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## **Expand sustainable operation and maintenance of handpumps for rural communities in Balkh Province, Afghanistan**

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PUBLISHER

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VERSION

VoR (Version of Record)

PUBLISHER STATEMENT

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REPOSITORY RECORD

Vijselaar, Leendert. 2019. "Expand Sustainable Operation and Maintenance of Handpumps for Rural Communities in Balkh Province, Afghanistan". figshare. <https://hdl.handle.net/2134/29391>.

32nd WEDC International Conference, Colombo, Sri Lanka, 2006

SUSTAINABLE DEVELOPMENT OF WATER RESOURCES, WATER SUPPLY AND ENVIRONMENTAL SANITATION

**Expand sustainable operation and maintenance of handpumps for rural communities in Balkh Province, Afghanistan**

*Leendert Visselaar, Afghanistan*

*Normally DACAAR sets up an Operation and Maintenance (O&M) system while installing new wells, this time around DACAAR went out in one Province (Balkh Province) in which we had not worked previously. Visited 2095 well sites and managed to convince the communities to become part of O&M system with a mechanic serving 50–100 wells. In the process 534 hand pumps were repaired. During the process of setting up the O&M system a number of construction mistakes and sort cuts in community approaches were noted. What has been learned that NGO's have a responsibility to bring proven systems (community approach as well quality of hardware) to the communities. To enforce such behaviour coordination and outreach is needed by the authorities and peer pressure and donor awareness for the need of quality workmanship, proper community outreach and setting up and follow up of a O&M system to ensure lasting functioning of water points (hand pumps and piped systems)*

## Introduction

There is a saying that wells that do not have an O&M system are not functional in a short time or breakdown faster than systems that have a system in place that will support the community in enhanced O&M over the years. After a survey (sponsored by ICCO (Interchurch Organisation for Development Cooperation – Netherlands) and executed by DACAAR) in the north of Afghanistan (Balkh Province) an intervention strategy of putting in place a maintenance system was implemented. During the survey it proved that 867 of the 2,095 wells (see Table 1) visited were not working for a variety of reasons (from bad workmanship, no maintenance of the wells to wells that went dry) only those communities that NGO's left with a strong O&M system had the least problems.

## Present situation

Addressing water and sanitation related diseases in Afghanistan are of critical importance. Afghanistan has the fourth-highest rate of infant mortality and children under five in the world<sup>1</sup>. Recent surveillance studies undertaken by the Ministry of Health (MOH) and the Centre for Disease Control indicate that diarrhoea is responsible for 54 per cent of the deaths of children under five<sup>2</sup>.

### *Drinking water availability*

Traditionally, the population of Afghanistan has relied on surface water, groundwater, springs and *karez*s (man made springs) as sources of drinking water. In addition, in the less mountainous areas of the country, open hand dug wells are common, accessing groundwater at depths between 10 and 30

meters. Water from all of these sources is deemed to be unsafe with varying levels of micro-organisms contamination.

### *Coverage with improved water*

Over the past decade agencies such as DACAAR, the Swedish Committee for Afghanistan (SCA) and others provided improved water to rural communities in Afghanistan by fitting handpumps on dug and bored wells, installing gravity fed pipe schemes and protecting spring and *karez* water sources. After September 2001, a very large number of agencies have entered the WatSan sector in Afghanistan. Through the interventions of all agencies, there are now approximately 50–60,000 community-based improved water points in rural Afghanistan<sup>3</sup> providing 19 per cent of the population with access to improved water<sup>4</sup>, out of which more than 36,000 have been installed by DACAAR.

The Ministry of Rural Rehabilitation and Development (MRRD)<sup>5</sup> estimates that 100,000 new water points are required to supply the rural areas of Afghanistan with improved water<sup>6</sup>. The target does not take account of the expected high population growth rate, the deterioration of existing hardware (some of which was installed almost a decade ago) and the current high failure rate of wells (due to falling water tables) and of handpumps (due to agencies not ensuring sustainable maintenance systems).

### *Improved water maintenance systems*

While the number of agencies working in the WatSan sector was relatively low it was possible to motivate most agencies to adopt a standard maintenance system for handpumps and pipe schemes. Although there are few statistics available to indicate the success of this system, DACAAR statistics

indicate that the percentage of non-operational handpumps within the DACAAR handpump maintenance system, up to the start of the recent drought, was on average, only seven per cent at any one time. The percentage of non-operational handpumps is now 15 per cent because so many wells are dry due to the drought. Communities are less interested in paying for the repair of the handpumps on dry wells.

### ***Regulation of the WatSan sector***

The WatSan sector is currently largely unregulated except for the efforts of the Water & Sanitation Sectoral Group for Afghanistan (WSG) which was established by UNICEF, DACAAR, SCA and others in 1997 to coordinate the drinking water and sanitation sector. Although the WSG is now managed by MRRD, there are, at present, serious difficulties in persuading all agencies in the sector to follow previously agreed guidelines. These previously agreed guidelines cover issues such as recommended user group size, maintenance strategy and technical standards. MRRD has recently issued policy guidelines but these are, as yet, little possibility of monitoring compliance with these.

