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**WATER, SANITATION AND HYGIENE:
SUSTAINABLE DEVELOPMENT AND MULTISECTORAL APPROACHES**

Sustainability factors for water points in Liberia

L. Rudge & E. Bosch, UK

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As part of a WaSH Consortium in Liberia, Action contre la Faim carried out an exhaustive survey of water points in three counties of Liberia. Besides serving as a baseline of information in post-war Liberia, and thus filling a gap of information, the results of the survey highlight the link between the creation of community-based operation and maintenance systems, including access to spare parts for hand pumps, and the sustainability of the water points. The difference amongst counties is significant, and the water coverage could be improved through improving these sustainability mechanisms, and choosing the appropriate mechanism according to the village and town size, and cohesion of the community. Stakeholders have a clear responsibility in constructing technically sustainable water points, but also ensuring the operation and maintenance systems are in place. The survey shows that the improvement of sustainability mechanisms on already existing infrastructure could provide drinking water for 234,000 people.

The Government of Liberia, elected in 2006, sets the objective of 50% coverage of water points by 2011, which is halving the current population with no access to a safe drinking water supply in its Poverty Reduction Strategy¹. Logically, increasing the number of water points are part of the activities for achieving this objective. It is well known that “the Millennium Development Goals will never be met if money continues to be spent on infrastructure and projects and within a short period the benefit is lost through a lack of sustainability” (House, 2007). It is therefore significant that the PRS also sets out to invest in 200 hand pump spare parts depots, in all fifteen counties, and will support the establishment and strengthening of WATSAN committees (PRS, 2008).

Reaching these goals means building partnerships between all stakeholders. In 2007, the Liberia WASH consortium was formed by five INGOs – Action contre la Faim, Concern Worldwide, Oxfam GB, Solidarités and Tearfund – after consultation with the Government of Liberia (GoL) and DFID. The aim of the Consortium is to improve the efficiency of the five INGO WaSH activities and to support and reinforce the development of the Liberian WaSH sector.

The water and sanitation responses in Liberia, have largely been emergency responses providing water in IDP camps during the conflict period, and providing water points in areas where people re-settled after the peace agreement signed in 2003. Whilst establishing a three-year strategy for the Consortium in 2007, the lack of baseline information on water coverage in the country, and per county was highlighted. Basic information such as demographic data, population locations, number of points and their location, sanitation infrastructure were not available.

