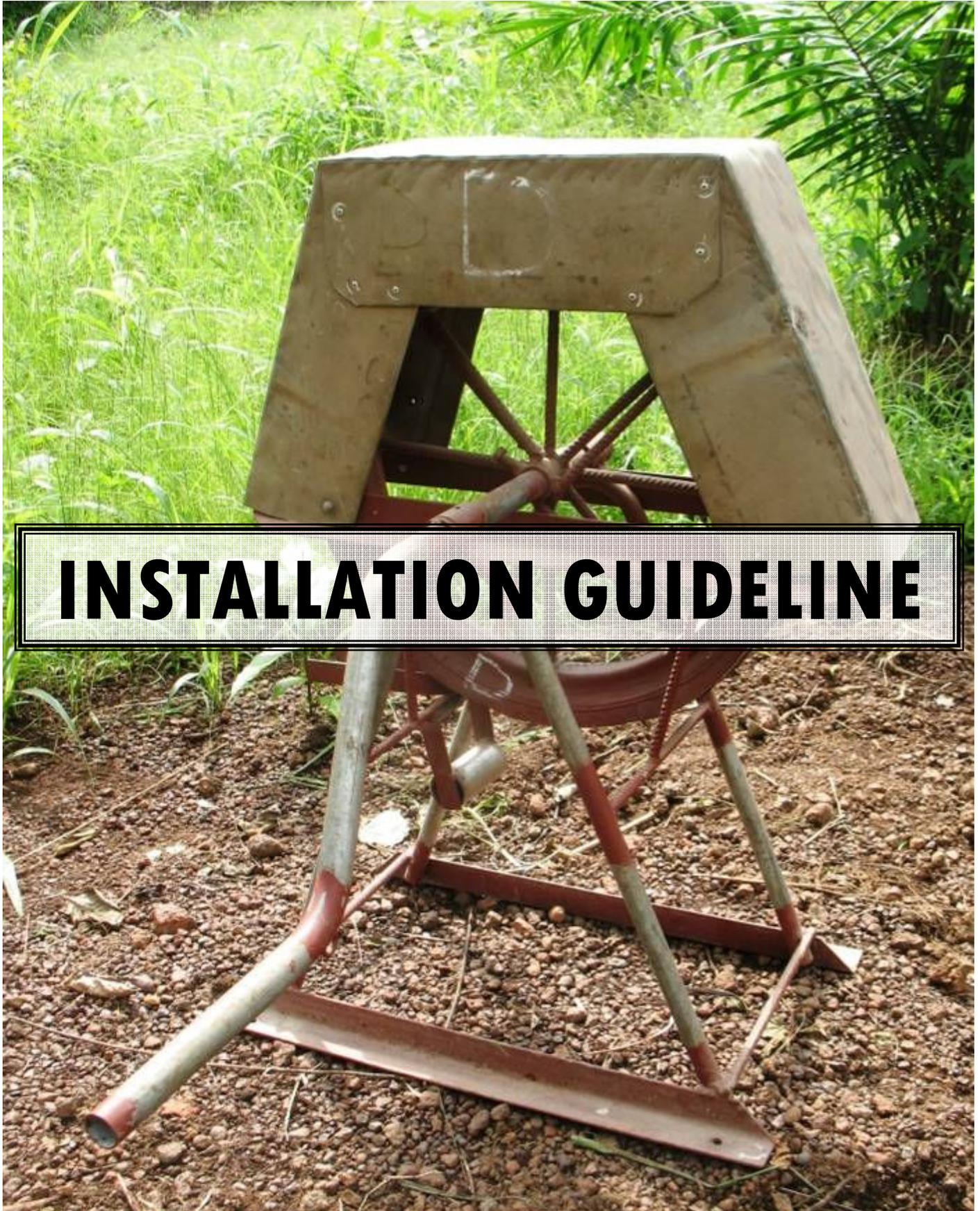




Inter Aide Sierra Leone

ROPE PUMP

European Union



INSTALLATION GUIDELINE



A) Preparations

I. Before leaving for the field

1. Invite the Community members and especially the Water Committee members to attend to the installation. Be sure the pump caretakers of the villager will be here to help for installation. Ask the community to invite women to attend the installation. Women can do the minor maintenance of the pump, so that you should invite the community to choose at least one women to be Pump Caretaker.
2. Make sure you know the proper depth of the well. Make sure you took the appropriate length of PVC Pipe
3. If you plan to do the handover of the money and of the community tool bag, be sure to take the handover forms: MOU tool kit and Receipt maintenance form (see annexe)
4. Make sure that you have all the components of the Rope Pump community kit:

	Name of the Item in the kit	Unit	Quantity
SPARES	Nylon rope	Roll	1
	PVC pipe 1 meter	Piece	1
TOOLS	Cement solvent	Piece	1
	Grease	Cup	1
	Hack saw blade	Piece	2
	Screw driver flat s/s	Piece	1
	Spanner flat + ring 13mm or 17 mm	Piece	1
	Tool bag small	Piece	1





