

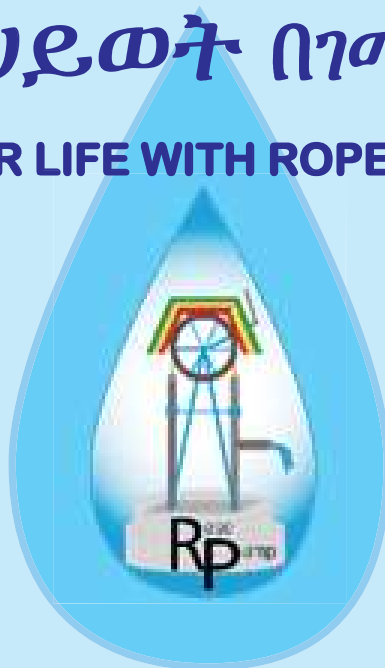


**The Project for Rural Water Supply, Sanitation and Livelihood Improvement
through Dissemination of Rope Pumps for Drinking Water (WAS-RoPSS)**

HANDBOOK FOR ROPE PUMP DISSEMINATION THROUGH SELF-SUPPLY

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- BETTER LIFE WITH ROPE PUMP -



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READERSHIP

This handbook is prepared by the Project for Rural Water Supply, Sanitation and Livelihood Improvement through Dissemination of Rope Pumps for Drinking Water (WAS-RoPSS) based on the experiences through the Project activities mainly in the Southern Nation, Nationalities and People's Region (SNNPR). WAS-RoPSS is a technical cooperation project under the bilateral cooperation agreement between Ministry of Water, Irrigation and Electricity (MoWIE) and Japan International Cooperation Agency (JICA).

The handbook is primarily prepared for woreda level sectoral practitioners to have an understanding on the rope pump technology, promotional activities, and implementation procedures. The handbook is intentionally developed in a way to reach people from different background. It is also believed that this handbook will be a useful resource for governmental organizations, individuals, private enterprises and for non-governmental organizations on the rope pump technology with its entire implementation procedures.

As much as possible difficult technical terms and terminologies are avoided in order to facilitate better understanding of the handbook for the intended readers. Subject matters are not discussed and explained exhaustively but the readers can refer to the further reading in the bibliography section.

Rope pump dissemination tools are also developed by the Project, and recommended to be used together with this handbook in promotion activities.

A great care has been taken in the course of writing this handbook to integrate as much information as possible to reach a wide range of readers, however some of the information may appear to be rudimentary and redundant for experienced readers.

Preface

Increment of water supply coverage rate and improvement and proper operation and maintenance of water supply schemes are very important elements to achieve the target set by the Government of Ethiopia in its Growth and Transformation Plan (GTP-I and II), and water policy documents. Self-supply is one of the modalities for water supply services. The core concept of Self-supply policy is an improvement of household water supply through owner investment. The rope pump technology is a very useful technology for improvement of traditional hand dug wells.

Whilst the provision of water for drinking is a substantial issue, using water for productive activities is also an important driving factor to contribute to the technology dissemination. A combination of domestic and productive water use benefits using the technology can give an appreciable impact on livelihoods and poverty eradication for rural households. Therefore, it is believed that dissemination of the rope pump technology in association with Self-supply concept contributes to the upgrading and improvement of the lives of rural households

This handbook addresses the key issues that should be considered in acceleration of Self-supply through rope pump dissemination. Water sector line offices, development partners and private service providers are expected to use this handbook as a guide for their practices.

It is hoped that this handbook will be widely used for the dissemination of the rope pump technology, and for a better life of rural people in Ethiopia.

Samuel Tamiru
Bureau Head of WIDB-SNNPR,

Acknowledgements

This handbook is prepared by the Project for Rural Water Supply, Sanitation and Livelihood Improvement through Dissemination of Rope Pumps for Drinking Water (WAS-RoPSS), to serve as guiding document for regions, zones, woredas and stakeholders involved in the sectors across the country.

The Project would like to express its deepest appreciation to all national and regional stakeholders who contributed valuable information to complete this handbook.

The Project would also like to acknowledge development partners, because, in the course of developing the handbook, various documents and studies prepared on Self-supply by development partners were used as source materials.

Last but not the least the Project expresses a deep sense of gratitude to the Project members for their valuable contribution in compiling the handbook.

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List of Acronyms and Abbreviations

COC	Centre of Competencies
GTP	Growth and Transformation Plan
HWTS	Household Water Treatment and Storage
IDE	International Development Enterprise
IRC	International Water and Sanitation Centre
JICA	Japan International Cooperation Agency
MFI	Micro Finance Institution
MOA	Ministry of Agriculture
MoWIE	Ministry of Water, Irrigation and Electricity
NGO	Non-Governmental Organization
OMFI	Omo Micro Finance Institution
SNNPR	Southern Nations, Nationalities and Peoples' Region
TVETC	Technical and Vocational Education and Training College
WASH	Water, Sanitation and Hygiene
WAS-RoPSS	The Project for Rural Water Supply, Sanitation and Livelihood Improvement through Dissemination of Rope Pumps for Drinking Water
WHO	World Health Organization
WIDB	Water and Irrigation Development Bureau
WQT	Water Quality Test

Chapter 1 : Introduction

1.1 Background of Self-supply in Ethiopia

According to National Policy Guidelines for Self-supply in Ethiopia the basic definition of Self-supply is “improvement to water supplies developed largely or wholly through owner investment by households or small groups of households”. In other words, Self-supply engages active participation of the owners in developing, constructing, upgrading, maintaining their own water supply facilities and in water treatment with own investment.

Self-supply fills the gap where public or formal private sector-led approaches do not reach, especially in scattered rural communities and where water sources are easily available.

Self-supply encourages the incremental improvement of household and community supply through owner investment in water treatment, construction and up-grading of water supply facilities.

Self-supply is not a new concept in Ethiopia. It has been applied in different forms by different private initiatives in a large part of Ethiopia over the years. However it was not properly supported to ensure both the supply and demand side for incremental water supply development towards safe water supply. Therefore, traditional practices need to be acknowledged and supported through the provision of services including financial mechanisms.

In order to bring all stakeholders together the methods and procedures

for effective Self-supply implementation are highly needed as a component of One WASH¹ National Program and MoWIE enacted the Self-supply Policy Guidelines in January 2012.