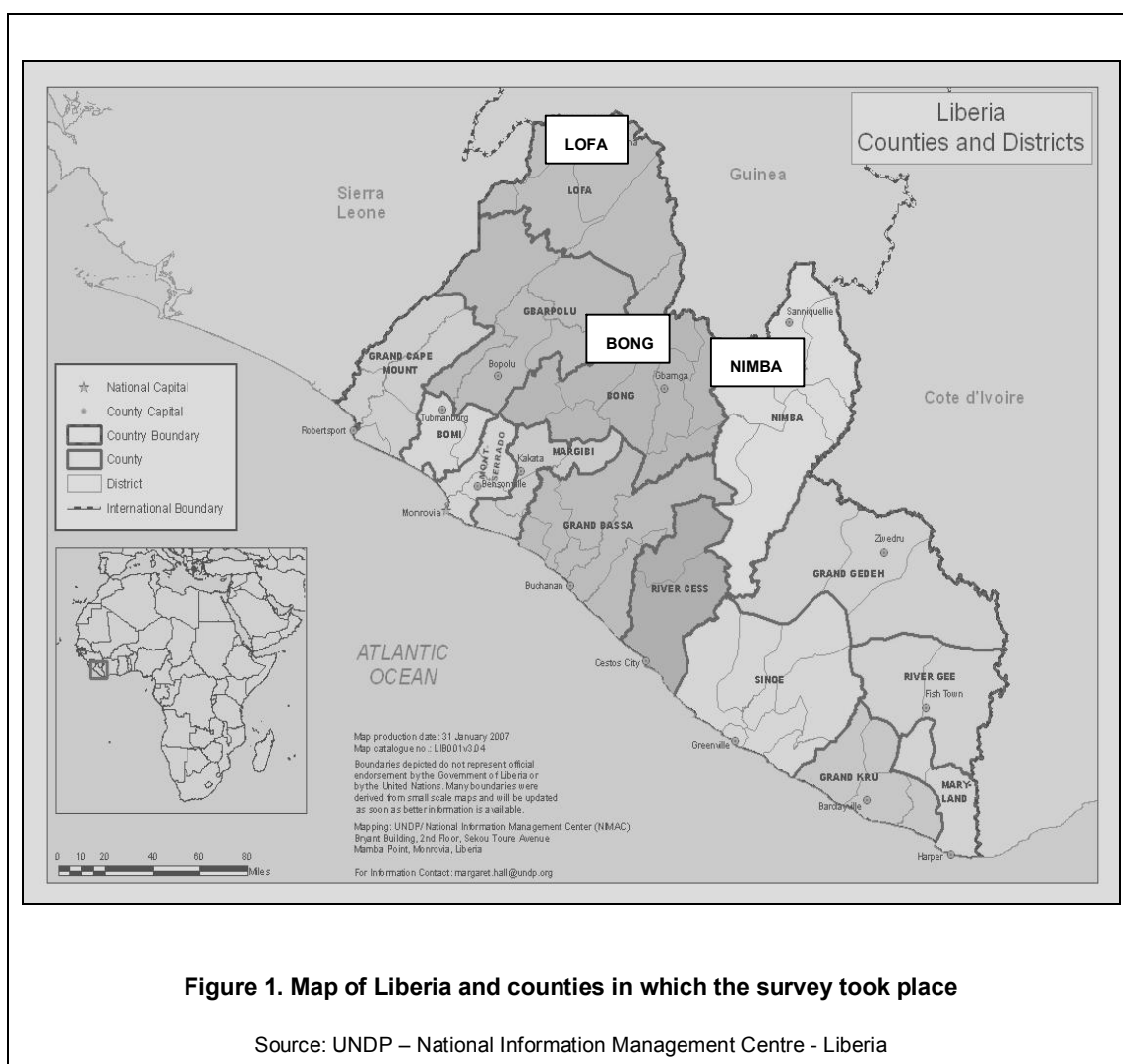
At that time, Action contre la Faim, decided to launch exhaustive surveys in the three counties where it was implementing programmes, Lofa, Bong and Nimba Counties. The findings of the county surveys contributed to reducing the information gap, but also highlight gaps in coverage of water supply. Therefore precise needs identification can take place, including the type of activity which must be implemented (rehabilitation of water points, construction of new water points). The results also clearly show the interaction between water point construction, operation and maintenance and sustainability. It is this aspect that will be explored in this article, in order to provide practice-based experience on the responsibility of stakeholders for the quality of water point construction, but also for taking into account and perhaps

implementing the sustainability mechanisms which will guarantee a longer time use of water points, and thus contribute to MDG goals.

Exhaustive county surveys: Methodology

Action contre la Faim, through the WaSH Consortium decided to carry out exhaustive surveys of all villages, towns and their protected water points. Indeed, the lack of baseline information justified such a methodology rather than a sampled survey. Such an ambitious project demanded rigour, organisation and the commitment of donors and partners. The surveys took place in three counties between February 2008 and June 2008. The timing was crucial as it was planned during the dry season, when the water table is at its lowest. The following number of villages and water points were surveyed for each of the three Counties:

- Lofa County: 879 villages or town quarters, and 1,000 protected water points
- Bong County: 1,476 villages or town quarters, and 1,179 protected water points
- Nimba County: 680 villages or town quarters, and 1,623 protected water points



The survey teams were composed of ACF WASH Programme staff (technical and social mobilisation teams), members of a local partner organisation – Virginia Homes and Wells (VHW), Community Health teams (CHTs). Each team was composed of at least four experienced ACF technical and social mobilisation team members. It took the teams in all three counties approximately two months to survey all the villages and towns, sometimes walking all day to reach the most remote villages.

