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**DELIVERING WATER, SANITATION AND HYGIENE SERVICES
IN AN UNCERTAIN ENVIRONMENT**

**Handpump sustainability challenges; analysis of problems
and alternatives and what PRACTICA can contribute**

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Community handpumps, especially in Sub-Saharan Africa, show often a very low level of post-construction sustainability. At PRACTICA Foundation some problem analysis has been conducted, including both literature review and field input. According to these information sources, the main sustainability challenges regarding handpumps lie at the spare parts supply chain and at the functioning of the water point committees. After the problem analysis, an overview of experiences with alternative management models is made, including public-private partnerships, maintenance contracts, Handpump Mechanics Associations, private ownership, centralized companies and the water kiosk model. The contribution of PRACTICA regarding handpump sustainability is both related to the spare parts supply chain (combined with local procurement of handpumps) and to alternatives that do not rely on community water committees (including private sector involvement and developing an option with mobile payments).

Introduction

Sub-Saharan Africa is the region with the lowest percentage of people with improved drinking water sources, especially the rural areas (WHO/UNICEF, 2012). The lack of improved water supplies in rural areas of Sub-Saharan Africa has motivated governments, non-governmental organizations and other entities to highly invest in this sector. In the last few decades, wells and boreholes with handpumps are promoted as the most viable option for rural water supply in many developing countries and have become the principal technology (Harvey and Reed, 2004). Although solar pumping and piped water systems are growing also in rural areas, 'the humble handpump will be supplying safe water to millions of rural water users for decades to come' (Baumann & Furey, 2013).

However, after implementation, many handpumps stop functioning within a few years or less. This low post-construction sustainability of handpumps is a much described problem in literature. For PRACTICA Foundation it means that a lot of support is given for the construction of wells and boreholes, which are not in use anymore after a short period. Realizing this, the idea arose to expand the support for the partners from only construction (mainly focusing on manual well drilling) to also the handpumps. This report gives the preparation work for this expansion. The objective of this preparation is to find out what the main problems related to handpump sustainability are, which promising alternatives to the current approaches exist and how the expertise of PRACTICA can contribute to an improvement in handpump sustainability.

Literature review

The first part of the problem analysis is a literature review. An inventory is made on which problems are mentioned to be the main problems causing the low post-construction sustainability of handpumps. Used information sources for this literature review are: WEDC, RWSN, IRC, World Bank, Google and ScienceDirect. Used keywords are: handpumps, community handpumps, community management, sustainability and rural water supply. In total eleven case studies (in ten different African countries) and three expert studies are reviewed (Harvey, et al., 2002; Harvey, et al., 2003; Kalulu, et al., 2012; Jones, 2010; Godfrey, et al., 2009; CARE, 2012; Bönda, 2006; Peter & Nkambule, 2012; WaterAid, 2009;

Harvey, 2003; WaterAid, 2012; Carter, et al., 2010; Parry-Jones, et al., 2001; Lockwood, et al., 2010). The problems related to the sustainability of community managed handpumps are given in the order of number of times mentioned in the reviewed studies.

Users' payments

The most often mentioned problem is related to the users' payments. Within community management users are expected to collect money, at least for the regular maintenance, but almost all studies mention problems with these payments. The contributions are not enough to pay for the O&M. Case studies mention more specific the inability of committees to raise and manage the money, the misappropriation of funds and a lack of willingness to pay.

Follow-up support

The second factor is the follow-up support by either the government or NGOs. This support is needed for monitoring, community collaboration, spare parts provision, technical training and training on managerial and administrative skills of water committees.

Spare parts

Five case studies mention problems related to spare parts. Spare parts are not easily available. One study mentions that the government does not assist in the spare parts provision. Another study mentions that the existence of different handpump types makes it difficult to set up a profitable spare parts provision.

Participation

Another factor is the participation of the community, during the implementation and also later on. Case studies mention a lack of participation as a cause for a lower sustainability. Some communities were never convinced of the desirability of new water sources and they did not have a say in decision making.

Other

A part of the other factors are related to the functioning of the water point committees (WPCs). They do not meet regularly, they are not diverse enough (different kind of people from the community), they have not received maintenance training, they do not cooperate enough with local leaders, do not exist anymore, lost interest or moved away. One study states that the WPCs do not fulfil their tasks and responsibilities because everything is voluntary and only altruism is not enough motivation.

Less often mentioned factors are: low user satisfaction, no preventive maintenance, no village level understanding of government water policy, no accountability for policy compliance, lack of incentives/motivation for trained mechanics, sabotage by people who are against the existence of handpumps, long fetching time, bad construction quality, bad reliability of water supply and the use of alternative sources.

Field input

Besides the literature review a questionnaire was sent to two Dutch partner organizations of PRACTICA Foundation who have handpumps in their programs (Simavi and AMREF). This questionnaire consists of a list with problems, in the following categories: finances, follow-up support, participation, spare parts and water committees. The interviewees had to tick all problems that occur in their area and also had to give their opinion about the three main problems related to handpump sustainability. In total 14 partners gave their input, with on average about 60 handpumps within their project areas.

