify or create expanded markets for hardware, water treatment materials, pump spare parts, soap, improved storage vessels and for marketing agricultural produce etc.
- Areas where households undertake limited small scale irrigation and markets are developing and/or nutritional needs are recognised but not satisfied
- KAP relating to water quality of different sources and ways water is contaminated
- To afford household level water treatment means having a poor level of supply but relatively high disposable income, which is a commoner condition in urban or peri-urban areas.

3. AFRICA-WIDE POTENTIAL

3.1 Information Base.

Tables 1 and 2 present some initial data for identifying the countries where household level solutions may have most potential. It is probable that all countries have some potential, but it may be best to start piloting and advocacy first in those countries where most people may be able to benefit. Table 1 gives summary information and Table 2 the source data on types of supply for rural populations. The most recent information available is given, but coverage figures are notoriously poor, (as comparisons of MICS, DHS, census and Living Conditions surveys show), so figures are only indicative, and the fact that some

Table 1 Summary of main statistics for assessment. (ranked on numbers unserved and poorest HDI)

Country	Total population (CIA/UNICEF 2003)	Urban proportion 2001 (HDR 2002/ UNICEF 2003))	Rural number 2001 (HDR 2002)	Rural population density 2001	Rural water coverage 2002/3	Number of people without access	HDI ranking /177 countries HDR 2004	Ranking unserved and poorest	Numbers drinking from shallow wells and springs	% age <15mins to water	% age RW S functioning
Ethiopia	68,961,000	15.90%	57,996,201	51.4	11%	51,616,619	170	1	2,087,863	21%	n/a
DR Congo	51,201,000	31%	35,328,690	15.6	26%	26,143,231	168	2	16,675,142		40%
Mozambique	18,200,000	33.20%	12,157,600	15.5	26.8%	8,899,363	171	3	6,236,849	31%	65%
Mali	12,623,000	32%	8,583,640	7.0	33%	5,751,039	174	4	5,184,519	65%	65%
Sierra Leone	5,883,889	32.20%	3,989,277	55.6	21%	3,151,529	177	5	1,954,746		65%
Chad	8,348,000	25%	6,261,000	5.0	25%	4,695,750	167	6	3,643,902	27%	50%
Nigeria	120,911,000	44.80%	66,742,872	72.3	32%	45,385,153	151	7	23,626,977	45%	50%
Cote d'Ivoire	16,365,000	45%	9,000,750	28.3	35%	5,850,488	163	8	1,188,099	66%	<35%
Niger	11,544,000	22.00%	9,004,320	7.1	50%	4,502,160	176	9	n/a		65%