The survey was based on two forms, one for gathering information at the village level (village form), and the other for carrying out a diagnosis of the water points (water point form). The village form aimed at

gathering GPS coordinates to allow mapping and spatial analysis, gathering population data to enable the calculation of the water coverage and to carry out a rapid assessment of the vulnerability of the village (village accessibility, presence of health and education and WasH facilities).

The water point form included the following information on the water point:

- Location – through GPS coordinates
- Type of water usage from this water point, and months of year during which it is usable
- Maintenance and operation structure
- Pump type, Pump condition (when the pump was not functioning, the pump was dismantled and a diagnosis of the problem carried out and recorded)
- Water quality parameters
- Water point sanitary risk²

The village form was also used in urban areas. Towns were decomposed into quarters, and one form was used per quarter, in order to have a more precise understanding of the coverage in safe water sources in urban areas. This was done for Lofa and Bong counties, but not for Nimba County for lack of time.

In order to ensure the reliability of the data collected, each form was filled in by one member of the team, and then cross checked in situ by another member of the team (hence the need for four surveyors per team). The Project managers entered the data into the computer, and the data was cross-checked by the programme coordinator whilst carrying out the analysis.

The results presented here give an overview of the information gathered, but the purpose of this extensive survey is clearly to be able to have access to reliable data from the county level to the water point level through districts, villages and quarter level. Since the survey was decided, the Government of Liberia carried out a national census in 2008. Nevertheless, for the purpose of this analysis, the population information from the survey is kept.

Findings of the survey

Varying coverage of access to a protected water source at the county level

The basis for measurement of water coverage is 500 people per water point, based on the standards for emergency intervention recommended in the Sphere Guidelines (Sphere, 2004). As Liberia is just exiting from a civil war, it was deemed justified to measure current water coverage according to the emergency standards which have been used so far. For instance, the survey considers that a village with 500 people and access to one improved water point has 100% water coverage. The following criteria are used for the analysis:

Percentage water coverage	Label for analysis
Below 25%	No protected water supply
25% - 75%	High pressure on protected water supply
75% - 200%	Sufficient protected water supply to cover basic needs
Above 200%	Very high access to protected water supply to cover basic needs

The survey took into account the number of used and not used water points. The definition of this distinction will be described shortly. For the analysis of coverage, only the used water points have been taken into consideration for the results below:

