BRIEF OVERVIEW
This handbook explains and compiles the steps and guidelines used by Inter Aide within his Maintenance system program (O&M) from the recruitment to monitoring and evaluation of the Areas Mechanics. It serves as reference tool for hand pump Area Mechanics establishment.
PREFACE

InterAide Operations and Maintenance Project is pleased to present this Area mechanic Training Handbook to share its experiences and expertise in best practices in setting up, monitoring and follow up of Area Mechanics networks. InterAide appreciates the work done by other stakeholders in promoting Area Mechanics such as JICA by producing AM handbooks. Through this handbook we would like to fill some gaps and share our practical experiences. We have dedicated much of our time to develop training and follow up materials for Area Mechanics. Hopefully this handbook will enrich our joint quest to consolidate the work done in training, follow up and promotion of Area mechanics and allow other stakeholders understand our approach. It serves as a complete reference tool for AM network establishment.

In Malawi, rural communities still lack access to safe water. This is largely in part due to ever increasing demand for new water points and to a larger extent lack of proper structures to support the Operation and Maintenance of the existing infrastructures. In response to the latter factor, InterAide in 2008 piloted and established the Operation and Maintenance Systems Program to address the issues of borehole maintenance. Since then InterAide has trained 124 Area Mechanics and 56 Partner Shop owners in the 5 Districts of Dowa, Kasungu, Salima, Mchinji and Ntchisi.

InterAide is developing strategies and working closely with DWOs to build capacity at the level of District Water Offices as one of its core strategy in retaining sustainability of the AM network.

Cognizant of the important role of the CBM 1 training, the Community Based Management approach, cannot work without supporting structures such as the Spare Part Supply Chain and AM network. Our experience has proven that AMs provide a quick solution to borehole maintenance needs of rural communities. It is against this background that we call upon all stakeholders to work together to support the Maintenance networks.
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**LIST OF ACRONYMS**

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<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>ADC</td>
<td>Area development committee</td>
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<tr>
<td>AEC</td>
<td>Area executive committee</td>
</tr>
<tr>
<td>AFRIDEV</td>
<td>African development pump</td>
</tr>
<tr>
<td>AM</td>
<td>Area Mechanic</td>
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<tr>
<td>CBM</td>
<td>Community based management</td>
</tr>
<tr>
<td>DC</td>
<td>District commissioner</td>
</tr>
<tr>
<td>DEC</td>
<td>District executive committee</td>
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<tr>
<td>DWO</td>
<td>District Water Office</td>
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<tr>
<td>DWDO</td>
<td>District Water Development Officer</td>
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<tr>
<td>GVH</td>
<td>Group Village Head</td>
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<tr>
<td>MALDA</td>
<td>Malawi district action pump</td>
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<tr>
<td>MO</td>
<td>Maintenance Officer (Inter Aide)</td>
</tr>
<tr>
<td>MOU</td>
<td>Memorandum of understanding</td>
</tr>
<tr>
<td>MOWDI</td>
<td>Ministry of Water Development and Irrigation</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>RUWASO</td>
<td>Rural Water Solution (Private Company organizing the spare parts supplying in the central region)</td>
</tr>
<tr>
<td>T/A</td>
<td>Traditional Authority</td>
</tr>
<tr>
<td>VDC</td>
<td>Village development committee</td>
</tr>
<tr>
<td>VLOM</td>
<td>Village Level Operation and Maintenance</td>
</tr>
<tr>
<td>WASH</td>
<td>Water Sanitation and hygiene</td>
</tr>
<tr>
<td>WD</td>
<td>Water department</td>
</tr>
<tr>
<td>WMA</td>
<td>Water Monitoring Assistant (from the DWO)</td>
</tr>
<tr>
<td>WP</td>
<td>Water point</td>
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<tr>
<td>WPC</td>
<td>Water Point Committee</td>
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Before starting any AM network process in the district some groundwork is required. The first step is to meet the District Water Officer. This helps to lay a firm foundation for support of the stakeholders in the district and have effective collaboration with the stakeholders concerned. Below is a summary of a district entry process.

1. **DISTRICT WATER OFFICE**

The DWO office is instrumental in Operation and Maintenance issues at district level and for sustainability of the AM network. It is only normal to involve them through consultations at every stage. The office should be informed on the criteria and explain why we chose those criterions.

InterAide is currently developing strategies towards integrating the established AM networks in the District Councils. We are closely working with DWOs Offices in the Districts of Dowa, Kasungu, Mchinji, Ntchisi and Salima. We have undertaken to make DWO meetings in order to have their input and active involvement in developing AM networks in their districts.

Salima district is currently at advanced stage in integrating AMs in the District work plans as evidenced by allocating a budget towards the support and follow up of AMs. The DWO has appointed one WMA as a manager for the AMs network in the District. This is a good step towards sustainability of the network that needs support from the WASH sector.

*Material: Project Profile*

2. **ORGANIZE DCT MEETING TO BRIEF STAKEHOLDERS ABOUT THE PROJECT**

The DCT is the technical arm of the district in water and sanitation; it consists of the following sectors, the District Water Officer, the District Health Officer, the District Community Development Officer and representatives of NGOs in the district. Consultations are made at this point to integrate them and allow them to support the AM network through their extension services.

*Material: Project Profile*

3. **ORGANIZE DEC MEETINGS TO SENITIZE STAKEHOLDERS ABOUT THE PROJECT**

The District Executive Committee is chaired by the District Commissioner. Its purpose is to coordinate development projects in the District. The DEC is composed of all heads of departments and NGOs in the district. It debates and approves projects and gives directions on distribution of projects in the district.

To avoid duplication of efforts the DEC is an important arm at the implementation stage of the AM network this reduces confusion at community level.

4. **ORGANIZE ADC MEETINGS TO SENITIZE CHIEFS ABOUT THE PROJECT**
The ADC is the development coordination unit at T/A level. This branch of district administration structures acts as a link between the district assemblies, development partners and communities on the other hand. The ADC is involved in selection process so that Area Mechanics are recognized and accepted by communities.

**Material: Project Profile**

<table>
<thead>
<tr>
<th>CONTACT</th>
<th>CONTACT POINT</th>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st contact</td>
<td>DWO</td>
<td>Inform and consult DWO about the Project collect data, maps and information about O&amp;M initiatives in the District</td>
</tr>
<tr>
<td>2nd contact</td>
<td>DCT</td>
<td>To arrange for briefing with DCT and organize a DCT meeting</td>
</tr>
<tr>
<td>3rd contact</td>
<td>DEC members</td>
<td>Seek approval to start work in the District – sign MOU with District</td>
</tr>
<tr>
<td>4th contact</td>
<td>ADC members</td>
<td>Brief ADC members about the Project - Sign MOU with T’s.</td>
</tr>
</tbody>
</table>
SECTION 2. AREA MECHANIC NETWORK ESTABLISHMENT PROCESS

1. AREA MECHANIC SELECTION CRITERIA

InterAide developed several parameters to guide selection and setup the AM network. Careful consideration must be given to every aspect that may impact on the smooth operation of the network. Considerations are given to geographical setup of the district, size of the district in sq meters, number of WP and water source technologies available in the district, ratio of WP to one Area Mechanic and area to be covered by an AM. See below paragraph for details.

1.1 Determine geographical barriers in the district

Geographical situation of the district helps one understand the geographical challenges in the district. These may include mountains and rivers that act as barriers to people movement and cut off sections of the district from access roads. In this case special consideration may be given as regards to the ratio of area mechanics to WP.

Source of information: District Maps

1.2 Determine size of District in sq km

To establish an effective network of area mechanics we should first understand the various aspects of the district. Determination of the size of the district will help us estimate the number of area mechanics to train.

Source of information: District Maps

1.3. Determine number of WP and Water Source Technologies

Before establishment of an Area Mechanic network, source data for water points and water technologies in the district. This information can be sourced from the DWO or the District Planning Office. This step helps to establish the correct number of Area Mechanics to train

Source of information: District data base

1.4. Ratio of AM to WP and Coverage per AM

InterAide recommends a minimum of 30 WP and a maximum of 100 WP per AM. This figure was reached at after considering other aspects such as efficiency and follow up. This helps Maintenance Officers to have a good number of AMs to supervise. Consideration has also been given to allow AMs have economic incentives. The number of water points may vary according to the population, alternative sources of water, and geographical limitations.
1.5. *Area to Be Covered by One AM*

An Area Mechanic should have an area which can be covered by cycling. InterAide Maintenance Systems Projects recommends an area of 25km radius. The maximum is 50km radius between two AMs.

2. **AREA MECHANIC RECRUITMENT PROCESS**

This is an important step in the establishment of AM network. It should be borne in mind that when you are recruiting you are making a commitment for a long term investment through training the individual AM. As is always the case it becomes a challenge dealing with human resources. There are key considerations to be taken i.e. motivation of the prospective AM, his economic levels, commitments to other demanding occupations, age and standing in society. To determine the above, a rigorous selection process has been designed to select an AM. Matters of withdrawal and replacement of AM are dealt with in a separate chapter. Below is a step by step process for selection and recruitment of AM;

2.1 *Random selection of GVHs to select people for oral interview through ADC meetings*  

In order that AMs are trusted and recognized by communities, the involvement of local leaders in the selection process through the ADC meeting is important. Local leaders are asked to recommend at least 3 persons to be assessed through oral interview. Priority is attached to proactive and self motivated individuals.

The questions in the oral interview are designed to look for the following attributes in the people selected;

a. Motivation  

b. How they economically sustain themselves  

c. Participation in other community development work  

d. Knowledge of water access issues in their area  

e. Educational background

*See Appendix - AM recruitment Oral interview – page 19*

2.2 *Written Interview*

An AM job requires writing and advising WPCs on the spares to buy and report on his diagnosis of water point problems. This aspect of an Area Mechanic job requires basic literacy skills. We have also considered the evolving demands of AMs job and future roles for example involving them in periodical functionality surveys.

The written interview is structured to measure the prospective AM on the following;

a. Numerical skills and writing skills  

b. Basic technical knowledge of Afridev Pump
c. Problem solving skills

*See Appendix – AM recruitment written interview – page 23*

### SUMMARY AM RECRUITMENT PROCESS

<table>
<thead>
<tr>
<th>STEP</th>
<th>CONTACT</th>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>ADC meetings</td>
<td>Random selection of GVH to select at least 3 people</td>
</tr>
<tr>
<td>Step 2</td>
<td>Prospective AMs</td>
<td>AM written interview to select 1 person for training</td>
</tr>
</tbody>
</table>

### 3. MAPPING

It is only true that the AMs have a better knowledge of the areas they will operate. The next step is to meet all selected persons to determine their boundaries. Through an excise called mapping, AMs make a sketch map of their area, this map includes road, rivers, mountains, villages and other features that help them build boundaries. This process helps to approximate location of AM and avoid overlapping of areas. A district map is then used to fix the agreed boundaries. Depending on the outcome, you are able to adjust and adapt the findings of earlier processes.

**Objective:**

The objective of this exercise is to have an overview of the distribution of AMs and match realities on the ground to fix AMs boundaries.

**Materials:** flip charts, markers, pencils and district map
Our training approach is geared at empowering beneficiaries with skills to find their own answers to challenges affecting them in rural water access and use of local resources, guided by the spirit of self reliance. Area Mechanics training is done through a participatory approach with 80% dedicated to practical and real field situations. The training deals with 2 VLOM pumps as designated by the Malawi Government namely, Afridev and MALDA hand pumps. However, organizations can sponsor AMs to train them on any chosen technology. For example PUMPAID in 2014 trained AMs on Elephant pump repairs in Mchinji District.

Demand generated refresher trainings are organized to update AM skills in pump repairs. We organize quarterly review meetings to offer AMs an opportunity to share technical challenges and field experiences providing additional ways in improving AMs’ skills.

We strive to equip Area Mechanics with requisite skills to enable them gain the trust of Water Point Committees and communities.

1. OBJECTIVE OF THE TRAINING

The training objective is to produce Area Mechanics who are able to handle any type of repair. The training outcome is designed to produce independent entrepreneurial professional pump mechanics who understand that they will work for a fee and not as volunteers. The training prepares Area Mechanics for a role in communities as a first point of call in rural water access related issues. The AM is only exempted in major rehabilitations which require heavy machinery such as a compressor.

Area Mechanic Level of Competence:

a. **Minor Repairs** – this involves problems mostly to do with simple pump repairs.

b. **Preventive Maintenance Repairs** – this involves an agreement between AM and communities that the AM undertake to make 4 visits in 12 months to check on the operation of the pump, and give advice to the WPC on spares to be purchased and replaced.

c. **Major repairs** – this intervention deals with major breakdowns of the water point i.e. fishing pipes, fishing rods and other objects, removing and reassembling of rising main pipes and making joints on the rising main.

How Network Operates?

After training AMs are introduced to communities through ADC meetings. They are provided with fliers to advertise their services. Once communities engage an AM he explains the services he can provide and the charges involved. Charges range from MK1, 000 to MK4, 500 this is according to kind of work and distance travelled by AM. There are three main services
referred to as **CONTRACTS** which AMs offer to communities namely, **Preventive Maintenance Contract**, **Repair Contract** and **Pump Security Contract**. This is explained in detail in a subsequent paragraph.

Once an AM and the community have agreed to work on the WP, the AM dismantles the WP and makes his diagnosis of the WP, he then writes a quotation detailing the cost of spare parts and labour charge. We ran a parallel spare part supply chain where communities are advised to source spare parts. When the AM repairs the WP, another standard receipt is done detailing the spares actually used and labour paid. AMs are advised not to involve themselves in actual purchasing of spares. With this arrangement we have managed to stem vandalism of WP and instill confidence in communities in the integrity of the AM network. These papers also help to have transparency at community level where communities can have access to the written information provided by AM. These are in triplicate with one copy given to the community/WPC, one copy to the office and one is retained in the AM book. **See Appendix for standard AM quotation and Contract Receipt.**

**Types of Services Provided by AM:**

- **a. Preventive Maintenance Contract**
  In this kind of contract, communities pay the AM an amount of MK4, 500 for a 1 year service contract. The AM will carry out 4 visits in 12 months to the WP to replace worn out parts and advise the community on spares required for the next service.

- **b. Repair Contract**
  In this contract, the community/WPC engages the AM to repair their water point when it’s breaks down. It is mostly a one off contract and the AM is paid for every repair done at the WP.

- **c. Security Contract**
  In this contract the AM offers to fix a prefabricated locking system designed and promoted by InterAide at a fee. **For pictures of Locking System see appendix**-

## 2. LIST OF TRAININGS

### 2.1 Initial Afridev training

The initial training is to train AMs in simple and major Afridev pump repairs and covers subjects that prepare them for their role in society as Area Mechanics. The initial training is the **AREA MECHANIC TRAINING**; the training is conducted for 5 days.

The training is done through a participatory approach; practical elements take up 80% of the allocated training time. The training starts with a pre-training evaluation to measure the levels of knowledge of the participants and adapt the training delivery. On the last day, a post – training evaluation is done in order to know the results of the training. This helps develop interventions to assist individual AMs during field visits and subsequent follow up trainings. The pre and post evaluation questionnaire is the same.  
**See appendix - AM training pre evaluation questionnaire – page 26**

The training is divided into 5 main sections referred to as activities in the training manual. The content of the initial Area Mechanic training is as summarized below. For full content of the Afridev initial AM training...
See Appendix. Initial AM training on AFRIDEV pump– page 28

Section 1 - Training Preamble
a) Climate setting
b) Pre training evaluation
c) Objectives of the training
d) Background to AM training
e) Roles of Area mechanics in the community

Section 2 – Field Practical Simple repair
a) Afridev pump parts and function – appendix ---- sample Afridev pump drawing
b) How the pump works (Demonstration)
c) Field trip (CBM 1 practical session)
d) Fast wearing parts and effects on pump operation
e) Trouble shooting (pump diagnosis)

Section 3 – Field Practical Major Repair
a) Identification of problem in rising main pipe
b) How to repair a leaking rising main pipe
c) How to remove and replace rising main pipes
d) How to make joints using double end sockets

Section 4 – Field Practical Fishing Rising Main Pipes
a) How to fish pipes using fishing tool and winch – appendix --- drawing of fishing tools

Section 5 - Spares procurement and reporting methods
a) Use of quotation book – appendix – sample quotation
b) Use of price list – appendix – sample price list
c) Link AMs with communities– appendix – sample AM flier
d) Fliers to link Partner shop owners with AM – appendix – sample shop flier
e) Use of contract book– appendix – sample contract

2.2 Afridev refresher trainings

As indicated elsewhere in this document, our training policy encourages continuous training of AMs through refresher trainings. We periodically organize refresher trainings based on continuous assessments done by our district officers. These trainings have elements of practices in the field. A number of specialized refresher trainings have been designed. Below are examples of refresher trainings aimed at enhancing professionalism in Area Mechanics

2.3 Initial Malda Training

MALDA hand pumps are the second most prevalent water source technology after the Afridev. The pump is known for its simplicity and commonly used in shallow wells. A survey conducted in Ntchisi district in 2014 revealed that % of these pumps were not functioning. The results indicated that there is no much information among users on pump repair and
availability of spares in rural settings. InterAide trained Area Mechanics to be able to carry out repairs on these pumps. The training of AMs acted as a route for demand creation and to bring awareness to water users of the existing MALDA pump repair services. The initial MALDA training is conducted for 3 days. Below is a summary of the training. For full training guide manual.