Madagascar	16,916,000	31%	11,672,040	20.1	34%	7,703,546	150	10	n/a		n/a
Kenya	31,639,000	34.30%	20,786,823	36.8	40%	12,472,094	148	11	2,473,632	43%	n/a
Liberia	3,317,000	46%	1,791,180	15.8	9%	1,629,974	160	11	n/a		10%
Zambia	10,698,000	39.80%	6,440,196	8.6	37%	4,057,323	164	11	2,344,231	50%	80%
Burkina Faso	12,300,000	17%	10,209,000	37.3	57%	4,389,870	175	14	n/a		75%
CAR	3,800,000	42%	2,204,000	3.5	34%	1,454,640	169	15	202,768		60%
Tanzania	35,920,000	33%	23,994,560	25.5	62%	9,117,933	162	16	4,414,999	26%	70%
Guinea	8,359,000	28.00%	6,018,480	24.5	41%	3,550,903	160	17			82%
Guinea Bissau	1,361,000	32.30%	921,397	25.4	49%	469,912	172	18	921,397	n/a	n/a
Malawi	11,651,000	15%	9,891,699	83.5	61%	3,857,763	165	18	3,877,546	28%	60%
Uganda	25,633,000	14.50%	21,916,215	91.9	55%	9,862,297	146	18	6,202,289	15%	70%
Benin	6,400,000	43%	3,648,000	32.4	51%	1,787,520	161	21	882,816	56%	81%
Cameroon	15,746,000	51%	7,715,540	16.3	42%	4,513,591	141	21	1,674,272	42%	n/a
Congo B	3,633,000	67%	1,198,890	3.5	17%	995,079	144	21			
Angola	13,184,000	34.80%	8,595,968	6.9	15%	7,306,573	166	24			
Rwanda	8,272,000	6.00%	7,775,680	311.7	67%	2,565,974	159	25			
Ghana	20,471,000	37.00%	12,896,730	56.1	55%	5,803,529	131	26			
Burundi	6,400,000	10%	5,760,000	224.6	78%	1,267,200	173	27			
Eritrea	3,991,000	20%	3,192,800	26.3	54%	1,455,917	156	27			
Mauritania	2,870,000	61%	1,119,300	1.1	44%	626,808	152	29			
Togo	4,801,000	35%	3,120,650	57.4	44%	1,760,047	143	29			
Senegal	10,580,000	48.10%	5,491,020	28.6	68%	1,757,126	157	31			
Zimbabwe	12,577,000	36.00%	8,049,280	20.6	73%	2,173,306	147	32			
Swaziland	1,100,000	27%	803,000	46.7	42%	465,740	137	33			
S Africa	44,759,000	57.60%	18,977,816	15.4	73%	5,124,010	119	34			
Gabon	1,300,000	83.00%	221,000	0.9	36%	141,440	122	35			
Gambia	1,400,000	32.00%	952,000	84.2	75%	238,000	155	36			
Equatorial Guinea	481,000	51%	235,690	8.4	42%	136,700	109	37			
Lesotho	1,800,000	30.00%	1,260,000	41.5	74%	327,600	145	38			
Namibia	1,961,000	32.00%	1,333,480	1.6	77%	306,700	126	39			
Sao Tome/ Principe	157,000	48.00%	81,640	85.0	72%	22,859	123	39			
Botswana	1,770,000	50%	885,000	3.8	90%	88,500	128	41			
Comoros	700,000	35%	455,000	209.7	95%	22,750	136	42			
Cape Verde	400,000	65%	140,000	34.7	89%	15,400	105	43			
Seychelles	80,832	65.00%	28,291	62.2	75%	7,073	35	43			
Mauritius	1,200,000	42%	696,000	376.2	100%	-	64	45			
									83,592,046		
			410,946,747								