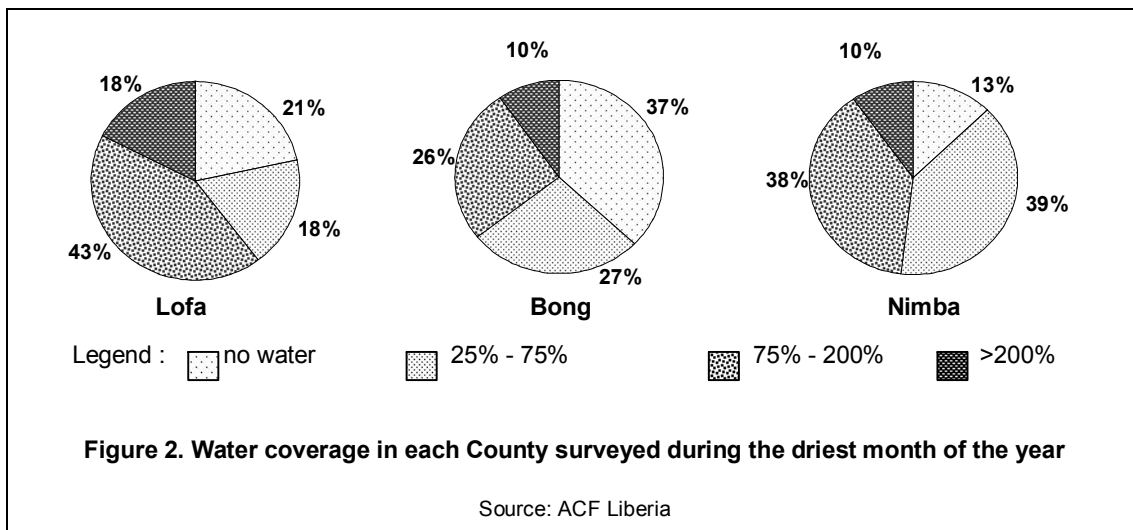


Figure 2 shows that over the three counties and during the dry season, 48% of the population has access to an adequate (at least 15 l/p/d) quantity of water, using 500 people per water point. Of course, at this level of analysis, it is impossible to say whether some areas within districts are more underserved than others. The coverage of water supply in the three counties does not reflect the situation in the other twelve Counties. Indeed, these Counties may have received a higher proportion of aid. In 2006, a report noted that there were significant discrepancies amongst Counties in terms of water supply and sanitation coverage (Republic of Liberia, 2006). It remains however that over half the population suffers from insufficient access to a safe water point and more seriously that 24% (307,728 people), in the three counties, do not have access to a safe water point at all.

Figure 2 also highlights the variable water coverage is variable in each County. Bong and Nimba Counties are underserved compared to Lofa. This measure of coverage was done with those protected water points that are used. When looking