

1. Findings

Project Mesa Pela, project number 26.00, District Berea

1.1 Project's history

1.1.1 Before construction starts

This water supply was planned to supplement the existing hand pump and water point supplies which were built earlier. The VDC from all three villages applied for the system. Villagers were explained by VWSS what they will get: it was not possible to drill for other hand pumps at that time. The only solution seemed to be a pumped system.

Ownership
In all villages there was a clear involvement from the beginning till people found out the high yield borehole used lies in Ha Nkalimeng. People from Ha Tebeli already felt that they will have no full right in the system because relatives from Ha Nkalimeng accused their Chief for selling water to Ha Tebeli people.

1.1.2 During construction

It went quite well besides people mostly from Ha Tebeli were not working. Construction time started in June 1987 and it was finished in July 1988. Construction time has been quite long due to village problems with village labour and site organisation by VWSS. Although there was an old pump test dating 1975, the new pump test was made late within construction time. It showed a productivity that could meet VWSS' request to fill up the tanks. The cost per capita excluding village labour was M44, a reasonable amount.

1.1.3 Official opening and handing over

Before masons moved out, they explained that from this time on the system will be owned completely by villagers and that means to maintain and repair it. In Ha Tebeli villagers never felt to own the pumped system but in Ha Nkalimeng people believed strongly they own it.

1.1.4 Time after finishing

HA Nkalimeng
 Conflicts were not within the village but between neighbouring villages from the beginning. Ha Tebeli got enough water for only two months after completion. Ha Nkalimeng complained the other villages would fail contributing diesel fund. When Ha Tebeli refused to pay, all villages called Chiefs and members. Ha Tebeli members did not come to the meeting, even the other village stopped to come to the meetings.

Finance Report
Ha Tebeli people told they paid M1 for diesel fund and complained they never got a record about how much has been collected for diesel fund by all three villages, how much fuel has been bought and how much it costs. At that time, the other two villages only paid c50. Ha

Tebeli people decided to stop raise funds.

When Ha Nkalimeng cut off the pipe going to Ha Tebeli, Ha Lekhafola was closed too because it lies on the same branch as Ha Tebeli. It could be that those villagers were willing to pay but they were smaller in number so they could not contribute the same amount to diesel fund as Ha Nkalimeng did. In 1990, water pipes have been affected by road improvement unit plants where they cross the road at three localities.

Until 1992 the engine stopped several times lack of diesel. After 1992, Ha Tebeli and Ha Lekhafola were not participating anymore in the following years. The Principal Chief decided to close the outlet going to these villages. In Ha Nkalimeng, on voluntary basis villagers started to contribute M5 each household. It was a great success; there was even one person paying M200 for a fanbelt. Because of two groups within this village, a dispute arose: the chairman of the coordination committee was trying involving those other villages again whilst the other group thought it would be waste of time. So they splitted. The following breakdown reports came from different groups within the same village. This was the reason why VWSS did not repair the engine. *recommen to close*

Ha Tebeli was a long time without water. Then villagers went to VWSS to ask for their own system. They were provided with three hand pumps in 1993. Ha Tebeli is highly satisfied with this solution; A reanimation of the old pumped system seems to be hopeless. Villagers do not like it because of conflicts and disputes. Now they have the feeling of ownership they never had before with the pumped system. The support done by VWSS at Ha Tebeli was very satisfactory: it was fast and people liked it.

1.2 Technical design and condition

1.2.1 System

The pipe line of 7500m includes both the pump main and distribution. A 20m³ stone masonry tank serves as storage from pump main. Another tank of 5m³ is built on the supply line to increase storage. 21 standpipes made of concrete to be cast. The system was planned to serve about 1000 people, now about 1600 people live in this area. The project is oversized; instead of small scale projects VWSS tried to supply three villages in one project. Project's failure was obvious from the beginning.