Table 2. Rural water supply source types (selected countries).

Country	Total population (CIA/UNICEF 2003)	Numbers drinking from shallow wells and springs	Source types %ages Rural	Piped to house	Piped to yard	Standpipe	Borehole with pump	Protected well	Protected spring	Rainwater	Undifferentiated wells/springs	Unprotected spring/source	Unprotected well
Ethiopia	68,961,000	29,462,070	DHS 2000			5.30%		3.00%	5.20%			47.20%	3.60%
DR Congo	51,201,000	16,675,142	MICS/Census 95	0.10%		2.90%	1.50%	21.30%				41.90%	
Mozambique	18,200,000	6,236,849	QUIBB 2001			13.60%		12.50%					51%
Mali	12,623,000	5,184,519	DHS 2001	1.70%	(inc to yard)	15.50%		15.30%	inc yard	0.60%	5.50%		60.40%
Sierra Leone	5,883,889	1,954,746	Pilot Census 2003	(tap)	9%	12%				30%			
Chad	8,348,000	3,643,902	DHS 1997	0.20%			20.80%	0.50%		4.20%			58.20%
Nigeria	120,911,000	23,626,977	DHS 2003		2.30%	6.20%	20%	1.30%	2.10%			35.40%	14.20%
Cote d'Ivoire	16,365,000	1,188,099	MICS2000,DHS'98	3.90%	6.30%		28.80%	29.00%	2.10%	0.20%		4.40%	13.20%
Niger	11,544,000	n/a	DHS 1998	0.10%		7.80%	16.50%				69%		
Madagascar	16,916,000	n/a	DHS 1997	2.20%		2.40%		17.70%			26.10%		
Kenya	31,639,000	2,473,632	DHS 2003	3.80%	7.80%	6.80%		13.40%		2.50%	16.90%		11.90%
Liberia	3,317,000	n/a	n/a										
Zambia	10,698,000	2,344,231	DHS 2002	1.00%	1.30%	4.20%		24.70%		0.10%	2.10%		36.40%
Burkina Faso	12,300,000	n/a	DHS 1999		5.00%	52.00%	BH and modern well						
CAR	3,800,000	202,768	MICS 2000	0%	0.20%	4.60%	29%	7.40%	14.30%	0.10%		21.80%	9%
Tanzania	35,920,000	4,414,999	DHS 1999	1.00%	3.10%	18.20%	10.40%	18.50%	5.10%			8.20%	18.40%
Guinea	8,359,000		DHS 1999	0.20%	1.10%	2.90%	34.70%		3.30%	0.50%	13.60%	12.60%	
Guinea Bissau	1,361,000	921,397	MICS 2000	0.10%	0.20%	0.40%	17.90%	25.30%	5.20%				46.60%
Malawi	11,651,000	3,877,546	DHS 1996	0.40%	1.80%	10.60%		27.30%					39.20%
Uganda	25,633,000	6,202,289	DHS 2001	0.10%	0.10%	1.50%	26.60%	17.100%			9.40%		28.30%
Benin	6,400,000	882,816	DHS2001	1.60%	10.40%	18.10%	16.00%	5.50%	2.50%	8.00%			24.20%
Cameroon	15,746,000	1,674,272	MICS 2000	0.30%	0.50%	9.80%	10.50%	12.10%	6.20%	0.10%		19.40%	21.70%
Congo B	3,633,000												
Angola	13,184,000				0%	13.00%		27.00%					18%
Rwanda	8,272,000												
Ghana	20,471,000			15.70%			31.30%	6.90%		0.90%			8.100%
Burundi	6,400,000												
Eritrea	3,991,000				0.10%	18.10%		26.70%			17.20%		25.30%
Mauritania	2,870,000		10.60%		9.30%		24.00%				2.30%	47.00%	3.20%
Togo	4,801,000												
Senegal	10,580,000		7.30%		17.10%	5.90%				65%		65.20%	5.70%
Zimbabwe	12,577,000												
Swaziland	1,100,000												
S Africa	44,759,000												
Gabon	1,300,000			8.40%		10.80%	15.00%	1.60%				22.20%	4.80%
Gambia	1,400,000												
Equatorial Guinea	481,000												
Lesotho	1,800,000												
Namibia	1,961,000												
Sao Tome/ Principe	157,000												
Botswana	1,770,000				8.20%	17%	57.40%	7.90%					
Comoros	700,000												
Cape Verde	400,000					7.10%							
Seychelles	80,832												
Mauritius	1,200,000												

figures are over five years old is unlikely to have significant effect relative to ranking with other countries.

The order of listing for countries is based on a ranking that includes proportion and number of rural people without access to safe water and the Human Development Index ranking as an indicator of poverty. For the first twenty of these additional information has been collected, where available to help in assessing potential, according to the factors discussed above. Time was unfortunately not sufficient to go into more detail, or abstract information for all countries.

3.2 Countries with largest target population.

Whilst Ethiopia and Nigeria have by far the highest numbers of un-served rural poor, the contrast between them is marked. Ethiopia's rural poor depend very largely on springs and surface water, so that spring protection could benefit more than 20 million people, but not much reduce the time they take to collect water. Rainwater harvesting could augment supplies but would probably be constrained by roof type, so in many cases communal supplies would be the only alternative. However in Nigeria a high number of people (some 23 million) take water from traditional wells, and a high proportion (45%) have water close to their homes (see Summary Table 3). Although the two countries have similar numbers of unserved rural people, the potential in Nigeria would seem to be far higher for household level interventions (not least because the GNI per capita in Nigeria is three times that of Ethiopia).