5. Make sure you have all required tools and spare parts:



- ✓ Hack saw blade
- ✓ Nylon rope for “guide box security rope” (at least 1.5 times the depth of the well)
- ✓ Nylon rope with knots and rubber pistons every meter (2 times the depth of the well)
- ✓ Cement solvent
- ✓ Rope pump
- ✓ Binding wire
- ✓ Pliers and wire cutters
- ✓ Cement
- ✓ PVC Pipe (more than the depth of the well)
- ✓ Outlet pipe
- ✓ Cement guide box
- ✓ A Paintbrush or a sponge
- ✓ Paint

- ✓ A cigarette lighter



I. Pump Caretaker basic training



Present and explain the name and use of every tool and spare parts to the Pump Caretaker

Ask all non concerned people to go out of the fence. Are allowed to enter only Field Supervisor, Pump Officer, Pump Caretakers and eventually Water Committee members

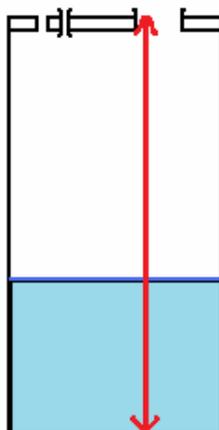
Ask one of them to repeat the name spare parts and tools

Explain the steps of the installation and the particularities of this rope pump.

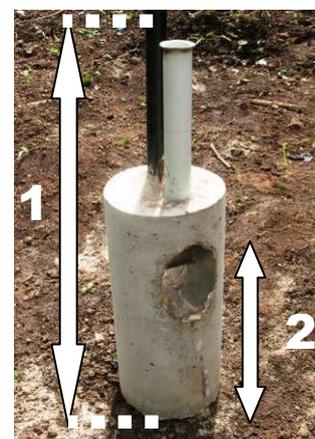
II. Mounting the pump

Step 1 Defining the pipe length

1. Start by measuring the depth of the well, from the cover level to the filtration bed at the bottom of the well (when you reach the top of the filter bed).



2. Measure the distance from the bottom of the guide box to the end of the PVC pipe (1) and from the bottom to the inlet of the guide box (2)

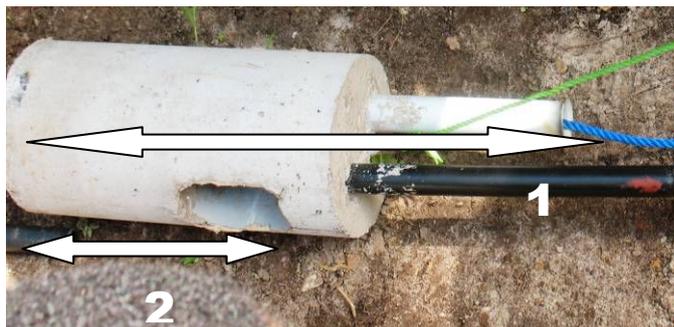
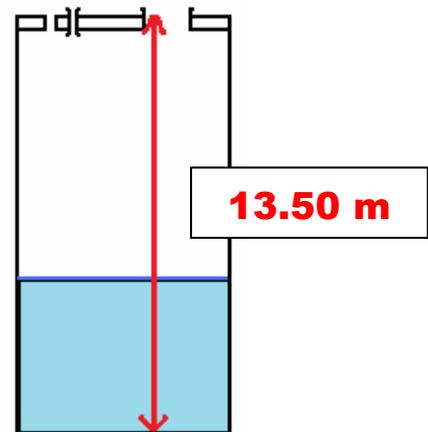




To decide the length of PVC you need it depends on the type of bed at the bottom of the well

Example:

- If you measure from the top of cover to the bed rock **13.50m**



pipe fixed to the guide box (1) is **70 cm**

- and if the distance from the bottom of the guide box to inlet (2) is **25cm**

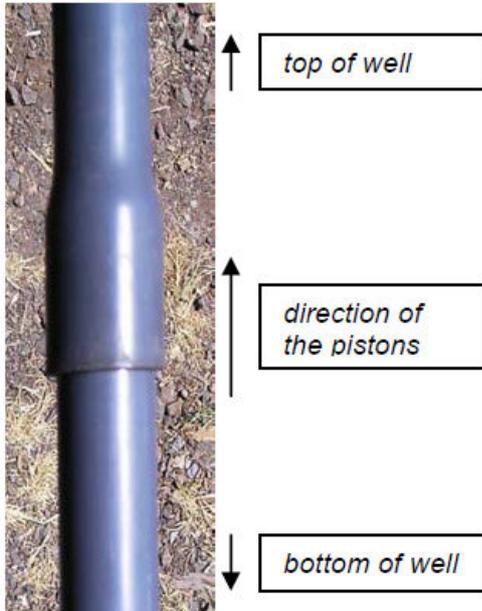
- If the distance from the bottom of the guide box to the top of the PVC

	Muddy bed	Rocky bed
Distance from bed to inlet	At least 40cm	At least 10cm
<i>If from guide box bottom to inlet(2)</i>	25 cm	25 cm
THE GUIDE BOX BOTTOM SHOULD BE PLACED	At 15 cm above the muddy bed	Directly on the rocky bed
So from bed to the PVC pipe of the guide box	70cm (1) + 15cm = 85cm	70 cm (1)
So from the cover to the top of the PVC pipe of the guide box <i>(Total depth minus distance from bottom to top of PVC pipe of the guide box)</i>	13.50 – 0.85 = 12.65m	13.50 – 0.70 = 12.80m
<i>extra for external outlet</i>	+ 20 cm	+ 20 cm
Length of PVC pipe you need	12.85m	13m



Step 2: Cutting the pipe

Once you have defined the proper length of PVC pipe, use the hack saw blade to cut it



Make sure during installation all connections are constructed with the male parts towards the bottom side of the well and the female parts towards the top side of the well.