The rope pump technology is one of the water lifting devices in Self-supply technology packages. In Ethiopia, Japan International Cooperation Agency (JICA) first introduced rope pumps in 2004. As of 2011, more rope pumps have been produced in Ethiopia than in any other Sub-Saharan country (Sutton and Hailu, 2011), but the uptake and sustainability of the technology remain an issue which need much more marketing and development. Adoption of the rope pump technology as an effective Self-supply technology is being promoted not just by the water sector but also by the Ministry of Agriculture (MoA), with a focus on the expansion of small-scale and household irrigation.

The rope pump technology is being promoted for its low cost, local production, ease of maintenance, good yield, and suitability for families/small groups. It does not have expensive pump rods, piston seals which need frequent replacement, or heavy and costly pump head works (Sutton and Hailu, 2011)

¹ Water, Sanitation and Hygiene

1.2 Objective of the Handbook

The main objective of this handbook is to guide and to enable woreda level water experts, micro finance institutions (MFI), extension or development workers towards rope pump promotional and dissemination activities. It is also designed to convey information to ensure the sustainability of rope pump technology, implementation mechanisms, promotional as well as dissemination procedures with inter-sectoral collaboration at grassroots level.

The handbook can serve as a quick reference material for rope pump promotional and dissemination activities at field level. It helps the government organizations, individuals or organizations who are interested to promote rope pump technology.



1.3 Scope of Handbook

As stated in the previous section, the handbook is primarily designed to guide the woreda as well as lower level officers and practitioners. The focus is given on the field practices rather than theory. Each section of this volume provides a brief explanation on the different stages of rope pump dissemination process where to start the activity, what to include in the activity and how to ensure the sustainability of the activity.

The information provided are based on the experiences gained by WAS-RoPSS Project over the years in SNNPR; it is believed that the methods and procedures introduced in the handbook works in other parts of the country in different contexts, with or without modifications.

A certain limitation could be there since the Project experiences in field activities are mainly through the government channels. The practitioners could implement the activities outside the government channel, but it is highly recommended to consider the local context where the roles of the government are important and the significance of the government involvement for a smooth implementation of the activities.

In this volume, the steps for dissemination activities begin from the area identification based on the assumption that selection of the target zones and woredas is done at the zonal and/or regional levels, as the decision may involve some political and administrative issues at a higher level.

1.4 Self-supply Technology Ladder

One of the key characteristics of Self-supply is its incremental improvements (ladder), allowing owners to exercise management and for gradual financing. Therefore, a household can start with a low cost investment like digging a well and may improve the facility to the level of engine driven pump. Easiness of lifting water, reliability, cost and quality also increase as they go up the ladder. On top of these, contamination risks may decrease significantly as protection level is increased.

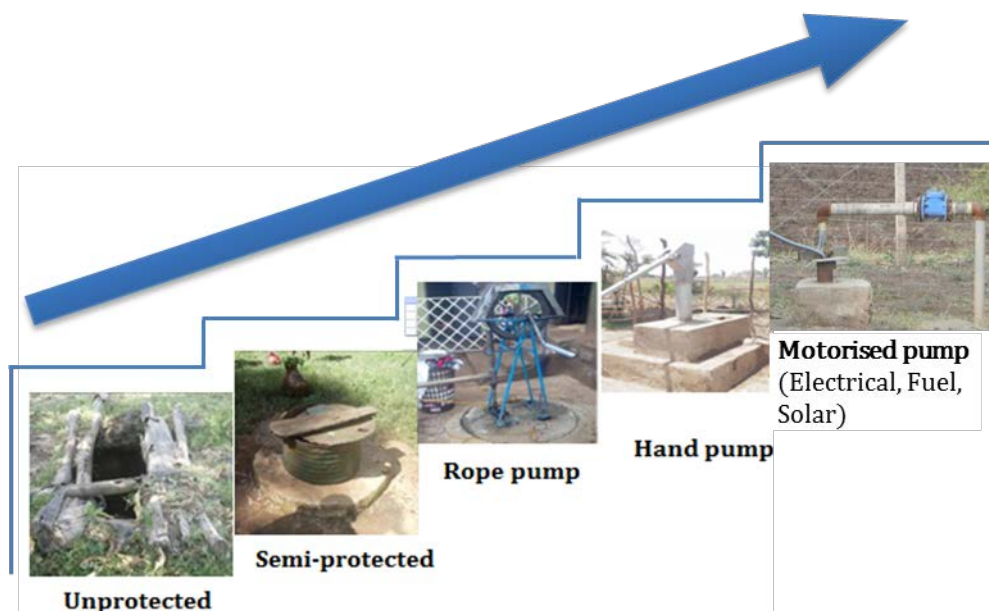


Figure 1: Self-supply ladder² - an example of shallow groundwater development

² International Water & Sanitation Center (IRC), 2014 “Guidelines for developing a self-supply acceleration plan for your area” and WAS-RoPSS

1.5 Roles and Responsibilities of Stakeholders

The role of stakeholders is very significant in terms of introduction and scaling up Self-supply through different activities; in planning, promoting (demand creation) and marketing household level services and products, supply improvements, providing information, training and facilitating financing through microcredits, and certifying service providers and products.

The main actor for **target area identification and selection** is Woreda Water Office with support of Woreda WASH Team+ and Kebele WASH Team by providing necessary information to area identification and target kebele selection.

In promotion/demand creation of rope pump sensitization of Woreda WASH Team+ has to be done by WIDB, Zonal Water Office and supportive actors - in this case, the Woreda Water Office. In sensitizing Kebele WASH Team and promotion to communities, the main actors are Woreda Water Office and Woreda WASH Team+. Private sector (manufacturers, suppliers and service providers including technicians and consultants) and owners can play a role in promoting technology.

Registration of the potential rope pump owners and preliminary technical assessment of wells are done mainly by Kebele WASH Team, with the supportive actors like Woreda WASH Team+ and Village Technicians.

In financial arrangement, owners are responsible either through loan

or direct payment. MFI can play a role in loan arrangements.

Preparation of material for installation is solely the responsibility of the owners. The owners may need technical advice from Woreda Water Office and/or Village Technicians.

In installation and construction agreement, the owner/s agree with technician/s seldomly with manufacturers on installation. Woreda Water Office plays the supervisory role while Kebele WASH Team play the facilitation role.

Operation and maintenance are primarily done by owners. In trouble shooting, technicians and manufacturers can provide technical services on fee basis.

Woreda Water Office and Woreda WASH Teams+ are the main actors in **monitoring** with the support of other stakeholders.

Table1 shows the summary of the roles and responsibilities of different stakeholders in rope pump dissemination.