more deeply into the reason why some water points are not used, it will become clear that operation and maintenance have a role to play in extending this water coverage, and in explaining the differing levels of coverage in each County.

The link of water coverage with village or town size

The analysis of the results shows that when correlating water coverage with the village and town size, a pattern of rural versus urban is highlighted. For the analysis, a typology of villages and towns was developed, as in figure 3. The results are presented here for Lofa County, where it is clear that villages under 250 people are underserved in terms of access to water points. This is also the case for the other two counties. For Nimba County there is also high stress in large towns over 2,500 people, and in the Bong larger towns (more than 5000 people) also suffer from partial coverage.

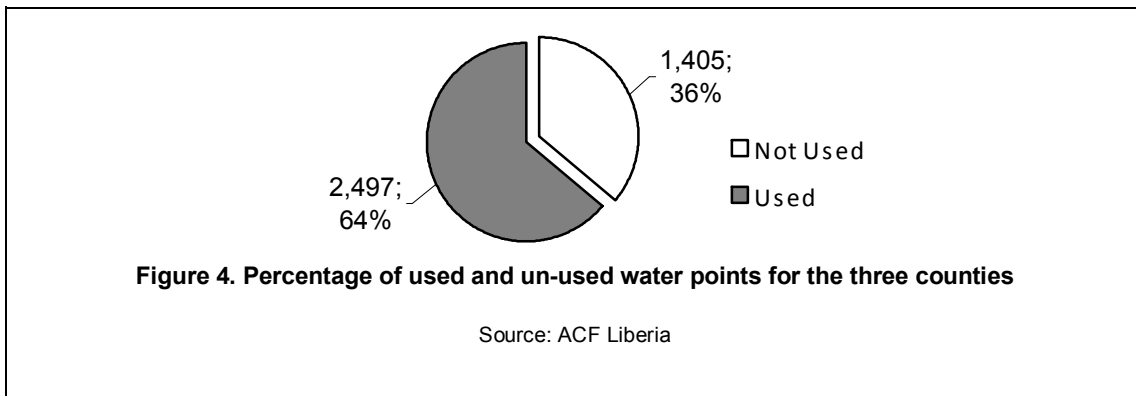
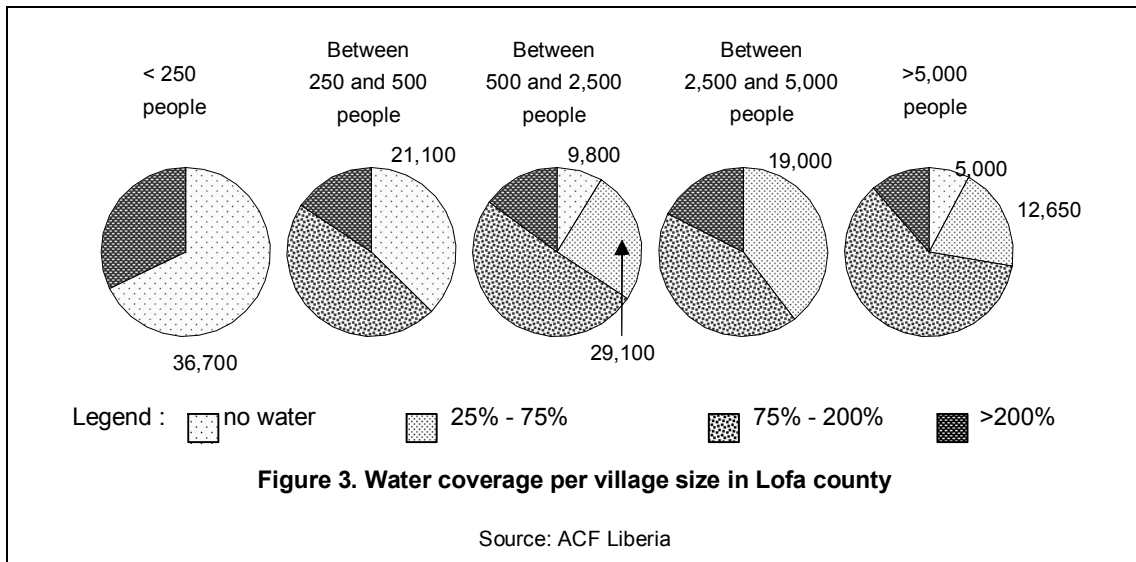
This level of detail will be a useful tool for programming interventions and identifying gaps for those stakeholders who are planning water point construction and or rehabilitation programmes.