See appendix – Initial training on MALDA pump – page 69

<table>
<thead>
<tr>
<th>Section 1 – Training Preamble</th>
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<tbody>
<tr>
<td>Climate setting</td>
</tr>
<tr>
<td>Training evaluation</td>
</tr>
<tr>
<td>Objectives of the training</td>
</tr>
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</table>

<table>
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<tr>
<th>Section 2 – MALDA Pump Knowledge</th>
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<tbody>
<tr>
<td>Background to MALDA pump</td>
</tr>
<tr>
<td>MALDA spares and their function</td>
</tr>
<tr>
<td>Worn out parts and effects on pump operation</td>
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<table>
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<tr>
<th>Section 3 – Field Practical’s</th>
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<tbody>
<tr>
<td>Routine preventive checks</td>
</tr>
<tr>
<td>Half year checks</td>
</tr>
<tr>
<td>Repairs on nonfunctioning water points</td>
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</tbody>
</table>

2.4 MALDA refresh training

Following results of the first training a feedback and appraisal of the training is done. The aim of the training is to keep AMs updated in the repair skills for MALDA hand pumps. Refresher trainings are designed based on the needs and demanding services for AMs. For example AMs in Dowa were trained on installation of latest MALDA variation where PVC pipes are used other than HDEP pipes. An example of MALDA refresh training can be seen in the appendices.

See See Appendix - Refresh training on MALDA pump. Page 81.

2.5 Community Approach Training

This training was designed and integrated in the initial training to assist AMs improve their communication skills. In some instances, AMs have difficulties to be paid by after a repair. Investigations revealed that most AMs found it difficult to effectively communicate to their clients that they are independent workers. This made it difficult for them to be paid for the services rendered. The training assists AMs know steps to take a good approach when contacting new villages.

See appendix— Refresh training on AFRIDEV pump – Page 60.
2.6 Preventive Maintenance Training

It is a known secret that for any machine to operate to its optimum and serve its designed lifespan, periodic preventive maintenance is important. In Operations and Maintenance program, we attach great value to preventive maintenance contracts. The preventive maintenance refresher training is designed to empower AMs with knowledge on the importance of preventive maintenance.

*See appendix— Refresh training on AFRIDEV pump – Page 60.*

2.7 Rising Main Pipes Fishing Training

Studies have shown that we lose a number of boreholes due to fallen rising main pipes. When this occurs communities have no hope to repair the WP. Water points are mostly abandoned since there were no tools and skilled persons to fish pipes and repair water points with such complicated problems. Area Mechanics have been specially trained to accomplish such tasks. This is part of major repairs done by AMs. If successful, this kind of repair ignites pride and confidence in AMs as well as communities.

*See appendix— Refresh training on AFRIDEV pump – Page 60.*

2.8 Bicycle Maintenance Training

An AM who has no working bicycle cannot be able to reach communities in his catchment area thereby breaching trust with the community if he fails to render his services with negative repercussions on the intended goal of increasing WP functionality.

It has been the experience of many Non-governmental organizations, Inter Aide inclusive, that beneficiaries will ask for spares and even new bicycles because the ones in use is no longer in use. It is noted that this happens after a period of 2 to 3 years. Notwithstanding this, privately owned bicycles are well maintained even after a period of 10 years. The training is an answer to try to solve this anomaly. It should also be noted that InterAide goal is to make AM independent. We provide skills to allow AMs achieve autonomy and to be responsible for their job.

**Conduct of the training** — a local bicycle repair is first consulted. We go through the training process for him to understand the methods for the training. Spares are provided to facilitate the training. Participants are divided into groups and bicycles are shared among the groups. Participants work on one bicycle until it’s finished. In this way the training becomes participative and an enjoyable. The facilitator only guides participants to go through the repairs and does not repair the bicycles by himself.

*See appendix -- Bicycle Maintenance Training manual – page 86.*

3. AM MATERIALS AND TOOLS

Area Mechanics are provided with standard materials and tools to kick start their job. This is done on the last day of the training. AMs are told that since they are entrepreneurs they are supposed to maintain and replace their tools. When an AM is withdrawn from the network, the bicycle is retained by the office and given to a new AM who replaces him. In case of bicycles a special training on bicycle repairs was done to train AMs in maintaining their bicycle.
Objectives

The main purpose for the standardized materials is to encourage transparency in how AMs work and develop community trust. In this way, we are able to monitor the activities and quality of services offered by AMs. The materials are used as advertising tools for their job and to promote professionalism among AMs. Copies of quotations and contracts are retained by the office to use as raw data. A computer generated database has been designed to track activities of each AM. The database records villages visited by AM, the amount he was paid, amount of money used to buy spares and other necessary records. Below is a list of materials and tools provided for AM use.

a. List of materials
   - MOU between AM and InterAide. (See appendix page ?)
   - ID card (See appendix page ?)
   - Area Mechanic flier (See appendix page ?)
   - Partner Shop flier (See appendix page ?)
   - Quotation book (See appendix page ?)
   - Contract book (See appendix page ?)
   - Afridev maintenance handbook (See appendix page ?)
   - Afridev spares description chart (See appendix page ?)
   - MALDA Spare parts definition (See appendix page ?)

b. List of tools
   - Bicycle
   - Flat spanner
   - socket spanner
   - 1 hacksaw
   - 1 fishing tool
   - 1 cell phone
   - 1 comb spanner
Training of Area Mechanics is not enough. In order to have a robust network in the district, Monitoring and follow up is an important aspect of the network. We have developed tools to allow for monitoring and follow up of the network. Below is a list tools developed by InterAide to serve this purpose.

1. **AM INDEX DOCUMENT**

A document compiling the Areas Mechanics names has been done for each district. It remind the district and TAs where every AMs is operating, his contact number, the working starting year and the number of contracts that he realized the six previous months. This document is updated every six months.

*See appendix – AM list – Page 107.*

2. **AREA MECHANIC FOLLOW UP FORM**

This form was developed to assist Maintenance Officers keep records about field visits and assist AMs on their challenges in the field. The form helps to keep track of monthly activities in the district and can be referred to in case there are outstanding issues that need assistance from the office in the monthly review.

*See appendix—AM follow up form - page 96.*

3. **AREA MECHANIC EVALUATION FORM**

We work to support AMs to be professional artisans. To gauge their professional competence, the Area Mechanic evaluation form is used. The evaluation of AM competence is centered on, technical skills in simple repair, technical skills in major repair, writing skills, use of materials and information sharing (teaching) This form helps us to support individual AM according to his/her needs.

*See appendix—AM evaluation form – Simple repair page 97 ; Major repair page 101.*

4. **AREA MECHANIC SKILLS ASSESSMENT DATA BASE**

We have developed a database to allow the project teams assess AM skills annually. The parameters for assessment are, technical skills, writing quotation, care of materials and equipment, pedagogical skills. The scores of evaluation forms are processed in this database. The data base includes a column corresponding to the motivation (AM review meetings presence...). An annual average score shows the AMs that need to be supported and allow us to identify the capacities to be strengthened.

*See appendix –AM skills assessment database- page 105.*
5. **AREA MECHANIC CONTRACTS DATA BASE**

Another way to follow the AMs activities is to collect and compile in a database the contracts realized by the AMs in the communities. According to the nature of the repair we differentiate preventive maintenance/repair/security contracts. The contracts are collected every three months by the maintenance officers during the Area Mechanics review meetings organized in each districts.

*See appendix –AM contracts database- page 106.*

6. **SURVEY FORM**

Every three years we plan to realize a survey concerning Waters point’s functionality in the 5 districts. This survey is done through the Area mechanics in their catchment area. The last survey has been done in 2014. Ask Inter Aide maintenance program management to obtain the document analyzed.

*See appendix – Survey – Page 108.*

7. **CUSTOMER SATISFACTION SURVEY**

We plan to develop a satisfaction survey to have more feedback from the beneficiaries about the AM services (satisfaction survey from a sample of rural communities) and about Inter Aide monitoring in O&M (satisfaction survey from AM and partners shops). These two documents are still in process.

**NOTE ABOUT TERMINATION AND REPLACEMENT OF AM**

As much as it is recognized that AMs are independent workers, to develop the network we have deliberately put measures to check their performance. A viable AM network cannot be sustained if other parts are not carrying its functions. In this case InterAide considered grounds for termination of AM agreement. The grounds for termination are spelt in the AM agreement form. Notwithstanding there are other factors that are considered to terminate the agreement such as follows;

- Chronic sickness
- Involvement in criminal activities
- Conflict of interest
- Lack of interest
- Involvement in activities that endanger the professional life of fellow AMs
- Less than 5 contracts in a year
- Dishonesty
- Incompetence (according to the evaluation) after strengthening.

When it is established that an AM is in breach of any of the above, a process to replace him is initiated by informing him of the decision. All materials are taken back to avoid him from defrauding unsuspecting communities. The ADC is informed and told not to engage him as AM. The process of replacement immediately follows.
AM NETWORK ESTABLISHMENT PROCESS

1. Area Mechanics Oral Interview
2. Area Mechanics Written Interview

AM TRAININGS

3. Pre and Post training Evaluation (for AM new recruited)
4. Initial training on AFRIDEV pump
5. AFRIDEV training aids documents
6. Area Mechanic Materials and Tools
7. Area Mechanic Agreement Form
8. Refresh training on AFRIDEV pump
9. Initial Training on MALDA pump
10. MALDA training aids documents
11. Refresh Training on MALDA pump
12. Bicycle Training
13. Bicycle Agreement

MONITORING AND EVALUATION

14. Area Mechanic Follow up Form
15. Area Mechanic Evaluation Form
16. AM skills Evaluation Database
17. Survey Form
18. Area Mechanic Contracts Database
19. AM list by district
AREA MECHANIC ESTABLISHMENT PROCESS

1. Area mechanic oral interview ................................................................. Page 19

2. Area Mechanics Written Interview
   - English version ........................................................................... Page 23
   - Chichewa Version ........................................................................ Page 24
**AREA MECHANICS ORAL INTERVIEW. GUIDELINE FOR THE INTERVIEWERS**

**A. PREREQUISITE**

1- Is the candidate able to read and write words and numbers – Can one make additions, multiplication and subtractions? – Give him/her a simple practical question.

- All candidates who are able to read, write words and able to do simple arithmetic can qualify for the position of Area Mechanics.

2- Have you ever convicted of a crime?  
{Yes}  {No}  (Please confirm with ADC.)

- All the candidates who have been convicted of a crime can not qualify for the position of an Area Mechanic unless if seven years have elapsed after the conviction – this is according to Malawi Laws.

3- Are you a member of WPC or pump caretaker?  
{Yes}  {No}  – What is your position? Can you give us the frequency of breakdown of your Afridev Hand Pump?

- If a candidate is not a member of WPC the panel can use other attributes i.e. capability and knowledge about Area Mechanic work for one to qualify for the position of Area Mechanic.
- The candidate qualify for the position of an Area Mechanic if the candidate is a pump caretaker but fails to give the frequency of breakdown of the pump under his/her jurisdiction.

4- How long have you stayed in the catchment area? How long are you planning to stay in the catchment area?

- The candidate can qualify for the position of an Area Mechanic if one has stayed over 3 years in the catchments area and is ready to stay in the area as long as one lives but a period of 6 years can be considered basing on the outcome of the interviews for the competing candidates.

**B. MOTIVATION/GENERAL**

1- Why do you want to be an Area Mechanic?

The answers should cover the following areas: Functionality, Accessibility, Business, Consideration of the communities etc.
• To reduce the burden of taking longer period before the Afridev pump is fixed by providing maintenance and repair services to the communities.
• To ensure that the communities in my catchment area are accessing safe potable water throughout the year.
• To uplift the lives of the communities under my jurisdiction.
• To contribute towards reducing the number of non-functional water points within the catchment area.

2- What do you think are the roles and responsibilities of an Area Mechanic in the community?

• AMs are a point of contact for communities on water point functionality issues through promotion of their services.
• AMs work with communities to diagnose problems with water points and perform repairs that restore a water point condition.
• AMs support water point committees by improving leadership by suggesting fundraising strategies.
• Participate in monthly meetings with BMOs.
• Produce a monthly report on repairs or maintenances done.
• Keeping of maintenance or repairs records

3- Check the physical appearance of the candidate and ask the candidate if she/he has any problem/sickness.

• Being able to lift something. Ask each of them to lift something and observe.
• Being able to ride a push bike.
• Looking very fit and energetic.

C. TECHNICAL SKILLS

1- Did you receive training on pump maintenance? Yes or No

2- Mention some parts of Afridev Hand Pump and explain their usage? Show part of the sample and question on it.

• Handle of the Pump – For pumping operation
• Pump rods- Provides support to plunger body and assists in pumping.
• Rising Main- Provides passage for water from well up to the pump head
• Bush bearings- Prevent rubbing of fulcrum pin against handle and hanger pin against hanger
• Fulcrum pin- Connects handle to pump head and provides pivot for the handle.
• Rod centralizer- Prevents rods from rubbing against raising mains.

3- Name some of the fast wearing parts of Afridev Hand Pumps?

• Bush bearings, O-ring, U-seal/Cap Seal, rod centralizer, bobbin.

4- Present two scenarios of breakdown. Can you explain the cause and propose solutions?

THE HANDLE IS LOOSE
<table>
<thead>
<tr>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fulcrum nut is loose</td>
<td>Tighten nut. If necessary replace fulcrum pin</td>
</tr>
<tr>
<td>Locking pin missing</td>
<td>Weld new locking pin on fulcrum pin (contact WMA for help)</td>
</tr>
<tr>
<td>Worn bearings</td>
<td>Replace bearings</td>
</tr>
</tbody>
</table>

**THERE IS DELAYED FLOW**

<table>
<thead>
<tr>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot valve is leaking</td>
<td>Check and replace bobbin and o-ring on the foot valve</td>
</tr>
<tr>
<td>Foot valve is not in place</td>
<td>Check and re-seat foot valve</td>
</tr>
<tr>
<td>O-ring is worn</td>
<td>Check and replace O-ring</td>
</tr>
<tr>
<td>Broken or leaking pipe joint</td>
<td>Check and repair rising main</td>
</tr>
</tbody>
</table>

5- Which tool kits do you use to repair Afridev Hand Pumps? How do you use it to work on Afridev maintenance?
- Fishing tool
- Flat Spanner -17/19
- Socket Spanner

6- Where can you report when the problem is beyond your control?
- WMA

D. INTERPERSONAL SKILLS

1- Do you have experience in any business? Which field? What were you doing? Were you successful? Since you were successful how do you intend to turn borehole repairs into a successful business venture?
- Individuals with experience doing business for profit should be given greater consideration, compared to people who have previously failed to manage their businesses.

2- What are the roles of WPCs & Traditional leaders towards O&M?

**Roles and Responsibilities of WPC**
- Regulate use and care of the new facilities and distribution of water
- Organise maintenance and repair of the facilities
- Collect and manage money to pay for spare parts and repairs
- Keep the community informed about money raised and spent
- Keep records of money, maintenance, and meetings
- Organise cleaning and maintenance of the water point site

**Roles and Responsibilities of Traditional leaders**
- Encourage community participation in money contributions.
- Enforce the bye-laws on care and use of the water point.
- Enforcement of fines on non-contributors.
3- As an Area Mechanic, what would you do if a community refused to pay you for a repair?

- One should be able to negotiate with communities to pay him/her in kind. The Area Mechanic should be able to set the time frame with the communities on how they can settle the fee when the facility starts working (Use of negotiation skills or alternative payments).
- The Area Mechanic should be able to use other decentralized structures like VDC/ADC to influence the communities for his/her payment.
- The Area Mechanic should build a trust and good working relationships with the communities in his/her catchment area prior to any break down of the borehole.

4- What are the most important factors for building good relationships with ADC and WPCs?

- The AM should be able to introduce him/herself to the village heads and WPCs under his/her catchment area.
- The AM should be able to participate in post-construction trainings in her/his catchment area as one way of marketing the work.
- The AM should be able to participate in drilling works and pump installation in his/her catchment area.
- The AM should always provide feedback to the ADC and WPC to win people’s confidence.
- The AM should be trustworthy, honest and committed.

5- If you were selected, how would you promote your work as an Area Mechanic?

- Conduct meetings with WPCs to make formal introduction of the work of Area Mechanics.
- Support the fundraising activities of various WPCs.
- The AM should consider the comparative pricing.
- The AM should consider the payment terms depending on the seasons.
- The AM should be sociable and dependable.
NUMERICAL TEST

1- 24+24+24+24+24
2- 24 x 5
3- 8000 ÷ 8

4- A water point has 10 rods, each rod is 3 metre long how deep is the WP

5- A water point has 12 PVC rising main and you are required to pull off the pipes you have cut the pipes in 2 part sections how many double end sockets will you need to join the pipes?

6- A water point needs money amounting to K49,000.00 to repair, there are 60 households using the WP how much should each household contribute?

7- Write a quotation to inform the WPC about the cost of repair using the prices below:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Item</th>
<th>Unit Price</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>U Seal</td>
<td>K350.00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Plunger Body</td>
<td>K1370.00</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Rod Centralizer</td>
<td>K440.00</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Double end Socket</td>
<td>K990.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bobbin</td>
<td>K420.00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Fulcrum Pin</td>
<td>K4940.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Labour Charge</td>
<td>K4000.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GRAMMATICAL TEST

8- Write a problem story about water access in your area.

9- A water point has a breakdown and people travel long distance to draw water from unprotected source. Write a short essay on how you can deal with the problem without relying on external sources.
NUMERICAL TEST

1- 24+24+24+24+24
2- 24 X 5
3- 8000÷8

4- Mjigo uli ndi malodi 10 rod imodzi ndiyotalika mamita 3 kodi Mjigo uli ndi mapaipi anagati?

5- Mjigo uli ndi Mapaipi 12 mwadula mapaipi awiriawiri ndipo mukufuna kulumikiza ndi ma double end socket angati omwe akufunika?

6- Mjigo ukufunika ndalama yokwanira K49, 000.00 kuti ukonzedwe ndipo akomiti akufuna kusonkhanitsa ndalama. Mudzi wawo uli ndi makomo 60 kodi khomo limodzi liyenera kuperekana ndalama yokwana bwanji?