Physical structure is in good condition. The borehole seems to be good because villagers never had problems with yield during drought. The pumphouse is made out of bricks, but it seems to be well protected and the villages never faced theft or vandalism. Because of not running well, villagers use several traditional sources and one protected close to school though the wall has fallen inside. Population per collection point and collection distances seemed to be suitable only for Ha Nkalimeng. The valve chamber is unlocked as nobody feels responsible to handle it. Ha Tebeli was handicapped from the beginning because over 20% of households are situated more than 150m away from the next tap.

1.2.2 Engine

In 1992 there was a problem with the cooling system. Villagers on their own changed the fanbelt. The engine is covered by dust and in general cleanliness is not the same compared to other systems.

1.2.3 Pump

Another design was used for this project: the pump is outside the building. The last breakdown was caused by waste of water between pump and pipe.

1.3 Physical and socio-economic conditions

1.3.1 Physical place

The location of the project is along Mateka road. It is about 5km from TY. One school and three churches are situated in this area. The three villages are still in the lowlands, not mountainous at all. The area is easily accessible.

1.3.2 Social condition

There are big differences between the villages. They differ in number and wealth. Ha Nkalimeng is the biggest village, Ha Tebeli second and Ha Lekhafola third. In all villages the number of persons belonging to village but working and living outside is quite small. Besides of that, all three villages have in common a lot of young men returning from mines who are without any work instantly.

1.3.3 Economic condition

Villagers' income is from mining, farming, having livestock and homebrewing. But there are differences between the villages: in Ha Nkalimeng villagers have even three big houses per household whilst in Ha Tebeli a mixture exists from very poor to wealth. People possess donkeys, cows and sheeps.

1.4 Community management

1.4.1 Personnel organisation

There was a Coordinating Water Committee. It contained the three village Chiefs and two ordinary members from each village. It was elected in 1985. **The piquancy;** Treasurer and Chairman came from Ha Nkalimeng... In that time there was no area VDC handling the conflicts. In Ha Nkalimeng a new VWC was elected. This initiative came from the newly elected VDC: "forget about those people in other villages and elect your own VWC". Duties will be collecting diesel fund and maintenance fund and reporting breakdowns. Villagers think

strongly a VWC is needed.

1.4.2 Relationship between the major stakeholders

VWSS could or wanted not help. They were helpless because confusions were already within the villages and VWSS decided not to intervene. Ha Nkalimeng had a good relationship to DRDO and DS whilst Ha Tebeli was highly satisfied with the service done by VWSS. DRDO and VWSS must decide which section would be responsible for solving village disputes. In 1992 the engine was not repaired purposely because of conflicts within the village. After reorganisation, VWSS will help villagers again.

People do not know what the Chief's role has been in the past. Villagers gave him not much importance; the Chief stands no longer in the VDC. The new leadership will be VDC. It will be like an umbrella and it is determined to help them. It is a good development after this short time VDC is elected.

Villagers said five different DEs have been in the past... They could not identify difference between DE and STO. It is surprising that no dispute comes up again between the villages concerning the on-going dam construction. It must be organised very well and people must respect the new Government fully.

also the participation seems very high because the dam is constructed under food for work again. The organization of labour is controlled by (BCP) (Communist Party) organizing body

1.4.3 Operation and maintenance

There was no communication before. Nobody was responsible making reports to community. VWC was out of order. VWC should have been responsible for collecting diesel fund and seabo, reporting breakdowns and checking children not playing with taps.

There were four WMs in the past. Confusion reigned, everybody was handling the engine. The new WM used to work with diesel engines and he will get training by the previous WM. He will be responsible for starting and stopping the engine, filling in fuel and checking oil. The WM thinks a toolbox is not necessary.

The new VWC thinks not to work on a voluntary basis although they do not get any money. It will be their role to act in the VWC. VWC plans to pay the WM. Breakdown reporting is still functioning: the broken down system has been repaired one day before we visited the village.