Water point condition and use

As was explained, the water coverage is based on the number of used protected water points. During the survey, there were some safe improved water points which were not used. In order to understand the reason why they were not used, a diagnosis of each water point was done. Figure 4 shows for the three counties, the percentage of used and un-used water points.

Out of a total of existing improved water sources of 3,902 water points, 36% of water points are NOT used. If those 1,405 water points could be used, it would mean enough water to cover basic needs for 702,500 people at the rate of 500 people per water point, if they could be rehabilitated.

In order to understand why the water points were not used, all water points were inspected to check the water availability. Once this was done, it was possible to establish whether the water point was dry or water was available, thus eliminating one hypothesis for the dysfunction of a water point. The survey was carried out at the height of the dry season, which reflects the sustainability of the water points constructed. Indeed, ensuring the wells are dug beneath the water table is an important factor in the construction of water points.

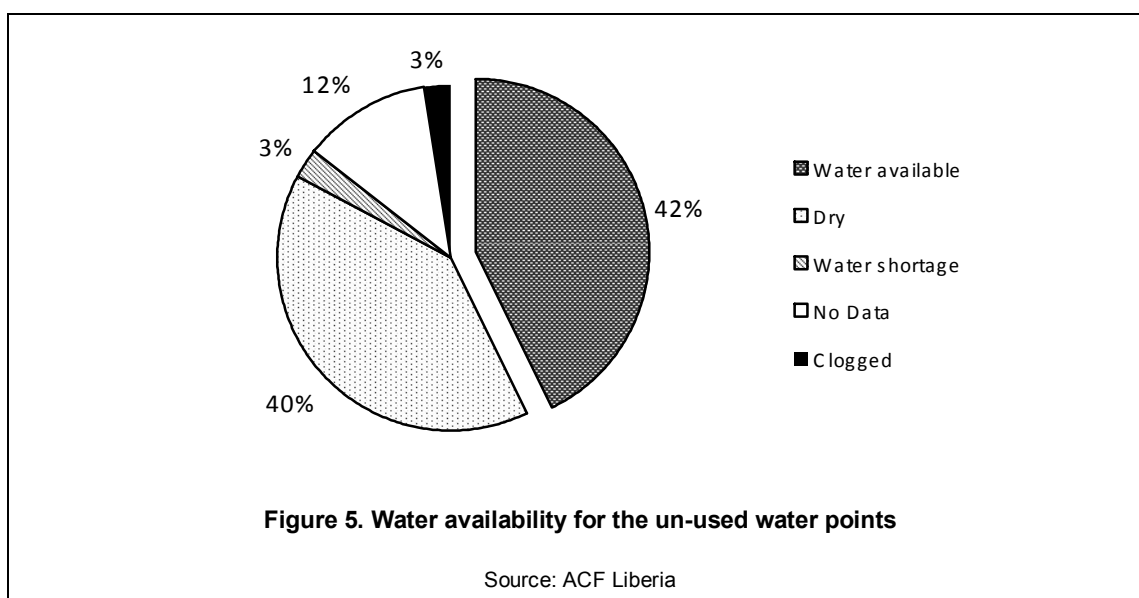


Out of the 1,405 water points which are not used, water is present (in the well or borehole) for 596 of those, 42% of the water points. These water points were then checked by a skilled technician and a diagnosis made. The following table highlights the type of repairs that are necessary on the 596 non-functioning water points where water is present.

As one can see in Table 2, a majority of water sources are not used because of a broken hand pump. Of those, 172 hand pumps could easily be repaired with spare parts available. Several water points were reported having water with odour, bad taste or bad smell. These are probably due to contamination (from swamps, graves) essentially due to poor siting. The heavy repairs require a skilled technician for the replacement of parts of the purchase of a new cylinder for example.

From the Table 2 one could conclude that: 468 water points could be rehabilitated by heavy repairs on the hand pumps, or changing spare parts, or by simply installing a new hand pump. This would cover the needs for 234,000 people.

There is a clear responsibility of stakeholders to ensure that wells and boreholes are dug below the dry season water level, in order to ensure that water points are sustainable. Indeed there are 562 water points which are dry (40% of 1,405 un-used water points), which represents an equivalent of water for 281,000 people (500 people per water point).



Type of repair	Major repair	Hand pump spare part missing	no pump	bad water quality	pump being installed	no data/other	total
Lofa	40	37	9	28	7	3	124
Bong	99	78	16	24	5	37	259
Nimba	100	57	15	9	5	27	213
Total	239	172	40	61	17	67	596

Spare parts and sustainability

It is generally agreed that when implementing a WaSH programme, the mechanisms for ensuring sustainability must be present or put in place. Action contre la Faim and the WaSH Consortium has ensured that hand pumps are VLOM³. The Afridev hand pump has been selected because of the cost, availability of the spare parts, the robustness and ease of maintenance. In addition a Water committee is formed, designated by the community, water point caretakers are trained in the community, hand pump mechanics are trained for heavy maintenance and private spare parts dealers are established.

In order to assess whether the community-based and private sustainability mechanisms were in place, the survey checked whether:

- A structure was in place to take care of the water point
- A skilled person is available to fix the hand pump
- The community knows where to fetch spare parts

Figure 6 shows that when all three mechanisms for community-based maintenance and operation, the percentage of unused water points is only 17%. When no sustainability mechanism is in place, the percentage of unused water points almost doubles to 31%. In other words, the chance that a water point (when it is not dry) remains in use for a longer period of time is increased by two when the three sustainability mechanisms are in place. This also means that there are still 17% of water points are not used, even when water is available, and a sustainable operation and maintenance system is in place. Indeed, community based systems may not always be appropriate, and it is therefore important that all stakeholders carry out an analysis of the community willingness to run an operation and maintenance system. If the community is not willing, another system of operation and maintenance, through the private sector or government authorities must be envisaged.