7- Lembani koteshoni yofuna kuuza eni mjigo kuti akagule zipangizo zokonzela mjigo pogwiritsa ntchito mitengo iyi;

<table>
<thead>
<tr>
<th>Kuchuluka Kwa Katundu</th>
<th>Katundu</th>
<th>Mtengo Wakatundu</th>
<th>Zonse</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>U Seal</td>
<td>K350.00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Plunger Body</td>
<td>K1370.00</td>
<td></td>
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<td>Rod Centralizer</td>
<td>K440.00</td>
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<tr>
<td>5</td>
<td>Double end Socket</td>
<td>K990.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bobbin</td>
<td>K420.00</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Fulcrum Pin</td>
<td>K4940.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ndalama ya Malipiro a Okonza</td>
<td>K4000.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GRAMMATICAL TEST

8- Lembani nkhani ya vuto la madzi lomwe mukukumana nalo kudela lanu.
9- Mjigo unawonongeka anthu akutunga madzi kutali ndipo ndiosatetezedwa - (Lembani momwe mungathetsere vutoli posadalira mathandizo kuchokera kwina).
AREA MECHANIC TRAININGS

3. Pre and Post training Evaluation (for AM new recruited)
   - English version (in process) ................................................................. Page
   - Chichewa version .................................................................................. Page 26

4. Initial training on AFRIDEV pump .................................................. Page 28

5. AFRIDEV training aids documents
   - Afridev pump drawing ........................................................................ Page 45
   - Plunger and foot valve drawing ........................................................... Page 46
   - Afridev pump Spare Part Description and Function ............................... Page 48

6. Area Mechanic Materials and Tools
   - Quotation Book .................................................................................. Page 50
   - Contract Book .................................................................................. Page 51
   - List of tools issued to Area Mechanics ............................................... Page 52
   - Fliers .................................................................................................. Page 53
   - ID cards ............................................................................................ Page 54

7. Area Mechanic Agreement Form
   - English version ................................................................................. Page 55
   - Chichewa version ................................................................................ Page 57

8. Refresh training on AFRIDEV pump ............................................. Page 60
   - Community Approach
   - Security Contract for Afridev Pumps
   - Preventive Maintenance Contracts
   - Pipe Fishing Skills
   - Pump Diagnostic Skills

9. Initial Training on MALDA pump ..................................................... Page 69
10. MALDA training aids documents .................................................. Page 76
11. Refresh Training on MALDA pump ................................................ Page 81

12. Bicycle Training ............................................................................. Page 86
13. Bicycle Agreement ......................................................................... Page 93
PRE AND POST TRAINING EVALUATION. Chichewa Version

AM name/surname:

District/TA:

Date:

☐ PRE-TRAINING ☐ POST-TRAINING

1) Kodi mukuganiza kuti ndi chifukwa chiyani chimene unduna wa zamadzi ndi mabungwe monga Inter-Aide anakhalirana pansi kusankha ndikuphunzitsa akonzi amijigo m’madera akumudzi?

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

2) Kodi ntchito za a mkonzi a dera ndi chiyani?

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

3) Fotokozani kusiyana kwa CBM 1 ndi CBM 2

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

4) Tchulani magawo awiri a pump ya afiridevu

________________________________________________________________________________________

5) Tchulani zipangizo zisanu zopezeka pampu ya afiridevu

________________________________________________________________________________________

6) Tchulani ntchito ya zipangizo izi

✔ Bush bearing: __________________________________________________________________________
✔ Fulakapini : _____________________________________________________________________________
✔ Rodi centeleza : _________________________________________________________________________
✔ U-silu : _______________________________________________________________________________
✔ Kapu- Silu : _____________________________________________________________________________
✔ Bobini : _______________________________________________________________________________
7) Fotokozani momwe pampu ya afiridevu imatengela madzi kuchoka pansi

8) Kodi ndikoyenela kuti mkonzi wa mijigo akayitanidwa kukakonza mjigo kutulutsa mapaipi ngati komiti yilibe ndalama kapena zipangizo ngakhale atadziwa kuti bvutulo ndilokhuza mapaipi?

9) Fotokozani momwe zinthu izi zingapangitse kusiya kugwira bwino kwa mjigo
   ✓ Mabush bearing wakutha: ________________________________
   ✓ U-silu: ________________________________
   ✓ Bobini wakutha: ________________________________
   ✓ Rodi centeleza: ________________________________

10) Kodi mkonzi wa dera ayenela kudutsa njira ziti kuti adziwe kuti bvuto ndilokhuza mapaipi?

11) Fotokozani zizindikiro zitatu zomwe mungadziwire kuti mavuto a mjigo akhudza kumapayipi

12) Kodi mavuto awa tingawathetse bwanji
   ✓ Madzi kutuluka mochedwa: ________________________________
   ✓ Madzi kutuluka pang’onopang’ono: ________________________________
   ✓ Madzi sakutuluka: ________________________________

13) Tchulani mitundu iwiri ya migwirizano

14) Kodi mkonzi wa mdera ayenera kutani kuti:
   ✓ Alowe m’mgwirizano wokonza mijigo: ________________________________
   ✓ Akhale ndi ma contract ochuluka: ________________________________
   ✓ Mgwirizano wake ndi a komiti komanso mudzi kuti upitilire: ________________________________
   ✓ Ngati bvuto limene wakumana nalo labzyola msinkhu wake? ________________________________
AREA MECHANIC INITIAL TRAINING CONTENT
ON AFRIDEV PUMP

PREFACE

This booklet is a result of a process of consultations and sourcing relevant information with the aim of improving training delivery for Area Mechanics in InterAide Maintenance Projects.

The contents in this manual, is a compilation of several attempts by stakeholders in Maintenance of boreholes. While this is the case this booklet only explores the training philosophy in InterAide which is structured to allow for participation of the trainees to achieve optimum results.

We believe that this is not a complete job, we welcome all involved in Pump Operation and Maintenance to come forward and provide their input to make this booklet a useful tool in establishment of Area Mechanic networks.

ACKNOWLEDGEMENTS

This booklet has come about through the involvement of several stakeholders. InterAide would like to acknowledge the contribution of the following people who took their time to review this booklet and gave information each time they were asked to do so.

Mr. P. N Moyo, District Water Officer Ntchisi, Mr. M. Thengezi Ntchisi District Water Office, Mr B.R Chinungu Ntchisi District Water Office, Mr. A.A. Saad Ntchisi District Water Office, Mr Nkhoma Ntchisi District Water Office, Mr. G. Banda W.V.M Ntchisi.

We are also indebted to the entire InterAide Maintenance Project team who laid the foundation for this work.

Sources of information: TECHNICAL MANUAL FOR TRAINING CARETAKERS PHASE 2 by CBM UNIT, CBM 1 by CBM UNIT, BOREHOLE CARETAKERS MANUAL by MATAFERIA CONSULTING and InterAide Maintenance Team.
DAY 1

CBM 1 REFRESHER

**Activity 1. Introduction and Climate setting**

**Aim:** To allow participants know each other, settle down and gain confidence

**Method:** Plenary

**Materials:** Flip charts and pental markers

Ask one participant to open the session and allow participants to introduce themselves and the position they hold.

**The Facilitator will ask Participants to:**

1. Self-introduction
2. Elect their leaders
3. Discuss the timetable

**Ask Participants to go in groups to do the following**

1. Write their expectations?
2. Their fears
3. Why do they want to be trained in pump maintenance?

*In plenary discuss what they have written. The facilitator will address the issues through discussions with the participants*

**Activity 2:** Objectives of the training, What are the differences between CBM 1 and CBM 2, Duties of an Area Mechanic

**Aim:** Orient Participants to understand the Training Objectives and know their roles in the community

**Method:** Focus Group Discussion and Plenary session

**Materials:** Flip charts and pental markers
The facilitator will ask participants to go in groups to discuss the following questions and later compare the answers with answers from the facilitator in plenary session.

a. Objectives of the training
b. What are the differences between CBM 1 and CBM 2?
c. Duties of an Area Mechanic

What are the objectives of the training?

1. To train pump mechanics so that they are able to do complicated repairs on the WP and advise communities on maintaining the WP with the primary objective of increasing pump functionality.
2. To train them to understand that there are independent workers and paid by community

The difference between CBM 1 and CBM 2

3. CBM 1 relates to minor repairs to the WP i.e. changing of fast wearing parts whiles CBM 2 relates to major repairs especially to do with repairing of rising main and making joints on the rising main.

Duties of an Area Mechanic

1. Assist communities in repairing their WP
2. Advise communities on good use of the WP
3. Advise communities on keeping the WP surroundings clean all the time
4. Promote Partner Shops by advising WP committees where to buy spare parts
5. Report technical problems to the DWO or MA
6. Make monthly reports to the DWO in his area
7. Record payments made to him by WP committees
8. Make quotation on water point maintenance costs
9. Advise WP committee on how to raise funds to maintain WP
10. He/she should promote himself among community
11. He/she should always attend ADC meetings
12. He/she take care of his project tools
13. He/she must take responsibility to maintain his bicycle

Activity 3. Afridev pump parts and functions
**Aim:** Orient Participants on what a Borehole is, how the pump functions and allow participants to know fast wearing parts

**Method:** Visual Aids and Focus Group Discussion

**Materials:** Drawing showing a Borehole, stickers, page showing parts and function, parts of the pump

1. Paste a poster showing the Afridev pump and ask participants to identify the picture on the poster,
2. Hand out the posters and ask participants to label parts of the pump
3. In plenary each group should present their work and mention the function of each part
4. By way of discussion participants correct group mistakes

**Facilitator asks participants the function of each part in reference to table 1 below.**

**In conclusion,** the facilitator will explain that a pump is divided into two categories ABOVE GROUND PARTS and BELOW GROUND PARTS and mention all the parts correctly and explain the function of each part as in table 1 below.

**Above ground components**

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump head and Cover</td>
<td>Closes the topmost part of the pump to prevent dust and foreign materials from getting inside the pump it houses the hanger assembly and supports the handle bar</td>
</tr>
<tr>
<td>Pedestal</td>
<td>Main body supporting above ground components and below ground components</td>
</tr>
<tr>
<td>T bar or handle</td>
<td>This is the part that is held to pump water. It can be adjusted to correspond to the depth of the BH.</td>
</tr>
<tr>
<td>Fulcrum pin</td>
<td>Joins the handle bar to the head pump and acts as a movement joint when for the handle pumping water</td>
</tr>
<tr>
<td>Hanger Assembly</td>
<td>Suspend the rods</td>
</tr>
<tr>
<td>Hanger pin</td>
<td>Joins the end part of the handle to the hanger to allow for upward and downward movement of the rods</td>
</tr>
<tr>
<td>Bearing bush</td>
<td>To allow free movement of the fulcrum pin and hanger pin. There are four in a pump, two on the fulcrum pin and two on the hanger pin</td>
</tr>
</tbody>
</table>
Cone plate  | A metal plate holding the rising main
---|---
Rubber cone  | Sits between the pump head and pedestal acts as a seal to stop water from spilling between the pump head and pedestal
Rubber flapper  | Installed on the top rod prevents foreign materials from getting into the rising main and prevents outward flashing of water
Collar  | Fitted on the top end of the rising main. It prevents the rising main from slipping through the rubber cone

**Below ground components**

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rising main</td>
<td>A pipe connected to cylinder assembly carries water from the cylinder to ground level</td>
</tr>
<tr>
<td>Pump rods</td>
<td>To connect plunger so that the pump can be operated above the ground using the handle</td>
</tr>
<tr>
<td>Plunger</td>
<td>Connected to pump rods moves up and down with the movement of the handle to facilitate suction of and delivery of water</td>
</tr>
<tr>
<td>Cylinder assembly</td>
<td>Most important part of the pump it takes water from the bore hole and pumps it up to ground level</td>
</tr>
<tr>
<td>Suction pipe</td>
<td>Fitted at the bottom end of the cylinder it draws water into the cylinder and controls sand intake</td>
</tr>
<tr>
<td>U- seal/ Cup seal</td>
<td>Fitted to the plunger body seals water above plunger and push water up with every upward movement of the plunger</td>
</tr>
<tr>
<td>Bobbin</td>
<td>Fitted inside plunger and foot valve moves up and down to allow water to move in one direction only and prevents water from getting back into the bore hole</td>
</tr>
<tr>
<td>Material</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>O - ring</td>
<td>Fitted to the foot valve it prevents water inside the cylinder from getting back into the bore hole</td>
</tr>
<tr>
<td>Rod Centralizer</td>
<td>Fitted on rod joints centralizes rods and prevent friction between the rod and the rising main</td>
</tr>
<tr>
<td>Rising main centralizer</td>
<td>Fitted at every 3 meter rising main prevents excessive swaying of the rising main in the borehole</td>
</tr>
<tr>
<td>Nylon rope</td>
<td>Connected to the suction pipe and passes through the pipe centralizer to cone plate to hold the rising main to fall into the bore hole in case of joint failure</td>
</tr>
</tbody>
</table>

**Activity 4: How the pump - works Demonstration cylinder**

**Activities 4 and 5 will take place outside at the WP!**

**Aim:** Orient Participants on how an Afridev pump functions

**Method:** Demonstration and Visual Aids

**Materials:** Drawings of Foot valve and Plunger, Cylinder, suction pipe, pail of water

1. Give out materials to build a complete cylinder
2. Using the complete cylinder built by participants and a pail of water, demonstrate how the pump operates.
3. Simulate different case scenarios by using damaged bobbins, foot valve, u-seal or O-ring.

*This activity acts as a link to allow participants relate this with their own experiences and the facilitator should give more room for discussion.*
Activity 5: Participants Dismantle and Reassemble Pump

Aim: To determine participant’s technical aptitude in CBM 1

Method: Practical Session and Plenary Session at the Water Point

Materials: flat spanner, socket spanner and pail

Instructions for Activity 5

_The facilitator will divide Participants into two groups to dismantle and reassemble the pump. This activity will be done without intervention from the facilitator._

_When the pump is reassembled and water does not come out, the facilitator will ask participants to discuss and find reasons why this is the case._

_The facilitator will observe that all necessary steps are being followed as outlined below in the process recording weak and strong points for each group;_

1. Wash hands and keep two pails of clean water
2. Loosen bolt for cover
3. Loosen bolts on the hanger pin
4. Loosen bolts on the fulcrum pin
5. Insert the socket spanner in the hanger hole
6. Remove the pump handle and the fulcrum pin and bush bearings
7. Remove the hanger pin and bush bearings
8. Keep all the removed parts in the cover
9. Take out the pump rods and place them in order of how they were originally assembled
10. Remove the plunger
11. Assemble fishing tool and remove the foot valve
Activity 1. Recap day 1

Instruction to the facilitator

The facilitator will start with a recap of Day 1 Activities with emphasis on activities 2, 3 and 5.

Activity 2: Identify fast wearing parts and their effects in pump operation

Aim: Allow participants to know how they can identify worn out parts so that they can accordingly advise communities and do timely repairs on the WP

Method: Group work and Visual Aids

Materials: Flip charts and markers Old and damaged u – seals, bush bearings, bobbins, cup – seals, o – rings, rod centralizer

1. Ask participants to give names of routinely replaced parts
2. Ask participants to go in groups, each group should be given a set of worn out parts and ask participants to do this exercise;
   a) Write symptoms of the worn out parts
   b) Give long time effects of the worn out parts on good pump operation
3. In plenary participants will compare and discuss their findings

Conclusion

In conclusion, the facilitator will say that it is the duty of Area Mechanics to advise communities that it is cheaper to replace the fast wearing parts than to allow effects of the worn parts to damage more expensive parts.
Activity 3: Trouble shooting

Aim: Allow Participants to diagnose faults and competently make repairs to the WP

Method: Plenary discussion

Materials: Flip charts and markers

1. Ask participants to give problems of a WP they have ever experienced

2. Ask participants to go in their groups to;
   a) Give possible cause of the problem
   b) How they can solve the problem

In plenary the facilitator will make add other possible problems and remedies as outlined in table 2 below.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
</table>
| 1) Delayed flow of water | 1) Foot valve leaking, O ring/U seal/Cup seal  
2) Leaking rising main | check and replace bobbin and o-ring  
check and repair rising main |
| 2) Weak flow       | 1) U seal worn out, damaged or wrongly installed  
2) Plunger or foot valve bobbin worn out or damaged  
3) O-ring on foot valve damaged  
4) foot valve bobbin damaged or stuck  
5) rising main leaking | Check and replace U-seal  
Check and replace bobbin  
Check or replace O-ring  
Check or replace bobbin  
Check and repair rising main |
| No flow | 1) Plunger or foot valve bobbin stuck or damaged  
2) U-seal displaced or damaged  
3) O-ring displaced or damaged  
4) Rising main damaged  
5) Pump rod broken or disconnected with plunger  
6) Plunger unscrewed from rods  
7) Water level is below suction pipe  
8) Low recharge rate | Check and clean, replace if badly damaged  
Replace with new U-seal  
Replace with new O-ring  
Check and repair rising main  
Fish out rods, replace or repair  
Remove rising main and reconnect the plunger to rods  
Add rising main if possible and a rod |
| Heavy handle | 1) Incorrect handle adjustment  
2) Plunger tight or stuck inside cylinder  
3) Pump rod tangling with rising main  
4) Broken foot valve | Adjust handle to correct length  
Check and clean or replace U-seal if necessary  
Check and replace bent rods, rod centralizers, or reinstall rising main  
Remove and clean |
| Excessive lateral play of the handle | 1) Fulcrum bearing bushes badly worn out  
2) Fulcrum pin worn out | Replace fulcrum bush bearings  
Replace fulcrum pin |
| Noise of metal rubbing against metal in pump head | 1) Hanger pin rubbing against pump head body inside  
2) Fulcrum pin or hanger pin rubbing against their housing  
3) Loose nuts on fulcrum or hanger pin  
4) Handle rubbing against pump head cover | Replace hanger or fulcrum bush bearings |
| Shaking of the pedestal | Concrete plinth cracked | Repair or reinstall |
**Activity 4: Identification of problems in the rising main**

**Aim:** Allow participants to make a diagnosis of problems of the rising main

**Method:** Group work and Visual Aids

**Materials:** Flip charts and markers, samples of old and damaged rising main, badly done joints

---

**Ask participants to**

1. Mention possible reasons of problems of a rising main;
   - a) *Leakage at joints due to poor practice when making joints*
   - b) *Perforations made on pipe due to rubbing with rods or worn out centralizers*
   - c) *Cracks in pipe*

2. Signs of problem with rising main;
   - a) *Low flow of water*
   - b) *No flow of water*
   - c) *The handle is light*

In plenary session, participants discuss their answers.

