



India mark II maintenance systems

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MAINTENANCE IS AN inevitable requirement of any system that depends on mechanical equipment, let alone the rural water supply handpump systems. Historically, handpump maintenance systems have been managed in many different ways, though the principle has always been to repair the pump once it has broken down, rather than to carry out regular preventive maintenance.

In Zambia two Rural Water Supply (RWS) Projects come to mind where two different types of maintenance system were put in place. In the Central Province, covering 5 districts, a two tier system was put into place whereas in the Eastern Province – covering 8 districts, a three tier system was already in place when the Rural Water Supply Project, Eastern Province commenced work there.

The first system (i.e. the two-tier system) is a centralised system combined with community participation and depends on the efficiency and economic viability as well as the commitment of the supervising authority (in this case the local authority) to succeed. The three-tier operations and maintenance system is a community based VLOM (Village Level Operations and Maintenance) system, which depends on the participation of the local communities to succeed.

Both systems are still in operation in the above provinces with variable degrees of success, however, both of them require some changes to ensure a measure of success. We look at both systems, their weaknesses and strengths and endeavour to recommend possible changes to improve on their performances.

Central Province Rural Water Supply Project

The Rural Water Supply Project in the Central Province commenced in 1985 and ended in December 1996. The project covered 5 districts where wells were dug and boreholes were drilled with 564 handpumps being installed. A particular technological factor in the Central Project is that whereas most RWS Projects used galvanized iron riser mains and rods, in this project stainless steel rods and riser mains were used. Another interesting factor in the above project is that a large percentage of the wells and boreholes were determined by hand divining. It should be noted that all these water points have been and still are perennial water points.

Eastern Province Rural Water Supply Project

The Rural Water Supply – Eastern Province Project commenced in 1998. At this juncture, several donors had

already dug wells and drilled boreholes, with installed India Mark II and Mark III handpumps. In fact an established system was already in place. This system is the three-tier system. All the infrastructure pertaining to the three-tier system were already in place, thus making it inevitable for the RWS-EP project to synchronize themselves into the existing system.

The two-tier system in central province

The two tier operations and maintenance system in the Central Province, Zambia was designed to be a centralized system built around the Director of Works department of the various district councils in the province.

The system was designed so that there was:

- A District Maintenance Team (DMT) working as an autonomous department of the directorate of works
- A well committee elected by the community at every water point to look after their handpump
- A caretaker elected as part of the well committee to do the house keeping of the water point such as greasing, bolt tightening etc. as well as contacting the District Maintenance Team when there were any breakdowns.

The District Maintenance Team was made up of a plumber and a mason. They were trained i.e. initially employed by the project in first the plumbing and installation teams and thereafter the well digging and apron construction teams. At the end of the project works in their respective districts, they were attached to the Works Department of their districts.

The districts were supplied with sufficient spare parts for approximately 5 years, which were regularly economically priced so as to enable restocking of spare parts when the need arose. Finally, a Rural Water Supply account was opened up with any bank to cater for the depositing of all moneys realised from the sales of spares parts and repairs. Prior to the above, the well communities were sensitised to the following;

- They had to report breakdowns to the DMT
- They had to pay a call up fee to cater for fuel to get the DMT to the location of the breakdowns and finally,
- They had to pay for all spare parts required for the repairs.

However, since the DMT had only a motorbike to carry out their duty, it was decided to erect tripods over each

handpump to enable the DMT (using a chain block) to lift up the riser mains of the handpumps.

Originally, it was planned to provide each district with a pick up truck as well as two motorbikes, however, this was changed when it became apparent that the pick up was being misused. That is, it was being used for other council works instead of rural water supply works, as well as being used as a personal to holder vehicle by senior authority. Hence, each district was provided with the motorbike which had a carrier fitted to it, so that the tools could be carried when the DMT was called up to carry out repairs.

Strengths

The positive factors of this system were that;

- A RWS department was created in the local government Engineering department to deal exclusively with breakdowns of handpumps
- Spare parts were immediately available for breakdowns
- The DMT was always available for repair when called upon
- A bank account was opened to deposit money received from sales of spare parts, thus enabling sustainability of the availability of spare parts.

Weaknesses

Weaknesses of this centralised two-tier system became apparent after the project completion when local government took over. It was not long before the following became apparent;

- The RWS Honda and office were diverted from Rural Water Supply work and given to others (e.g. the Chief Messenger)
- The council charged the community the lunch allowances for the DMT for every repair carried out instead of bearing the cost themselves
- The funds in the RWS account were used for other works besides RWS works and never replaced
- The District Maintenance Team was moved from RWS work to other departments and only carried out RWS repairs work as a secondary exercise

Three-tier Operations and Maintenance Existing System – Eastern Province

The Three-Tier system involved:

- The District Water, Sanitation and Hygiene Education (D-WASHE)/District Maintenance Team (DMT)
- Area Pump Mender (APM) and
- The Village Water, Sanitation and Hygiene Education (V-WASHE) Well Committee, with elected caretaker

The APM was given a set of repair tools and would purchase the required spares from the D-WASHE stores.

After getting the cost of spares from the community the APM could then carry out the repairs and the water committee would pay him for the repairs (e.g. US\$5-00). The spare parts were given to a private businessman to sell and return the capital back to the D-WASHE who controlled the system. The D-WASHE subsidised the spare parts kit at a cost of US\$5.00 to US\$6.00 per kit.