1.4.4 Bylaws

In construction phase, a lot of people were not participating the work. They were charged M800. Nobody paid. The Principal Chief charged them M100. Villagers paying seabo were very upset about this decision and stopped to pay. This is an example for false understanding concerning bylaws. People making bylaws consider a village as a society. This is not true: bylaws must be developed for the whole community. Bylaws must be a service. Some Chiefs and VDCs believe penalties are solutions to everything without discussions. It works only when penalties are legalized clearly by an appreciate policy. Following a water supply should

In other words village is think strongly that for them to get organized and get going they must have the bylaws, they think they are very important however this should be careful on so as to enable everybody to participate in the process for this is a service not get as a society

be on a voluntary basis. There must be other ways to convince people but one is for sure: it takes time!

1.4.5 Fund raising

Collecting diesel fund was parted: one month this village had to pay and the next the other village. This methodology of collecting diesel fund cannot be the right way because villages do not have the same size and conflicts are not avoidable.

In those times, no receipts were given to villagers. Financial reports were short and written in the record book. Fuel fund and seabo are collected in a similar way as in the other project surveyed in Berea District. The DE must have been given high influence on to villagers and especially VWC. VWC has got no problem to collect fuel fund but people seem to be reluctant to pay for seabo. Although villagers can pay in installments, the amount of M25 is too high without collecting it continuously. Due to the paid M600 in 1990 because of damages caused by road works, villagers think VWSS must fix the coming six breakdowns for free.

2. Conclusions

2.1 Community assumes responsibility for operation and maintenance

The major aim behind the idea to work as close as possible with local people is to construct and build up a supply that will be socially integrated into the local structure. This will help to increase the responsibility of the villagers for repair and maintenance work. Different options of supply systems and service standards including maintenance cost involved have to be thoroughly discussed with the villagers. Making decisions should not be carried out only with engineer's eyes! *what is the meaning? which one now*

In the villages visited, community involvement clearly starts during preparation stage at the project however still not enough. VWSS seems to assume that technical issues of rural water supplies are too difficult to explain to rural communities.

Only if villagers' decisions are well thought over, a higher willingness to pay can be expected. Especially in pumped systems it is of eminent importance studying different options before a village is provided with a pump. Pumped supplies succeed only when they deliver the services on a reliable basis which villagers want.

The idea of village participation in maintenance policy must be built up more and more and taking over responsibility to care for o+m has to be considered as part of a development process. It is a proven fact that well running systems are the villagers' responsibility with little help from VWSS and moreover that community management will be the only way to keep costs for maintenance at an affordable level.

It is amazing to see these well formed organisations within the villages even when the system has been broken down for years. Nevertheless, there are a lot of conflicts within such organised teams. There are various reasons why community management becomes so difficult in rural areas: committee members know they are not protected by law if they have to charge a community member or they do not want to be used against their fellow villagers. Everybody can do whatever they want to do without being charged and VWSS does not give recommendations what committee members should do in situations when courts are involved.

The survey showed that a supply system consisting of an institution like a Mission or a Farmer's Training Center has to be managed very carefully. All villages close to such institutions seemed to be dependent on those bodies. VWSS should give hand to VWC or VDC if they are dealing with clever people from such institutions. Those people know clearly to handle laws and manipulate people. So there should be a strong support that villagers are not going to meet disappointment in future. Physical place and remoteness have no considerable impact on people's responsibility.

The newly elected VDCs seem to be very powerful and villagers have trust again in these organisations. So there is an absolute need for VWSS to give clear direction and guidelines to support these rising VDCs which have got legal power. It hurts to see villagers not getting the support they need. The team hopes it will be not too late to win again villagers' trust. There should be no doubts and rumours in a village, otherwise people will loose trust and confidence in VWSS. Those are some of the most valuable points VWSS' policy has to

- It has a lot of all the things that people have to pay for. The local fund does not do much. People have to pay but they have doubts about how much they have collected and how much has been used. From surveying report about people's funds is much.

protect instantly.