Table 3. Countries with greatest potential for self supply from traditional wells

Country	Level of Coverage	Rural people drinking from traditional wells	People with water within 15 mins	Functioning systems
Nigeria	32%	23,626,977	45%	50%
DR Congo	26%	16,675,142		40%
Mozambique	26.8%	6,236,848	31%	65%
Uganda	55%	6,202,289	15%	70%
Mali	33%	5,184,519	65%	65%
Tanzania	62%	4,414,999	26%	70%
Chad	25%	3,643,902	27%	50%
Malawi	61%	2,670,759	28%	60%
Kenya	40%	2,473,632	43%	n/a
Zambia	37%	2,344,231	50%	80%
Ethiopia	11%	2,087,863	21%	n/a
Sierra Leone	21%	1,954,746		65%
Cameroon	42%	1,674,272	42%	n/a
Cote d'Ivoire	35%	1,188,099	66%	<35%

Zambia, Mali, Côte d'Ivoire and Benin all appear to have relatively large proportions of people with household or small group supplies which could be improved, a fact that is endorsed by those in the countries concerned. Liberia also depends very largely on family wells (both for urban and rural supplies as a result of the wars), and so do Sierra Leone and DR Congo, but the same wars also mean that the supporting statistical data is missing. Mozambique, Tanzania, Malawi, Uganda and Chad all have large numbers of people using traditional sources but distances to water which suggest that only specific areas of each country would have the potential for household-level solutions of up-grading. However in all cases the numbers of people who may benefit by being enabled to improve their own supplies (in a way that can be developed to be replicable, and responding to the demands and initiative of individual households) number more than a million per country, and in the case of Nigeria probably over 10 million.

4. BRIEF ASSESSMENT OF POTENTIAL IN FIVE FOCAL COUNTRIES NOMINATED BY WATERAID

4.1 Malawi

The country poverty assessment in the PRSP⁶ remarks on the high demand voiced by several of the consulted districts for rural water supply and sanitation, and consequently gives it a high priority within the pillars of rapid sustainable structural transformation and human capital development. However while the PRSP identifies the importance of rural water, and aims for 100% coverage, the 2003 review found that donor funds were not being released so less than 25% of the annual target for boreholes (3,800) had been constructed.

The DHS survey 2000 suggests a much higher proportion of rural people with access to protected sources (some 60%) than the earlier surveys which consistently put coverage at about 40-44%. Survey of pumps installed before 1997 showed only 33% working properly⁷ in a survey by GITEC, whilst overall government estimates are of 40% not working⁸. There are said to be some 17,000 handpumps in the country.

According to the DHS survey of 2000 some 2.7 million people take their drinking water from unprotected wells and a further 1.2 million from surface water sources. These are targeted to be covered by conventional protected supplies. Kasungu and Ntchisi districts appear to have the greatest need for improvements in water supply⁹, but the situation may have improved since the Living Conditions Survey of 1998.

Scope for Self Supply.

Government has standardised on Malawi made pumps, mainly on boreholes, so there is limited possibility to introduce lower cost options, although the WaterAid 2003 Evaluation summary does identify the lack of strategies for targeting the disadvantaged. Malawi is at present not contemplating lower cost strategies to ensure there is some improvement for all, as it plans full coverage by handpumps, mainly on boreholes and would therefore seem to be less suitable than others as a piloting country for Self Supply.

4.2 Moçambique.

4.2.1 Background information.

The PRSP for Moçambique emphasises both the need for improved water supply and sanitation in urban and rural areas and the need to reduce costs. The target was 40% by 2004, but present figures suggest that it is nearer 30% (QUIBB). Government figures of 38.2% in 2001 are based on 500 people per functioning water point which is a very high estimate.

QUIBB¹⁰ suggests that 50-75% of rural people take water from unprotected wells for drinking in Zambezia, Nampula, Niassa and Inhambane. Nampula, Niassa and Cabo Delgado especially have large areas where people make their own wells for domestic and productive use, with over 60% of people living less than 15 minutes from water. In

⁶ Malawi PRSP June 2002

⁷ Improving Community-based management of boreholes: Case Study from Malawi. Joseph de Gabriele March 2002.