If the repairs are too complicated, the APM can contact the DMT who will then assist in repairs.

Strengths

The advantage in the three-tier system found in operation in the Eastern Province was that it was community based.

- The well committee (V-WASHE) were motivated to purchase their own spare parts for repairs,
- Source transport was available for the APM to bring his tools to the breakdown location as well as to purchase the spare parts from the shop and finally,
- The Area Pump Mender received remuneration for the repairs carried out which was fixed at approximately US\$5.00

Weaknesses

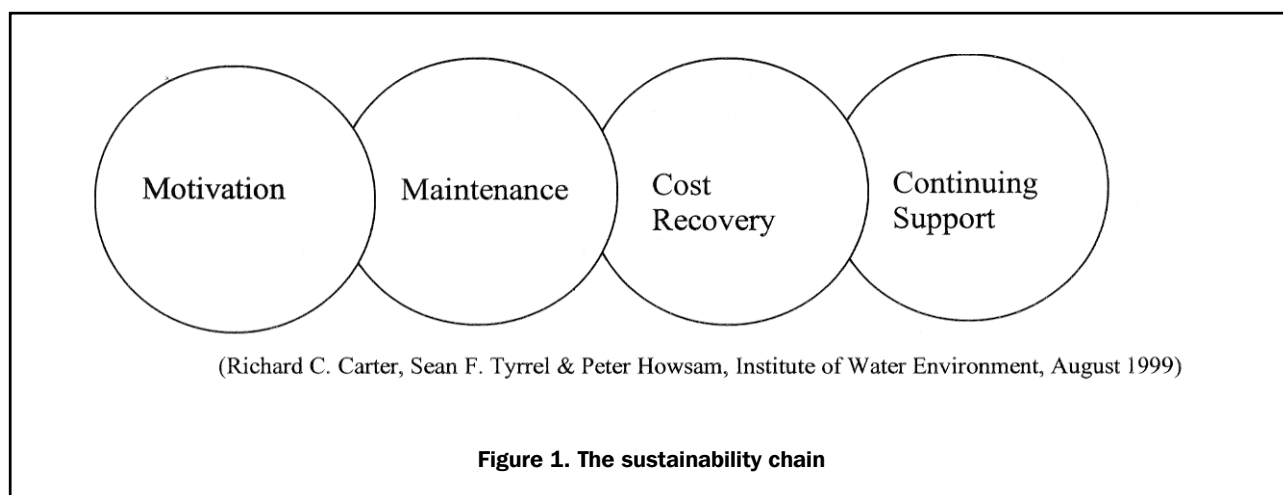
The disadvantages in the existing three-tier system in Eastern Province pertain more to the following;

- The attitude of the APM who have tended to charge more than the recommended amount.
- The cost of the spare parts kit is too low and insufficient to enable restocking of spare parts hence counter to sustainability and
- The tendency of all APMs being enticed to workshops and training exercises by offering them hefty sitting allowances
- The actual content of the training exercise which put a minimum of training time on actual pump repairs and instead emphasized more on apron and Sanplat construction.

It is absolutely essential that the core operations and maintenance workers, like the Area Pump Mender and caretakers are motivated towards the appreciation of their roles in the sustainability of their water points, and not to encourage them from the outset to look for monetary gain alone.

Terms of Reference: Rural Water Supply Project – Eastern Province

The terms of reference for the Rural Water Supply Project – Eastern Province maintenance system is to encompass all water points with handpumps. It was incumbent upon the RWS-EP Project to look at the 3-tier system and synchronize wherever possible. To this end, it was decided to carry out the following;



- Institute refresher courses in operations and maintenance for all APMs trained by previous donors especially as the RWS-EP cylinder differs from the previous handpumps
- Integrate the RWS-EP catchment areas with those of previously trained Area Pump Menders and
- Issue certificates for Area Pump Menders and Caretakers trained or re-trained by the Rural Water Supply Project – Eastern Province.

Conclusion

When examining most operation and maintenance systems including the systems discussed in this paper, four important factors come into mind: Motivation, Maintenance, Cost recovery and Continuing support

These are the factors which are hardest to maintain once the project has come to an end and the project handed over to (in Zambia) the Local Government, and these are the very points that fail and need strengthening.

- First of all, motivation should be extended to the local authorities. They should be sensitized to appreciate the value of rural water supply to their rural communities and work towards strengthening the system, not misuse the system and abuse the rural communities by charging them lunch allowances for repairs, when these allow-

- ances should be borne by themselves since the District Maintenance Teams are their personnel.
- Maintenance training should be strengthened at the training level
- Preventive maintenance (i.e. proper maintenance) should be carried out on every handpump at least every 2-3 years. The whole handpump through to the cylinder should be inspected and repaired where necessary. This will ensure that all handpumps are always in reasonable order
- Spare parts should be economically costed and not subsidized, otherwise cost recovery will be impossible. The community should pay economic prices for their spare parts.
- Continuing support for the community is essential to ensure sustainability of their rural water supply system
- Technology choice is absolutely critical. It is recommended that stainless steel riser mains be used instead of galvanised iron, thus reducing maintenance and ensuring greater sustainability.

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