

4 Methodology

4.1 Basis for the investigation

4.1.1 Data gathering

A combination of methods was adopted to gather information regarding the effectiveness of the different exit strategies adopted and the factors, which appear to most influence their success.

The main process was an open enquiry of the community and key informants followed by semi structured interviews. Open enquiry allows the community to set the agenda, and to mention the factors which according to their perceptions are important to the sustainability of the water supply. The methods involved key informant interviews, site visits and observations, interviews with water-point users in each of the sampled communities and a review of secondary data involving project documents and pertinent literature.

4.1.2 Analysis

As stated above, the main approach adopted was to capture the perceptions of community members regarding the development, use, management and performance of their pumps. These open enquiry perceptions were used to form the conceptual construct of the proceeding enquiry. These issues provided the structure for the continuing data collection, i.e. a semi structured interview process.

The data from the pump user and key informant interviews, and observations were coded and entered into computer software for analysis. Given the nature of the data, non-parametric tests were applied to identify possible relationships, i.e. Mann-Whitney test for differences, and Spearman's correlations.

Significance. Throughout the text the word significant is used in the statistical sense. There was a greater than 95% confidence that there was a difference between the two samples. Where the data suggests a particular link between two samples but this is not statistically significant the text uses the phrase "the data tends to suggest". In order to keep the text easy to read, the report avoids putting the p values of the significance in the text as recommended in academic reports.

4.1.3 Verification

Initial findings were also discussed with the project holders to further explore and verify that the issues pertinent to the users were also the main concerns of the key players. A workshop was held, initially with the project partners and later opened to other agencies in Mozambique. The workshop discussed the issues surrounding sustainable water supplies and verified the data generated by the local communities. A wider verification of the issues was achieved by presentation of interim findings at the WEDC annual conference in Ethiopia and distributing a questionnaire among practitioners at the conference.

4.2 Sample

4.2.1 Sample Size

The following calculations were applied to determine the minimum sample size. These were taken from the World Health Organisation's (WHO) manual for determining sample size (WHO, 1987:2-3).

Minimum sample size for estimating population proportion with absolute precision.

$$n = z^2_{1-\alpha}p(1-p)/d^2$$

where:

$1-\alpha$	p	= 50%	(assumed proportion of population)
z		= 95%	(degree of confidence)
d		= 10%	(degree of absolute precision)
n		= ?	(Minimum sample size)

n = 96 Minimum sample required in the case of a simple random sample.

$n(2)$ = 192 Minimum recommended sample to allow for the design effect of cluster sampling.

Actual sample used = 96(3) The design effect used was "3" in order to help the issue of greater representative ness.

= 288 (1.1) Additional 10% to allow for sampling problems

= 316

4.2.2 Sampling Process

A random stratified cluster sampling process was used to identify the sample of pump users. This approach was used given the lack of reliable census data and the recent population movements within the areas surveyed.

The clusters were the communities dependent on pumps installed by the programmes under study but now independent of further agency support. The selection of the clusters was divided evenly between the three agencies and further divided evenly between three of the regions in which each programme was or had worked. I.e. 16 pumps were selected from each programme, 5 from each of the 3 randomly selected districts. In the case of the CARE programme only two districts were visited due to the condition of the roads not permitting access to the most isolated region. In this instance two subsets of 7 and 8 clusters each was selected. The clusters were selected at random from the respective agencies records. Given that some of the World Relief sites were more isolated than the Care ones, the lack of isolated Care sites was not considered significant.

The sample unit was an adult member (over 18 years of age) of selected community dependent on a pump installed by one of the three programmes under study. In each selected cluster approximately 7 member were randomly sampled.