In this way the up moving pistons will not get stuck behind the male the end of the male (rim) inside the pipe

Step 3 Making flares

1) To make the pipe fit to the connecting PVC pipe of the guide box; you must create a flare to one end of the pipe: a female nozzle.



2) The flare is made by heating the end of the pipe and then opening it up with a small PCV pipe of the same diameter. Push this flare tool (small pipe) into the hot end pipe before it cools down. Keep it inside the flare until it goes cool.



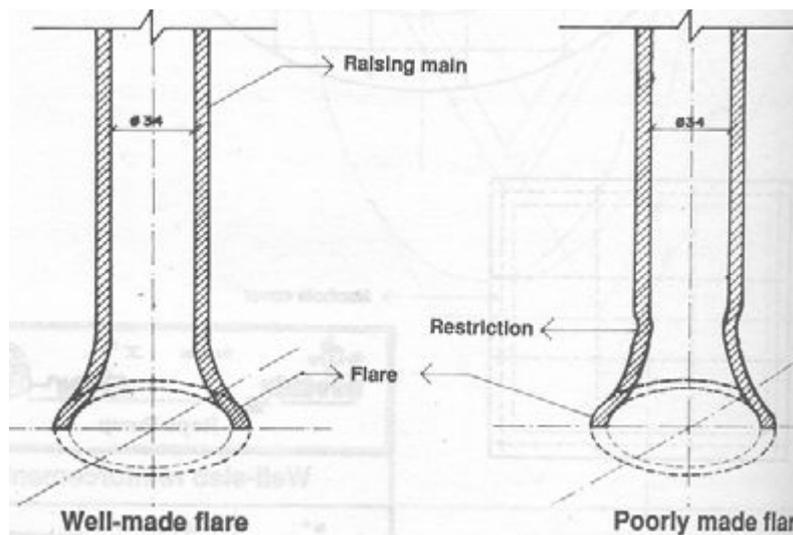
Do not remove the small pipe while the flare is still hot



Inter Aide
Sierra Leone



European Union



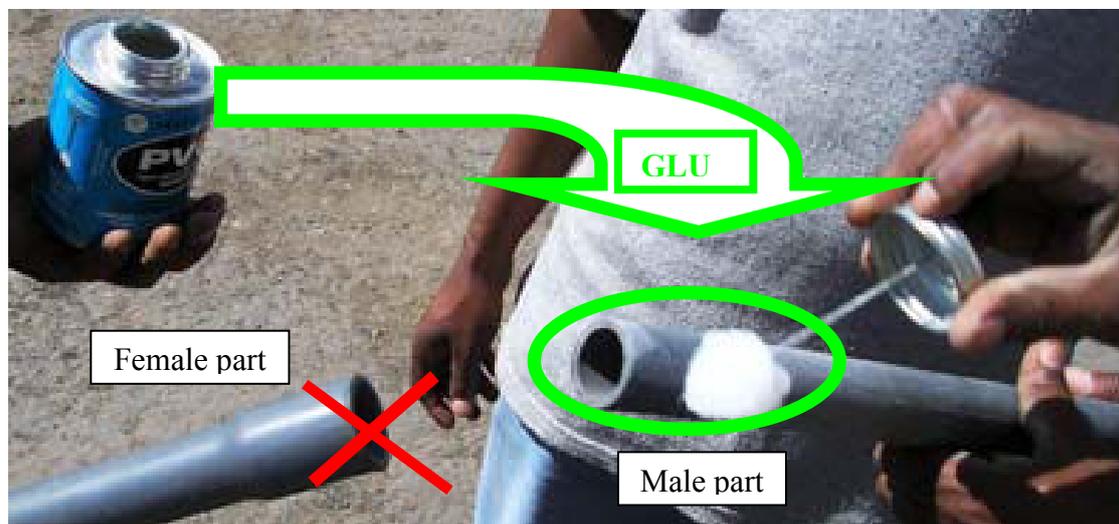
Don't heat up the pipe-end too much!
This will create restrictions which hamper the entry of the

Step 4: Connecting pipes

- 1) Roughen up the inside of the female and the outside of the male part with Sandpaper or with the hack saw blade



**Put PVC glue (PVC cement) only on the male part,
NOT INSIDE THE FEMALE PART.**



2) Push the male part inside the female part. Wait 2 minutes to make it glue.



Step 5: Threading the piston rope

1) To pull the rope through the pipe:

- You can take a thin rope and connect a heavy bolt to it. Drop the bolt and the rope through the pipe. Connect the rope with pistons on the thin rope and pull it through.
- You can use biding wire. Thread it inside the pipe. Connect the rope with pistons to the end of the biding wire when it goes out of the pipe. Pull the biding wire through the pipe to thread the rope through.