Two of the 36 problems in the questionnaire were most often mentioned to be present in the project areas of these partners. The first problem is that spare parts are not easily available and the second that the voluntary basis is not enough motivation for the water committee members. Eight other problems were mentioned often, namely:

- Water committees do not have the capacity for the financial management;
- Communities do not feel ownership over the handpumps;
- Too many users per handpump;
- There is no external support to strengthen the spare parts supply;
- Government does not take care of the handpumps;
- Spare parts are too expensive;
- Water committees do not have regular meetings; and
- There is no preventive maintenance.

Spare parts

Problems with spare parts are most often mentioned. Spare parts are not easily available, there is no external support to strengthen the spare parts supply and the spare parts are too expensive. It is beyond doubt that in many Sub-Saharan Africa countries there are problems with the spare parts supply chain for handpumps. Out of the 14 partners who gave input, there was one partner from outside Africa and that was the only one who did not mention problems with spare parts.

Water point committees

After the spare parts, most mentioned problems are related to the water point committees. The voluntary basis is not enough motivation for the committee member, they do not have the capacity for the financial management, they do not have regular meetings and do not conduct preventive maintenance. At many locations the committees do not fulfil their tasks and responsibilities.

Other

Other often mentioned problems are that communities do not feel ownership over the handpumps, which also makes them feeling less responsible for the maintenance. And the fact that too many people are using the handpumps makes that the handpumps need more maintenance. The last point is that governments do not take care of the handpumps.

Discussion

Combining the literature review and the input from the partners, two main problems remain: poor spare parts supply and disfunctioning of the water committees (in literature review in reverse order). Peter Harvey in a RWSN/UNICEF publication states that it is very difficult to have a good supply chain for spare parts in Sub-Saharan Africa since the production of handpumps and components is mainly in India and most customers are water committees or private mechanics based in rural areas. This requires a good distribution network from the point of manufacture to the points of use (Harvey, 2011). All actors in the chain need to have some profit and still the price and quality need to be acceptable.

It is clear that there are many problems with the local water committees. They are having difficulties conducting their job, partly because they have to do everything on a voluntary basis. They face problems in collecting money and managing the finances well. They neglect to conduct preventive maintenance. And related to that, they do not get the external support they need.

It is also useful to analyse this situation from a higher organizational level. For example in one district there might be a few hundreds of handpumps. At every handpump there is a local water point committee who needs training on financial matters and on preventive maintenance. And in literature it is widely acknowledged that this support is not only once at the beginning but it needs to be followed up. This takes an enormous amount of time for the local government or any other local institution.

Summarizing the problem analysis, it is clear that the main problems which came out are not in first instance technical. The quality of the handpumps is not often seen as a main problem. In contrast, most problems are related to the management of the activities related to the handpumps. It has become clear that the most common management model, community management, goes together with many problems. Therefore the next step is to make an inventory on alternative management models.

Looking from a country or province perspective with many handpumps, it seems that the current (maximal decentralized) situation is not the most efficient option. In the process of searching for alternative management options, it is important to look for options where the management is arranged at a more central level (e.g. district level).

Alternative management models

Currently, the most widespread management model for handpumps is community management. But according to the literature review and the input from the partners, there are many problems. Stefs Smits from IRC (Smits, 2012) even stated: 'Community management is dead'. In order to find out whether other options function better, an inventory is made on alternative management models for handpumps. As starting points the same literature sources as for the problem analysis are used to find information on alternative management models for rural water supplies. From there other literature was found via references of the previous literature. The alternative hand pump management models are described and evaluated based on the experiences described in literature, see table 1.

Table 1 Examples of alternative handpump management models (Kleemeier E. , 2010; Kleemeier & Lockwood, 2012; Foster, 2012; Aqua for All, 2012)

Approach	Description	Countries	Experience
1. HPs under responsibility of piped scheme operator in the area	Maintenance of HPs in supply area of piped scheme included in responsibility of piped scheme operators.	Angola Burkina Faso Rwanda Ivory Coast	In all these cases this model did not lead to better handpump functioning. Especially the payments were problematic.
2. Maintenance contracts between community and company	Users pay a fixed fee to a private company. This company in return provides a guaranteed maintenance service. Depending on the agreement, spare parts might be included.	Mauritania Niger Benin Burkina Faso Angola Kenya	Results were not satisfactory because community committees were too weak to collect the user payments and to manage the funds.
3. Maintenance contracts between local government, Water Users' Associations and private enterprise.	Local governments sign maintenance agreement with private maintenance operator. WUA pays annual fee for inspection visit to commune and costs for repairs to private maintenance operator. WUAs hire local handpump managers for money collection.	Burkina Faso Madagascar	In Burkina Faso many contracts were signed, but the users neglected to pay the regular fee. Results for Madagascar are not yet documented.
4. Handpump Mechanics Associations	All HPMs of a district are organized in an association with leadership, constitution, registration, bank account and membership fee. Some have also set up their own spare parts stores or depots.	Uganda	Positive results: increased cooperation amongst HPMs; increased access to spares and knowledge; increased access to service contracts (for rehabilitation activities).
5. Private ownership	Private entity owns and maintains HP, community pays to owner. Comparable to e.g. many maize mills.	Kenya Many countries	High functionality rates. But high investment costs make this model being not widely applied.
6. All services combined in one central company + using mobile payments	Central service company for large amount of pumps, responsible for money collection (with RFID card system), spare parts supply and maintenance.	Not yet implemented	Not yet implemented anywhere. Costs might be too high compared to costs in other models. Costs include RFID cards, scanning device, uploading point, etc.
7. Water kiosk model	Enterprise/entrepreneur pays licence fee to local government for rights to manage and maintain cluster of handpumps. Licence fees pooled in insurance scheme for major repairs. Per water point a caretaker, pays part of collected money to entrepreneur.	Not yet implemented	Model not yet implemented for handpumps. But for piped water supplies the positive experience is there. With e.g. an extension from a borehole with a motorized pump to a water kiosk, also in very remote areas.