In partnership with the government, **the support of NGOs and other development partners** are significant in terms of scaling up Self-supply through their rural development programs. In addition to this, they have an important role in building the capacity of human resources where the local governments are in need.

In technical training, Technical and Vocational Education Training Colleges (TVETCs) play a leading roles in technology transfer and

provision of training to technical personnel in different levels. Assessment of trainees and certification can be done by Centre of Competencies (COC).

Table 1: Roles and Responsibilities of Stakeholders

Stakeholder \ Process Step	WIDB	ZWO	WWO	Woreda WASH +	Kebele WASH	MFI	Manufacturers	Technicians	Owners
Target area selection									
Target area identification & selection			⊙	○	○				
Promotion / Demand creation									
Sensitisation to Woreda WASH Team	⊙	⊙	○						
Sensitisation to Kebele WASH Team			⊙						
Promotion to communities			⊙	⊙	○	○	○	○	○
Registration of the potential RP owners				○	⊙				
Well Technical assessment			⊙	○	○			○	
Securing fund									
Loan agreement			○		○	⊙			⊙
Provision of finance						○			⊙
Payment for installation & construction			S		F			⊙	⊙
Installation									
Preparation of materials / pump			○				○	⊙	⊙
Installation and construction			F					⊙	○
Operation, maintenance & monitoring									
Daily maintenance									⊙
Preventive maintenance								⊙	⊙
Trouble shooting							○	⊙	⊙
Monitoring	○	○	⊙	⊙	○	○	○	○	○

⊙=Main actor, ○=Supporter, S=Supervisor, F=Facilitator
 ZWO=Zonal Water Office, WWO=Woreda Water Office
 WASH Team+ = WASH Team plus agriculture office

1.6 Self-supply as Business Opportunity

Self-supply as an investment by households or group of households, it is implemented at users' level, particularly in rural areas. It is common to see local artisans digging traditional wells for households water supply that are used for domestic, livestock and household irrigation. While thinking of the improvement of this traditional water source, the owner may need to construct well head to protect the well from flooding and/or avoid entrance of unwanted substances to the well. This construction of well head calls for another skill on construction. If further improvement is implemented like fitting the well with rope pump, it needs some more technical inputs from: manufacturers of the rope pump and technicians of well cover and installers of the rope pumps. For the sustainability of the scheme, there should be somebody to conduct the maintenance of the rope pump. Supply of materials and spare parts (pistons, rope, pipes and fittings) may be required for ensuring sustainability.

These activities are interconnected in their natural order and should be active for Self-supply. As we accelerate Self-supply, we are intensifying these activities and create more business opportunities for the local artisans such as: well diggers, masons, rope pump manufacturers, installers, maintainers and spare part suppliers. Thus, individuals or group of local technician/artisans and middle level professional can be organized as small and micro enterprises to be involved in the aforementioned activities. The experience of WAS-RoPSS Project in its target areas, particularly in Dale and Yirgachefe woredas in Sidama and Gedeo zones respectively in SNNPR witnesses the same fact. The trained rope pump installers are

doing their business in constructing well head (including drainage and soak away pit), producing well reducer blocks, installing and maintaining rope pumps in their villages. Construction material shops and sand and gravel suppliers are also a part of the beneficiaries of the business. Even though the scale of the mentioned business is small, it is a good experience to be used in other places too where Self-supply is to be scaled up.

In view of the future extensive implementation plan of Self-supply acceleration in Ethiopia, (one of the modalities of One WASH National Program and GTP-II), in which rope pump has been considered as one of the chief technologies, there will be a big opportunity of business for those who are working on rope pump as manufacturers, installers, maintainers and suppliers of rope pump spare parts.

It has to be noted that the sustainability of these business opportunities depends on proper implementation of the technology whereby the natural process/procedures of the work should be maintained. Assessing potential areas for the implementation, proper promotion of the technology options to create demand in convincing the stakeholders particularly, the household to invest in it, involvement of private sector and linking with finance institutes are among the main activities to be considered for the sustainable implementation of Self-supply with sustainable business opportunity.

On the other hand, the supply side should also match with the demand created for the product and service. This will be successful through the involvement of private sector which should get profit from the business. As already mentioned, in the dissemination of rope pump technology,

private sector can do business as suppliers, manufacturers, installers, maintainers of the technology or work on water source like well digging. These private sectors need to be capacitated with training (on manufacturing, installing and maintenance, business) and/or with materials for the proper implementation of the technology and sustainability of their business.



Figure 2: Part of the rope pump business opportunities

Chapter 2 : Rope Pump Dissemination Activities

2.1 Overall Process of Rope Pump Dissemination

Chapter 2 deals with the suggested procedure for rope pump dissemination by the woreda officers; from area selection to operation and maintenance, are described. In this section, overall procedure is indicated and the following sections explain the detail of each step. As it is mentioned earlier, the assumption is that the potential woredas are selected before the readers use this handbook, according to their purpose.

Here is a suggested process;

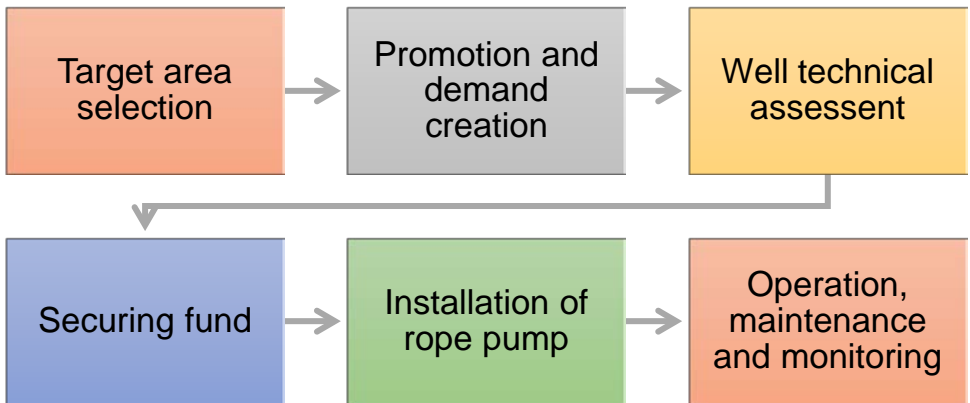


Figure 3: Process of rope pump dissemination

The above steps include several activities and the guiding tools were developed to support the activities smoothly. The following table shows the activities and the tools to be used. The section numbers in the table is corresponding to the section numbers in the handbook.