*To summarise the facilitator will explain that before concluding that the problem is due to rising main, the operation of the U-seal, O-ring, Cup seal and bobbin must be checked.*

*Participants should explain the importance of fitting rod centralizers on the entire length of the pump rods.*
DAY 3

Activity 1: Recap day 2

Facilitators Instruction

While on the field to have a practical demonstration session in CBM 2

The facilitator will start with a recap of Day 2 Activities with emphasis on Activities 2, 3 and 4.

Emphasis should be made on activity 4 as it links with Activity 2 Day 3

Activity 2: Repairing rising main

Aim: Allow Participants gain practical knowledge on best practices in repairing rising main

Method: Visual Aids and Demonstration

Materials: Flip charts and Markers, double end sockets, rope, pipe fishing tool, rising main pipes (Damaged samples of rising main)

Facilitators Instruction

On arrival to the site the facilitator will inform participants on the reason for the field trip and ask them to explain their experiences in this work:

a) How to remove rising main  
   b) How making joint to the rising main

HOW TO REMOVE AND REPLACE RISING MAIN?

Facilitators Instruction:

Facilitator will explain on best procedures to be followed as below

a. remind participants that before removing pipes they should consider number of people available to assist him in removing pipes (we recommend that more people should be available)
b. **explain that removing rising main, is a major operation and should be done as a last solution** and that a double check of the condition of all below ground components should be done before resorting to removing pipes.

c. The rope should be untied and knots made on both sides to coincide with top of rising main pipe. These marks can be used to check if the rising main length has been changed during repairs.

d. Leaking and broken parts should be marked as the rising main is being removed.

**IMPORTANT NOTE!**

1) Make sure that everything is ready to avoid delay when applying solvent cement.
2) Select a suitable place to lay down the pipes and carefully examine the rising main for damage and signs of leaking.
3) Any damaged length of more than 300 mm should require a section of, or full length of the rising main to be replaced in addition to a double end socket.
4) There may be several damaged sections especially when a pipe or rod centralisers are missing or damaged.
5) Fit pipe centralisers at each pipe length and make sure pipes are washed before fitting back in the borehole and explain why this should be one.
6) Instead of lowering down the whole rising main it is easier to reconnect the rising main in sections on the pedestal (**demonstrate this aspect for participants to see**).
7) Finally explain again on how to check length of rising main using knots made on the safety rope (any length above 30 mm on top of rising main, should be cut by the same length and a new collar fitted).
8) Use more people to hold up the pipe in addition to the rope on the raising main.

**HOW TO MAKE JOINTS ON THE RISING MAIN?**

**Facilitators Instruction**

*Facilitators will make a demonstration on how to make a good joint by following these steps:*

**Step 1:** mark a length of 115 mm (depth of socket) on plain pipe to check how far the plain end entered the socket after making the first joint.

**Step 2:** mark 10 mm from end of pipe and make a chamfer from an outer edge of the pipe (if not factory made) – Demonstrate how to make a chamfer using a hacksaw and a file.

**Step 3:** clean the outside of the plain end, up to the 115 mm mark and inside the bell socket of the other pipe using cleaning fluid.

**Step 4:** roughen the cleaned surfaces with sand paper or hacksaw blade, file.

**Step 5:** Use a brush to apply solvent cement or a feather.

**Step 6:** apply solvent cement quickly and thoroughly.

**Step 7:** apply solvent on socket and then plain end up to the 115 mm mark.
**Step 8:** immediately push in the plain end into the bell socket in a straight line up to the 115 mm mark and allow **FIVE** minutes for drying to have a good joint

**Step 9:** wipe out excess solvent with clean cloth

**Step 10** check the mark and ascertain how far the plain end entered the socket.

To summarise the facilitator will say that:

*“If the pipe goes in ‘40’ mm or less the joint will be weak. In this case cut pipe where it meets the sockets, and cut back the socket length where the pipe entered and remake the joint. (Recommend joints of between 75 mm – 115 mm)”*

**Repairing leaking pipes while maintaining its length**

The facilitator will take lead to discuss with AMs problems encountered during practical session.

<table>
<thead>
<tr>
<th><strong>DAY 4</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity 1:</strong> Recap day 3</td>
</tr>
</tbody>
</table>

**Facilitators Instruction**

*The facilitator will make a refresh to remind Participants on best procedures when repairing rising main Activity 2 day 3*

<table>
<thead>
<tr>
<th><strong>Activity 2:</strong> Repairing rising main by Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim:</strong> Assess Participant’s technical aptitude in carrying out rising main repairs</td>
</tr>
<tr>
<td><strong>Method:</strong> Practical Session</td>
</tr>
<tr>
<td><strong>Materials:</strong> Double end sockets, rope, rising main pipe fishing tool, rising main pipes, sand paper and tape measure</td>
</tr>
</tbody>
</table>
Facilitators Instruction:

Participants will be asked to demonstrate how to repair a rising main while facilitators will make observation on best procedures against this check list (make a score out 10)

Step 1: mark a length of 115 mm (depth of socket) on plain pipe to check how far the plain end entered the socket after making the first joint

Step 2: mark 10 mm from end of pipe and make a chamfer from an outer edge of the pipe (if not factory made) – Demonstrate how to make a chamfer using a hacksaw and a file.

Step 3: clean the outside of the plain end, up to the 115 mm mark and inside the bell socket of the other pipe using cleaning fluid

Step 4: roughen the cleaned surfaces with sand paper

Step 5: Use a brush to apply solvent cement or a feather

Step 6: apply solvent cement quickly and thoroughly

Step 7: apply solvent on socket and then plain end up to the 115 mm mark

Step 8: immediately push in the plain end into the bell socket in a straight line up to the 115 mm mark and allow FIVE minutes for drying to have a good joint

Step 9: wipe out excess solvent with clean cloth

Step 10: check the mark and ascertain how far the plain end entered the socket.

Facilitators Instruction:

The next step will involve participants removing and replacing the rising main the facilitator will check against the following important aspects of the session; (make a score out of 5)

1. Remove below ground components to take out water and make the rising main lighter.
2. Selecting a suitable place to lay down the pipes and carefully examine the rising main for damage and signs of leaking.
3. Marking leaking and broken parts as the rising main is being removed.
4. Checking the length of rising main if it has been changed during repairs.
5. Fit pipe centralisers at each pipe length and make sure pipes are washed before fitting back in the borehole and explain why this should be one.

The facilitator will take lead to discuss with AMs problems encountered during the practical session and together work out ways of dealing with different case scenarios.
Activity 1: Recap day 4 and a Question and Answer session on technical aspects of the training.

Same procedure than the previous days.


Aim: Equip Participants with record keeping skills, monitoring and evaluation tools, good community approaches and Project promotion skills

Method: Group work, Drama

Materials: Hand outs of price lists, partner shop owner’s fliers, contract books, quotation book, Area mechanic Calendar

Facilitator’s instructions

The facilitator will ask participants to take out handouts of the following;
- Contract book
- Quotation book
- Area Mechanic calendar
- Reporting format

1. Go through the steps on how to fill each book.
2. Later participants will go in groups to fill the information required.
3. In plenary, each group will present its work and correct mistakes done.

The facilitator will also mention all shops and locations in the district. The aim is to encourage AMs to play an advisory role to communities on where they can find Afridev spares.

AMs should be advised not to interfere in the procurement process so as to build more trust with the Water Point Committees.

Their role should only be to advise on the required spares using the quotation book.
Hand out post-training evaluation questionnaires and allow participants 15 minutes to answer the questions.

Participative discussion around the questionnaire correction; questions from the participants and facilitator closing remarks.
1. Afridev pump drawing
2. **Plunger and foot valve drawing**
3. Afridev pump. Spare parts description and function

<table>
<thead>
<tr>
<th>COMPONENTS / ZIPANGIZO ZA PANSI PA MJIGO</th>
<th>FUNCTION / NTCHITO ZAKE</th>
<th>POSITION / MALO OMWE AMAKHALA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump rod / Pampu rodi</td>
<td>To help plunger in pumping system / Kuthandiza pulanja kupopwa madzi</td>
<td>Inside the rising main / Mkati mwa mapai</td>
</tr>
<tr>
<td>Rod Centralizer / Rodi Senteleza</td>
<td>To centralize pump rods / To prevent friction between rods and rising main / Kukhazikitsa ma rodi chikatikati</td>
<td>Rod joints / Molumikizila ma rodi</td>
</tr>
<tr>
<td>Plunger / Pulanja</td>
<td>To pump water up / Kutungu madzi kupulitsa mwamba</td>
<td>Inside the cylinder, at the end of the pump rods / Mkati mwa silinda kumapeto kwa marodi</td>
</tr>
<tr>
<td>Foot-Valve Futu Valavu</td>
<td>Up keeping pumped water / Kusungu madzi a mwamba nwa silinda kuti asasikhe pansi</td>
<td>At the bottom of the cylinder / Pansi pa silinda</td>
</tr>
<tr>
<td>U-seal / U-Silu</td>
<td>Seals water above the plunger (plastic plunger only) / Kuthandiza pulanja kutungu madzi. Kusungu madzi opezeka mwamba mwa pulanja (pulanja pulasikhi okha)</td>
<td>On the plunger (plastic plunger only) / Pa pulanja (pulasikhi okha)</td>
</tr>
<tr>
<td>Cup-seal / Cup-Silu</td>
<td>Seals water above the plunger (brass plunger only) / Kuthandiza pulanja kutungu madzi. Kusungu madzi opezeka mwamba mwa pulanja (pulanja ya chitsulo)</td>
<td>On the plunger (brass plunger only) / Pa pulanja (ya chitsulo okha)</td>
</tr>
<tr>
<td>O-ring / O-ring’i</td>
<td>Prevents water inside the cylinder for going back to the bottom / Kuteteza madzi a mu silinda kuti asapite pansi pa mjigo</td>
<td>On the footvalve / Pa futu valavu</td>
</tr>
<tr>
<td>Bobbin / Bobini</td>
<td>Allow water to flow in one direction only. Kuthandiza ndi kulola madzi kuti atenge njila imodzi</td>
<td>Inside plunger and foot valve / Mkati mwa pulanja ndi futu valavu</td>
</tr>
<tr>
<td>Rising main / Mapaipi</td>
<td>For carrying water from the cylinder on to the top level / Modutsa madzi kuchokwa mu silinda kupita pamwamba pa mjigo</td>
<td>Connects cylinder and top level / Imulumikizila silinda ndi. Pamwamba pa mjigo</td>
</tr>
<tr>
<td>Double end socket</td>
<td>To join two rising mains after repairing (use solvent cement) / Kulumikizila ma paipi pamene Mjigo waonooneka (pogwiliitsa ntchito soventisenteni)</td>
<td>Between two rising mains Pakati pa mapai</td>
</tr>
<tr>
<td>Solvent cement / soventisementi</td>
<td>Positioning the rope or acts as rope holder / Kuthandiza chingwe kuti chikhale pa mala ake komanso kugwila chingwe kuti chisachoka mmalo mwake</td>
<td>Rising main joints / Molumikizila mapai</td>
</tr>
<tr>
<td>Cylinder assembly / Silinda Asemble</td>
<td>Cylinder part where the plunger is moving. It takes in water from the borehole and pumps up / Ndii mwenene plunger imayendayenda kutenga madzi a pansi pa Mjigo ndi kwupopeka mwamba</td>
<td>Bottom of the rising main / Pansi pa mapai</td>
</tr>
<tr>
<td>Suction pipe / Sakishoni paipi</td>
<td>Minimize incoming sand in the cylinder / Kuchepetsa / Kuteteza kuti mengena usamapite wambiri mu silinda</td>
<td>Bottom of the cylinder / Pansi pa silinda</td>
</tr>
<tr>
<td>Rope (nylon rope 6 mm) / Chingwe</td>
<td>For strengthening and upholding the rising main / Kulimbikitsa ndi kugwila mapai kuti asagwele pansi pa mjigo</td>
<td>From the suction pipe joined to steel cone plate / Kunja kwa mapai kuchokela mu sakishoni papi mpaka pa koni plate mwamba.</td>
</tr>
</tbody>
</table>
## Tikonze Mjigo – Maintenance System

<table>
<thead>
<tr>
<th>ABOVE GROUND COMPONENTS / ZIPANGIZO ZA MMWAMBAMBA MWA MIGIGO</th>
<th>FUNCTION / NTCHITO YAKE</th>
<th>POSITION / MALO OMWE ZIMAKHALA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Pump and cover / Hedi Pampu chi vindikilo</td>
<td>Housing above parts / Kusunga zipangizo za mmwamba mwa mjigo</td>
<td>On top of pedestal / Pamwamba pa pedesito</td>
</tr>
<tr>
<td>Pump Pedestal / Pampu Pedesito</td>
<td>Housing and uphold head pump and rising main / Kasunga ndi kugwira hedi pampu ndi mapaipi</td>
<td>Between apron and head pump/ Pakati pa ndi hedi pampu</td>
</tr>
<tr>
<td>T/Bar / Handullo</td>
<td>Part of the handle that can be adjusted for easy pumping / Handulo yomwe imatha kuita lilika kapena kufupitiksa yomwe imagwilitsidwa pojiga</td>
<td>At the back of the Head pump / Kumbuyo kwa hedi pampu</td>
</tr>
<tr>
<td>Hanger Assembly / Hang’a Asembleule</td>
<td>To hang rods / Housing Hanger pin and Bush Bearings / Kugwira ma rodi / Kasunga hang’a pini ndi ma bushi’beling’i</td>
<td>Handle forks / Kumatoloko a handulo Kumbwamba kwa hedi pampu</td>
</tr>
<tr>
<td>Fulcrum Pin / Falakalamu pini</td>
<td>To join handle with head pump / Kugwirizanitsa handulo ndi hedi pampu</td>
<td>Fulcrum handle / Pa bowo la pa handulo Kumbuyo kwa hedi pampu</td>
</tr>
<tr>
<td>Hanger pin / Hang’a Pini</td>
<td>To join handle with hanger assembly / Kugwirizanitsa handulo ndi hang’a asembleule</td>
<td>Inside the hanger assembly / Nkati mwa hang’a asembleule</td>
</tr>
<tr>
<td>Bush Bearing / Bushi Beling’i</td>
<td>To prevent friction and corrosion between hanger ass, fulcrum handle and both pins / Kuteteza kuti hang’a asembleule ndi bowo la pa handulo zisamakulane ndi mapini</td>
<td>Fulcrum handle and Hanger Ass / Pa bowo la pa handulo komanso nkati mwa hang’a asembleule</td>
</tr>
<tr>
<td>Rubber flapper / Labala Fulapala</td>
<td>Prevent fallen bodies / Kuteteza kuti zinthu zisagwele mu mapaipi</td>
<td>On top of the top rod / Pamwamba pa rodi yomaliza</td>
</tr>
<tr>
<td>Rubber cone / Labala Koni</td>
<td>To uphold the rising main and seal the gap between pedestal and head pump / Kugwila ma mapaipi ndi kuchepetsa bowo pakati pa pedesito ndi hedi pampu</td>
<td>Between head pump and pedestal / Pakati pa hedi pampu ndi pedesito</td>
</tr>
<tr>
<td>Steel cone plate / Koni Puleti</td>
<td>To minimize pedestal hole / To hang up rising main through rope / Kuchepetsa bowo la pedesito / Kugwira ma mapaipi mopwirizana ndi chingwe</td>
<td>Between head and pedestal / Pakati pa hedi pampu ndi pedesito</td>
</tr>
<tr>
<td>Top sleeve (collar) / Topu Silivi</td>
<td>It prevents the rising main from slipping through the rubber cone/ Kuteteza mapaipi kuti isafumphuke kugwela nkati kudzela pa labala koni</td>
<td>At the top end of the rising main / Pamwamba pa mapaipi Pa bowo la pedesito</td>
</tr>
</tbody>
</table>

### TOOLS / MASIPENALA

- **Socket spanner / Spanner ya bowo**: To remove head cover and to hold the hanger assembly when removing rods / kumasullila kavala ndi kugwira marodi tikamamasula
- **Flat spanner**: To remove the bolts between head and pedestal / Kumasullila mabauti apakati pahedi ndi thunthu / To fish the foot valve and pump rods / Kuwedzela marodi ndi futuuvu
- **Fishing tool / Mbedza**
AM MATERIALS AND TOOLS

1. Quotation Book
2. **Contract Book**
3. **List of tools issued to AM**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Bicycle</td>
<td>1</td>
</tr>
<tr>
<td>b Flat spanners</td>
<td>2</td>
</tr>
<tr>
<td>c Socket spanner</td>
<td>1</td>
</tr>
<tr>
<td>d Hacksaw</td>
<td>1</td>
</tr>
<tr>
<td>e Fishing Tool</td>
<td>1</td>
</tr>
<tr>
<td>f Cell Phone</td>
<td>1</td>
</tr>
<tr>
<td>g Blue book</td>
<td>1</td>
</tr>
</tbody>
</table>
4. **AM fliers**

---

**Pakadalipano, tili ndi amisiri 20 akonza mijigo madela mwanu m’boma la Ntchisi**

Pitirizani kudalila amisiriwa anzeru zakuya pa mtengo otsika kuyambira 800 mpaka 3500 omwe ali ku fupi ndi inu

Amisiriwa ndi awa:

<table>
<thead>
<tr>
<th>Dzina</th>
<th>Mudzi</th>
<th>Selufoni</th>
</tr>
</thead>
<tbody>
<tr>
<td>Janet Kwenda</td>
<td>Kam’goma</td>
<td>0999 618 923</td>
</tr>
<tr>
<td>Tsalirani Chimpeni</td>
<td>Madanjala</td>
<td>0999 488 449</td>
</tr>
<tr>
<td>Killion Nthara</td>
<td>Ngwanje</td>
<td>0884 758 845</td>
</tr>
</tbody>
</table>

**Kuti mumve zambili lankhulani ndi:**

Maintenance Assistant

NTCHISI – 0999 067 699

*Mjigo wokonzedwa bwino umapulumutsa ndalama*
Ntchito yanga ndimagwila pandekha ndipo mudzi kapena a komiti amandilipila ndalama ndikakonza mjigo

Mukandifuna ndiyimbireni foni pa nambala iyi
0994 048 186/0999 387 675

Kuti mumve zambili imbani foni lankulani ndi:

Mr. Pacharo Chiumia
Mlangizi wa zamadzi Boma la :

*Mjigo wokonzedwa bwino umapulumutsa ndalama*

5. **ID card**
AM AGREEMENT FORM – ENGLISH VERSION

CONTRACT OF COLLABORATION BETWEEN:

Tikonze Mjigo Dowa AND Mr/Ms __________________________ the Area Mechanic

Box __________ based in_______________________ TA. DowA District Cell:____________

Catchments area ____________________________

Mr/Ms __________________, regarding to your performances in maintenance services, during this 2 years’ collaboration with Tikonze Mjigo, we are pleased to propose you an other two years’ contract running from 2011 to 2012.