### **Framework for strategy formulation**

Although DACAAR believes that the achievement of service delivery targets in the WatSan sector is undoubtedly vital, it is also true that infrastructure alone, without complementary investments in the other needs of the sector, is unlikely to achieve the desired impact. The installation of improved water and sanitation facilities is made up of relatively straightforward tasks and DACAAR believes that, given some degree of coordination, monitoring, regulation and legislation, contractors and construction agencies could carry this out relatively easily. This in itself would be a strengthening process for the private sector.

Over the past three years every effort has been made to support MRRD in focusing on policies, standards and guidelines as opposed to raising funds for projects. Some success has been achieved and more is expected in future as MRRD addresses the multitude of needs, expectations and responsibilities before it today.

### **Co-operation with other agencies**

The WSG is now based in the MRRD and is working on capacity building within the ministry. The WSG has, over the past three years, established a technology development working group (TDWG), hygiene education working group, sanitation working group. The WSG is also in the process of establishing a Quality Assurance Committee with MRRD.

### **Implementation methodology**

The intervention planned and executed to improve sustainable operation and maintenance in Balk Province is through discussion with the community owning wells. The discussions were done by six teams of engineers and skilled labourers with car and driver. They were supported through the provi-

sion of maps of the districts and use a GPS (Global Positioning System) equipment to locate the wells. In the follow-up visits they carry spares and other items deemed necessary to support the community in the maintenance of wells. The teams implement the points as outlined below.

### **Expanded sustainable maintenance system for rural community drinking water systems**

It is vital that communities take the lead in maintaining the facilities that they use, not just to ensure the continued functioning of the facilities but also to ensure that the community receives maximum benefit from the assets they own.

The Water and Sanitation Sectoral Group for Afghanistan (WSG) and MRRD have agreed that the community-based maintenance system outlined below is the standard to be used for all handpumps and pipe schemes installed by agencies in rural Afghanistan.

#### ***Surveys***

The methodology for extending the maintenance system, involves firstly prioritising districts for inclusion in the system. Criteria for district selection include:

- Evidence that many water points with handpumps have already been installed and are out of order because of lack of maintenance
- Evidence that water provided by the handpumps is portable,
- Discussion and coordination with other agencies working in the area,
- Discussion and coordination with local authorities.

#### ***Motivating the community***

When installing a new drinking water system, site engineers inform the community of their future responsibility for maintenance right from the initial discussion concerning installation. Once installation is under way, a maintenance agreement is agreed, drawn up and signed by the community with a handpump mechanic. This agreement details who has responsibilities with regard to the facility, what those responsibilities are, what payments should be made, and to whom.

The basis of the current system is that the community is given a well plus handpump in return for agreeing to join the maintenance system (pay the handpump mechanic).

#### ***Engendering a sense of ownership***

DACAAR has three principle concerns when providing WatSan services. The first concern is to ensure that improved water facilities remain public after the withdrawal of the site engineering team and are not privatised by any of the wealthier and more powerful families in the community. Secondly DACAAR is concerned to ensure that the sites selected for water points are accessible to women at all the necessary times of the day when water is collected. Lastly, the implementation strategy is designed to ensure a sense of community ownership of water points so that maintenance

will take place as needed and facilities will be sustainable.

In order to generate a sense of ownership of the facility, the community is required to contribute up to 30 per cent of the cost of materials and labour for installation. In general contribution take the form of free unskilled labour and the provision of sand and gravel as needed for concrete work. Under this project the sense of ownership of facilities will vary depending on the implementation methodology of the agency which originally installed the well. Where repair work on the well is needed, contribution will be required from the community in order to establish or strengthen the sense of ownership.

### **Handpump mechanics**

The site engineer trains the new mechanic for up to three months and equips him with a bicycle and the necessary tools. On completion of his training, a handpump mechanic is considered to be a private entrepreneur who is paid by communities to maintain and repair wells. When a new handpump is installed, the community signs a maintenance agreement with the trained mechanic who can then be called upon when necessary. Each mechanic is expected to maintain 50 to 100 handpumps.

Mechanics are paid an annual wage by the user group of each handpump for routine maintenance. The wage is usually paid as wheat (27 kgs per handpump) annually after harvest.

### **Caretakers**

As well as signing an agreement with a mechanic, the community selects a caretaker for the handpump. The caretaker is responsible for liaison between the community and the mechanic on maintenance issues and for ensuring that the well is accessible to the whole community. He has the following responsibilities regarding maintenance and repair:

- Ensure that the handpump is properly used and not wilfully damaged;
- Ensure that the platform of the well is properly used and excess water is properly drained;
- Inform the handpump mechanic regarding repair needed;
- Collect grain/money for spare parts as well as the annual wages for the mechanic; and
- Act as motivator to promote improved hygiene practices, proper use of the handpump and improved sanitation in the village.