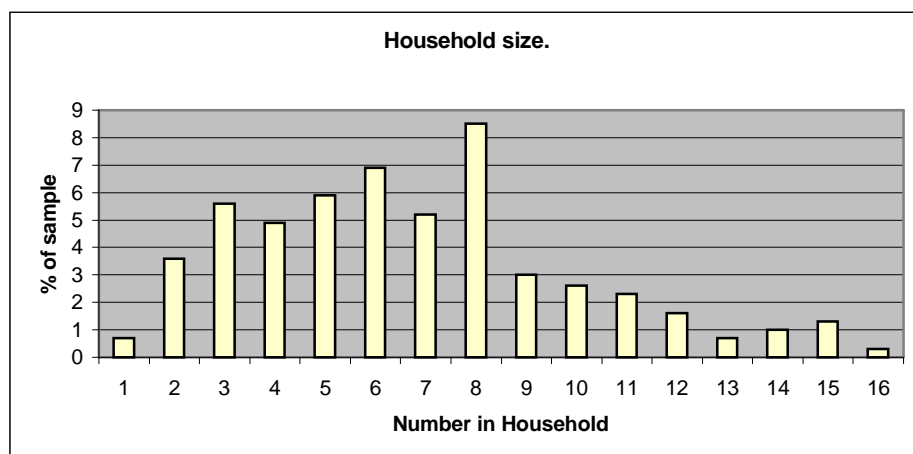
4.2.3 Description of acquired sample

In all 305 usable sets of data were collected from 47 communities or clusters. The description of this sample is presented in the following Table 1 :

Table 1 Sample Descriptors

Description	% of valid responses
Gender	
Male	49.3
Female	50.7
Age	
<30	19.1
30 to 50	49.0
50>	31.9
Position	
Chief	6.9
Water committee member	10.1
Pump mechanic	7.5
No position	74.7
Proximity to pump	
< 1 kilometre	74.7
1 kilometre >	25.3
Settlement	
Respondents settled due to pump	14.2
Others settled due to pump	35.8

Figure 1 Household size.



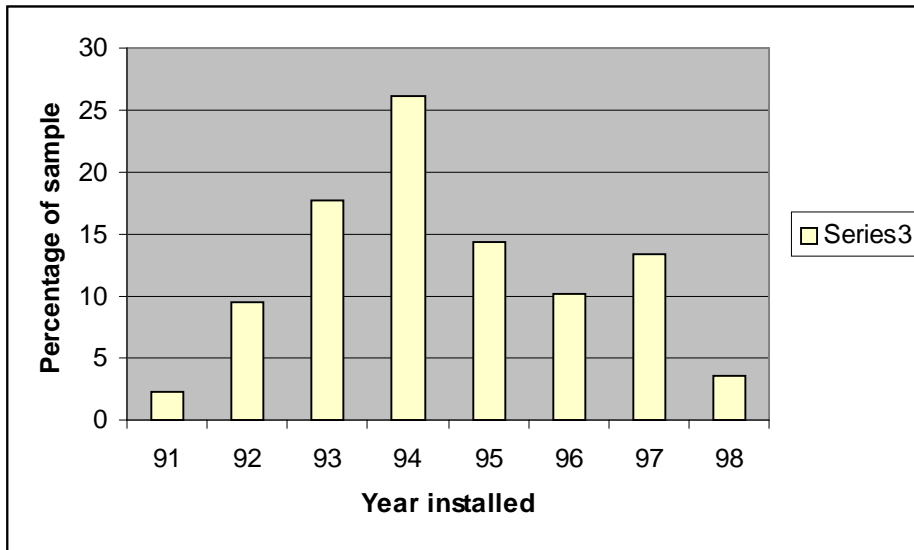
The following gives the basic description of the pumps

Table 2 Pump Descriptors

Description	% of sampled pumps
Depth of pump	
Set <30metres	42.5
Date of installation	
<1995	59.0
Emergency installations	83.0
Type of pump	
Volanta	10.6
Afridev	83.0
Other	6.4
Non operational at time of visit	21.2
Distance from Agency op's centre	
<50 Km	21.3
50 to 100	55.3
100 to 150	10.6
151 to 200	4.3
200>	8.5

Of the pumps investigated, 83% were described by the agency as being installed in emergency or rehabilitation conditions. The other 18% were installed post emergency and would be described as being installed in the “development” phase of their work. In practice this gave a wide spread of years that the pump had been installed. .

Figure 2 Year of pump installation



In approximately one third of the pumps the depth of the water was less than 20m, a third between 20m and 40m, and the remaining third over 40m. 76% were new boreholes by the agency while the remaining were reconditioned. 83% had the Afridev pump installed, while 10% had the Volanta and 6% had the Nadia. 80% were due to the drought or emergency and the remainder were post drought and part of a development process.

The valid percentages for each variable are available in Appendix (11)