2.2 System is reliable and meets villagers' need

The chosen engines and pumps seem to be appropriate to this kind of pumping: they are quite cheap and a great variety of designs are available to meet a wide range of pumping conditions.

It may be uneconomic to run diesel engines and pumps for short periods of time and they tend not to give their best when run on an intermittent basis. Because of that fact, pumping for short and intermittent periods is an expensive way of pumping water.

Choosing the right duty for pumps, the right hours of working and the right amount of standby are matters that must be most thoroughly investigated by engineers. But the design has to work in social and financial terms as well as narrow technical terms. Wherever the site conditions allow, different options for the supply system should be considered. The advantages and disadvantages including costs and in particular maintenance requirements should be discussed with villagers. Especially planned projects supplying several villages should be analysed thoroughly not only in technical but in social issues. It cannot be the solution to supply Ha Tebeli with handpumps after failure of the pumped system. This is in financial issues the most expensive way and at the same time in social issues the cheapest to solve village disputes!

If there is no other choice than a pumped system, be aware: sophisticated equipment demands sophisticated maintenance and is often inappropriate. Engineers have to increase the priority to maintenance friendly engines. Designing the system to require minimum operation and limited maintenance is a way to help ensure its survival. It is very important people benefitting from the project make decisions concerning following points: ability and willingness to contribute and acceptance of the option.

VWSS has to plan small scale, flexible projects. A plan should be a blueprint, not a prison. VWSS should be able to incorporate new information that emerges during the project. New systems should be provided with a generous supply of spares as well as replacement parts.

Although a number of different spring measurements are taken before a system is designed if these all take place during wet years it is possible that a system experiences problems in periods of drought. It is a substantial point for pumped systems that pump tests or spring measurements are performed with reliability, not within construction phase...

2.3 Community rises funds for o+m

The collection of maintenance fund results in social conflict in many communities. Although the amount of money per household (M5) is low, almost every community seems to have a number of defaulters who do not pay. The solution cannot be high penalties, at the same time VWCs do not have the right to prevent people not contributing or they have no legally recognized mechanism for enforcing payment. In the end, the only pressure is social which often leaves communities divided. Villages have to use methods which will result in greater cohesion rather than conflicts.

Investigations into this important aspect need to be handled very sensitively. Especially when a number of separate villages gets water from the same system. Each village may have its own VWC, collect its own money and keep its own bank account. Yet people must find a way to work together so there is always fuel to keep the one engine on which they all depend working. This is a big problem and rural communities are left to make their own decisions on which way to contribute. VWSS must be very careful how they explain policies and make villagers understanding for contributing seabo, especially making estimations and examples. In the beginning, VWSS has to guide villages: it cannot be the right way, that a high populated village pays only the half of what the neighbouring village raises for diesel fund. VWSS has to enlighten committee members on collection of funds from the very beginning: it will be an on-going and time consuming task that requires considerable commitment.

Villagers' willingness to pay is high, if they understand the reason why they should pay and see a benefit for themselves. It is important that villagers notice water is not for free. There must be reconsidered external factors when collecting money for maintenance fund: it is better to raise funds after harvesting time, rain time or before villagers have to pay for school.

Transparency in financial issues is highly recommended. An advisory treasurer is needed for examining books. Accurate and honest in making reports to the villagers, they will trust and be cooperative. It helps to give receipts to villagers who have paid. Moreover, it is a good solution to have one person in charge of each water tap. This person collects the monthly payments from families making use of this particular tap.

Willingness to pay will be negatively affected when breakdowns are not reported or spare parts are not available, the collected sum of money will have no use. Regular monthly payments are less problematic than single initial payments into a maintenance fund.

Concerning big penalties: it is better to allow people to pay in installments rather than totally preventing them from drawing water. This is to avoid conflicts and even damage to the water system from people feeling they are not being treated well. Cost recovery policy helps make even those communities who never paid for their maintenance to be more responsible. Full cost recovery is a target far away in future.