- 2) To run the piston rope through the guide box, you must make the rope turn around the metal pipe before going out of the guide box

- 3) Thread the rope with piston so that it will go back and forth from the top of the PVC pipe, to the U-turn inside the guide box and then to come back to the top of the PVC pipe. **Thread extra length (3 to 4 meters) for security**



- 4) Use a second nylon rope without knots or piston. Tie it to the upper hook of the guide box between the inlet and outlet Pipes. This security rope will be useful to lower the pump inside the well or to hold it out of the well for reparation.



III. Installing the inner pump

Step 1: Lowering the pump

- 1) Lower the guide box with rising pipe and ropes into the well.

The PVC pipe should be lowered in a bend as large as possible, to prevent cracks or even breaking of the pipe.



Don't turn the pipe around during installation to prevent the rope from winding around the pipe. Lower it straight. Keep the rope on one side of the pipe.

Help yourself holding the security rope

- 2) Once you reach the proper depth (see chapter II. *Mounting the pipe*), keep holding the pump thanks to the security rope.

Step 2: Threading PVC Pipe and rope with piston through the cover

- 1) Thread binding wire inside the outlet hole (1) and another one through the ceramic inlet pipe fixed in the cement of the cover (2)



Always hold the guide box by holding the security rope. All the weight must weigh on this rope.

- 2) One person must lie on the cover and catch the 2 binding wires from inside the well through the inspection cover
- 3) Once it is done, link the binding wires to the rope with piston:
 - The rope going inside the PVC pipe must go through the hole number 1.
 - The rope going down the well to the guide box out of PVC pipe must go through the ceramic hole number 2





Inter Aide
Sierra Leone

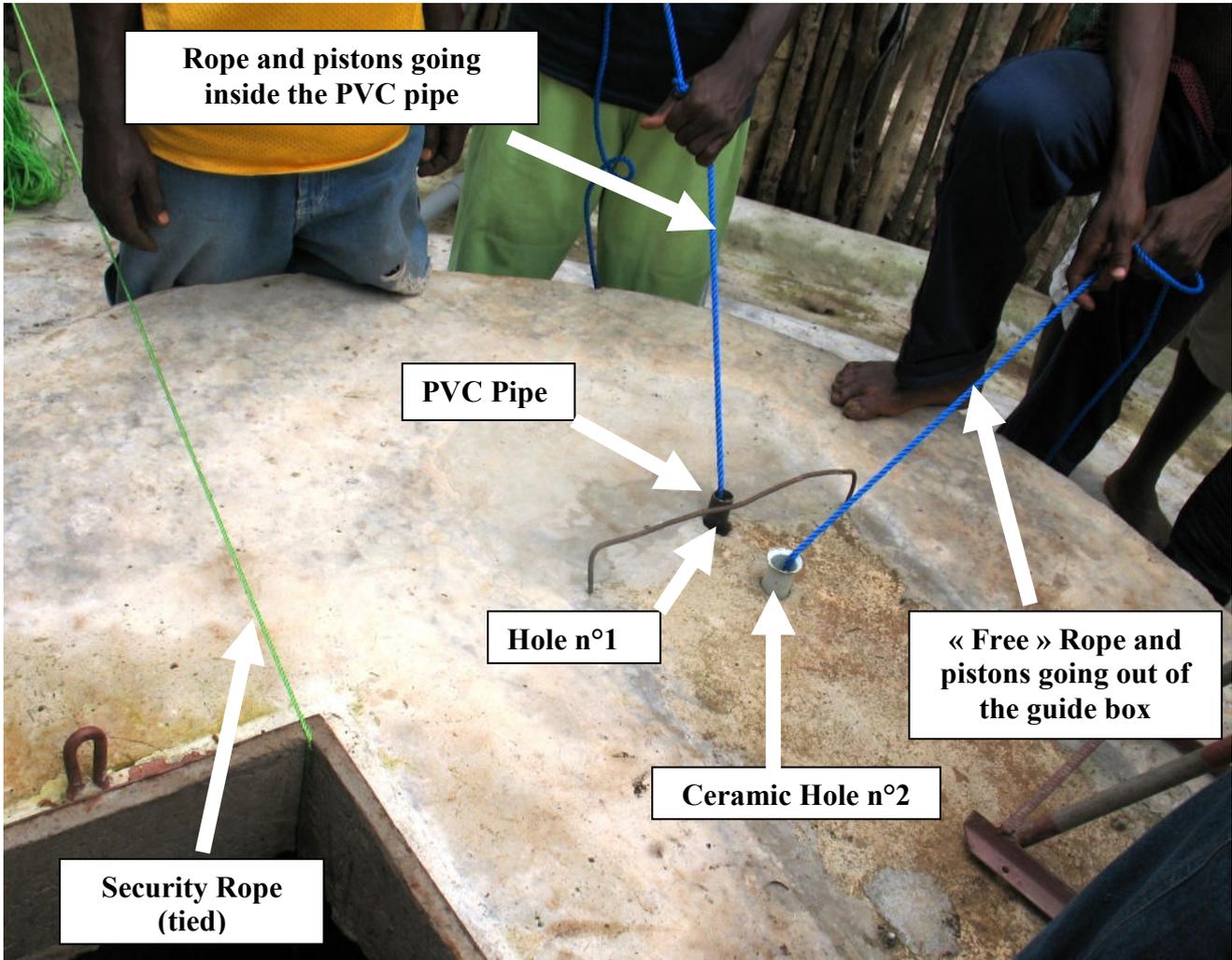


European Union



- 4) Pull the binding wires out of the cover holes. The person laying on the cover must guide the PVC pipe end to help to thread it into the hole number 1
- 5) Thread the PVC pipe through the cover. The extremity of the PVC pipe must be at 20 cm above the well cover
- 6) Tie the security rope