Table 2: Activities and Tools for Each Steps

Sec. No	Steps	Activity	References & Tools
2.2	Target area selection	<ul style="list-style-type: none"> ◆ Select area (kebele) according to the assessment criteria 	Water Quality Test (WQT) procedure ³
2.3	Promotion and demand creation	<ul style="list-style-type: none"> ◆ Sensitisation to Woreda WASH and Kebele WASH Team ◆ Promotion to communities ◆ Registration of the people who need rope pump 	OMFI booklet ⁴ , O&M sheet
2.4	Well technical assessment	<ul style="list-style-type: none"> ◆ Taking measurement of well dimension ◆ Water level measurement ◆ Well surrounding assessment 	RP manual ⁵ , Installation checklist ⁶ , OMFI booklet
2.5	Securing fund	<ul style="list-style-type: none"> ◆ Qualified well owner and MFI sign on rope pump installation agreement (cash at once or loan) ◆ Direct payment 	OMFI booklet
2.6	Installation of rope pump	<ul style="list-style-type: none"> ◆ Well cleaning ◆ Installation ◆ Operation and maintenance training for owner ◆ Disinfection of the well 	RP manual, Installation checklist, O&M sheet, WQT procedure
2.7	Operation, maintenance and monitoring	<ul style="list-style-type: none"> ◆ Operation and regular maintenance ◆ Fixing break down ◆ Monitoring 	O&M sheet, Monitoring sheet ⁷ , Business catalogue

³ Rope pump dissemination tool: Water quality test and disinfection procedure sheets

⁴ Rope pump dissemination tool: Operation procedure for the rope pump credit scheme

⁵ Rope pump – a manufacturing, installation, operation and maintenance manual

⁶ Rope pump dissemination tool: Rope pump installation checklist for quality control

⁷ Rope pump dissemination tool: Rope pump monitoring sheet

2.2 Target Area Selection

In promotion of Self-supply, the first step to do is conducting potential assessment of the areas. In this handbook which is intended to be used mainly at the woreda level, target areas refer to the areas which fall in a kebele or within kebeles where the rope pump technology is practically implemented on the ground. Though the term “area” does not represent the administrative units in this volume, it is recommended to consider it as the activities often involve the government officers. The assessment includes investigating the existing Self-supply activities and potential to introduce and/or scale up Self-supply.

Some technical factors should also be considered for area selection, as the suitable areas for rope pump installation have some specific characteristics. Consideration for drinking water quality is also another critical factor to be looked at. Some critical points are as follows.

The areas should;

- Be free from the geo-genic water quality risks (e.g. fluoride, iron, etc.)
- Have reliable water source (e.g. shallow groundwater, water level up to 25m is recommendable)

Assessing potential areas for the implementation of the rope pump technology should be made based on the available water resources, infrastructure, and demand for the technology and access to conventional water supply system. The potential areas can be categorised as high, medium and low potential.

Table 3: Category of Self-supply Potential Areas⁸

High potential areas	Medium potential areas	Low Potential areas
<ul style="list-style-type: none"> • Demand for water closer to their compound to use for agriculture, livestock and domestic services • Areas with scattered settlement and/or inaccessible thus community water supply is not a viable option 	<ul style="list-style-type: none"> • Low coverage with the conventional water supply system • Areas with community water supply but challenges with functionality and reliability of the water supply • High coverage and reliable service but difficult to reach the last 10 to 20% of the population • Areas where Self-supply is already practiced 	<ul style="list-style-type: none"> • Areas with 100% water supply coverage • Low demand for productive use • Areas with deep groundwater and inadequate rain for rainwater harvesting • Areas with unsafe shallow groundwater

It is always advisable to start with the high potential and proceed to the others as people can learn experiences from one another. This means starting with the areas where Self-supply is already happening needs less efforts to scale up to the surrounding communities.

There are other possible social and technical factors to be considered which are not mentioned above. For further reading, refer to IRC 2014 (see bibliography).

Rope Pump Dissemination tool

- ✓ Water quality test and disinfection procedure sheets

⁸ International Water & Sanitation Center (IRC), 2014 "Guidelines for developing a self-supply acceleration plan for your area"

2.3 Promotion and Demand Creation

There are various ways of promoting rope pump technology to the rural communities. Here is an example of how you can start with promotional activities.

You may start with sensitisation of the main promoters of rope pump technology. In many cases, it is useful to utilise the existing structure in dissemination, such as WASH structure; Woreda WASH Team and Kebele WASH Team. Woreda WASH Team, composed of water, health, education, finance and administrative offices, in collaboration with agriculture and women affair offices, which we call WASH Team+, shall go down to the villages to do promotional activities.

(1) Sensitisation of Rope Pump Promoters: Woreda Level

Before starting promotion to communities, the following information should be understood by the promoters; Woreda WASH Team+ and Kebele WASH Team. (It is expected that a sensitisation session to be organised either by a higher level government organisation, such as Zonal or Regional Water Bureaus, or development organisations, who is promoting the technology, to the promoters at Woreda level.)

What to be considered during promoting rope pump technology?

There are many advantages in introducing rope pump technology.

- ✓ Better access to low risk water with a sealed dug well.
- ✓ Better access to water within/nearby homestead for multi-purpose use; irrigation and livestock production, washing

- utensils and clothes, bathing, drinking, etc.
- ✓ Labour and time saving of water fetching.
- ✓ Better security for children and livestock falling into wells.

The contents of the sensitisation would include the following points. The detailed information on each item can be found in “Rope Pump Manual” (see bibliography).

- ✓ Advantages and limitations of the technology
- ✓ Technical information (different models and options, maintenance, access to technical services, etc.)

The above basic information should be introduced in association with the concept of **Self-supply**. The rope pump technology is introduced for the rural people to make one step up on the Self-supply ladder. For promotion of the technology, rural communities should be aware of Self-supply (self-financing), as they are the ones who should initiate the process of improving their water supply facilities.

In order for the rope pump owners to fully enjoy the benefits of the rope pump technology, it is highly recommended that the technology is introduced with many other components of livelihood improvement, such as;

- ✓ Water hygiene and water point sanitation for better health
- ✓ Agriculture production and other income generation activities (Multi-purpose use of water)
- ✓ Financial service, such as micro finance, for covering initial investment

As shown above, multi-dimensional approach to promote the rope pump technology has been proven to be effective through the experiences of various stakeholders, promotional activities should be done effectively by a multi-sectoral team of promoters.