2.4 Preventive maintenance and system management is ensured through voluntary labour (VWC/WM)

2.4.1 Operation

VWC and WM are the key to longterm success of any system. VWC's role in the post construction phase can be delicate in particular in view of the established VDC. Each of the four projects surveyed handles o+m differently from each other. One village relies completely on its own resources, the other village has never sent any report to VWSS and the other village relies on VWSS' assistance.

Success depends upon adequate and continued financial provision for o+m as well as for construction. The lack of such provision is the prelude to the failure of the project. Operating problems are of less importance to the community than the maintenance problems which completely stop the whole supply system.

WM (
 limited to describe some technical problems

At present, WM's mechanical skills are on a such low level that they are only used as reporters of breakdowns. Other operations are left for VWSS' maintenance team. It is strongly recommended that villagers should give something WM every month to encourage him and thank him for his work.

Although design understanding leads to increased effectiveness of operation, the survey showed there are pictures or images of engines nowhere. The less skilled the WM is, the greater is the need to have a programme of duties which he can follow. If an operating manual would be properly prepared and understood by the WM, it could be the greatest single factor for encouraging efficient o+m. Additional drawings are likely to be required for operation. Performance data should be required on a weekly or daily basis for each activity (filter washing, oil changing). Simple but effective tricks of instruction will enable quite complicated operations.

2.4.2 Maintenance

The creation of an efficient maintenance service will be facilitated if VWSS states its maintenance policy clearly. For consolidation of a maintenance policy it is necessary to work out a concept that is appropriate to local situations. A general maintenance guideline is the basis for further elaboration in cooperation with communities. Moreover, responsibilities must be clearly defined and adequate equipment must be provided. ? like what

VWSS does not have a clearly defined policy on how far the waterminder can go in maintenance and which responsibilities it takes in maintaining rural water supplies. This confuses communities as to what they should report and what not to report. It will be desirable that WMs should undertake as much routine maintenance of all kinds as is allowed by their duties, their abilities and the tools so that the costs of visits by District workers is held to a reasonable minimum. Providing on-the-job training for WMs should be a standard component of VWSS. These trainings must be from the very beginning, because once a pattern is established, change may be very difficult. WMs are influential on the whole management of water supply systems. Of course, periodic visits by well-equipped teams belong to VWSS' duties.

To be effective, breakdown services must be carefully planned. Potential crisis must be identified and reasonable provision made, and tools, equipment, materials, transport and men must be available. The most important point in breakdown repair is to show a quick reaction to villagers.

In urban centres, where there are reliable, privately operated mechanical workshops should be engaged, the cost-effectiveness of contracting with them for maintenance and repair work should be carefully examined. However, as the sophistication of new supplies increases, the demand for workshop facilities must increase with it.

In some villages, no reporting was done due to a number of reasons; one of which is the community did not want the type of system given to them. VWSS has had the burden of unnecessary repair which could easily be done by the WM.

2.5 DRWS provides efficient support

The emphasis must be of providing considerable quantities of a wide range of materials. Spare parts are often in short supply and the cause of long breakdowns. These are best obtained through a Departmental store in order that they may be quickly and certainly available when needed, and also purchased at the lowest price possible. Adequate planning, controlling and checking of stores has to be intensified. Another possibility would be to store a spare engine and in case of breakdown to change it. But the emphasis must be of storing enough spare parts; but do not give more money to District Offices to buy spare parts, it would be too tempting... *what is the meaning*

2.5.1 Staff motivation

VWSS has to increase the levels of satisfiers (recognition, work itself, responsibility) and remove any reason for discontent with the levels of dissatisfiers (interpersonal relations, salary, status). Deep interest in WM's work is one of the most powerful motivators. The right tools should be provided, with facilities to keep them in good working order. One of the quickest methods of improving poor treatment is to initiate a regular monthly review by the Supervisor. Periodic contact and tactful suggestions for improvement and positive encouragement may do wonders for morale.