To help you to guide the extremity of the PVC pipe through the cover, you can release carefully the tension of the security rope and make the guide box go down a bit

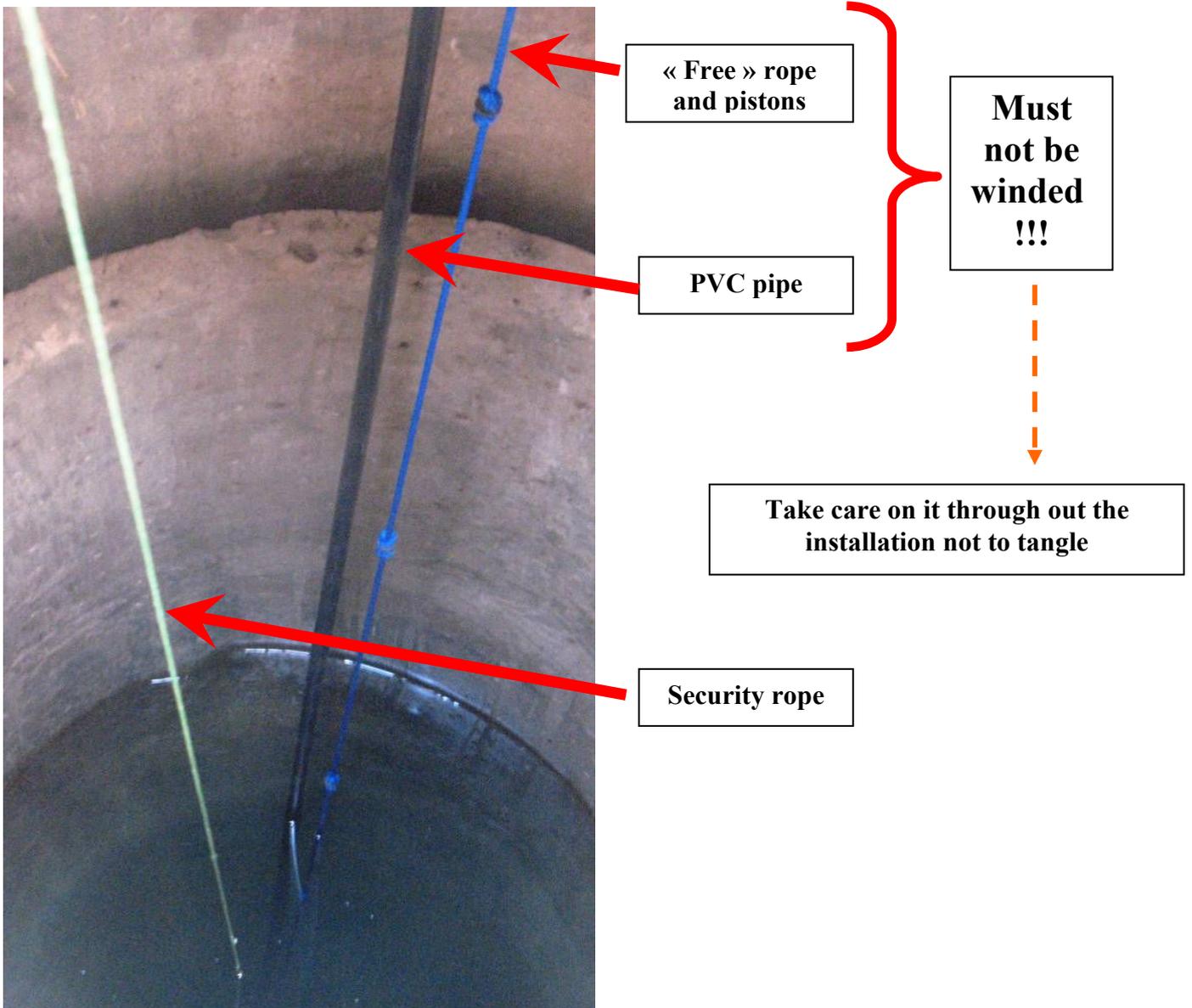




Step 3: Checking

Before going further, look through the inspection cover and verify that the ropes are not winded around the pipe.

If it is the case, hold the extremity of the pipe going out of the inspection cover and turn it until you free the rope from the pipe.





IV. Installing the exterior parts

Step 1: Fixing the wheel



1) Place the front of the wheel basement between the two holes of the cover, centralize it

2) Place the back of the wheel basement on top of the bolts fixed in the cement of the cover. Thread it inside the frame.