Based on this overview it needs to be said that most results from alternative handpump management models are not hopeful. The first three alternatives are similar to each other. In all these cases there were problems with the payments. An extra factor in the first approach was that the piped scheme operators were not interested in the handpumps (compared to their piped scheme) because it is more difficult to make profit out of it. In the second approach it turned out that it is very difficult to have a contract with a community, which is a group of people and not a legal person. In the third model in Burkina Faso, the users were not paying the regular fee and therefore the system did not work. The fourth option with the HPMAAs gives improvements relating to the maintenance. But the inefficient structure with the water point committees remains.

The fifth option is not widely described in the literature. In Kenya some studies give very good results for these handpumps. There is a clear ownership and responsibility and a strong incentive for a rapid repair. The private owned handpumps exist both for self-supply as for selling water to the community. Although this option seems to work well, the high investment costs for the owner make that this option is not widely used.

Option six is only in the development phase. It is based on some calculations regarding profitability of business models. Within this model use is made of payment with a chip card, which is expensive in terms of technology but saves a lot of money in terms of labour for fee collections.

The last option is only mentioned in one detailed study on private sector provision of rural water supplies (Foster, 2012). This report states that ‘proven delegated management models for water kiosks in peri-urban areas may provide a useful blueprint for new business models’. Within this model, different options exist for the agreement between the caretaker and the enterprise. In water kiosks, the caretaker often pays a fee to the enterprise per volume of water and keeps the rest of the collected money for profit. The enterprise is responsible for the operation and maintenance.

Contribution of PRACTICA

PRACTICA has several activities in collaboration with partners who are working in the rural water supply sector. Part of these activities are related to professionalizing manual drilling and water point development, including handpumps (with UNICEF and other partners). Activities within these programs include:

- Feasibility studies: hydrogeological conditions, market conditions, private sector assessment and national policy conditions;
- Support to development of country-specific programs for implementation of manual well drilling and handpump installation;
- Selection, training and certification of drilling enterprises and handpump installers;
- Training of supporting businesses.

Activities of PRACTICA relating to handpump sustainability are directly connected to the activities mentioned above. The activities match with the two main problem, the bad spare parts supply chains and the bad functioning of the water committees:

Spare parts supply

Relating to the bad spare parts supply chain, PRACTICA has several activities.

- In the mentioned study on sustainable supply chains (Harvey, 2011) an integrated supply chain is suggested. This means that one private enterprise includes the whole chain from importing pumps, conducting installations, pump repairs and spare parts. Especially the establishment of in-country importers is a major shift. It requires a thorough feasibility study and identification of potential enterprises. But also the legislation might need adaptations. PRACTICA has been involved in the exploration of possibilities for local handpump procurement (in collaboration with UNICEF) from 2009 onwards. One mission in this respect is planned in June 2013 in Guinea (also with UNICEF). This mission includes both discussion with the governmental water department on current import policies and identification of enterprises/retailers for local procurement.
- Related to this is technical advice on handpump types. Although the choice of a handpump type is often not a determining factor for the handpump sustainability, it has its influence on the possibilities for local procurement and on setting up a good functioning O&M mechanism. In the example of Guinea, the allowed handpump types are limited to proprietary handpumps which are less easy to procure locally compared to public domain handpumps. PRACTICA gives support and advice related to shifting to public domain handpumps.

Functioning of water committees

Based on the current study, PRACTICA wants to advocate handpump management models that do not rely on community committees. Key is more private sector involvement in the management of the hand pumped water supplies. Two related activities are:

- Country-specific feasibility study for innovative private sector O&M mechanisms which can be used in the programs. This is also an explicit part of the Guinea mission in June.
- A totally different activity is related to the earlier mentioned model with the mobile payments. This model eliminates the need for a water committee at every handpump. The technical development of this option is currently conducted by the company Susteq in collaboration with PRACTICA Foundation. The first prototype is planned to be ready by the end of July and is planned to be tested in collaboration with SNV Kenya in Western Kenya.

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