The community will be asked to select a caretaker if one has not already been appointed.

### **Spare Parts**

In order to ensure that necessary spare parts are available, DACAAR and other WSG members are gradually establishing a network of shops stocking handpump and pipe scheme spare parts across the country. The aim is to have at least one shop in every district. During implementation of each new WatSan project, the site engineer checks local availability

of spare parts and, depending on the situation, motivates at least one local shopkeeper to stock spare parts. He does this by providing a starter kit of spare parts and linking the shopkeeper to relevant retail outlets or manufacturers.

### **Handpump inspection teams**

To ensure that the maintenance system continues to function, DACAAR handpump inspection teams (HITs) visit all mechanics/valvemen and water points every three to six months. During these visits, HITs inspect all handpumps and standposts and meet with communities, shopkeepers and handpump mechanics/valvemen to solve problems. HITs are the key to the success of the handpump maintenance system. These teams provide significant support to handpump mechanics, including:

- Solving problems with communities (usually non-payment of wages)
- Solving technical problems with wells and handpumps
- Replacing handpump mechanics who have left or stopped working
- Checking the quality of spare parts
- Motivating new shop keepers to stock spare parts as necessary

At present DACAAR has 12 HITs covering 22 provinces in south, east, central and west Afghanistan. Under this project two new teams will be established in northern Afghanistan covering two provinces.

### **Problems encountered**

It became apparent after visiting 2,095 wells that the majority were still working, but 867 wells were not functional and managed to repair 534 water points. Table 1 makes clear that the districts had different success rates which had partially to do with the type of wells used. There was a high failure rate with tube wells making clear that the expertise of the contractors was rather low.

- Technical know how was lacking to make proper tube wells in the area.
- Dug wells were not constructed deep enough.
- Well collapsed, lining was too short.
- Wood used to shore up platform rotting then slabs sinking in unpredictable manner
- Use of air dried bricks for lining instead of fired bricks.
- Apron not made properly therefore leakage
- Bad workmanship, obviously no supervision
- Pedestal slabs not properly fixed damage to pipes
- Badly glued pipes, problems with faulty cylinders.
- Community were often not made aware that they should also look after the quality of the work and ensure after care.
- No caretakers at many wells and or no organisation to do operation and maintenance.

### **Lessons learned**

1. NGO's can set up a O&M system but to make it functional

**Table 1. Table Districts in Balkh Province Surveyed and O&M system enhanced**

S/ No	District Name	Total Wells #	T/W	D/W	D/E	Working	Not Working	Dry	Repair of HP	Replacement of HP	Apron Construction
1	Khulam	93	2	89	2	32	61	18	22	2	--
2	Deh dadi	128	16	107	5	38	90	40	23	--	2
3	Nahri shahi	311	160	151	--	213	98	20	107	--	13
4	Balkh	316	133	110	73	264	52	6	47	14	--
5	Dowlat abad	473	172	245	56	277	196	49	100	--	--
6	Sholgara	215	38	166	11	164	51	3	23	3	--
7	Chemtal	181	44	60	77	124	57	2	44	--	--
8	Charbolak	361	185	104	72	99	262	26	119	13	2
9	Charkent	17	--	17	--	10	7	--	--	--	--
	Total	2,095	750	1,049	296	1,221	867	164	485	32	17

T/W = Tube well; D/W = Dug Well; D/E = Deepening; HP = Hand Pump

there is need to have an organisational set-up and run by the government/ local government (See ref. Eric Bauman in Waterlines) namely to support the communities in O&M, major repairs, solving community problems etc. The HITeams (Hand Pump Teams) should be part of the government services to the rural community.

- Organisations supporting communities with handpumps need to control quality of work, handpumps and must set-up an O&M system based on tried out systems by the WSG of Afghanistan.
- Some of the organisations did not liaise with RuWatSan MRRD or others, therefore the Provincial MRRD offices need support in coordination with all organisations providing water services to the communities.

## Reference

- Access (An e-newsletter for the Water and Sanitation Program Community) – WSP – New Thinking on Rural Water Management Models by Richard Pollard, WSP-EAP Regional Team Leader – April 29, 2005
- Erik Bauman (2006) Do Operation and Maintenance pay? Waterlines, Vol 25 No 1 Quarterly July 2006 page 10-12.
- Peter Harvey & Bob Reed (2004) Rural Water Supply in Africa: Building Blocks for Handpump Sustainability. Water, Engineering and Development Centre, Loughborough University
- Vijseelaar, Leendert (2005) Operation and Maintenance of

Hand Pumps in Afghanistan 31 WEDC Conference

## Endnotes

- IRIN, 2003
- Government of Afghanistan (GOA)/UNICEF, 2003
- WSG/DACAAR National Improved Drinking Water Database
- MRRD, 2003
- The Ministry of Rural Rehabilitation and Development (MRRD) has the major responsibility for provision of rural drinking water and sanitation.
- One improved water point for an average of 20

## Contact addresses

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