In appreciation of your good work and collaboration, we should provide incentives depending on the number of contracts you have done.

DUTIES OF TIKONZE MJIGO

➢ Tikonze Mjigo has to organize the follow up of the work done by the AM through monthly meeting, field visits, technical and management trainings, etc.
➢ Tikonze mjigo will assist the AM to solve the problem between stakeholders and communities.
➢ Tikonze Mjigo has to organize supply chain of spare to facilitate the Area Mechanic work.
➢ Tikonze Mjigo will promote Area Mechanic activities through official meetings, fliers, etc.

DUTIES OF AREA MECHANIC

➢ The Area Mechanic is in charge to regularly visit the water pumps in his catchments area to propose repair and preventive maintenance services.
➢ The works and contracts have to be done in accordance with the rules set by Tikonze Mjigo and the District Assembly during the CBM1 & CBM2 training.
➢ All the works done have to be proved by the signature of a contract.
➢ The Area Mechanic must honestly respect the contracts commitments with the communities and report any problem to the Maintenance Assistant.
➢ The AM is a facilitator, he has to give advices to the communities: where to buy the spare parts, which spare parts need to be changed, how to manage the water point, etc.
➢ The AM has to maintain a good relationship with the communities and other stakeholders in the area.
➢ The catchments area of the Area Mechanic is limited, any extension has to be approved by Tikonze Mjigo.
➢ The Area Mechanic must stay in touch with the maintenance assistant and give him a copy of contracts signed.

This contract can be terminated by either parties if the Area Mechanic does not perform or if he is not interested by this activity.

I _____________________, Area Mechanic, acknowledge the above stated and agree to follow all.

Date and signature of
Tikonze Mjigo maintenance Officer

______________________

Date and Signature of
Area Mechanic

______________________
AM AGREEMENT FORM – CHICHEWA VERSION

MAPHUNZIRO A KOZI A DERA OKOZA MIJIGO PA MAVUTO ANG’ONO KOMANSO AKULU (CBM1 NDI CBM2)

M’MGWIRIZANO PAKATI PA

Tikonze Mjigo Salima NDI Mr. /Ms ..........................Mekaniki wadera
Ntchisi InterAide C/O Box 1
Salima Malo Antchito ................................. Salima

M’mgwirizanowu ukuchotsa migwirizano yonse yammbuyomu, koma ukhoza kuthetsedwa ndi mmodzi mwa mbali ziwirizi;

i. Ntchito zomwe Tikonde Mjigo Salima imagwira

Nthawi yosainira m’mgwirizano wa ntchito pakati pa Tikonde Mjigo Salim ndi Katswiri wadera (Area Mechanic) wokonza mjigo.
Tikonze Mjigo Salima imamupatsa mkonzi wa mijigo wa dela pepala lojambulapo mwandondomeko malo omwe iye azyiyendera pogwila ntchito kapena tidzamuonetsa mkozi wa delayu dera lake pakuyenda naye limodzi kwao

Owona zokonza za mijigo aziitanitsa msonkhano mwezi ndi mwezi. Zokambirana zawo zizikhala motere: Aitanitse chikalata cha m’mgwirizano wo gwirira ntchito, chomwe anagwiritsa mweziwatha ndipo alondoloze ntchito yomwe yagwirika, awone mabvuto omwe apezeka mu nthawiyi, agawane zokambirana za uku ndi uku, a tekinikolo ndi abwana ake Tikonde Mjigo Salima akumbutsane zantchito yawoyo, ndi zina ndi zina.

A Tikonde Mjigo Salima awonetsetse kuti zipangizo zokonzera mijigo zipezeke nthawiyi zonse m’malo wogulitsirawo kuti zisasokoneze ntchito ya a mekaniki m’deralawo.

Tikonze Mjigo Salima idzathandiza mkozi wa dera pomutsatsa mdera lake mnjira zosiyanasiyana.

Tikonze Mjigo Salima ndiwokonzeka ku mu bwerekwe mkozi wa dela zipangizo zina zogwiritsa ntchito pa ma rodi kapena pa ma raising main fallings ngati azifuna

Tikonze Mjigo Salima idzakonza misonkhano kamodzi pa mwezi pafupi ndi kumene amakhala Mkonzi wa Dela (makilomita 20 woyenda pa njinga).
Tikonze mjigo idzapereka mlangizi wa zamadzi kuti aperere upangiri oyenera nthawi zonse ndi chithandizo kwa akozi a dera

Zonzezi zaperekedwa popanga akozi adera kuti akhale odziyimira pawokha

ii. Ntchito zomwe aAZigwira Mekaniki

Mkozi wa Dela ali ndi udindo woyendera pafupi-pafupi mjigo ya mdela lake kuti azitha kuwalondolera anthu a mudela lake ngati pajunika kusinthu zitsulo kapena kukonza mijigowo

Mkozi wa Dela ayenera kukhalal wokhulupirika ndiponso wodziperuka kwathunthu pamgwirizano womwe wapanga ndi anthu a mu delalo
Mkozi wa dera ali ndi udindo ofotokozeri mitengo ya katundu ndi malipiro antchito yake pogwiritsa ntchito buku la Koteshoni

Mkozi wa Dela agwiritse ntchito ka buku komwe analandira kuchokera kwa Tikonze Mjigo Salima ndi kulembambo ma kontrakiti bwino bwino wosalakwitsa. Bukulo ndi lamasamba atatu pa ntchito iliyonse, tsamba loyamba aperere kwa anthu amdelalo, tsamba la chiviri aperere kwa Mlangizi wa Tikonze Mjigo Salima ndi Mkozi wa Dela ayenera kukhala wokhulupirika ndiponso wosaina saina a makontrakiti omwe walemerana ndi anthu.

Mkozi wa Dela ayenera kupezeka kamodzi pa mwezi, apeze yekha njira yofikira ku misonkhano yomwe iziyitanidwa ndi Tikonze Mjigo Salima ku kaperaka mapepala wosaina saina a makostrakiti omwe walemerana ndi anthu.

Nthawi yomwe akugwira ntchito mudela lilionse, Mkozi wa Dela aziyesetsa kunenerera ubwino wagolosale imene imagulitsa zipangizo za mijigo m'delalo ndi mafunso athe kuyankha moyenerera.

Zonse zochitika ndi mkozi wa dera zichitike mu ndondomeko yomwe inakazikitsidwa ndi Salima District nthawi yomwe inkahunzitsa mu CBM1 ndi CBM2.
Ntchito zonse zogwiridwa zitsimikidzidwe ndi munthu wo zigwirayo polemba chizindikiro cha umboni wake yekha (signature, kapena kudinda).

Makontrakiti wosaina ayenera kupitilira 20 pa chaka chilichonse.
Tikonze Mjigo Salima atha kuthetsa m’mgwirizanowo ngati Mekaniki wa delayu sakugwira bwino ntchito yake. Zikatero Mekanikiyu abweze njinga ndi zipangizo zonse za bungweli.

Mkozi wa dela ndi wogwira nchito pa yekha, komanso amalipilidwa ndi mudzi

MGWIRIZANO WAKAGWIRIDWE KA NTCHITO NDI MTENGU Wake Pakati pa Mkozi Wa MJigo Ndi Mudzi

Mitengo yake ikhale pakati pa K1000.00 ndi K4500.00 mwachitsanzo
Mgwilizano pakati pa Area Mechanic ndi mudzi, Mgwirizano wapachaka. Mtengo wake ukhale pakati pa K3500.00 ndi K4000
Ngati ntchito ili yaying’ono monga kusitha **U-silu** malo ozungulira (mtunda wosapitirira makilomita 5 kuchokera kumudzi komwe Mkonziyu amakhala) **Mtengo wake ndi K1000.00**

Ngati ntchito ili yaying’ono koma (mtunda ndi wautali ndi kumudzi kwawo wamkonziyu) **Mtengo wake ndi K1500.00**

Ngati ntchito ili yokulirapo monga kuchotsa **mapaipi** malo ozungulira (mtunda wosapitirira makilomita 5 kuchokera kumudzi komwe Mkonziyu amakhala) **Mtengo wake ndi K4000.00**

Ngati ntchito ili yokulirapo monga kuchotsa **mapaipi**, kutali ndi mudzi wa Mkonzi (mtunda wopitirira makilomita 15) **Mtengo wake ndi K4500.00**

Ngati ntchito igwiridwa kopitirira masiku awiri mkonzi wa delayu akambilane ndi mudzi za mtengo omwe angalipiliidwe owonjezelapo

Ine, Mkonzi wa Dela, ndikubvomereza zomwe zalembedwazi ndipo ndikulonjeza kutsatira zonse.

*Udindo osamalira katundu uli mmanja mwa mkozi wa dela, komanso kukonzetsa njinga ikaonongeka ndi udindo wa mkonzi wa dela.*

*Ine, Mekaniki wa dela ndikubvomereza zonse zomwe zalembedwazi ndiponso ndikulonjeza kutsatira malamulo onsewa.*

<table>
<thead>
<tr>
<th>TUNDU OPEREKEDWA KWA AMISILI OKONZA MJIGO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BICYCLE</strong></td>
</tr>
<tr>
<td><strong>FLAT SPANNER</strong></td>
</tr>
<tr>
<td><strong>SOCKET SPANNER</strong></td>
</tr>
<tr>
<td><strong>FISHING TOOL</strong></td>
</tr>
<tr>
<td><strong>CELL PHONE</strong></td>
</tr>
</tbody>
</table>

Tsiku ndi siginetcha

Tikonze Mjigo Salima Maintenance Officer

Mekaniki wa Dela
REFRESH TRAINING ON AFRIDEV PUMP

AREA MECHANIC ADDITIONNAL TRAINING CONTENT

AFRIDEV PUMP

FOCUS 1. COMMUNITY APPROACH

Initial questions:

6. For the new village, who do you contact? How many people normally do they meet?
7. How are you introducing yourself to communities?
8. What do you discuss with the community?
9. What questions do community asked you?
10. What is your aim of visiting the community?
11. What is the problem do you face when introducing to the community?
12. What do you tell to the community about your job?
13. What to do in case of problem of payment?

Participative activity:

Aim: To make the participants know how to present in the community about their work.
Method: Focus group discussion and plenary
Materials: Flip charts, masking tape and pental markers

The facilitator will ask the participants to go in groups to discuss the following

- How do they enter the community?
- Who do they contact?
- How they will introduce themselves and explain their job?

Plenary

Let the participants to present their work and let them discuss with the help of the facilitator
The facilitator will then give the following answers

- We need to see the authorities in the community such as the chief, the committee and VDC.
- Set a good appointment to build first time good relationship and friendship atmosphere
- Try as much as possible to be equal to the community during the discussion.
- Explain well about your job and how you work independently.
- What are your duties being more precise?
- ID card and phone numbers to give.
- No labour charge = no job.
FOCUS 2. PUMP SECURITY CONTRACT

Aim: To allow participants see the reason to secure water points from theft, vandalism

Method: Focus group discussion and plenary session

Materials: Flip charts, pental pens, masking tape and posters for security system on water point

a. The facilitator will ask participants to go in groups and give them tasks to come up with methods that can be used to secure water point from theft
b. Discuss the methods raised by participants in plenary
c. The facilitator will introduce the method by inter aide on how it work (guideline below)

GUIDELINE FOR SECURITY SYSTEM ON AFRIDEV PUMP

1. Introduction to Afridev pump security system

Afridev pump is a common pump installed in the rural community of Malawi because it is an easy pump to maintain, operate and manage and its spare parts are available on the market which are sold very fast, due to the market of spares most Afridev pumps are prone to theft and vandalism mostly during the night.

Due to the high rate of vandalism in areas where Inter Aide project is doing operation and maintenance of the Afridev pumps, inter aide has introduced a removable security system in order to secure the pumps.

2. Procedure of welding security system tool

Materials needed:
- Iron bar (Y12) of 1.5 m
- 1 Pad Lock of 70mm

How to install the security system tool on the pump?

1. Remove the pump head cover and the pump handle
2. Insert the frame through the top of the pump head and let it rest at the bottom of pump head
3. Re-assemble the pump handle and the cover
4. Lift the frame to insert the opening designed to cover the cover for bolt M16X25mm
5. Adjust the frame in order to allow the hole on the frame to have equal position for the lock to fit well
6. Lockup the LOCK!

Note: The Afridev pump requires only 1 spanner to access inner parts which makes its simplicity to be vandalized if security has not been applied on the pump.

3. Advantage of safety system
- It is cheap (**Cost for installation – MK 5, 200.00**)
- Easy to install
- It doesn’t require the pump users to dismantle and take the pump head to the welder
- It is strong to accommodate security of the pump

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**FOCUS 3. PREVENTIVE MAINTENANCE CONTRACTS**

**GUIDELINES ON PREVENTIVE MAINTENANCE CONTRACTS FOR AREA MECHANICS**

1. **INTRODUCTION**

Need to be explained to the AM

- Preventive maintenance is an agreement that take place between AM and WPC/People in the community on how the water point is going to be maintained/serviced for the year.
- Contract charge for preventive maintenance is between **K4, 000 and K4, 500**.

It is good to enter this contract since it helps people to have an access of good water all the time. Not only that but also knowing the spares that are needed for the next service, it also assist the people in the way that they only contribute money for the buying of spare parts for the service.

Preventive Maintenance Contract is dedicated to WP which have been installed more than 3 years ago, because the WPC doesn't know the life of spares, and need the AM to have these information

**Preventive Maintenance Contract is also dedicated to the WP which is functioning**

The Preventive Maintenance Contract is a way to plan the spares which need to be change to avoid a big breakdown: it is a way to spend less money on the maintenance.

That's why this type of contract help communities to forecast next investments on spares : they can organize easily monthly contribution and avoid an expensive repair.
2. **AIMS OF PREVENTIVE MAINTENANCE GUIDELINE**

The aim is to make Area Mechanics have more points on how to explain on the importance of preventive maintenance to the WPC/people in the community. It has observed that people go for other contracts such as repair due to lack of necessary information on the importance of preventive maintenance from AMS.

3. **WHAT AM MUST EXPLAIN TO THE COMMUNITY/WPC?**
   - He/She must explain his/her duties.
   - Explanations on the advantages of preventive maintenance.
   - Explanations on the importance of having/keeping fast wearing spare parts in stock.
   - He/she must explain to the community/Water point committee that the water point shall be serviced **four (4) times** a year (each 3 months)

4. **ADVANTAGES OF PREVENTIVE MAINTENANCE FOR COMMUNITIES**
   - It helps people to know the amount of money they use when buying spare parts for future service.
   - It is cheaper as compared to other contracts. -for example, the water point shall be serviced **four (4) times** a year and this will lead to the availability of safe water throughout the year.
   - People do contribute small amount of money only for the buying of spare parts for the service/maintenance of the water point and not for the labor fee for the AM.
   - It is also cheaper as compared to other contracts since their water
   - Points will be maintained /repaired without labor charge for AM.

5. **WHAT AM MUST DO DURING FIRST VISIT ON THE WP?**
   - Checking anything/all spare parts concerning the water point, even removing raising main pipe to detect any problem (fire method for example, rope, pipe centralizers...).
   - Advising the WPC to buy all spares that are needed, with a planning for next service.

6. **WHAT AM MUST DO?**
   - Checking/seeing the fast wearing spare parts.
   - Checking/seeing the pipe centralizer.
   - Checking/seeing the rope.
   - Asking the years of the water point it has take from the time it was put.
   - Making service agreement with water point committee for the water point.
   - Advise the water point committee to buy fast wearing spare parts before the time of the service.
   - Signing agreement contract book with the water point committee.

**EXAMPLE OF PREVENTIVE MAINTENANCE FORM:**
FOCUS 4. PIPE FISHING AND TOOLS

Activity
Aim: To make the participants know the process of fishing rising main pipe and what to do when the pipes stuck.