(2) Kebele Level Promotion

Woreda WASH Team+, preferably with who have participated in the sensitisation session, is expected to conduct promotional activities at kebele and/or village levels. The suggested targets, occasions and contents are as follows;

A) *Who are the targets?*

The targets of rope pump promotion could be determined according to the local needs and socio-economic situation of the areas. The following list is to show some examples, which you may choose one or several of them.

Box 1 : Rope pump options

WAS-RoPSS Project came up with a “Pole model”, a rope pump which is nearly 1000 birr cheaper than the “2014 model”.



Pole model



2014 model

- ✓ Kebele WASH Team / WASHCO
- ✓ Village leaders
- ✓ School teachers, parents and children
- ✓ Various social groups; farmers groups, women groups, etc.

B) *What occasions?*

You may select one or several occasions during which you can promote the technology, such as;

- ✓ General assemblies of kebele/village
- ✓ Various social meetings: health promotion, agriculture extension meeting, village meetings, etc.
- ✓ School events
- ✓ Market days
- ✓ Special meetings/trainings set for the promotional purpose
- ✓ Cultural events and religious occasions
- ✓ Local mass media and school mini media

C) *What to tell? What to show?*

The promotional sessions could be arranged in many different ways, in combination of lectures, demonstrations and practical exercises of some activities. The contents could include the followings;

- ✓ Concept of Self-supply
- ✓ Advantages and limitation of the technology
- ✓ Technical information (different models and options, maintenance, access to technical services, etc.)
- ✓ Importance of water point sanitation and water treatment at household level
- ✓ Financial information and services (required initial cost and maintenance costs, financial services)

- ✓ Multi-purpose use of water (domestic consumptions, irrigation and livestock production, other productive use)

Box 2: What to show in the promotional sessions?

These are rope pump prototypes which are movable and can demonstrate how rope pump works.



Rope pump prototype

Note: Private sector stakeholders (manufacturers and Village Technicians) and development partners can be involved in promotion activities in any part of the above.

Rope Pump Dissemination tool

- ✓ Operation procedure for the rope pump credit scheme
- ✓ Rope pump operation and maintenance sheets

2.4 Well Technical Assessment

After the promotion work to create demand and convincing the households to invest in the rope pump technology, the next step is well technical assessment. In view of the using rope pump for shallow wells (hand dug or drilled), the following points have to be considered as the criteria for rope pump installation. It is to be noted that the technical assessment is not only about the well but also about the surroundings of the well. This technical assessment of the well should be carried out during the driest season.

- The diameter of well should be 0.8m to 1.2m (for hand dug well) greater or equal to 0.1m (for drilled well)
- The well should be at least 30m far from latrine
- The well should be upstream of latrine
- The minimum water column in the well should not be less than 50 cm⁹ during the driest season of the year
- The maximum static water level of 25m is recommendable
- The well should be free from source of pollution (e.g. animal excreta, rubbish, etc.)
- The well soil formation needs to be considered, not liable to collapse; if it is collapsing, it should be lined

In addition, the well owner has to agree with the following conditions

- Cleaning and deepening of the well (if required)
- Operation and maintenance including payment

⁹ This is based on the Project experience with individual household Self-supply. It is subject to change according to the needs.

- Fencing around the well after the rope pump installed (when required)
- Using well water for multi-purpose
- Reduction of water quality risks before using for drinking (agree to use different method of household water treatment and safe storage)

Rope Pump Dissemination tool

- ✓ Rope pump – a manufacturing, installation, operation and maintenance manual
- ✓ Rope pump installation checklist for quality control
- ✓ Rope pump operation and maintenance sheets

2.5 Securing Fund

It is obvious and undeniable that, individual households are the main source of funds in Self-supply. Therefore households are responsible to finance their well either through direct payment or going through micro finance.

Micro finance use a distinct and various loan agreement approaches in lending their money in different schemes. For example, WAS-RoPSS Project has established a credit scheme in collaboration with Omo Micro Finance Institution (OMFI), based on the existing structure, which enables rural households to access to funds for rope pump installation. And the practices and lessons learnt by the Project can be perfectly applicable to non-target woredas in the region through the same channel.

The loan agreement signing process mentioned below, works in a situation where the clients have financial constraints to get the rope pump technology. The steps shown in figure 4 were widely used and experienced by WAS-RoPSS Project through OMFI sub-branch offices.

Woreda Water Office in collaboration with MFI's woreda level offices takes the leading role of facilitation in loan arrangement.

In case of direct procurement individuals or households can directly approach the manufactures and/or village technicians for the technology. These individuals can obtain technical advice from Woreda Water Office if necessary (see the colored boxes, number 5 to

7, in the figure 4). It is recommendable to make a technical assessment before the installation (figure 4, box 3).

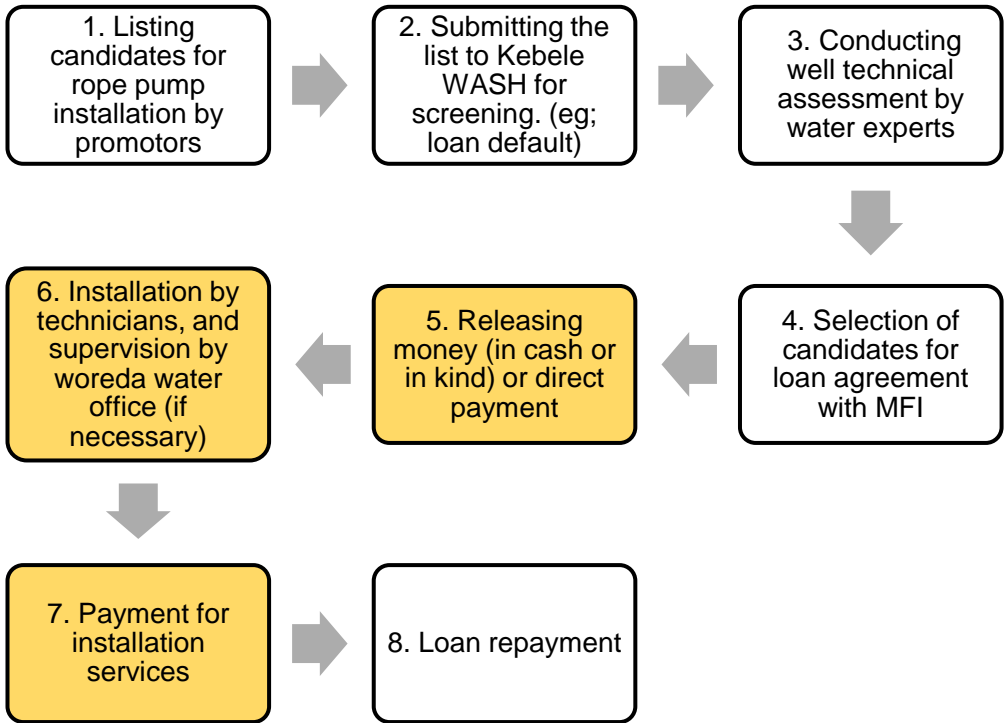


Figure 4: Process of rope pump installation with or without loan

Rope Pump Dissemination tool

- ✓ Operation procedure for rope pump credit scheme

2.6 Steps of Rope Pump Installation

Rope pump installation is a process to put a rope pump on a well and it is often associated with the well-head construction, including well sealing, construction of an apron, a drainage canal and a soak pit.