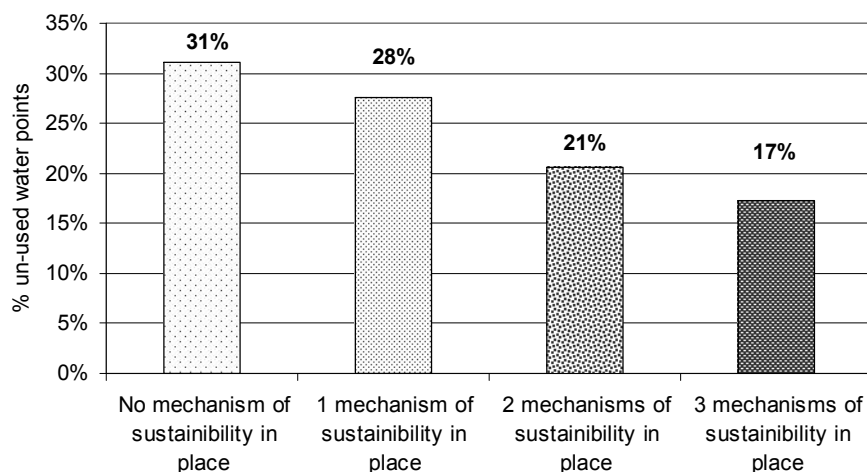


Figure 6. Percentage of un-used water points (where water is available) according to number of sustainability mechanisms in place