3) If the bolt is too short to fix the nut, use a hammer and a chisel (or at least a screwdriver flat) to brake thin layers of the cement by mortising slowly the surface around the bolt





Inter Aide
Sierra Leone



European Union

- 4) Place the frame on the bolt, screw the nut, help yourself using the spanner



- 5) Finally, fix the front of the frame to the iron rod of the cover. Fix it with biding wires;



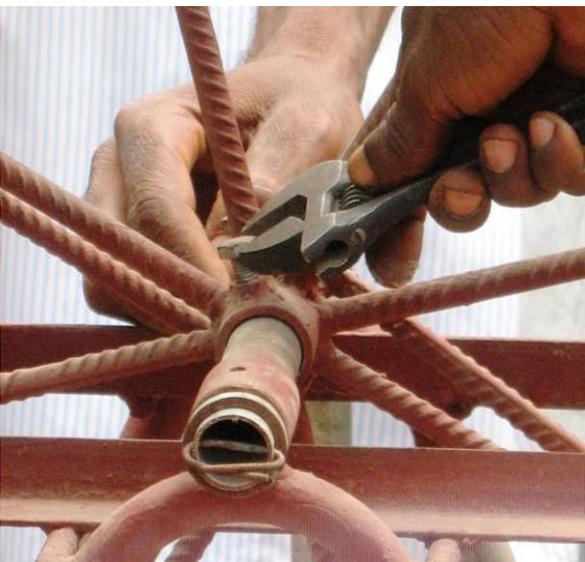


Step 2: Mounting the wheel



1) Place the wheel basement on the cover above the holes. Remove the pump cover

2) Thread a pin to fix the handle. Use the pliers to bend it



3) Use the spanner to tight the bolts of the axle



Inter Aide
Sierra Leone



European Union

Step 3: Fixing the Outlet



1) Tread the rope with piston going out of the PVC trough the T pipe

2) Fix the T pipe to the PVC pipe. Centralise the T pipe according to the position of the metal frame and the wheel





Inter Aide
Sierra Leone



European Union



- 3) Fix the T-pipe to the frame with biding wire.



Step 4: Fixing the rope and pistons



- 1) Place the rope, with the desired tension, over the pulley wheel to indicate where the knot should be made. Remove the rope from the pulley wheel and cut it, leaving about 40 extra centimetres at each end. Burn the ends with a cigarette lighter or matches and twist them while they are hot

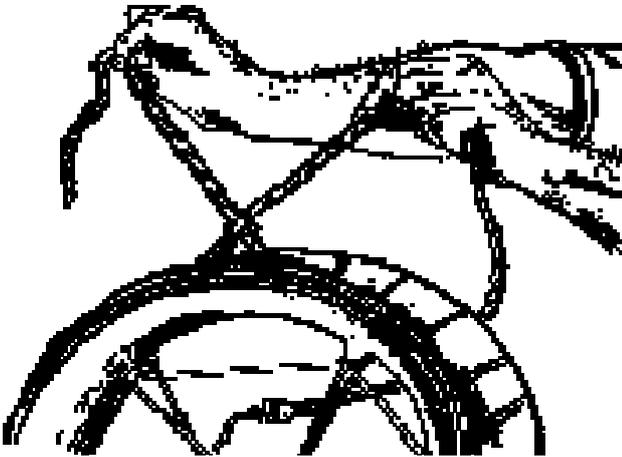
- 2) Make a loop on one of the rope ends by threading the rope three times back, through its own base... You can help yourself with a screwdriver flat to keep it open



- 3) Put the other rope end through the loop.



- 4) Remove the screwdriver and thread the second rope through the loop. Check the tension.



- 5) Take the two ends and braid them together as shown above, then put the rope back on the pulley wheel. The tension is correct when the rope does not slip or slide back over the pulley wheel while pumping water.

- 6) Take the rope between thumb and forefinger. **Turn your hand. If the turn can be completed between 90 and 180 degrees, the rope tension is ok.**



Verify the tension before fixing the rope.
Do not tight too much !!!

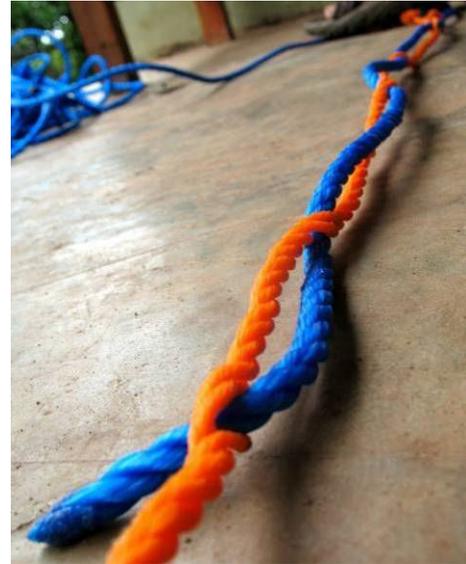


There should be little play on the rope. If not, the pistons get stuck in the guide box and the rope might slip on the wheel.