Since the installation and construction works involve specific knowledge and skills, it is highly recommended that the well owner hires one or more trained technicians (Village Technicians) in fee basis, while the owner may be involved in some physical works during construction. Woreda Water Office could provide technical advices when necessary. In some cases, rope pump manufacturers can also be hired for installation and construction works.

Installation of rope pump has different steps and procedures as shown in the figure below (for more detail, refer to “Rope Pump Manual”, see bibliography);



Figure 5: Steps of rope pump installation

Well Owners' Responsibilities

It is important to note that the well owner plays a major role in preparatory works before the installation. Facilitating disinfection after the construction is also the responsibility of the owner. The followings are the major activities done before and after the installation.

1. Procurement of pump, pipes, fittings and construction materials

The owner of the well need to make sure all necessary materials are procured. A rope pump unit, pipes and fittings, a well cover, reducer blocks should be ready at the well site. The construction materials such as gravel, sand and cement can be procured by the technician, if the owner agrees to include that payment in the construction works. For suppliers' information, refer to suppliers' list annex to operation and maintenance strategy (see bibliography) and Business Catalogue.

2. Procurement of technicians for installation and construction

The owner can hire one or more trained technicians (Village Technicians) to do the installation and construction works. The technicians can do procurement of construction materials, installation and well head construction. They are also trained to give trainings to the well owner and users on operation and maintenance of the rope pump. For more technical details, see "Rope Pump Manual".

3. Cleaning and preparation of the well

Prior to the installation and construction works, the owner should make sure that the well deepening and cleaning are done, when required.

4. Disinfection

Disinfection of the well can be arranged either by the owner or the relevant government office (e.g. Woreda Water or Health Office) upon request after installation. For details, see Water quality test and disinfection procedure sheet

The steps in rope pump installation and well head construction are shown in the following pictures;



1. Before installation



2. Measuring depth and static water level of well and checking well condition



3. Preparation of materials; construction materials, pump accessories and working materials



4. Cleaning the well and surrounding and make dewatering



5. Construction of apron, putting reducer blocks and construction of drainage canal



6. Placing a well cover on the reducer blocks



7. Finishing apron with concrete sealing



8. Putting the rope pump structure on the well cover and tightening bolts and nuts



9. Fixing pistons on the rope



10. Putting pistons with rope in the raiser pipe



11. Inserting the raiser pipe in to the well



12. Adjusting and loop making



13. Inspection and adjusting of outlet pipe position



14. Training the owners on operation and maintenance



15. Disinfection of the well

Figure 6: Illustrated steps of rope pump installation

Rope Pump Dissemination tool

- ✓ Rope pump – a manufacturing, installation, operation and maintenance manual
- ✓ Rope pump installation checklist for quality control
- ✓ Rope pump operation and maintenance sheets
- ✓ Water quality test and disinfection procedure sheets



2.7 Operation, Maintenance and Monitoring

(1) Who is responsible for operation and maintenance?

One of the advantages of rope pump technology is “easy and local maintainability”. A rope pump is designed to be used and maintained by the owners.

The owners should obtain the basic knowledge and skills of rope pump operation and maintenance. It is the obligation of the Village Technicians who install the rope pump to give necessary trainings on operation and maintenance to the owners. Basic technical information required for operation and maintenance is introduced on “Rope pump operation and maintenance sheets” (see bibliography).

When an owner faces difficulties in repairing the rope pump, he/she may call a Village Technician for a technical support (this should be in a fee-basis). The Village Technicians shall detect the problems and repair the pump accordingly.

When a Village Technician faces a major problem that he/she cannot solve alone, he/she may call a rope pump manufacturer nearby for help (this should be in a fee-basis). The rope pump manufacture shall detect the problems and repair the pump accordingly.

(2) Who are Village Technicians?

A Village Technician is a trained and certified person who can install rope pumps, construct well-head including drainage canal, apron and soak away pit, detect the problems and repair the pump, according to the clients’ orders. Village Technicians can also serve as rope pump

promoters in the community, and potentially mediate the rope pump purchases with micro finance institutions and rope pump manufacturers.

Woreda WASH Team+ may need to have a list of Village Technicians and promote their services to the rope pump users, while it can nurture the enabling environment for the Village Technicians working in the rural communities.

(3) What are the services of Village Technicians?

Village Technicians can give technical services to the rope pump owners. A Service Menu (see the example in the following page) may help the owners understand the contents of technical services and prices, as some rural dwellers considers technical services should be given free of charge, just like the government extension services. The services given by Village Technicians are just like repairing a TV set at an electric shop when it has a problem.

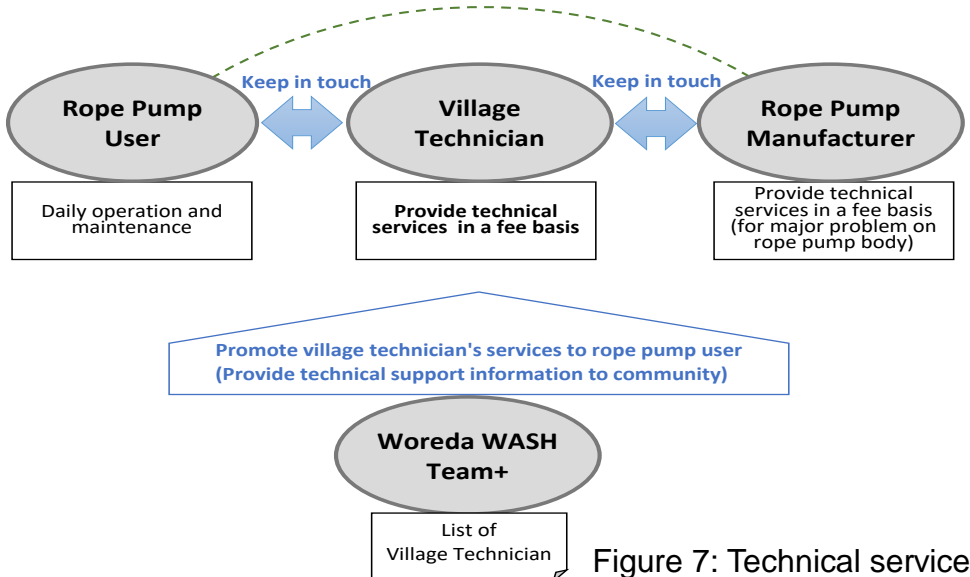


Figure 7: Technical services of Village Technicians

Table 4: Example for Common Technical Problems which can be Maintained by Trained Village Technician and Cost for Maintenance