2.5.2 Assistance by VWSS

Maintenance is one of the most ignored in VWSS. There is no balance between maintenance unit and construction unit. The survey showed that education provided to VWCs, WMs and communities was mainly on construction preparation and implementation of the system. This excludes maintenance which forms the important part of the whole process. Committee members are the ones who desperately would like to see VWSS' assistance during o+m. It is a must for VWSS to hold meetings with VWC, VDC and community Leaders to talk about problems that may have been arisen after completion of the project. If not repairing a system for a long time, at least there must be an explanation to the whole of the village. Those visits would be part of maintenance monitoring and on-the-job training to support and educate management organs. Villagers trust more where VWSS staff worked close for longer periods during construction. VWSS must pay attention to changes within the staff: it cannot be advantageous when DEs change four times within three years. Moreover, the handing-over must be carried out carefully.

2.5.3 VWSS' policy

VWSS should develop its own capability to provide community support in maintenance which would provide an input to balance the already strong technical elements. The activities of community related problems are enormous and one VLO per District cannot at all perform all duties as expected. VAU and VLO can become effective if their positions are not overloaded. These units must be given the necessary staffing resources to fulfil responsibilities. It may be wise to increase VLO's capacity to resolve on-going conflicts in older projects.

3. Recommendations

As a consequence of the conclusions made in this report and the experiences made during the field investigations, the following recommendations can be made to be appropriate for VWSS at the present stage.

3.1 Surveillance project

O+m problems cannot be solved until they are recognized. The first step must be an evaluation of existing projects. A critical review of past breakdowns provides valuable insights into the entire system of o+m. Pay attention to results which CSS report shows: only a few numbers or facts corresponded with surveyed, actual facts. If you really want to iron out the truth, you have to go to villages to get information. The magic point lies in interpreting various statements and declarations even when they are in contrary. As a surveyor, do not hide behind questions like "since when is the breakdown" or "how many times has the system broken down". Villagers are human beings and reasons for breakdowns are mostly social, i.e. the fact that two villages do not consist of the same number of people living there could be a reason for a breakdown. It is as easy as that!

For future surveys, the team has to consist of several trained people having amongst them understanding of sociology, psychology, local culture, language, environmental aspects and principles of adult education. Why should the team not include members of the community for which the programme is being prepared? These people should be able to step back from community's life and view it with some objectivity ("two eyes see better than one", Mauritanian proverb).

The questionnaires must be further developed. It is recommended to build up different groups of indicators which represent the most affected issues on o+m. It is far more important to examine a couple of supply systems frequently rather than to try to examine as many as possible. The focus must be on borehole fed as well as spring fed systems, in the whole of the country and especially in urban areas.

3.2 Improving o+m

It is easy to recount points which are critical for effective o+m. The implementation of sensible solutions is always more difficult. Nevertheless, I listed different options to improve o+m and I am sure they could improve the present situation, but they need to be discussed further.

3.2.1 Motivation

If nobody cares about o+m, improvements are impossible. Therefore, the first thing to do is ensure that everyone concerned with VWSS is aware of the need and importance of o+m. Most importantly, consumers themselves should be part of the operational phase.

3.2.2 Management

Good o+m does not just happen. It has to be planned and provided systematically; but the question of community management is complex. For that reason, VWSS must have completely legalized policies that are written down and which can be adopted by all Districts.

VWSS is on its right way to change from a mainly output oriented organisation to a more balanced institution which attends to maintenance and village affairs with the same priority as for construction. Improvements in maintenance are long term processes which are extremely slow and difficult to measure. Although much effort has been directed to those important aspects, the on-going maintenance should be continued and further reinforced. But targets should not be put too high. VWSS has to take step by step.

Information flow within VWSS has to be improved: it cannot be right that the DE confirms the system is running very well and when you go out to survey, you hear the system has broken down totally for years not even 10km from DE's office...