Method: Focus group discussion and plenary
Materials: Flip charts, masking tape and pental markers

The facilitator will ask the participants to go in groups to discuss the following
- What they do before and during fishing?
- What do you do when the pipes stuck

The facilitator will conclude with the best ways of fishing rising main and process of fishing.

If there are a lot of fishing in our area that means there some mistakes happened since fishing is a big job that involves time, more people and materials so weed to avoid it.

FISHING TOOL GUIDELINE ADDRESSED TO AM

This booklet is the result of 5 years of expertise from Inter Aide Maintenance system Project on options to have a good management when fishing fallen pipes on WP.

Fishing helps the community to have access of water again when the pipes drawn down and hence need proper attention for the fishing to take place effectively. When the raising main pipe drawn down, it does not mean, it is the end of the WP.

Inter Aide Maintenance Project System has brought some steps to be followed after experiencing the accident that occur in some districts due to fishing. For example, Mchinji, One AM made an accident during fishing.

1. Responsibilities of AM before Fishing
   - AM must Visit the WP that needs Fishing
   - Advise the community to find good and strong poles for the fishing
- Advise the community to dig a well depth hole according to the size of the poles.
- Advise the community to cut the poles with good branches.
- AM must prepare all fishing tools.

2. **Safety rules of Fishing**
   - The winch must be tied well with a strong rope.
   - The poles should be fixed close to the apron.
   - The Winch should be tied straight to the hole of the pedestal
   - When operating the Winch, people must not be close to the WP
   - There must be a good distance between the pedestal and where we tie our winch.
   - Tie a chain of the Winch to the rod with a chain or strong rope.
   - Use a Vince when there is no place to connect the chain to the rod.
   - The chain must be moving on its railway line and the operator must be on a good position according to the direction of the Winch.

Inter Aide also implemented two fishing tools, the one that holds the outer part of the pipe and one that holds the inner part of the pipe. **See Pictures below for reference**

3. **Operations of fishing tools**

   A. **Inner fishing tool**
      It is a Fishing tool that holds the inner part of the pipe.
      - Pull all the nuts to the top end position
      - Use the strings from the sack to attach the nuts with the nylon rope.
      - Tie the beginning of the rope to avoid the moving down of the nuts, as nuts goes bottom, they expand the size of the fishing tool, when goes up, they contract (reduces) the size of the fishing tool.
      - Insert the rope together with rods at the same movement of the rods inserted.
      - Make sure that nuts fitted on the fishing tool are moving freely from top to the bottom.
      - Make sure that the fishing tool has held the pipe before cutting the rope.

   B. **Outer fishing tool**
      It is the Fishing tool that holds outer part of the pipe
      - Adjust the teeth very well in the way that the tool is going to hold the pipe
      - Before inserting the tool, you need to test the pipe to make sure that it will hold the pipe inside.

   **NOTE:** Please take care when working on raising main pipe to avoid falling down pipes.
**Fishing tool 1**

- To retrieve PVC PIPE 63 mm – => *Handle pipe from inside*

**Operation mode:**

1. The fishing tool **goes inside** the PVC rising main pipe
2. Make sure the nuts must be **kept at the very top part of R6 wire** to reduce the size of the fishing tool: **going up of the nuts reduces its size** so as to allow the whole fishing tool penetrate the pipe vice versa
3. **Use the nylon rope to keep nuts up** in this case the rope is attached to **weak strings which are inserted in the nuts** to keep them at the top position as possible,
4. The rope must go together with the rods at the **same purse of movement and speed as possible**
5. When the fishing tool has penetrated the fallen PVC pipe try as much as possible the tool can reach, **when there is feeling that the tool has reached the most bottom of the PVC**, pull the rope out to free the nuts to descend which will make the tool expand and hence fishing can be possible.

**Advantages:** to precise

- Better grip of the element as it catch it from the inside

**Cost:**

<table>
<thead>
<tr>
<th>Nut n°13 x 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galvanized pipe</td>
</tr>
<tr>
<td>(27 cm of 12 gauge</td>
</tr>
<tr>
<td>Stainless steel rod</td>
</tr>
<tr>
<td>R6 wire x 3</td>
</tr>
<tr>
<td>Nylon rope</td>
</tr>
</tbody>
</table>

**Limits:**

- cannot retrieve rods or small elements like U-seal blocked in pipes
- does not work if pipe is obstructed or if it is the pipe + the rod that are to be retrieved
- risk of losing tool inside (to confirm)

**Efficiency – Results:**

How many tries – how much success? = %

Sold to AM? If yes how many?
Fishing tool 2 - To retrieve pipes – => **Handle elements from outside**

**Operation mode:**

**Advantages:**
- Can retrieve obstructed pipes

**Cost:** 5 000 MKw

**Limits:**
- Cannot retrieve rods
- Risk of losing tool inside

**Efficiency – Results:**
- In Mchinji, for 1 tool lost, 5 pumps were saved in the first month of this initiative
- 10 tools were done
FOCUS 5. PUMP DIAGNOSTIC SKILLS

PROCEDURE WHEN DOING DIAGNOSTIC...

STEP 1: Asking the water point committee the problem of WP

Asking the following questions:
When the pump was installed?
Here we can know that the problem is coming from the cylinder/pipes after noticing that the pump was Installed 10/15 years ago and the cylinder/pipes were not changed.
When it stopped?
Here it helps to know if the WPC is active/not after knowing the period when the WP was stopped working.
- Learn from the story tell by WPC
- Here it helps to know more information about the water point and what happen during the break down.

STEP 2: Seeing the WP by yourself, when seeing the following things happens
- Seeing the outer part of the pump
- Seeing bolts and nuts, head cover, fulcrum pin, handle and pedestal if they are functioning

STEP 3: Pumping the water point
- How you are feeling when pumping
- Here you feel yourself whether it is heavy/not by pumping the WP
- Flow of water
- Here you see the coming out of water whether it’s a lot/not.
- Noise of pump
- When you hear the noise coming from the handle you can know that bush bearings are worn out.
- If you hear the noise coming from inside the pump you can know that rod centralisers are worn out.

STEP 4: Dismantling of water point:
When we dismantle WP the aim is to know the real problem, checking pares inside the WP
- Removing rods and seeing foot valve, checking O-ring and bobbin,
- Checking bush bearings, fulcrum pin, hanger pin, u-seal/cup seal and plunger body plastic/brass, rod centralizers

When found the spares needed to be changed write a quotation but if there are spares available in their stock then you can change
If new spares changed but the water still coming little, we need to write a quotation to buy solvent cement and double end socket to do step 5 which is removing raising main pipes

STEP 5: Removing raising main pipe
- Remove all the pipes to check if they were not joined using fire method
- Checking inside the cylinder
- You check if there is rust inside the cylinder and if you find it, clean with piece of soft sack/use plunger with oil and after using piece of cloth with soap to clean the cylinder.
- Checking pipes if they have cracks
- Big cracks you can see it while small ones you can’t see, if it is the small crack, cover one end of the pipe, filling water and cover the other end of the pipe then put it on the sand to notice if there is linking.

N.B: with these steps we can easily know the real problem on the WP
AM INITIAL TRAINING ON MALDA PUMP

AREA MECHANIC INITIAL TRAINING CONTENT

MALDA PUMP

Objectives of the training

- To train pump mechanics so that they are able to do complicated repairs on MALDA pump
- Empower AMs to advise communities on preventive maintenance with primary objective of increasing MALDA pump functionality rate.

DAY 1

Activity 1 Introduction and Climate setting

Aim: Allow participants know each other, settle down and gain confidence
Method: Plenary
Materials: Flip charts and markers

The Facilitator will ask Participants to do the following;
- Self introductions
- Elect their leaders
- Discuss the timetable
- Fears and expectations
Activity 2: MALDA Pump Background

Aim: Participants understand background of MALDA pump

Method: Plenary

Materials: Flip charts and petal markers

- A MALDA pump is a Direct Action Pump
- Other examples of Direct action Pump are Mark V and Nira AF85
- The first Direct Action Pump was developed in Kenya between 1987 and 88
- Between 1990 and 1991, 45 Direct Action pumps were installed in Ntchisi and Lilongwe
- In 1993 an evaluation of the direct action pump was conducted
- Results led to the development of the a new hand pump basing on the Afridev direct pump
- The new pump was named MALAWI DIRECT ACTION PUMP
- Currently the pumps are being used in Malawi, Madagascar and Kenya
- MALDA pump is one of the VLOM pumps in Malawi

Activity 3: Differences And Similarities Between MALDA And AFRIDEV Pump

Aim: Orient Participants understand the two types of VLOM pumps

Method: Plenary

Materials: Flip charts and petal markers

Allow participants to discuss the topic so that they learn from each other’s knowledge.

Note: Participants may come up with different answers and facilitator will emphasise the best answers.
Activity 4: MALDA pump Ground and Underground Components

Aim: Participants to gain knowledge on the spares needed to make a good repair

Method: plenary

Materials: Picture of a MALDA Pump, Flip charts and petal markers
In conclusion, the facilitator will explain that a pump is divided into two categories ABOVE GROUND PARTS and BELOW GROUND PARTS and mention all the parts correctly and explain the function of each part as in table 1 below.

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>FUNCTION</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head pump and cover</td>
<td>Housing above parts</td>
<td>On top of pedestal</td>
</tr>
<tr>
<td>Pump pedestal</td>
<td>Housing and uphold head pump and rising main</td>
<td>Between apron and head pump</td>
</tr>
<tr>
<td>Complete handle</td>
<td>For pumping</td>
<td>On top head pump</td>
</tr>
<tr>
<td>Steel cone plate</td>
<td>Reduce pedestal hole and support rising main rope</td>
<td>Between head and pedestal</td>
</tr>
<tr>
<td>Handle sleeve</td>
<td>Protect handle from friction with main bush</td>
<td>Between handle and main bush</td>
</tr>
<tr>
<td>Handle rod</td>
<td>Connect rod to the handle</td>
<td>First rod from the top</td>
</tr>
<tr>
<td>Shock absorber</td>
<td>Prevents collusion between handle and main bush</td>
<td>On top of top rod</td>
</tr>
<tr>
<td>Rubber cone</td>
<td>To hold rising main pipe and seal space between pedestal and head pump</td>
<td>Between head pump and pedestal</td>
</tr>
<tr>
<td>Standing plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stopper (lock nuts)</td>
<td>Helps to hold the handle upwards</td>
<td>Handle rod connector</td>
</tr>
<tr>
<td>Main Bush guide</td>
<td>Sets the handle position in the head pump (there are two types)</td>
<td>Between the head and the handle</td>
</tr>
<tr>
<td>Top sleeve (collar)</td>
<td>Prevents rising main pipes from slipping through the rubber cone</td>
<td>Top end of the rising main</td>
</tr>
</tbody>
</table>
# Below Ground Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Function</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rods 1m, 2m, 3m.</td>
<td>Connect handle to plunger</td>
<td>Between handle rod and plunger</td>
</tr>
<tr>
<td>Rod connector</td>
<td>Two side screw used to connect rods</td>
<td>Between two rods</td>
</tr>
<tr>
<td>Handle rod connector</td>
<td>Two side screw used to connect handle rod and next rod</td>
<td></td>
</tr>
<tr>
<td>Plunger/foot valve connector</td>
<td>Two side screw used for Malda plunger to connect with the rod</td>
<td>Top of foot valve or plunger</td>
</tr>
<tr>
<td>Plunger body</td>
<td>To help in pushing water upwards can also be used as foot valve</td>
<td>Inside of cylinder</td>
</tr>
<tr>
<td>O–ring</td>
<td>Prevents backflow</td>
<td>Assembled on the top ring of the plunger body</td>
</tr>
<tr>
<td>Return ring</td>
<td>Sets in position the foot valve between cylinder and suction pipe</td>
<td>Lower ring on the foot valve</td>
</tr>
<tr>
<td>Foot valve assembly</td>
<td>Fitted with bobbin and o ring prevents water in cylinder from going back into the well</td>
<td>At the bottom end of cylinder</td>
</tr>
<tr>
<td>Bobbin</td>
<td>Allows water to flow in one direction only</td>
<td>Inside of plunger or foot valve</td>
</tr>
<tr>
<td>Plunger (Afridev) connector</td>
<td>Connect Malda rod and Afridev plunger body</td>
<td>Between Malda rod and Afridev plunger</td>
</tr>
<tr>
<td>Pipe coupling (socket)</td>
<td>To connect Malda pipes</td>
<td>Between pipes</td>
</tr>
<tr>
<td>Cylinder assembly</td>
<td>Its where the plunger moves it takes water from the well into the rising main pipes</td>
<td>Bottom end of the rising main</td>
</tr>
<tr>
<td>Suction pipe</td>
<td>Minimize uptake debris and sand in the cylinder</td>
<td>Bottom end of the cylinder</td>
</tr>
</tbody>
</table>
Activity 5: MALDA Pump Preventive Maintenance Procedure

What is preventive maintenance?

Preventive maintenance means regular checks of hand pump components and pump surroundings

Routine Preventive Checks

1. Check flange bolts are tight
2. Check guide bush is tight
3. Check pump rods are tight

If for example the expected lifetime of a return ring is one year the seal will be changed after a period of one year even if the water point is still functional

During the a preventive maintenance check, the foot valve is leaking, the AM will carry out repairs of the foot valve even though the pump is not broken down

Half Year Checks

<table>
<thead>
<tr>
<th>PART</th>
<th>EFFECT ON PUMP OPERATION</th>
<th>REMEDIAL ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handle</td>
<td>Unusual noise during operation</td>
<td>Check for reason and take corrective action</td>
</tr>
<tr>
<td>ISO flange</td>
<td>ISO flange is loose during operation</td>
<td>Repair the foundation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If fasteners are loose tighten</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If missing replace</td>
</tr>
<tr>
<td>Pump is leaking</td>
<td>If 10 strokes are done before water discharge, there is a leakage the pump is leaking</td>
<td>Replace bobbin in foot valve</td>
</tr>
<tr>
<td></td>
<td>beyond acceptable limit</td>
<td>Check rising main connection sockets if loose tighten</td>
</tr>
<tr>
<td></td>
<td>If discharge is less than 18l for 40 continuous strokes in 1 minute,</td>
<td>Change plunger seal, bobbin or different seals in the cylinder</td>
</tr>
<tr>
<td>Rod is separated from plunger</td>
<td>No flow</td>
<td>Fish out the rod and check if the screw threads are worn out and replace</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fish out Plunger if it is detached tighten</td>
</tr>
</tbody>
</table>
Activity 6: Field trip for repair

This activity will take place at a nonfunctioning pump

Instructions for the activity

Participants will be divided into two groups to do the following

1. Make proper diagnosis of the pump
2. Make quotation for spares
3. Repair the pump
## MALDA SPARE PARTS: DESCRIPTION AND FUNCTION