⁸ Millennium Development Goals Feb 2002. Monterey Financing and Development Conference 2002

⁹ Living conditions survey NSO 1998

¹⁰ Questionario de Indicadores Basicos de Bem Estar, INE 2001, Moçambique

contrast people in Inhambane have to travel a long way to water, except along the coastal strip, and here rainwater harvesting is beginning to be practiced and could be more widely promoted (although roof types are not at present very suitable). QUIBB indicates that there are over 5.6 million people in the country using unprotected wells, and also a large part of the urban population with unsafe water. There appears to be potential therefore for source up-grading at family level, rainwater harvesting and household water treatment. Since around a third of people use surface water¹¹ for drinking, there may also be scope to see how to encourage a cultural shift towards their accepting groundwater as a safer alternative.

Whilst government standardises nationally on handpumps (principally the Afridev and Nira), the level of functioning is only some 65%¹² despite local manufacture of pumps and spare parts, and many efforts to set up maintenance groups and supply chains. The affordability of pump maintenance for many, or at least the priority they give to what may or may not be slightly cleaner water is therefore an issue.

Up-grading of family wells has previously been undertaken in Manica Province¹³, with the well-owners providing bricks and stones (for below water level) and paying a contribution to cement, lid, bucket and chain. Returning refugees copied the ideas from Zimbabwe. Returning miners also copy the rainwater harvesting technologies of South Africa for their houses especially in Inhambane province where ground water is deep and sometimes saline, and distances to drinking water can be as much as a day's walk.

4.2.2 Scope for Self Supply

WaterAid has already done much work in up-grading local artisan skills for water supply and sanitation, and has some experience of family as well as community-based management of water points. The background information above suggests a large potential for inclusion of self supply principles in terms of social and physical conditions, but at present the political climate is not very conducive to piloting, since DNA is not in favour of supporting initiatives below community level, nor technologies other than handpumps. The work that WaterAid is doing and that which CARE is starting in Cabo Delgado and Nampula may in combination help to change the situation, and both have many elements which will provide useful lessons for Self Supply. In addition some of the surveys being undertaken may provide better indication of potential and ways to develop a strategy in Mozambique. The introduction of low cost (rope) pumps to the country may also give the opportunity for greater acceptance of low cost wells within a policy which does not presently accept bucket and windlass systems for water lifting. WaterAid is already testing this with pumps from Madagascar, and CARE is planning to establish rope pump manufacture in Nampula so there is much to learn from what is already being done.

4.3 Uganda

4.3.1 Background information

Water supply and sanitation is now a priority program area since it has been more closely linked to poverty reduction through the participatory processes leading up to the PRSP¹⁴

¹¹ DHS Moçambique 1997

¹² DNA survey 2001. DNA Survey in 2003 show some 4% more operating, mainly through major rehabilitation programmes.

¹³ Building on peace- upgrading water and sanitation technology in Mozambique, Zvidzai Zana Waterlines vol 15, no 3, Jan 1997

¹⁴ Uganda PRSP March 2000

and PEAP. The actions identified by government¹⁵ as enabling the poor to access basic water and sanitation services include -: increasing private sector involvement in RWSS, developing appropriate technologies (and low cost technologies) especially to be used in rainwater harvesting, and increasing grassroots participation in planning, selection, construction and maintenance of preferred choices of WSS services. Government plans to reach 95-100% coverage of water supply and sanitation for rural areas by 2015 from a starting point coverage of 58% for water at present (2004), planned to rise to 65% by 2005. So far progress remains on target, but is judged on the basis of the number of supplies brought into production rather than the number operating or the number using them. Costs per unit appear to be rising and DWD estimates 30% of systems not functioning properly.

The DHS survey of 2001 suggests some 8 million rural people taking drinking water from unprotected wells and springs. Since then the proportion has fallen by a few percent because of new protected supplies, but the annual population growth rate means that the number remains approximately the same. The proportion of people within 15 minutes of water is low (15.4%) suggesting that supplies serving only small groups are fairly limited in extent, but the large number and density of rural people mean that even work in limited areas can benefit large numbers. WaterAid tends to concentrate on spring protection and shallow wells as technology options but the evaluation of 2000 indicated that even these options are often not accessible to the poorest villages and households who cannot afford the necessary contributions for co-financing. Lower cost solutions may be necessary.