3.2.3 Money

Most villagers are prepared to pay reasonable prices for such an essential service as a water supply really is, provided that they are delivered satisfactory. The financial contribution must be on a higher level, especially in more urban areas.

VWSS has to look for solutions that can be duplicated in the hundreds for the greatest impact on development. But the solutions must still be tailored to fulfil local need within each District and area.

3.2.4 Manpower

In the present system VWSS itself looks after all the constructed systems by sending skilled personnel at regular intervals to maintain. This increases operating costs and it strips off community's responsibility and ownership of the system. Maintenance costs of Ha Khotso will emphasise this problematic point within one year after completion date:

1. maintenance: 85% of costs are caused by transport
2. maintenance: 77% of costs are caused by transport
3. maintenance: 100% of costs are caused by transport
4. maintenance: 100% of costs are caused by transport
5. maintenance: 60% of costs are caused by transport
6. maintenance: 55% of costs are caused by transport

It results an average factor of about 80% of costs caused only by transport. It is understandable, villagers protest against this policy even when the repairing team appears two or three months after the system has broken down.

Why not cooperate with a corporation like TSTC (Thaba Tseka Skills Training Center) to provide good workmanship or an exchange of experience with organisations working in the

southern part of Africa having a better knowledge about o+m than VWSS has it now? The danger exists that VWSS will overload its apparatus by forming new units like VAU but if VWSS will attach importance to this new unit in an appropriate way, it will be highly useful.

In the villages, external inputs should be kept to a minimum to reduce dependency and increase stability. For that reason, VWSS has to provide education and training, particularly for young people. WMs must be given clearly defined duties. WMs' documents are not sufficient and the survey team never found a job description or a log book. Although WMs would like to know more about engines, we never found any pictures or images of the engine.

It is worth noting that the most important point for no flow is not technical. Mostly, community disputes had resulted in breakdowns. Cases like this seem to occur most often where different villages share a single system or a pumped system includes other projects especially hand pumps. It may be a suitable VLO's job to resolve on-going conflicts in older projects.

3.2.5 Village selection

A social study should guaranty that the proposed water supply system is located in an area where the social situation allows for sustainable use and maintenance. This procedure shall avoid mistakes like a localisation in areas with disputing and quarreling villagers or opposing groups. At the same time, project size should be checked viewing community capacity. A firm structure within the village will protect against theft.

3.2.6 Poor logistics

Imagine yourself as the WM responsible for the water supply serving a remote village which is a two hours drive over gravel roads from the nearest workshop. One day you learn that the diesel engine has ceased working and the tank will be empty. You cannot diagnose the engine problem and even if you could, there are no equipment and tools for inspecting the engine. Communication with your District Office depend on the public telephone system (if any) or a message carried by the local bus. When the message is received at the Office, they have to locate a mobile vehicle (one of two is broken down and the other is out), competent repair crew and a supply of equipment and spares for the as yet undiagnosed problem. Is it any wonder that villages are used to breakdowns which take up to 10 months to repair?

The cheapest longterm solution will be to train the WM to complete basic repairs himself. This will involve better training and equipment for the WM but will greatly improve the service. The WM should be member of VWC and acts as the link between villagers, VWC, VDC and District Office. Major tasks and operations will consist of servicing the fuel, air and exhaust system or checking the gland packing and vee-belts, adjusting them and replacing them if necessary. WMs should be able to read and write English, and do simple calculations correctly. The applicants must be mentally and physically fit and should be cooperative and careful persons who are able to communicate easily with other people. Moreover, VWSS has to be prepared to offer troubleshooting services, that is to help diagnose and resolve practical problems that arise during operation.

There is no reason why creative planners should not put as much emphasis on o+m of water services as is usually spent on the planning for new facilities. In fact, the economic return on investments in keeping present systems functioning will be considerably greater than the return for investment in new facilities.