<table>
<thead>
<tr>
<th>BELOW GROUND COMPONENTS / ZIPANGIZO ZA PANSI PA MJIGO</th>
<th>FUNCTION / NTCHITO ZAKE</th>
<th>POSITION / MALO OMWE AMAKHALA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Pump and cover / Hedi Pamp ndi chi vindikilo</td>
<td>Housing above parts / Kusunga zipangizo za mmwamba mwa mjigo</td>
<td>On top of pedestal / Pamwamba pa pedesito</td>
</tr>
<tr>
<td>Pump Pedestal / Pumpu Pedesito</td>
<td>Housing and uphold head pump and rising main / Kasunga ndi kugwira hedi pampu ndi mapaipi</td>
<td>Between apron and head pump / Pakati pa konkileti ndi hedi pampu</td>
</tr>
<tr>
<td>Complete handle / Handulo yathunthu.</td>
<td>handle for easy pumping / Handulo yomwe imagwilitsidwa ntchito pojiga</td>
<td>At the back of the Head pump / Kumbuyo kwa hedi pampu</td>
</tr>
<tr>
<td>Steel cone plate / Koni Puleti</td>
<td>Minimize pedestal hole To hang up rising main through rope / Kuchepetsa bowo la pedesito Kugwira ma paipi mopgwirizana ndi chingwe</td>
<td>Between head and pedestal / Pakati pa hedi pampu ndi pedesito</td>
</tr>
<tr>
<td>Handle sleeve / Chitsulo chimene chimakhala kunja kwa handulo</td>
<td>Protect the handle from friction with the main bush / Kuteteza handulo kuti isamakhulane ndi chotsekera pakamwa pa pedesito</td>
<td>Between handle and main bush / Pakati pa chopukusira ndi chotsekera pakamwa pa pedesito</td>
</tr>
<tr>
<td>Handle rod / Rodi yaku handulo</td>
<td>Connect the handle to the plunger / Kulumikizitsa handulo ndi pulanja</td>
<td>First rod from the top / Rodi yokhala koyambilira kuchokera mmwamba</td>
</tr>
<tr>
<td><strong>Rods (1m, 2 m or 3 m)</strong> / Malodi</td>
<td><strong>Connect the handle to the plunger (Can be 1 Meter, 2 Meters or 3 Meters)</strong> / Amalumikiza handulo ndi pulanja</td>
<td><strong>Between handle rod and plunger/Pakati pa rodi yaku handulo ndi pulanja</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Plunger/foot valve body/Pulanja kapena chomwe amapangira futu valavu</strong></td>
<td><strong>Up keeping pumped water / Kuthandiza kuti madzi akwere mwamba</strong></td>
<td><strong>Plunger: Inside the cylinder, at the end of the pump rods - Foot valve: At the bottom of the cylinder / Mkati mwa silinda pomwe pamathera ma rodi - Futu valavu imakhala pamapeto pa silinda</strong></td>
</tr>
<tr>
<td><strong>O-ring / O-ring’i</strong></td>
<td><strong>Prevents back flow of water inside the cylinder / Kuteteza madzi a mu silinda kuti asapite pansi pa mjigo</strong></td>
<td><strong>Top ring on the footvalve / Imaikidwa pa mwamba pa futuvavu</strong></td>
</tr>
<tr>
<td><strong>Seal / Silu</strong></td>
<td><strong>Seals water above the plunger / Kuthandiza pulanja kutunga madzi. Kusunga madzi opezeka mwamba mwa pulanja</strong></td>
<td><strong>Top ring on the plunger / Pamwamba pa pulanja (pulasiki okha)</strong></td>
</tr>
<tr>
<td><strong>Return ring / Khoza la pansi</strong></td>
<td><strong>To set in position the foot valve between the cylinder and the suction pipe / Kuika mmalo mwake futu valavu pakati pa silinda ndi paiyi yosaka madzi</strong></td>
<td><strong>Lower ring on the footvalve / Imakhala kumapeto a futu valavu</strong></td>
</tr>
<tr>
<td><strong>Bobbin / Bobini</strong></td>
<td><strong>Allow water to flow in one direction only / Kuthandiza madzi akamalowa kuti atenge njila imodzi</strong></td>
<td><strong>Inside plunger and foot valve / Mkati mwa pulanja ndi futu valalu</strong></td>
</tr>
<tr>
<td><strong>Shock absorber/ Shoko abuzoba</strong></td>
<td><strong>Prevents collusion between the handle and the main bush / Imateteza kukhulana kwa handulo ndi chomwe chimatseka pakamwa pa pedesito</strong></td>
<td><strong>On top of the top rod / Pamwamba pa rodi yomaliza</strong></td>
</tr>
<tr>
<td><strong>Rubber cone / Labala Koni</strong></td>
<td><strong>To uphold the rising main and seal the gap between pedestal and head pump / Kugwila ma paiyi ndi kuchepetsa bowo pakati pa pedesito ndi hedi pampu</strong></td>
<td><strong>Between head pump and pedestal / Pakati pa hedi pampu ndi pedesito</strong></td>
</tr>
<tr>
<td>Component</td>
<td>Function</td>
<td>Position</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Rod connector / Cholumikizira ma rodi</td>
<td>Two side screw used to connect two rods together / Kulumikiza ma ma rodi</td>
<td>Between two rods / Pakati pa ma rodi</td>
</tr>
<tr>
<td>Plunger &amp; foot valve connector / Cholumikizira pulanja ndi futu valavu</td>
<td>Two side screw used for Malda plunger to connect with the rod and put in position the bobbin / Kulumikizitsa ma rodi ndi pulanja komanso kuika mmalo bobini</td>
<td>Top of footvalve/plunger / Kutsogolo kwa futu valavu</td>
</tr>
<tr>
<td>Handle Rod connector / Cholumikizira handulo ndi ma rodi</td>
<td>Two side screw used to connect the handle rod and the next rod / Kulumikiza rodi yaku handulo ndi ma rodi otsatira</td>
<td>Between handle rod and the next rod / Pakati pa rod yaku handulo ndi ma rodi ena</td>
</tr>
</tbody>
</table>

### BELOW GROUND COMPONENTS/

<table>
<thead>
<tr>
<th>ZIPANGIZO ZA PANSI PA MJIGO</th>
<th>FUNCTION</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stopper (Rock nut) / Sitopa</td>
<td>Set up handle movement / Imateteza kaimidwe ka handulo</td>
<td>On the Handle rod connector / Polumikira rodi yaku handulo</td>
</tr>
<tr>
<td>Plunger (Afridev) connector / Cholumikizira pulanja ya Afridev</td>
<td>Connect Malda rod and Afridev plunger / Imalukizitsa pulanja ya afridev ndi rodi ya malda</td>
<td>Between Malda rod and Afridev plunger / Pakati pa rodi ya malda ndi ya afridev</td>
</tr>
<tr>
<td>Main bush (Guide bush) / Chitseko cha pakamwa pa pedesito</td>
<td>Set the handle position in the pump head. Two types are existing / Kuthandiza handulo kulowa mkati mwa pampu hedi.Zilipo zamitundu iwiri</td>
<td>On top of the head, between the head and the handle / Pakati pa pampu hedi ndi handulo</td>
</tr>
<tr>
<td>Pipe / Paipi</td>
<td>For carrying water from the cylinder on to the top level / Kutenga madzi kuchokera mu silinda kupita mmwamba</td>
<td>Connects cylinder and top level / Kulumikiza silinda ndi zida za mmwamba</td>
</tr>
<tr>
<td>Pipe coupling (Socket) / Cholumikizila ma paipi</td>
<td>To connect two Malda pipes. Can be used as a top sleeve / Kulumikizila ma paipi, chitha kugwira ntchito ngati topu silivi (kolala)</td>
<td>Between two pipes / Pakati pa ma paipi</td>
</tr>
<tr>
<td>Top sleeve (collar) / Topu Silivi</td>
<td>It prevents the rising main from slipping through the rubber cone / Kuteteza paipi kuti isafumphuke kugwela mkati kudzela pa labala koni</td>
<td>At the top end of the rising main / Pamwamba pa mapai pi. Pa bowo la pedesito</td>
</tr>
<tr>
<td><strong>Cylinder assembly / Silinda Asembule</strong></td>
<td><strong>Cylinder part where the plunger is moving. It takes in water from the borehole and pumps up / Ndi mmene plunger imayendayenda kutenga madzi a pansi pa Mjigo ndi kuwapopela mwamba</strong></td>
<td><strong>Bottom of the rising main / Pansi pa mapaipi</strong></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Suction pipe / Paipi yosaka madzi</strong></td>
<td><strong>Minimize incoming sand in the cylinder / Kuteteza kuti mchenga usalowe mu silinda</strong></td>
<td><strong>Bottom of the cylinder / Pansi pa silinda</strong></td>
</tr>
<tr>
<td><strong>Rope (nylon rope 6 mm) / Chingwe</strong></td>
<td><strong>For strengthening and upholding the rising main / Kulimbikitsa ndi kugwila mapaipi kuti asagwele pansi pa mjigo</strong></td>
<td><strong>From the suction pipe joined to steel cone plate / Kunja kwa mapaipi kuchokela mu sakishoni paipi mpaka pa koni puleti mwamba.</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cylinder Malda &amp; Black pipes (PipeCo old) / Silinda ya yakale (yamaipi akuda)</strong></th>
<th><strong>Cylinder Malda &amp; PVC pipes</strong></th>
<th><strong>Cylinder Afridev &amp; PVC pipes / Silinda ya Afridev</strong></th>
<th><strong>Tool</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spanner with special welding / Sipanala yopasulira mjigo wa malda</strong></td>
<td><strong>Suction pipe / Paipi yosaka madzi</strong></td>
<td><strong>Minimize incoming sand in the cylinder / Kuteteza kuti mchenga usalowe mu silinda</strong></td>
<td><strong>Bottom of the cylinder / Pansi pa silinda</strong></td>
</tr>
</tbody>
</table>
INTRODUCTION

This training has been organised to assist Area Mechanics gain more skills in repairing MALDA PUMPS. The first training was organised in September 2013. There has been a slow uptake in MALDA PUMP Repair contracts and this training will allow InterAide to get information from the Area Mechanics on the challenges being faced and find solutions.

DAY 1

ACTIVITY 1: INTRODUCTION AND CLIMATE SETTING

AIM: Allow participants know each other and set good environment for the training

METHOD: Plenary

The Facilitator will ask Participants to do the following:

- Self introductions
- Elect their leaders
- Discuss the timetable
- Fears and expectations

ACTIVITY 2: OPENING REMARKS
1. Opening speech by DWO
2. Presentation by Project Officer
3. Main speech by District Commissioner

**ACTIVITY 3: DEMONSTRATION TYPES OF DIRECT ACTION PUMPS IN THEIR AREAS**

**Aim:** ALLOW AMS TO DIFFERENTIATE MALDA PUMP FROM MARK V AND NIRA

**Method:** OBSERVATION AND PLENNARY DISCUSSION

**Materials:** MALDA SPARES, MARK V SPARES, NIRA, FLIP CHART, PENTAL MARKERS

1. Open the session by asking participants the types of direct action pump
2. Ask participants to describe a direct action pump
3. Bring one type of pump each time and ask participants to name it
4. Ask participants to go in groups and write the differences for each pump
5. In plenary ask participants to present their work and discuss their work

**ACTIVITY 4: MALDA SPARE PART REFRESH**

**Aim:** REFRESH AMS ON MALDA PUMP SPARES

**Method:** GROUP WORK

**Materials:** MALDA SPARES, FLIP CHARTS, PENTAL MARKERS

1. Participants will go into groups and write the MALDA spare parts and function divided into above ground parts and below ground parts
2. In plenary, participants will discuss their work and discuss their work with reference to the table below
### ABOVE GROUND PARTS

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>FUNCTION</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head pump and cover</td>
<td>Housing above parts</td>
<td>On top of pedestal</td>
</tr>
<tr>
<td>Pump pedestal</td>
<td>Housing and uphold head pump and rising main</td>
<td>Between apron and head pump</td>
</tr>
<tr>
<td>Complete handle</td>
<td>For pumping</td>
<td>On top head pump</td>
</tr>
<tr>
<td>Steel cone plate</td>
<td>Reduce pedestal hole and support rising main rope</td>
<td>Between head and pedestal</td>
</tr>
<tr>
<td>Handle sleeve</td>
<td>Protect handle from friction with main bush</td>
<td>Between handle and main bush</td>
</tr>
<tr>
<td>Handle rod</td>
<td>Connect rod to the handle</td>
<td>First rod from the top</td>
</tr>
<tr>
<td>Shock absorber</td>
<td>Prevents collusion between handle and main bush</td>
<td>On top of top rod</td>
</tr>
<tr>
<td>Rubber cone</td>
<td>To hold rising main pipe and seal space between pedestal and head pump</td>
<td>Between head pump and pedestal</td>
</tr>
<tr>
<td>Standing plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stopper (lock nuts)</td>
<td>Helps to hold the handle upwards</td>
<td>Handle rod connector</td>
</tr>
<tr>
<td>Main Bush guide</td>
<td>Sets the handle position in the head pump (there are two types)</td>
<td>Between the head and the handle</td>
</tr>
<tr>
<td>Top sleeve (collar)</td>
<td>Prevents rising main pipes from slipping through the rubber cone</td>
<td>Top end of the rising main</td>
</tr>
</tbody>
</table>

### BELOW GROUND PARTS

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>FUNCTION</th>
<th>POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rods 1m, 2m, 3m.</td>
<td>Connect handle to plunger</td>
<td>Between handle rod and plunger</td>
</tr>
<tr>
<td>Rod connector</td>
<td>Two side screw used to connect rods</td>
<td>Between two rods</td>
</tr>
<tr>
<td>Handle rod connector</td>
<td>Two side screw used to connect handle rod and next rod</td>
<td></td>
</tr>
<tr>
<td>Plunger/foot valve connector</td>
<td>Two side screw used for Malda plunger to connect with the rod</td>
<td>Top of foot valve or plunger</td>
</tr>
<tr>
<td>Component</td>
<td>Function</td>
<td>Location</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Plunger body</td>
<td>To help in pushing water upwards can also be used as foot valve</td>
<td>Inside of cylinder</td>
</tr>
<tr>
<td>O-ring</td>
<td>Prevents backflow</td>
<td>Assembled on the top ring of the plunger body</td>
</tr>
<tr>
<td>Return ring</td>
<td>Sets in position the foot valve between cylinder and suction pipe</td>
<td>Lower ring on the foot valve</td>
</tr>
<tr>
<td>Foot valve assembly</td>
<td>Fitted with bobbin and o ring prevents water in cylinder from going back into the well</td>
<td>At the bottom end of cylinder</td>
</tr>
<tr>
<td>Bobbin</td>
<td>Allows water to flow in one direction only</td>
<td>Inside of plunger or foot valve</td>
</tr>
<tr>
<td>Plunger (Afridev) connector</td>
<td>Connect Malda rod and Afridev plunger body</td>
<td>Between Malda rod and Afridev plunger</td>
</tr>
<tr>
<td>Pipe coupling (socket)</td>
<td>To connect Malda pipes</td>
<td>Between pipes</td>
</tr>
<tr>
<td>Cylinder assembly</td>
<td>Its where the plunger moves it takes water from the well into the rising main pipes</td>
<td>Bottom end of the rising main</td>
</tr>
<tr>
<td>Suction pipe</td>
<td>Minimize uptake debris and sand in the cylinder</td>
<td>Bottom end of the cylinder</td>
</tr>
</tbody>
</table>

**ACTIVITY 5: REFRESH AMS ON MALDA PROBLEM DIAGNOSIS**

**Aim:** REFRESH AMS TO MAKE CORRECT DIAGNOSTIC ON MALDA PUMP

**Method:** GROUP WORK

**Materials:** FIELD PRACTICAL

A field trip will be made to do the following;

a) Make a pump diagnostic  
b) Write a quotation  
c) Repair the pump  
d) Facilitator will give the following information on routine checks as outlined below
ACTIVITY 6: ROUTINE PREVENTIVE CHECKS

1. Check flange bolts are tight
2. Check guide bush is tight
3. Check pump rods are tight

If for example the expected lifetime of a return ring is one year the seal will be changed after a period of one year even if the water point is still functional

During the a preventive maintenance check, the foot valve is leaking, the AM will carry out repairs of the foot valve even though the pump is not broken down

ACTIVITY 7: HALF YEAR CHECKS

<table>
<thead>
<tr>
<th>PART</th>
<th>EFFECT ON PUMP OPERATION</th>
<th>REMEDIAL ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handle</td>
<td>Unusual noise during operation</td>
<td>Check for reason and take corrective action</td>
</tr>
<tr>
<td>ISO flange</td>
<td>O flange is loose during operation</td>
<td>Repair the foundation</td>
</tr>
<tr>
<td>Pump is leaking</td>
<td>If 10 strokes are done before water discharge, there is a leakage the pump is leaking beyond acceptable limit</td>
<td></td>
</tr>
<tr>
<td>Rod is separated from plunger</td>
<td>No flow</td>
<td>Fish out the rod and check if the screw threads are worn out and replace Plunger if it is detached tighten</td>
</tr>
</tbody>
</table>

If discharge is less than 18l for 40 continuous strokes in 1 minute,
INTRODUCTION

A bicycle is one of the most convenient modes of transport in Malawi. It has been the experience of many Non-governmental organizations, Inter Aide inclusive, that after giving a bicycle for the purpose designated, beneficiaries will ask for spares and even new bicycles because the ones in use is no longer viable. It should be noted that this happens after a period of 2 to 3 years. Notwithstanding we have seen that privately owned bicycles are viable even after a period of 10 years. The training is an answer to try to solve this anomaly. It should also be noted that inter aide is working more to make AM independent thereby we give skills to allow AM to achieve autonomy and responsible to their job.

An AM who has no working bicycle cannot make more contracts and cannot be able to reach out to communities in his catchment area there by breaching trust with the community if he fails to render his services to potential clients with negative repercussions on the intended goal of increasing WP functionality.

AIMS AND OBJECTIVES OF THE TRAINING

To allow AM be able to maintain their bicycles and encourage them to be independent workers.

EXPECTED OUTCOMES OF THE TRAINING

1. AM know how to repair the bicycle
2. AM should be able to know maintenance cost
3. Understand the need of servicing the bicycle
4. Ownership of bicycle

DAY 1

Activity 1: Introduction and Climate setting
**Aim:** To allow participants to know each other, settle down and gain confidence

**Method:** Plenary

**Materials:** Flip charts and markers

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**Objectives:** allow AMS to be able to know bicycle parts, function and importance of maintaining bicycles

**Methods:** Plenary session. Visual Aids,

**Materials:** Poster of bicycle, flip charts, bicycle spares

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Ask one participant to open the session with a prayer and allow participants to introduce themselves and where they are coming from.

The facilitator will start this session by raising the following topics;

1. What are their expectations
2. What are their fears
3. Formulate with the participants norms and agree on the given timetable

The facilitator will write the answers given on a flip chart and address the relevant issues raised by participants in plenary session.

---

**Activity 2: THEORY**

**Importance of maintenance/bicycle repairing**

1. a bicycle is a tool to assist AM do his job well,
2. a bicycle should be maintained to last longer,
3. it’s expensive to buy bicycles than to keep the ones we have in good working condition,
4. cost in terms of lost revenue the AM,
5. it will cost more to repair the bicycle if it is not maintained in time,

**Poster of bicycle**

1. Poster of bicycle Paste poster of bicycle and ask participants to identify the picture on the poster,
2. Label parts of the bicycle, and mention its function
DAY 2

Activity 3: Practical Session Bicycle repair

Objectives: Knowing how to repair a bicycle
Materials: Bicycle spares, spanner and grease
Method: Group work, practical session

- Demonstrate dismantling of relevant parts
- Reassembling of the bicycle
- Participants should in their groups actively participate on how to assemble axle spokes on their own

Facilitator Instruction: The facilitator will divide participants in 5 groups

- Participants identify problems on each bicycle
- Give out spares required
- Assembling of the bicycle in groups
- Assessment of results

DAY 3

Activity 1 Recap

Objectives: To remind participants what they learnt in the previous 2 days
Method: plenary
Material: Poster of the bicycle, spare parts

Recap of day 1 and 2
The facilitator will ask participants what they have learnt in the past two days
Activity 2  Practical servicing on bicycle 1

Objectives: To practice what they learnt in the previous 2 days

Method:  Plenary

Material:  Tube, mending solution, sand paper, scissor, basin of water and pump

Facilitator will demonstrate how to make a good patch

The facilitator will let the participants go in groups to practice the competition of making good patch on the puncture.