Part no.	Description of work list	Cost / pump	Material and tools for maintenance
1	General maintenance and services	50 birr	Spanner M17 & M10
A	Setting proper tension of the rope (to fix too tight or too loose rope tension)		
B	Adjusting center and/or solving any alignment problems like: centering of piston/ rope in to the pipe		
C	Check and fix all bolts and nuts connections		
D	Check lubrication		
2	Rejoining of uPVC pipes separate or loosen due to use of inappropriate glue for joining or because of not keeping the bonding time	80 birr	PVC glue & sand paper
3	In case, if any break happened in the rising PVC pipe, to make new female part and to gluing & fixing.	80 birr	Belling tool & PVC glue
4	Replacing new rope when rope wear out totally or snapped because of touching the edges to change and to fix new rope again	80 birr	Rope
5	Taking out the RP / well cover and re-installation (for deepening and cleaning).	160 birr	Spanner M17, M10, chisel & hammer
6	Elongating of the rising PVC pipe b/c of the drawdown of static water level	100 birr	Rope, piston, baling, PVC glue

- Deepening and cleaning is not included in the cost
- The aforementioned prices do not include materials (pipe, fitting etc. prices except that of sand paper and PVC glue)
- The price for Village Technicians payment depends from area to area and time to time

(4) Monitoring

Woreda Water Offices and other governmental organisations play a critical role in monitoring and attending technical problems. Rope pump monitoring sheet can be used to grasp the situation of the rope pump schemes in the area, in particular to find out the common technical problems and to assess the effectiveness of the given technical services. The results of the monitoring can be utilised for strategy development and planning for sustainable operation and maintenance of schemes as well as for further dissemination of the technology.

Rope Pump Dissemination tool

- ✓ Rope pump operation and maintenance sheet
- ✓ Rope pump monitoring sheet (annex to O&M Strategy)
- ✓ Business catalogue (Village Technician, business and development partners)

Chapter 3 : Key Issues for Rope Pump Dissemination

3.1 Inter-sectoral Collaboration

It is increasingly understood that inter-sectoral collaboration is important for rope pump dissemination. The actors in the inter-sectoral collaboration include water, administration, agriculture, health, women affairs, MFI, TVETC, development partners, NGOs and private sector.

The objectives of this inter-sectoral collaboration are to encourage and enable communication among the sectors, in order to avoid duplication of efforts and to improve cost effectiveness, and joint identification and planning of actions to address common issues.

Water is an entry point for every development. Therefore in the area where conventional water supply is not available, having water from hand dug wells or other sources with self-investment is essential. In order to make Self-supply technologies accessible to these areas inter-sectoral collaborations have an unreplacable role. Table 5 shows possible collaborating actors and outcome of collaboration are summerized.

Table 5: Inter-sectoral Collaboration Activities and its Outcome

	Major activity	Collaborating actors	Possible outcome of collaboration
1	Demand creation	Woreda WASH Team+ , Kebele WASH Team, development partners, NGOS, private sector (rope pump	Household can be convinced and ready to invest on their water due to the presence of a variety of actors convey the similar

	Major activity	Collaborating actors	Possible outcome of collaboration
		manufacturers, Village Technicians and suppliers)	message.
2	Access to finance	Woreda WASH Team+ , Kebele WASH Team, MFI	Introduction of rope pump technology can be effectively done through paving the way to finance
3	Multi use of water (water for income creation)	Woreda WASH Team+ , Kebele WASH Team, Agriculture Extension Workers	Use of rope pump can be effectively encouraged with introduction of income opportunities by agricultural production
4	Water quality concern	Woreda WASH Team+ , Kebele WASH Team, Health sector officers and Health Extension Workers	Benefit of rope pump is effectively introduced in combination of water hygiene and HWTS promotion. Water hygiene and HWTS can be effectively promoted in combination with rope pump promotion.
5	Technical transfer of rope pump technology ¹⁰	Water sector line offices , rope pump manufacturers, Village Technicians, TVETCs, COC	Needs of technical transfer can be communicated, and technology can be effectively and efficiently transferred through good linkage among the stakeholders.
6	Monitoring	Woreda WASH Team+ , Kebele WASH Team, development partners, NGOS, private sector (rope pump manufacturers, Village Technicians and suppliers)	Cost effectiveness in monitoring activities are increased. Duplication of efforts is minimized. Common understanding among actors is reached.

¹⁰ For activities on “technical transfer of rope pump technology”, refer to WAS-RoPSS, 2016, “Strategies for Maintaining the Quality of Rope Pumps” (see bibliography)

3.2 Water Quality Concern

Shallow wells are often vulnerable to contamination, though well-head construction reduces water contamination to some extent. After a rope pump is installed, disinfection is critical because the well water may be contaminated during the installation and maintenance period. However, disinfection of the well with chlorine does not last long. Therefore, for drinking purpose, it is necessary for the households to treat water properly. Several methods of prevention and treatment are recommended as follows;

(1) **Water Point Sanitation**

To keep the source safe, water point sanitation is critical. Cleaning the surrounding of the well protects from bacteriological contamination. The followings are the critical points.

- A) Toilet should be away (more than 30m and downstream) from the well
- B) Take animal dung away from the well
- C) Clean well apron and surroundings

Box 3: Good practice on water point sanitation

Many rope pump owners mobilized their own resources to install fence surrounding rope pump well. Having a fence remove and decrease risks caused by contaminants, by keeping animal contact and its dung away.



Surrounded with branches in home garden

(2) Safe Storage

To avoid contamination during transporting from the well to storage and while storing, the containers should be kept clean.