The government 'water for production' strategy looks mainly at productive use from dams, and mainly for livestock, but wants to include small scale irrigation. Meanwhile health policies want to improve nutrition, both of which would fit well with the development of family level solutions, and encouragement for people to invest in their own supplies. The 'Build, Own and Operate' principle for the private sector could also apply at this level.

Water quality might also affect technology options. High fluoride levels are found in the Rift valley and in volcanic areas to the east (Mbale, Elgon, Moroto areas)¹⁶ suggesting that rainwater harvesting might need to provide an option to groundwater in some areas. Also the use of springs, even in urban areas, as well as open wells means that household water treatment could be appropriate, especially for vulnerable family members such as those with children under 2, the elderly and those who are HIV positive.

4.3.2 Scope for Self Supply.

This needs discussion with DWD and the country office. There would appear to be scope to encourage greater access to potable water in areas where groundwater is of poor quality or inaccessible, through rainwater harvesting, and to encourage the combined aspects of risk reduction through source improvement and productive use through easy access and improved lifting devices. However the distance to water data suggests that this would be possible only in quite limited areas, for household/ small group level supplies. A meeting with DWD/ policy makers has been planned for Dakar in November.

4.4 Tanzania

4.4.1 Background information

The PRSP (2001) gives high priority to rural water supply and plans an increase in RWS coverage from 48.5% in 2000 to 85% by 2010, including rehabilitation of malfunctioning

¹⁵ Poverty reduction and water access in sub-Saharan Africa. Uganda Case Study. E. Kapampara and D. Ssekiboobo. WaterAid and ODI June 2002

¹⁶ Groundwater quality Uganda. BGS/ WaterAid 2001

systems, promotion of rainwater harvesting , and needs assessment for different social groups, increased spending on RWS plus application of WHO water quality standards¹⁷.

This requires more than a 3% increase in coverage per year which is perhaps ambitious and does not allow for the likely need to cover smaller communities as coverage gets higher.

In 1999 the DHS survey suggested some 26.6% of the rural population (6.4 million) obtained their drinking water from unprotected wells and springs. The areas where sources supply only small groups cannot be identified from available data, but it is expected that people walk further to springs and share them among greater numbers. With only 25.5% of people within 15 minutes of their water supply, it would appear that areas where people have water close to the house are limited, confining source up-grading to specific parts of the country and linking to the government policy to try and develop rainwater harvesting for those far from water sources. These solutions also link to government aims for self reliance through adequate and safe water for domestic, livestock, industrial and other uses for the benefit of the entire population. This includes sector policies on cost sharing for rural areas, with management at the lowest possible level and health policies which include improved water quality control and source protection¹⁸.

4.4.2 Scope for Self Supply.

A evaluation carried out by WaterAid in 2002¹⁹ recommended that *'Where traditional sources may be expected to continue in use (i.e. where they are close by) technology choice must take this into account and consider the advisability of improving these sources'*. The evaluation further commented that *'It is assumed that similar solutions are appropriate to every community's demand for water. Differences in the relative importance of water quality, water quantity and distance to water are not considered. Systems are not presently used to their potential and WAMMA has perhaps reached a stage at which it can reconsider alternative technologies (including exploiting traditional sources) based on discussion of socio-economic considerations.*

In the assessment of demand and need more attention should be paid to the differences between communities and to the different types of requirement they may have. It was felt that more thought might be given on how to reach less advantaged communities'

The Country Representative identified two areas where she felt self supply principles might be particularly relevant *"We probably have potential to look at 'self supply' in two programmes, namely Singida (privately owned shallow wells often serving others in the community) and Kiteto (shallow wells and even small dams mainly for cattle). Our forthcoming Water Point Density Study in Kiteto (later in other districts) should start to give an idea on numbers who might best be 'self served"*

A previous report also mentions that a significant proportion of people in Singida District live in too scattered a pattern to benefit from communal supplies, but need some options as they don't qualify in numerical terms but wish to improve supplies and follow DRA²⁰.

¹⁷ Tanzania PRSP Oct. 2000.