Activity 3  Practical servicing on Bicycle 2

Objectives: To explain the parts of the bicycle which needs frequent attention to keep bicycle running

Methods:  Plenary session. Visual Aids

Materials:  Flip charts, markers, Bicycle, bicycle spares

The facilitator will start by asking participants the importance of servicing the bicycle frequently

1. Show to the participants the parts on the bicycle that needs frequent service
   - Checking rubber brakes
   - Checking wheel spokes
   - Pressure in the tyres
   - Checking and greasing in the movable parts like hubs, stark and the folk fittings.

2. Make the participants understand the problems of not servicing the bicycle
   - The brakes may cause an accident which may let big problems to the bicycles
   - The spokes may cause the ream to be damaged
   - Without required pressure, tyres may worn out fast.
   - Without greasing the movable parts like stark, hubs, and folk fittings, the bicycle may have problems to the parts like steel balls, keep cone and hard to cycle.
**Activity 4: Ownership of Bicycle**

**Objectives:** To make the participants to be able to know that the bicycle it’s their own tools

**Methods:** Plenary session. Visual Aids

**Materials:** Flip charts & markers

*The facilitator will start by asking participants some questions as follows:*

1. Why participants must take bicycle as their own tool?
   - It helps them to find money/contracts
   - For easy movement
   - It helps them to save money and time
   - It takes long time to break down

2. How participants must take bicycle as their own tool?
   - By servicing the bike frequently
   - By buying spare parts
   - By knowing the cost of service
   - By not overloading the bicycle

3. What will be the consequences of not taking the bicycle as their own tool?
   - Bicycle may not take long time
   - It cost a lot money when repairing the bicycle
   - It is time consuming and participants may not be able to find contracts
   - There can be a lot of break downs

**Activity 5: Cost of Maintenance/saving money**

**Objectives:** To make the participants to be able to know the importance of saving money for the maintenance of the bicycle

**Methods:** Plenary session. Visual Aids

**Materials:** Flip charts & markers

*The facilitator will start by asking participants some questions as follows:*

1. Why saving money is important for the bicycle maintenance?
   - It helps the participants to make the service in time
   - It cheap since is not needs a huge amount at same time
2. Why we must know the cost of maintenance per month?
   - To know how much you spend per month in items of servicing
   - To know the spares needed when doing service

The facilitator will explain the table how much they can save per month in terms of spares needed and cost:

<table>
<thead>
<tr>
<th>Cost in Mk/month to maintain a bicycle Indian type HUNTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spares</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Crank</td>
</tr>
<tr>
<td>crank set</td>
</tr>
<tr>
<td>Saddle</td>
</tr>
<tr>
<td>Pedals (pair)</td>
</tr>
<tr>
<td>TUBE</td>
</tr>
<tr>
<td>TYRE</td>
</tr>
<tr>
<td>REAM</td>
</tr>
<tr>
<td>Rear front set brakes</td>
</tr>
<tr>
<td>Rubber brakes</td>
</tr>
<tr>
<td>Handle</td>
</tr>
<tr>
<td>Handle fitting</td>
</tr>
<tr>
<td>free wheel</td>
</tr>
<tr>
<td>Chain</td>
</tr>
<tr>
<td>Front hub</td>
</tr>
<tr>
<td>rear hub</td>
</tr>
<tr>
<td>Fark</td>
</tr>
<tr>
<td>Mood guard</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
</tr>
</tbody>
</table>
Activity 6: Memorandum of understanding

Objectives: To make an agreement between AM and Project

Methods: Plenary session. Visual Aids

Materials: Copies of MOU

The facilitator will start by reading the content of memorandum of understanding

- The facilitator will ask the participants if there are some question about the MOU
- If they understand the content of MOU, they will sign the agreement
MGWIRIZANO WAKAKOZEDWE KA NJINGA PAKATI PA TIKONZE MJIGO DOWA NDI MKOZI WA DERA

Tikonze Mjigo Dowa NDI Mr/Ms ------------------------------- Mekaniki wadera
Cell ----------------- TA -------------------------------
MUDZI -------------------

Mau oyamba

Bungwe la Inter aide lapangitsa maphunziro a kankonzedwe ka njinga pofuna kuthana ndi mavuto amayendedwe komanso ngati njira imodzi yoθhandiza kupanga akonzi a mijigo kukhala anthu odziimila paokha.

- Bungwe la Inter aide likudziwa zamavuto amayendedwe pa ntchito ya akonzi amijigo.
- Cholinga cha bungwe ndi kukhala ndi akonzi amijigo odziymila paokha.
- Njinga ndi chida cha mkonzi wa mdera koma ntchito yake ndikutumikira anthu a mdera lake.
- Ndi udindo wa mkonzi wa mdera kukonza njinga yake
- Mkozi wa dera akasiya yekha ntchito kapena akachotsedwa ayenela kubweza njinga ku bungwe la Inter aide.

Zomwe mkonzi wa mdera ayenela kutsatila

- Kuonetsetsa kuti njinga yake ikugwira ntchito bwino nthawi zones.
- Ayenela kusunga ndalama zokonzetsela njinga yake
- Kukozekeletu za mavuto a njinga amsogolo
- Mkonzi wa dera azikoza njinga potsatila ndondomeko yomwe waphunzitsidwa
- Njinga ikasowa kapena kubedwa muyenela kukafotokonzera mlangizi wa za madzi ndikuonetsa kalata yochokera ku polisi

Ine Mr/s......................................................... ndikuvomeleza kuti ndamvetsa ndondomeko yoyenela kutsatidwa pakakonzedwe ka njinga.

Tsiku ndi siginetcha

Tikonze Mjigo Dowa Maintenance Officer

Mkozi wa Dela
Subject: Agreement on bicycle purchase

Because of unexpected issues with your bicycle, you can’t manage to do your job properly as an Area Mechanic. Indeed you need this to move around your area, and meet WPC to propose your services.

Nevertheless, one bicycle was given to you with a starter pack when you start as an Area Mechanic. It is not the responsibility of the Maintenance System Project to buy a new one.

According to the good job you did, and the number of contracts you have signed with communities, the Project decides to help you to have a new bicycle. That’s why we propose you to share the price.

The cost of the bicycle is 32 000Mk. The Project will pay 17 000Mkw, and you will pay 15 000Mk, as a loan you have now on the Project.

I, Mr………………………………………….. , Area number............. agrees that I owe 15 000Mk to the Maintenance System Project. I will refund it in 6 months as it is explained:

| Project Officer | Maintenance Assistant | Area Mechanic |
MONITORING AND EVALUATION

14. Area Mechanic Follow up Form ................................................................. Page 96

15. Area Mechanic Evaluation Form
   - Simple repair evaluation ................................................................. Page 97
   - Major repair evaluation ................................................................. Page 101

16. AM skills Evaluation Database ............................................................... Page 105

17. Area Mechanic Contracts Database ....................................................... Page 106

18. AM list by district .................................................................................. Page 107

19. Survey form ......................................................................................... Page 108
# AM FOLLOW UP DOCUMENT

## AM FOLLOW UP GUIDE DOCUMENT

<table>
<thead>
<tr>
<th>Month/Year</th>
<th>District</th>
<th>MO</th>
</tr>
</thead>
</table>

**Number of AM visited:**

**Check:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Date of checking</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>AM Name</th>
<th>Area No</th>
<th>Mode of Contact</th>
<th>Village</th>
<th>Purpose of Follow Up</th>
<th>Observation</th>
<th>Challenges</th>
<th>Solutions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Date and signature by the Maintenance Officer:
**AM EVALUATION – SIMPLE REPAIR**

**MAINTENANCE SYSTEM PROJECT**
**AREA MECHANIC PERFORMANCE EVALUATION**

**SIMPLE REPAIR**

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>:</th>
</tr>
</thead>
<tbody>
<tr>
<td>AREA MECHANIC NAME</td>
<td>:</td>
</tr>
<tr>
<td>STARTING YEAR</td>
<td>:</td>
</tr>
<tr>
<td>AM CELL PHONE NUMBER</td>
<td>:</td>
</tr>
<tr>
<td>MAINTENANCE OFFICER</td>
<td>:</td>
</tr>
<tr>
<td>DATE OF EVALUATION</td>
<td>:</td>
</tr>
<tr>
<td>WP WHERE EVALUATION WAS DONE</td>
<td>:</td>
</tr>
</tbody>
</table>

**Evaluation results:**

<table>
<thead>
<tr>
<th>EVALUATION AREA</th>
<th>TOTAL</th>
<th>AM SCORE</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECHNICAL SKILLS SIMPLE REPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUOTATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATERIALS AND EQUIPMENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEACHING SKILLS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL EVALUATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPECIFIC EVALUATION AREA</td>
<td>ANSWER CHECKLIST</td>
<td>SCORE</td>
<td>SCORE REALIZED</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------</td>
<td>-------</td>
<td>----------------</td>
</tr>
<tr>
<td>TECHNICAL SKILLS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Is the AM able to inquire the history of the WP?</td>
<td>AM ask year of WP construction</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>AM ask breakdown frequency</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>AM ask if there are seasonal breakdowns</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>AM ask if WPC or someone made repair before reporting to AM</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>AM ask if rising main pipes were removed before</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>AM ask if some parts were recently changed/removed</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Does the AM check the operation of the pump by trying the handle</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Is the AM able to follow procedure on dismantling of WP</td>
<td>Wash hands and keep two pails of clean water</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Remove the hanger pin and bush bearings</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Keep all the removed parts in the cover</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Pump rods are placed in order of how they were originally assembled</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Assemble fishing tool and remove the foot valve</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Does the AM check fast wearing parts</td>
<td>U-Seal</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Cup - Seal</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Rod Centralizers</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Bush Bearing</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>O-Ring</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Does the AM Check operation and condition of the outer parts</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Does the AM check operation and condition of below ground components</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Does the AM Record his intervention?</td>
<td>Spares removed</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>New spares installed</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Date of next visit in case of preventive contract</td>
<td>1</td>
</tr>
</tbody>
</table>
### TOTAL TECHNICAL SKILLS

22

### QUOTATION

<table>
<thead>
<tr>
<th>Quotation</th>
<th>Yes/No</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Phone number is written on quotation</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>9 By the quotation can we know the reason of the problem</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>10 Do we know what kind of contract it is</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>11 Are all spares indicated in the quotation</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>12 Does the quotation has correct name of spares</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>13 Does the quoted price correspond to the price list?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>14 Are all the cost indicated</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>15 At least 2 signatures are on the quotation</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>16 Does the quotation have good arithmetical calculation</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>17 Is the date of the repair indicated</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>18 Does the quotation have good presentation (hand writing)</td>
<td>Yes/No</td>
<td>1</td>
</tr>
</tbody>
</table>

**TOTAL QUOTATION**

11

### MATERIALS AND EQUIPMENT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Yes/No</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 Display and Use of ID card</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>20 State of Bicycle</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>21 Functioning phone</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>22 Hack saw</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>23 2 flat spanner</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>24 Fishing tool</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>25 Socket spanner</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>26 Price list</td>
<td>Yes/No</td>
<td>1</td>
</tr>
</tbody>
</table>

**TOTAL MATERIALS AND EQUIPMENT**

8
### TEACHING SKILLS

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Yes/No</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Does the AM explain the problem to the community?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>Does the AM explain what his intervention will change?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>29</td>
<td>Does the AM show the breaking spares and explain is role?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td>Does the AM give some advices to prevent the same kind of problem?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>Ability to provide advice to the community</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>Advise communities on preventive maintenance</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>33</td>
<td>Does advise WPC on stocking fast wearing parts?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>34</td>
<td>Does the AM advise communities to contribute money for WP?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
</tbody>
</table>

**TOTAL TEACHING SKILLS** 8

### REMARKS AND RECOMMENDATIONS

________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________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MAINTENANCE SYSTEM PROJECT
AREA MECHANIC PERFORMANCE EVALUATION

MAJOR REPAIR

DISTRICT :
AREA MECHANIC NAME :
STARTING YEAR :
AM CELL PHONE NUMBER :
MAINTENANCE OFFICER :
DATE OF EVALUATION :
WP WHERE EVALUATION WAS DONE :

Evaluation results

<table>
<thead>
<tr>
<th>EVALUATION AREA</th>
<th>TOTAL</th>
<th>AM SCORE</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECHNICAL SKILLS MAJOR REPAIR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td>TEACHING SKILLS</td>
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| TOTAL EVALUATION                 |       |          |     |

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<th>SPECIFIC EVALUATION AREA</th>
<th>ANSWER CHECKLIST</th>
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<td></td>
<td><strong>TECHNICAL SKILLS</strong></td>
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<tr>
<td>1</td>
<td>Follow best procedure to remove rising main pipes</td>
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<tr>
<td></td>
<td>More than 10 people are available to assist him in removing pipes</td>
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<td>Double check the condition of all below ground components before resorting to</td>
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<td></td>
<td>removing pipes</td>
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<td></td>
<td>The rope is untied and knots made on both sides to coincide with top of rising</td>
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<td></td>
<td>main pipe.</td>
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<td></td>
<td>Leaking and broken parts should be marked as the rising main is being removed</td>
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<td></td>
<td>Select a suitable place to lay down the pipes and carefully examine the rising</td>
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<td></td>
<td>main for damage and signs of leakage</td>
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<td>2</td>
<td>Follow best procedure to make a joint</td>
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<td></td>
<td>Mark a length of 115 mm on plain pipe to check how far the plain end entered the</td>
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<tr>
<td></td>
<td>socket after making the first joint</td>
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<td></td>
<td>Mark 10 mm from end of pipe and make a chamfer from an outer edge of the pipe</td>
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<td></td>
<td>Clean outside of the plain end, up to the 115 mm mark and inside the bell socket</td>
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<td></td>
<td>of the other pipe using cleaning fluid</td>
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<td>Roughen the cleaned surfaces with sand paper or hacksaw blade</td>
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<td></td>
<td>Use a brush to apply solvent cement or a feather</td>
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<td></td>
<td>Apply solvent cement quickly and thoroughly</td>
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<td></td>
<td>Immediately push in the plain end into the bell socket in a straight line up to</td>
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<td></td>
<td>the 115 mm mark and allow <strong>FIVE</strong> minutes for drying to have a good joint</td>
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<td></td>
<td>Wipe out excess solvent with clean cloth</td>
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<td>Check the mark and ascertain how far the plain end entered the socket.</td>
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<td>3</td>
<td>Follow best procedures to replace rising main pipes</td>
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<td>Make sure pipes are washed before fitting back in the borehole</td>
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<td></td>
<td>Make sure that everything is ready to avoid delay when applying solvent cement</td>
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<td></td>
<td>Any damaged length of more than 300 mm is replaced with a full length of the</td>
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<td>rising main.</td>
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<td></td>
<td>Double end sockets are used at every joint.</td>
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<td>Fit pipe centralizers at each pipe length</td>
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<td>Use more people to hold up the pipe in addition to the rope on the raising main</td>
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<td>Lowering of rising main is done in sections and reconnection is done on the pedestal</td>
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<td>Check length of rising main using knots made on the safety rope (any length above 30 mm on top of rising main, should be cut by the same length)</td>
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| TOTAL TECHNICAL SKILLS | 22 |

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<tr>
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<td>By the quotation can we know the reason of the problem</td>
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<td>Do we know what kind of contract it is</td>
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<td>Are all spares indicated in the quotation</td>
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<td>Does the quotation has correct name of spares</td>
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<td>Does the quoted price correspond to the price list?</td>
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<td>Are all the cost indicated</td>
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<td>At least 2 signatures are on the quotation</td>
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<td>Does the quotation have good arithmetical calculation</td>
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<td>Is the date of the repair indicated</td>
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<td>Does the quotation have good presentation(hand writing)</td>
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| TOTAL QUOTATION | 11 |

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<td>Fishing tool</td>
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<td>Socket spanner</td>
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<td>23</td>
<td>Does the AM explain the problem to the community</td>
<td>Yes/No</td>
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<td>24</td>
<td>Does the AM explain what his intervention will change</td>
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<td>25</td>
<td>Does the AM show the breaking spares and explain is role</td>
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<td>Does the AM give some advices to prevent the same kind of problem</td>
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<td>27</td>
<td>Ability to provide advice to the community</td>
<td>Yes/No</td>
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<td>28</td>
<td>Advise communities on preventive maintenance</td>
<td>Yes/No</td>
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<td>29</td>
<td>Does advise WPC on stocking fast wearing parts</td>
<td>Yes/No</td>
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<td>30</td>
<td>Does the AM advise communities to contribute money for WP</td>
<td>Yes/No</td>
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<td><strong>TOTAL TEACHING SKILLS</strong></td>
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**REMARKS AND RECOMMENDATIONS**

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

MO Signature...........................................................................................................

AM COORD ..............................................................................................................

PO Signature...........................................................................................................

104 | Page
<table>
<thead>
<tr>
<th>AM Name</th>
<th>Activities starting year</th>
<th>Eval SIMPLE repair</th>
<th>Eval MAJOR repair</th>
<th>EVALUATIONS annual average /40</th>
<th>NOTIVATION</th>
<th>NOTIVATION annual score /10</th>
<th>AMSKILLS ASSESSMENT Total annual score /40</th>
<th>AMSKILLS ASSESSMENT Total annual average /20</th>
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Inter Aide is a French NGO whose goal is to give practical answers to the needs of the most deprived strata of society in developing countries and help communities improve their health and living conditions.

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<th>Contract number</th>
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<td>Starting to work in AM (year)</td>
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**Note:** The table continues with similar entries, but some entries are not fully visible in the image provided.
SURVEY ON THE HAND PUMPS FUNCTIONMENT

**INTER-AIDE MAINTENANCE PROJECT (TIKONZE MJIGO)**

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MITUNDU YA MJIGO, A, M, M5, C, N, R EYA W, E, SP, PP
AYI = 1
AYI = 0