(3) Water Treatment before Drinking

There are several methods to treat water at household level before drinking. With regard to Self-supply, a combination of cloth filtering and boiling is recommended as the first step. It is expected that the households will step ahead to purchase chlorine or filter products which remove risks effectively. The tools / methods compared in the table below are the ones available in rural areas in Ethiopia.

Box 4: Example of promotion activity (sanitation marketing)

Private sector may play a role in promotion of water hygiene and household water treatment and storage



Demonstration of Bishan Gari



Demonstration of Tulip Filter and Sawyer Filter

Table 6: List of Household Water Treatment Technologies and Tools

Category	Treatment type	Name of product/method	Product descriptions	Remarks
Conventional practice	Filtration	Cloth filtering		Recommended as a first step: Combination with boiling
	Sedimentation	Settling		

Category	Treatment type	Name of product/ method	Product descriptions	Remarks
	Disinfection	Boiling		Recommended as a first step: Combination with cloth filtering
Chlorine	Disinfection	Water Guard	Sodium hypochlorite	
	Disinfection	Aquatabs	NaDCC tablets (sodium dichloroisocyanurate / sodium troclosene)	
	Source disinfection	Bleaching liquid in yellow bottle (berkina)	5% chlorine contents	Not recommended to use as HWTS
Flocculent-disinfectant	Sedimentation and Disinfection	Bishan Gari	Aluminum sulphate, calcium hypochlorite and soda ash	
	Sedimentation and Disinfection	Pur	Coagulants and a timed release form of chlorine	
Sand filter	Filtration	Concrete biosand filter	The filter box filled with layers of sieved and washed sand and gravel	
Ceramic filter	Filtration	Tulip water filter	Ceramic candle filter type, syphon filter. ceramic filter element impregnated with silver	Recommended as step up option: Costly but easy to use and biologically effective
	Filtration	Ceramic pot filter	Clay mixed with a combustible material or colloidal silver	
Membrane filter	Filtration	Sawyer	Hollow fiber membranes	Recommended as step up option: Costly but easy to use and biologically effective

References to come up with "Remarks"

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3.3 Access to Finance

The existence of Self-supply hangs on the financial intervention of individuals from own saving or loan from finance institutions. Finance is an engine that enables Self-supply to run properly. It is believed that a better access to finance on Self-supply schemes means more households have or improve their water facilities. The development of water supply facilities at the household level may significantly contribute to the improvement of water quality, and quantity. Therefore, individuals and/or households are responsible to pull up resources to invest for new construction, upgrading and maintaining their water supply facilities. Self-supply often receives less attention as more focus and attention given to conventional and community based water schemes. And it is important to find ways and means to boost investment at household level. One of the ways to access to finance is loan through micro finance.

(1) WAS-RoPSS Project Experience

WAS-RoPSS Project in collaboration with WIDB and OMFI signed a trilateral agreement in order to facilitate rope pump credit scheme for its target woredas. This rope pump credit scheme is mainly arranged for households who have financial constraints to get the rope pump technology.

(2) Rope Pump Credit Scheme

This credit scheme is arranged primarily to tackle the financial constraints of individuals or households when they improve their water facilities. It is a type of loan scheme for rope pump dissemination activities to individuals or households who have no access to finance

for improving or upgrade their water facilities. Eligible candidates have to go through a series of steps. In the rope pump credit scheme of OMFI, a client signs a two-year loan agreement with 2% service charge and 10% flat interest rate. This loan scheme opens financial access to the households as they improve their water facilities. Upon the installation, if the owner can pay 100% cash, they are exempted from the 10% interest rate. However the 2% service charge is applied upon payment.

Please note that the above figures of service charge and interest rate are used in WAS-RoPSS Project activities. These are subject to change any time and according to MFI credit scheme.

(3) Prospects

Securing finance for rope pump dissemination at household level is a center-point for sustainability of the technology. It is believed that as the loan repayment rate is growing from the already installed rope pumps, financial constraints are eased to scale-up activities.

Rope Pump Dissemination tool

- ✓ Operation procedure for the rope pump credit scheme

3.4 Multiple Use Services of Rope Pump Water

Multiple use service of water is the provision of water for different uses. These include domestic uses (e.g. drinking, cooking, washing and bathing) and productive uses (e.g. back yard garden irrigation, animal watering, fishery, and poultry). Household wells are likely to be used for productive uses than communal sources because of:

- Flexibility in time that the owner can operate the facility at any time,
- Proximity to facility (within owner compound or closer), and
- Cost

The rope pump water is used for backyard irrigation for domestic consumption and/or income generation. This productive use is a key driving force/ motivation for households and justifies the initial investment. Practices and experiences in different countries show that rope pump can irrigate up to 1,000m² of land depending on the type of crop, yield and static water level of the well and pumping hours. In WAS-RoPSS Project area many owners are using rope pumps to irrigate their back yard gardens for growing vegetables (cabbages, carrots, and onions) and other cash

Box 5: Good practice on multi use service of water

Using the rope pump to lift water from his well, Mr. Mohammed Shafo (Meskan Woreda) is producing vegetables for his family consumption and market purpose. In addition, Mohammed witnesses that his family uses the rope pump water for domestic (drinking, washing and cooking) as well as livestock watering.



crops. In addition, some of the owners are using the water for watering their livestock. This group of owners are witnessing that the productivity of their livestock is increased as they are not traveling a long distance to get water. The livestock are also getting free from the risk of parasites which is related to the water sources.

Domestic use of the rope pump water for washing, cooking, bathing, and drinking is commonly practiced. The

owners are witnessing that the quality of their water has been improved after the installation of rope pumps and well-head construction.

Generally, while planning rope pump dissemination for multiple use, some important factors should be considered. These are:

- ✓ all the possible purposes of water use to maximize the benefit of the rope pump water;
- ✓ selection of the well site to address more irrigable area as much as possible (upstream of the farm);

Box 6: Good practice on multi use service of water

A rope pump user in Meskan woreda, Mr. Zeleke Degaga is using the rope pump water for animal fattening and milk cows rearing in addition to the domestic consumption of water (drinking, cooking, cloth washing and bathing)



- ✓ conveyance mechanism¹¹ for better water use efficiency (surface or pipe);
- ✓ the quantity of water available and required for crops to be produced.



Figure 8 : Illustrated multi use services of rope pump

¹¹ Conveyance mechanism is the method of taking water from one place to another, particularly for agriculture purpose.

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