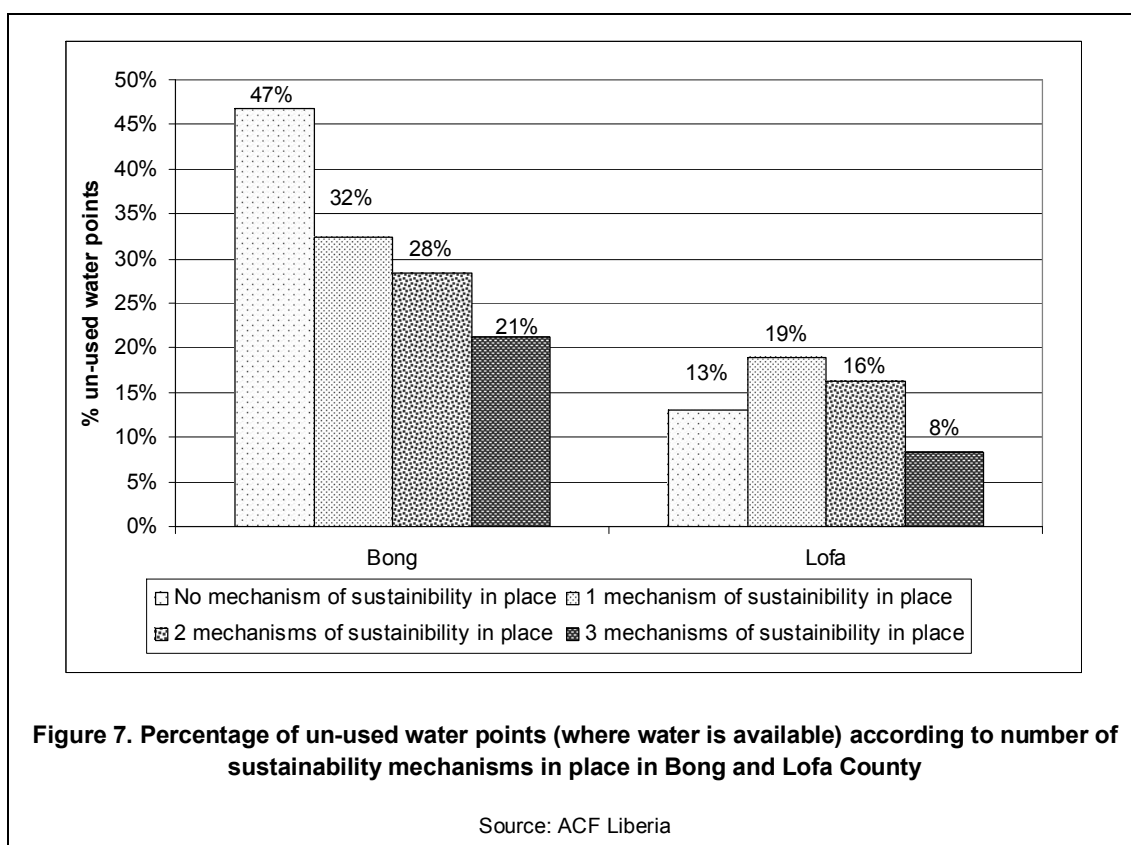
Source: ACF Liberia

The analysis for sustainability mechanisms can be fine tuned when looking at the county level. In Figure 7 the examples of Bong and Lofa have been highlighted. In Lofa County there is only a slight difference in percentage of used water points whether sustainability mechanisms are in place or not at all. In fact, when a geographical analysis of those water points with no sustainability mechanisms is done, one finds that they are essentially in area where a high density of IDP camps were. In these areas, the high involvement of NGOs means that pump repairs are still carried out by NGOs.

In Bong County, the results confirm the tendency across the Counties, at a more general level, where more the presence of all three mechanisms increases by half the chance of the water pump being used. When analysing the presence or absence of these mechanisms according to village and town size, it seems that small communities (<250 people) and large towns (>5,000 people) do not have a skilled person available or knowledge of where to buy pump spare parts. The communities between 250 to 5,000 people have a larger proportion of water points with all 3 mechanisms in place, although the pump spare parts availability is an issue. When all 3 mechanisms are in place, 78% of water points are used, and for those water points where only part of the mechanisms are in place, 50% of the water points are used.

In Nimba, towns between 250 and 5,000 people have structure and skilled persons in place, but little spare parts shops. For larger towns, no skilled person and no spare parts are available. At the district level the lack of spare parts is most striking. 69% of the water points are used when all 3 mechanisms are in place, against 55% when they are not all in place at the same time.

Sustainability mechanisms need to be adapted to the willingness of communities to participate, but also the cohesion of an entity of water point users. In rural areas, and small villages where cohesion is good, community structures are often a good solution for maintenance and operation of VLOM hand pumps. However, mixed structures are interesting for small towns and urban areas, where village cohesion is not the same. The particular case of Lofa County also highlights that NGOs have to ensure that they disengage and leave a viable operation and maintenance system behind them, especially if it was not studied or promoted at the onset of a project.



Conclusion

The analysis that has been presented here is only a part of the information that has been collected through these surveys. This methodology even if necessitating time and resources is replicable and could be used to cover all the other counties. It would enable the government to have a real baseline for measuring achievement of its PRS by the year 2011.

Even if the surveys cover only three of the fifteen counties, they represent a third of the national population. As explained in the findings, the results in terms of coverage and type of operation and maintenance mechanism to be put in place cannot be generalised to the entire country. However, the results clearly show that coverage in those three counties could potentially rise by 14% or provide water for an equivalent population of 41,720 people, just by putting in place a suitable operation and maintenance system in place. If those hand pumps which need heavy repairs, spare parts change, or the installation of a new hand pump, the number of functioning water points could rise to 468 water points, providing water to 234,000 people.

Unfortunately, the surveys have also highlighted that 40% of the un-used water points are dry at the height of the dry months of the year. This represents water for 281,000 people (with 562 water points for 500 people). This is a reflection of poor construction and little accountability for longer term use. Stakeholders in the sector have a clear responsibility to ensure that the operation and maintenance factors for sustainability are in place, but also that the technical components are durable.

Acknowledgements

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Note/s

1. The Poverty Reduction strategy estimates that 25% of Liberians do not have access to a safe drinking water supply
2. The sanitary risk was evaluated using a sanitary risk form.
3. VLOM: Village Level Operation & Maintenance

Contact details

Lisa RUDGE
4 rue Nièpce, 75014 Paris, France
Tel: + 33 (0)1 43 35 88 39
Fax: + 33 (0)1 43 35 88 00
Email: ludge@actioncontrelafaim.org
www: [www: www.actioncontrelafaim.org](http://www.actioncontrelafaim.org)

Eric BOSCH
4 rue Nièpce, 75014 Paris
Tel: +33 (0)6 12 25 48 10
Fax:
Email: boscheric@gmail.com