¹⁸ Water Supply and Sanitation Sector Assessment WHO 2004.

¹⁹ Evaluation of Dodoma Regional Programme, WaterAid Nov 2002

²⁰ Assessment/analysis of number of water points in a village Singida project. Godfrey Mpangala Undated

4.5 Zambia

4.5.1 Background information

The Millennium Development Goals Progress Report for Zambia identifies an apparent 3% increase in coverage since 1990 (48-51%), but less in rural areas (37% in 1999 but it was said to be 44% in 1995). These results are based on 2000 Census and 2001/2 DHS survey. The MDG Target is 74% but this would take at least another 20 years at this rate of construction and functioning. The PRSP gives low priority to water and appears to concentrate more on the resource than the supply.

Nationally the DHS survey finds 39.5% of people with open unprotected wells, and although many of these are called public, they are in fact owned privately, but shared with neighbours. 57.7% of the total rural population of Luapula use unprotected wells or springs for drinking water and these are mostly of this type. The sharing with neighbours is reflected in the short median time to water (less than ten minutes) and the proportion walking for less than 15min to collect water (50% or over 3 million people). This indicates that a significant proportion of households have a supply close to the house, often a family well so-called because of its ownership by one family. (However, unlike those in Zimbabwe there is a tradition of sharing the benefit). Over 2.6 million people take drinking water from unprotected wells.

This type of well is commonest in the northern provinces (Luapula, Northern, North-western and Western Provinces). Here most of the wells serve small groups of households (averaging 50 people²¹), but in Western and North-western the tendency is to use scoopholes and springs since ground is generally poorly consolidated and so wells need expensive lining. Self supply principles have been applied to scoopholes and springs for more than ten years by the Ministry of Health, and over 1000 sources have been improved. The same principles have been applied also in Northern and Luapula provinces particularly through Ministry of Health and proved very popular with small groups who prefer them to communal supplies, even though the latter are higher technologies and might provide safer water, since they question the reliability and sustainability of the latter. Within the country as a whole over 1000 further traditional wells have been improved through the work of owners supported by some materials from government or donors.

The potential in Southern Province, where WaterAid is most active, is more limited, as sources are farther apart and shared with more households generally, but even in the district with highest coverage (Monze) WaterAid surveys show large numbers of traditional sources are still in use (over 1400 still used for drinking, where coverage is 170% @200/protected supply). Over a wide part of the country people prefer the taste of water from traditional sources, and/or find them more convenient as they are closer than protected sources. Other districts with shallow water tables (Itezhi Tezhi and Kazangula) offer possibilities for traditional source improvement, while those with very deep and often saline water (Gwembe and Siavonga) could benefit from more rainwater harvesting to reduce distance for water collection for at least part of the year, although buildings other than institutions tend to have poor roofs for this. WaterAid concentrates at present principally on hand-dug well technology with windlasses for water-lifting.

Surveys of functioning of handpumps by DWASHE committees show high proportions functioning in 2001 in districts with UNICEF and WaterAid support (80-95%), but lower levels of functioning are common in other parts of the country especially the North where handpumps are less common.

4.5.2 Areas of greatest potential for Self Supply with WaterAid:-

²¹ Community led Improvements of rural drinking water supplies. Final Report KAR 7128. DFID Research. Sept 2002 Sally Sutton

Western parts of Southern Province and most of Western Province for source up-grading (scoop-holes, traditional wells).

Rainwater harvesting (but probably not for whole year as rainfall low and unreliable) in southern parts of S Province.

Household water treatment in peri-urban areas of all larger towns where supplies are intermittent or costs discourage people from using piped supply. Treatment could be SODIS (use of old Coca Cola bottles or similar) rather than higher cost alternatives (chlorination, silver /ceramic filters).

NB Government RWS strategy recognises household level initiatives as an option.

4.6 Conclusion.

The countries for looking in greater depth at potential first would appear to be Tanzania and Uganda, with lessons to be learnt from Mozambique and possibly Zambia. Zambia offers opportunities for greater application of Self Supply principles which already have some acceptance by government especially through the Ministry of Health which promotes it as a risk reduction strategy in primary health care.