Have a look inside the inspection cover to check if the pipe is not fold inside the well



- 7) Reproduce this process to thread the rope a second time inside the other extremity. Do it as many times as you need to weave the extra 40 cm (of the blue rope in this example). Once it is done, do the same for the other extremity (for this example: weave the orange rope inside the blue one)



- 8) Once you have finished this process, seam the extremity. Help yourself using thin biding wire firmly tied

Make sure to bend the extremity of the biding wire, so that neither the rope extremity nor the wire extremity will hook the pipe





V. Finishing

Step 1: Fixing security rope

- 1) Once you have fixed the rope with piston, thread a binding wire inside the hole of the cover, between the cement and the PVC pipe. Hook the security rope. Pull the wire to thread the security rope through the hole number 1
- 2) Tie it to the foot of the metal frame. Let 2 extra meters of rope.



Step 2: Fixing the outlet pipe

- 1) Fix the outlet pipe to the T-pipe

Step 3: Testing



- 1) Use the pump. Fetch some water. Take your time to check if there are no problems, abnormal sound or vibration.
- 2) Verify if the rope does not slide on the wheel
- 3) Verify if it is not too hard to turn the wheel and if the rope slides without any problems in the pipe

Just after installation the rope tends to stretch a bit, making the rope longer. Check the rope tension again after the pump is tested



Step 4: Sealing the pipe



Once you have fixed the security rope. Place some small stone between the PVC pipe and the cement inside the hole. Then seal the hole with cement. Let it dry

Step 5: Fixing the cover

- 1) Use Spanner to tight bolts and nuts of the cover



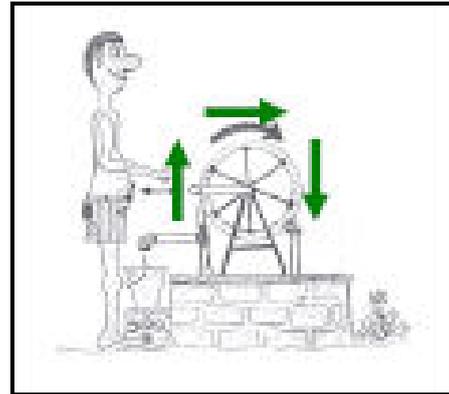
- 2) Paint 3 arrows on the cover (one on every section)



VI. Use, Maintenance and reparation advices

1) Good use

- Only rotate the pump in the direction on the arrows painted on the cover, never turn the pump reverse direction.
- Don't let very small children operate the pump. If the handle slips out of their fingers, the pump will turn in backwards direction and the handle could hurt the children.
- Don't operate the pump with more than one person at the time. Avoid children hanging on the handle.



don't hang on the handle



2) Regular maintenance

- Check the tension of the rope and adjusting when needed.
- Lubricate the bushings every 2 weeks or when the bushings are running dry. If the bushings start to make a shrieking noise oiling is URGENTLY needed. Use a clean stick to apply the grease, or your fingers if they are clean



lubricate the bushings



3) Potential repairs

• **Replacement of the rope.**

Pistons usually last about twice as long as the rope. When the rope shows a lot of damage, the rope should be changed preferably before it breaks. Tie the new rope (with the pistons) to the old rope (be sure pistons are running in the right direction) and pass it through the tubing. It is not necessary to take out the tubing.

• **Replacement of pistons**

The pistons should be changed, when the they look damaged or worn

• **Painting**

To avoid corrosion, it is essential to paint parts again that start corroding. Clean the parts with a steel brush and roughen it with sand paper. Then apply anticorrosive primer paint, and when it's completely dry, finish it with paint. Allow the paint to dry in the shade, NOT in the sun.

• **The bushings**

If bushings are worn out, dismantle and replace them. **(If properly oiled, bushes last for 10 years or more!)**

• **PVC tubing**

If a pump is placed in direct sunlight, the ultra-violet rays will affect the PVC parts, causing cracks. (To prolong life of PVC, paint it!) If the well contains fine sand, the sand will wear out PVC parts as well. In case wear is excessive, replace tubing.



European Union



Inter Aide
Sierra Leone

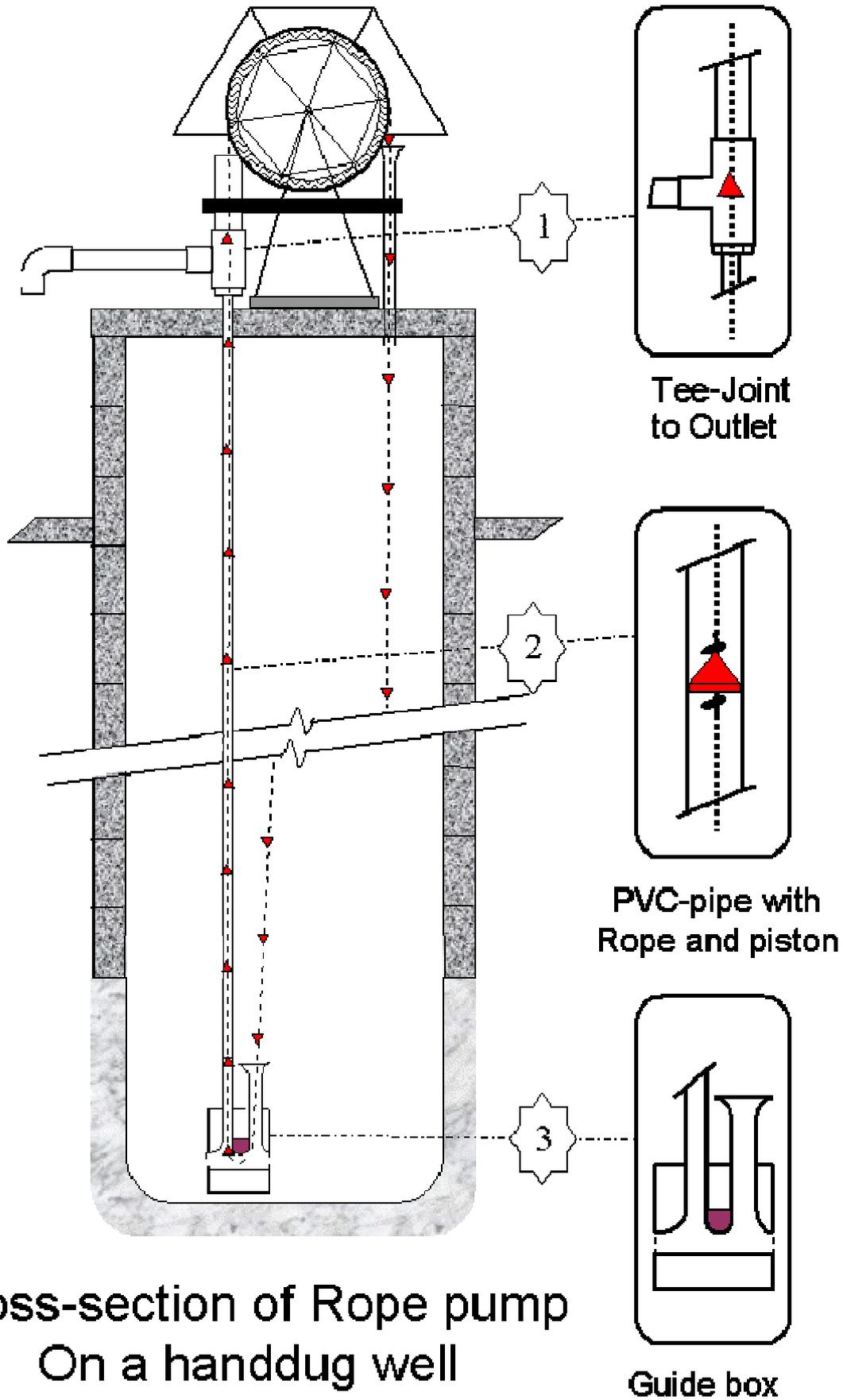
ANNEXE of Rope Pump Installation Guideline



European Union



Inter Aide
Sierra Leone



**Cross-section of Rope pump
On a handdug well**



European Union

**RECEIPT for
MAINTENANCE COMMUNITY FUND**



Inter Aide
Sierra Leone

We, the community of _____
Name of the community

Represented by _____
Name _____
Position in the community

Certify having received from INTER AIDE Sierra Leone _____,

Represented by : _____
Last name and First name _____
Position in Inter Aide

the following sum : _____
Amount and currency in capital letters

Total Le being payment for the refund of the maintenance fund of the community.
Amount in number

Date _____ / _____ / 200_____

Signature of Inter Aide

Signature of the community representative



Inter Aide
Sierra Leone

**RECEIPT for
MAINTENANCE COMMUNITY FUND**



European Union

We, the community of _____
Name of the community

Represented by _____
Name _____
Position in the community

Certify having received from INTER AIDE Sierra Leone _____,

Represented by : _____
Last name and First name _____
Position in Inter Aide

the following sum : _____
Amount and currency in capital letters

Total Le being payment for the refund of the maintenance fund of the community.
Amount in number

Date _____ / _____ / 200_____

Signature of Inter Aide

Signature of the community representative



**MEMORANDUM OF UNDERSTANDING
BETWEEN
WATER COMMITTEE CHAIRMAN
AND INTER AIDE
HANDING OVER COMMUNITY PUMP KIT**



I, Water Committee Chairman

certify having received today.....one **ROPE PUMP** kit

on behalf of the community of

Section of....., Bombali District

In the kit are the following:

	Name of the Item in the kit	Unit	Quantity
SPARES	Nylon rope	Roll	1
	PVC pipe 1 meter	Piece	1
TOOLS	Cement solvent	Piece	1
	Grease	Cup	1
	Hack saw blade	Piece	2
	Screw driver flat s/s	Piece	1
	Spanner flat + ring 13mm or 17 mm	Piece	1
	Tool bag small	Piece	1

I agree to ensure the safe keeping of the ROPE PUMP kit

I agree to release the tools to the pump caretakers when requested for maintenance of the pump.

I agree to release the spares to a professional when requested for repair.

I agree to use the spares and tools for the maintenance/repair of the PUMP ONLY.

AT....., THE.....

INTER AIDE
Name:
Position:
Signature:

WATER COMMITTEE CHAIRMAN
Name:
Signature: