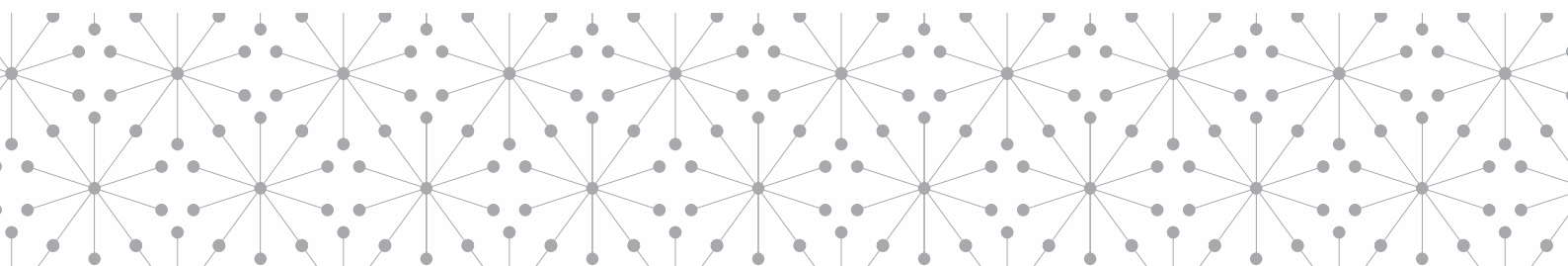




Federal Democratic Republic of Ethiopia
Ministry of Water, Irrigation and Energy



CLIMATE RESILIENT WATER SAFETY

PLAN IMPLEMENTATION

Guidelines for Community Managed Rural Drinking Water Supplies

JULY 2015 ADDIS ABABA ETHIOPIA

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Mrs. Semunesh Gola (Director of Hydrology and Water Quality)

Mr. Eyob Tesgaye (Core Process owner, Hydrology and Water Quality)

Mr. Arto Suominen (Manager of COWASH)

Mr. Ana Belay (Water and Sanitation Officer)

Mr. Balew Yibel (Hydrology and Water Quality Officer)

Mr. Osman Yiha (WHO Ethiopia, Public Health and Environment Consultant)

Ms. Bettina Rickert, National and International Advancement of Drinking-Water Hygiene, WHO Collaborating Centre for Research on Drinking-Water Hygiene, Berlin – Germany

Foreword

The Federal Democratic Republic of Ethiopia (FDRE) water sector policy and water sector development of the Ministry of Water, Irrigation and Energy (MoWIE) and Regional Water Bureaus have been exerting resources and efforts to ensure access to sufficient water of adequate quantity and acceptable quality to satisfy basic human needs of Ethiopian citizens. Safe drinking water in adequate quantities is a prerequisite for health improvement to ensure the wellbeing of the population and to sustain socioeconomic development of the country. To realize this demanding social service, the Ethiopian government took a number of actions following the water sector policy development such as WASH Implementation Framework, National WASH inventory, ONE WASH National Program, revision of the Universal Access Plan on WASH and revision of Drinking Water Quality Standard Specification for Microbiological and Physic-chemical Quality, a number of capacity building activities, and institutional arrangement for rural and urban water supply and sanitation.

In rural community setting, supply of safe drinking water in adequate quantities and sanitation service to the consumers is the responsibility of the local government and elected water supply and sanitation management committees (WASHCOs). Access to improved water supplies in rural communities is still low and the quality of water supplied through existing improved sources is not adequately monitored. In short, there has been no systematic and comprehensive drinking water supply risk assessment and risk based management practice in rural community managed water supplies. Taking this fact into consideration, the Ethiopian Water Supply, Sanitation and Hygiene Sector in collaboration with development partners came up with Water Safety Plans as one of the 5th WASH Multi-stakeholders Forum which took place in 2012.

Thus, the purpose of this guidelines is to provide step-by-step guidance to the rural community/board managed water supplies on how to develop, implement, monitor, and review the rural community managed water safety plans aimed at protecting human health. Furthermore, it serves as a practical tool in identifying and addressing priority risks to the water quality and quantity, reliability and sustainability of the rural water supply system including risks related to current and future impacts of climate changes by taking into consideration available resources and capacities of the water supply system.

Therefore, it is believed that, this guidelines will serve in strengthening and improving the efficiency and effectiveness of rural community WASH Boards and the WASHCOs management service level quantity, quality, accessibility and reliability. Thus, while the Ministry of Water, Irrigation and Energy is fully committed in making sure this guidelines is used among the rural WASH boards and WASHCOs in the country and urge the Boards and WASHCOs to make Water Safety Plans as part of the water supplies operation and management system for realization of service level including quantity, quality, accessibility and reliability as outlined in the revised Universal Access Plan (UAP II). Furthermore, the Ministry calls up on development partners' and stakeholders' collaboration and support in terms of availing resources for the rural WASH boards/WASHCOs and relevant Woreda and Kebele offices to make use of this guidelines for rural water supplies service improvement through risk assessment and risk based management.

H. E. Ato Kebede Gerba
State Minister of Water, Irrigation and Energy

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Acronyms

AWD	Acute Watery Diarrhea	NGO	Non Governmental Organization
CR-WSPs	Climate Resilient Water Safety Plans	NWI	National WASH Inventory
CESDWS	National Compulsory Standard Drinking Water Specification	NTU	Nephrometric Turbidity Unit
DHS	Demographic and Health Survey	ODF	Open Defecation Free
EDHS	Ethiopia Demographic and Health Survey	PHCU	Primary Health Care Unit
FDRE	Federal Democratic Republic of Ethiopia	PLWHA	People Living With HIV/AIDS
FMoEF	Federal Ministry of Environment and Forest	SCWS	-----
FMoWIE	Federal Ministry of Water, Irrigation and Energy	SOPs	Standard Operation procedures
FMoH	Federal Ministry of Health	ToT	Training of Trainers
GIP	Galvanized Iron Pipe	TVET	Technical, Vocational and Education Training
HDA	Health Development Army	TWG	Technical Working Group
HEW	Health Extension Workers	WASH	Water supply, Sanitation and Hygiene promotion
HHs	Households	WASHCO	Water supply, Sanitation and Hygiene Committee
HQ	Headquarters	WCO	WASH Coordination Office
IIP	Incremental Improvement Plan	WHO	World Health Organization
IWA	International Water Association	WSP	Water Safety Plan
NAPA	National Adaptation Plan of Action		

Operational definitions

A **hazard**: is a biological, chemical or physical agent that has the potential to cause harm.

A **hazardous event**: is an event or situation that can introduce a hazard to the rural water supply system from catchment to point of consumption.

A **rural water supply system**: is a water supply that provide water for drinking and other domestic uses including; (I). a rural piped system that could cover multiple villages, multiple Kebeles and/or multiple woredas managed by the WASHCO/Board. (II). A single point water source that serve one or more villages

A **sanitary survey**: is an on-site inspection of rural water supply system to identify actual and potential sources of hazards and hazardous events such as physical structure, operation of the system, point of consumption and external environmental factors; these factors are being evaluated and appropriate remedial actions are recommended to improve or protect the water supply.

Climate resilient water safety plans: is an approach which is based on assessment of climate risks to the water supply systems and management through identification of activities to better understand climate risks, plan to address climate impacts and implement adaptation measures to reduce the consequences of climate change to the water supply system from catchment to the point of consumption taking into account service level including quantity, quality, reliability, cost and accessibility.

Climate: Climate is average weather and occurs over long time frames (e.g. 30 years).

Control measures: are activities or processes to prevent or reduce a hazardous event/hazard. The WSP process involves consideration of both existing control measures and new/proposed control measure (or improvements).

Critical limit: is a cutoff point that signifies when a control measure has failed or is working ineffectively and, therefore, emergency action is required.

Operational monitoring: refers to routine monitoring of control measures along the water supply chain to confirm ongoing effectiveness. It is carried out by the WASHCO/Board (responsible for management of the water supply system) and involves defining critical limits for relevant parameters and corrective actions to take when critical limits are breached.

Risk: is the likelihood that a hazardous event/hazard will occur combined with the severity of the consequences.

Validation: refers to reviewing evidence to determine whether or not the existing control measures can effectively control the hazardous event/hazard. This must be done prior to risk assessment so that the risk assessment considers how well controlled the hazardous event/hazard currently is.

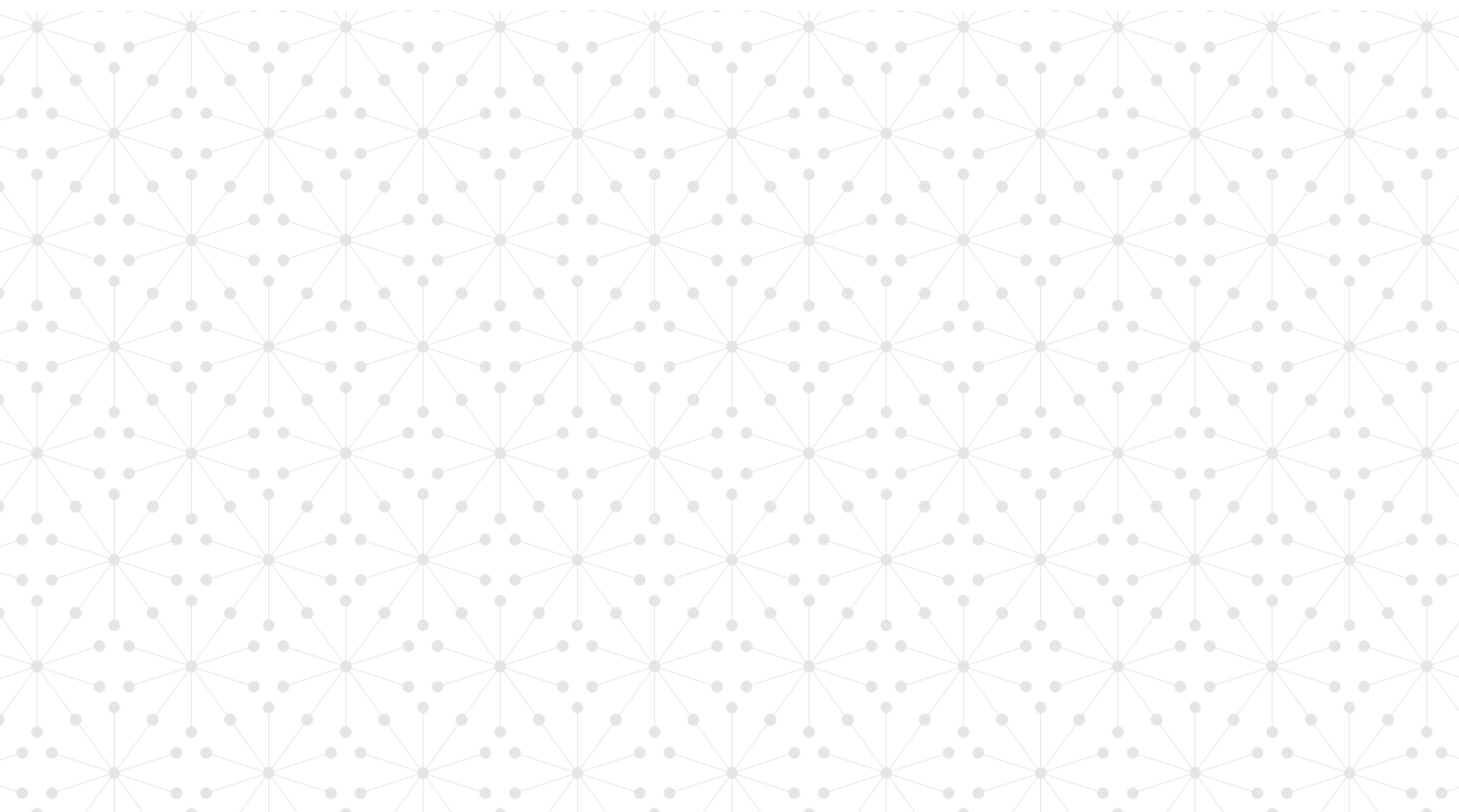
Verification: Monitoring to confirm the effectiveness of the WSP as a whole and involving three elements: 1) compliance monitoring (generally by health authorities to confirm final water compliance with drinking water quality standards); 2) consumer satisfaction survey; and, 3) internal/external WSP auditing.

Water Safety Plan (WSP): A comprehensive risk assessment and risk management approach that encompasses all steps in the water supply system, from catchment to consumer.

Weather: What is happening in the atmosphere at any given time is considered "weather" (It includes, for example, wind speed and direction, precipitation, barometric pressure, temperature, and relative humidity)

1 **CHAPTER** **1**

INTRODUCTION





1.1 Rationale for WSP for community managed rural water supplies

Data from the Ministry of Water, Irrigation and Energy (MoWIE) of Ethiopia indicate that community managed rural water supplies are the major sources for the majority of the rural communities and small towns. These sources include hand dug and shallow wells fitted with hand pumps, motorized deep boreholes, and on the spot and gravity springs. In addition, self-supply sources such as unprotected hand dug wells including wells fitted with rope pump owned by individual households and/or group of households are complementary water sources for rural households/communities.

According to National WASH inventory, there are 39,868 hand dug wells and 8,106 shallow wells fitted with hand pumps, 24,596 protected spot springs, 2,735 motorized deep boreholes, and 10,937 gravity fed springs, small and other 6,346 unprotected hand dug wells throughout the country (NWI, 2012). Since a huge investment is ongoing, the number might be double for some of the schemes types during the last 3 years.

Community managed water supplies most frequently suffer from frequent breakage, inadequate operation and maintenance, and gross microbial contamination by intrusion of human and animal excreta by surface runoff during rainy season, and contamination risk is also high in the household due to unhygienic water withdrawing and unsafe water storage practices. Shallow water sources are also highly susceptible to climate variability.

Furthermore, community managed rural water supplies in the country are at risk of drying, decreased yield during dry seasons, water shortage and increased concentration of chemical contaminants such as fluoride due to prolonged dry seasons. In addition, community managed rural water supply sources located in flood prone areas have been experiencing total or partial damage due to floods. In such a condition, communities revert to unsafe sources and depend on emergency response water trucking.

In addition, water quality testing (monitoring) and sanitary surveys to all community managed water supplies are not conducted on regular basis mainly due to shortage of skilled human resources and lack of water quality testing equipment and reagents, focus on increasing access than ensuring safety, lack of uniform performance monitoring system between regions and shortage of finance and transport to conduct water quality tests and to reach out all remote community water supplies. Even when testing is done to sort out suspects of contamination, results are obtained too late after many people consumed unsafe water and affected by hazards, and the test result is limited to provide information on where and when contamination happened in the water supply systems.

The problem related to water quality and quantity are confirmed by prevailing WASH attributable communicable diseases transmitted by bacteria, protozoa and virus including diarrhea, intestinal parasitic, trachoma and protozoan infection that remain among the ten top leading causes of morbidities. Diarrheal disease remains the third leading causes of under-five child deaths in Ethiopia (WHO estimates 2004 – 2010), and the recent Demographic and Health Survey (DHS) report also confirmed that 17% of childhood deaths are associated with diarrhea (EDHS 2011), indicating presence of unmanaged risks. These diseases are exacerbated and have been reported as epidemic proportion associated with risks of climate change to the small community water supplies.

Furthermore, outbreak of Acute Watery Diarrhea (AWD) from 2006-2010 in the country was among the major public health problems identified to be linked to weather variability and climate change. Following heavy rain fall, the community water supplies were contaminated by runoff, and prolonged dry seasons in drought prone woredas have caused shortage of safe water for drinking, food preparation and personal hygiene. The above problem was further exacerbated by drought and flood due to climate variability and change. Ethiopia has seen at least five major droughts since 1980 accompanied by recurrent local droughts as well. Though, the magnitude of the problem is not compared with drought, episodes of floods are also responsible for disease outbreak and damage to the water supply infrastructure. Areas in the Afar Region along the Awash River, in the Somali Region along the Wabi Shebele River, in the Gambella Region along the Baro-Akobo River, in the Southern Region along the Omo-Gibe River, and in the Amhara Region (Bahir Dar Zuria and Fogera areas) along the Abay River are prone to seasonal river flood. Thus, it is important to adapt climate resilient water safety plans approach to rural contexts of Ethiopia to ensure sustainability of the drinking water sources and improve efficiency and effectiveness of the WASH committees and the boards.

1.2 Concepts of the Water Safety Plans (WSPs) and Climate Resilient Water Safety Plans (CR-WSPs)

Water safety plans (WSPs) is a comprehensive risk assessment and risk management approach to ensure safety of drinking water from catchment to point of consumption that proactively identifies sources of hazards and level of risks that affect adequacy and quality of the rural water supply service delivery systems.


Climate resilient water safety plans (CR-WSPs) use the same approach as conventional WSPs to assess and manage risks to drinking water supply systems with special consideration to the current and anticipated impacts of climate change on the quality and quantity of the rural water supply systems.

Therefore, following the draft CR-WSPs strategic framework, this CR-WSP implementation guidelines is designed to provide a step-by-step guidance to caretakers of the water supply systems managed by rural WASH boards and WASH committees (WASHCOs). It focuses on how to plan, implement, monitor and evaluate effective risk assessment and risk management, including consideration of issues related to climate variability so as to identify immediate and urgent adaptation activities that address current and anticipated adverse effects on the sustainability of the drinking water supply systems.

1.3 Management of the rural water supply schemes in Ethiopia

Depending on the service level of the rural water supply system, operation and management of the rural water supply schemes is the sole responsibility of the WASH committees and of the rural water boards. WASHCO members are democratically elected by the water users mandated with operation and management roles of small community-owned water supply schemes including routine care taking, repair, facilitation of community participation, user fee collection and accounting and logistics management.

Each rural on-spot water scheme has WASHCOs. The committee has usually 5-7 members (number of members varies between the regions). Number of women should be minimum of two or 50%. WASHCO members have complementary roles (WASHCO contracts local artisans for repair works, and preventive maintenance is conducted by the caretakers): the guard is responsible for daily dispensing of water; the cashier is responsible for user fees collection as per set schedule and tariff; the store keeper is responsible for storing construction materials, maintenance hand tools and spare parts. Other responsibilities are shared with the accountant, the secretary and the chair person. It is recommended that one WASHCO member be responsible for hygiene and sanitation promotion among the households. User fees are set by the participation of users aimed to cover operation costs (salary or benefits of the caretaker and guard), purchase of spare parts, repair and other expenditure. WASHCO manages the schemes according to guidelines and operational manuals set by the government and are accountable to the Kebele Administrator.



In case of gravity water supply schemes that provide water to multi-villages and/or multi-Kebele including small towns and overall system management is the sole responsibility of the rural WASH boards. Rural WASH management general assembly, which is the highest management body, is made up of two democratically elected members of each WASH committee connected to the water supply system. These elected members again nominate executive board from members of the general assembly and from the local government WASH sector offices. Under the executive body, there is legally established water administration structure led by employed manager, and staffed by technicians and administrative workers. Technical staff is responsible for operation and maintenance of the overall system and provide technical support to artisans. Unlike small water supply schemes, tariff is set based on service level and on meter reading for household and institutional connections and with special arrangements to supply water during social events like weddings and funerals.

In summary, rural WASHCO/Board is an organized body which manages the system according to WASHCO/Boards' guidelines and an operational manual set by the government, and it is accountable to the local government (Kebele/Woreda). The management guidelines of both WASHCO and the rural WASH board provide fee exemption for very poor households, people living with HIV/AIDS, people living with disability, bedridden patients and for helpless elders.

In addition, the government has arranged technical support system for WASHCOs and rural WASH boards and usually they receive technical support from the woreda/district water resource, health and finance offices. These technical supports include: supportive supervision, capacity building training, water quality monitoring, water disinfection, and annual auditing services. In addition, the local governments provide administrative support to the WASHCOs and the boards whenever disputes arise between the upstream and downstream communities.

1.4 Objective of the rural CR-WSP implementation guidelines

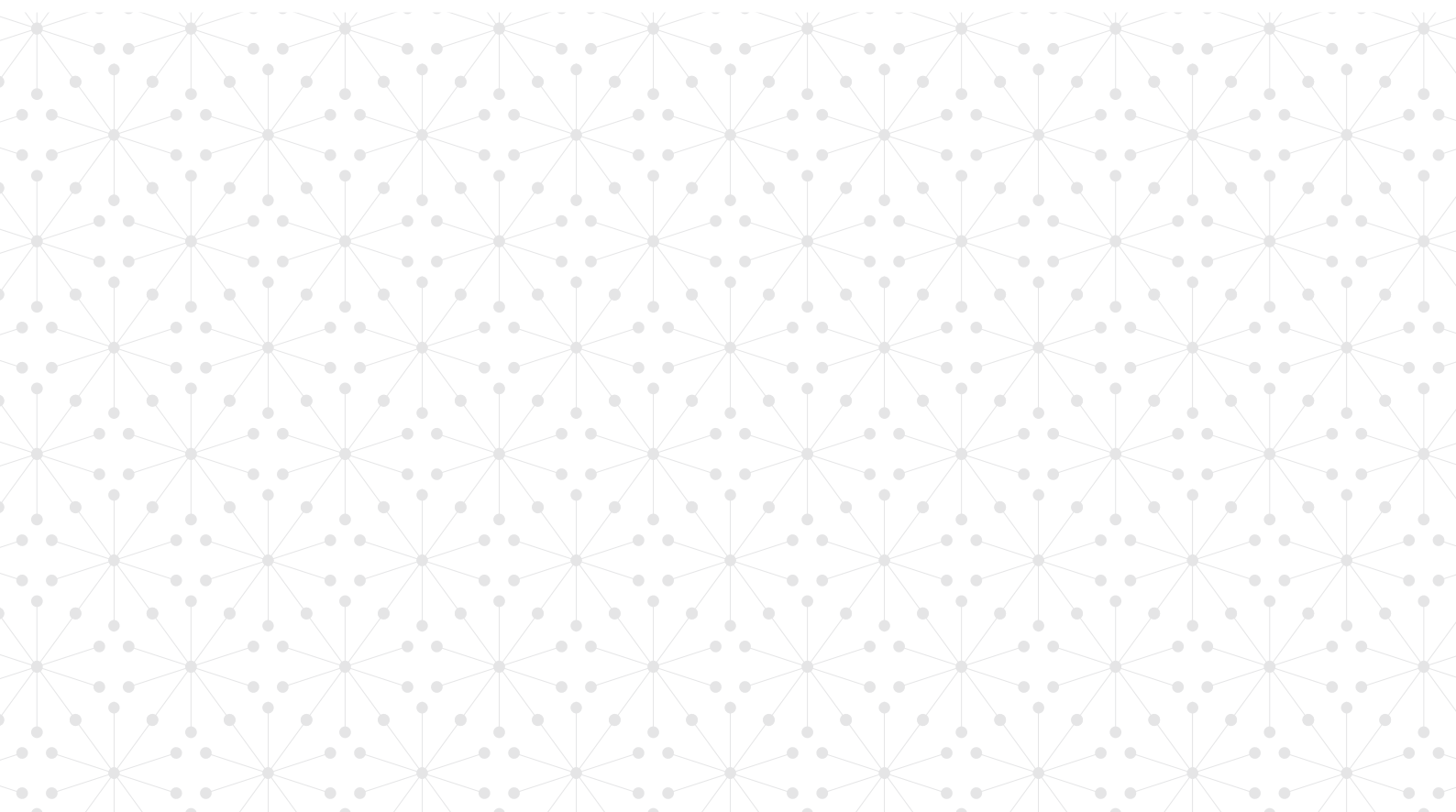
Rural community managed water supply schemes face frequent breakage due to lack of preventive maintenance, lack of timely repair and are susceptible to drying due to drought and system damage and gross contamination due to flooding. Thus, the objectives of this guidelines is to engage, empower and provide step-by-step guidance to the WASHCOs and rural WASH boards on how to manage risks that threaten the water supplies, including current and future impacts of climate change, and to take actions to improve and sustain water safety considering available resources and capacities.

2

CHAPTER

2

UNDERSTANDING RURAL/ COMMUNITY MANAGED WATER SUPPLIES





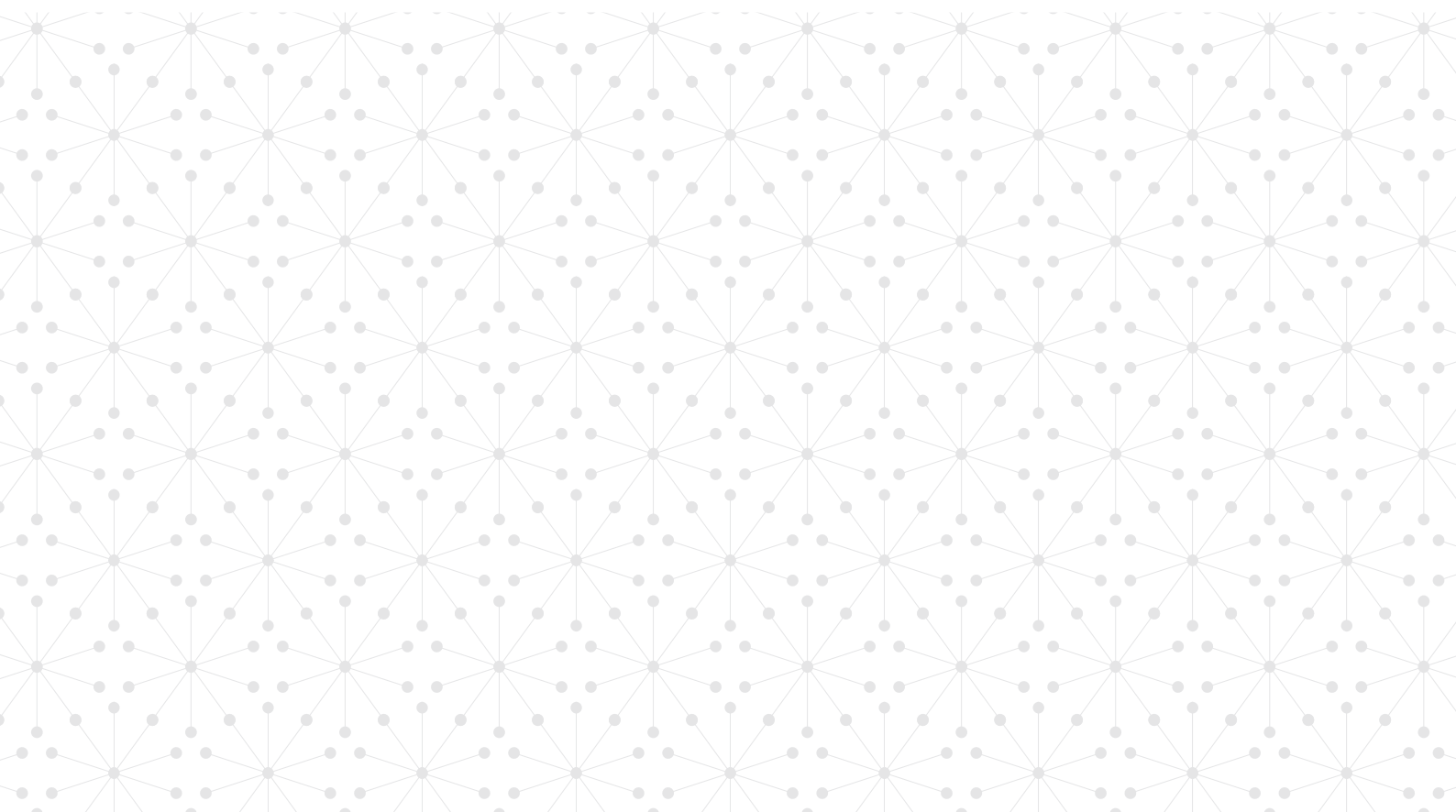
Even though technologies used for rural community managed water supplies are easier for the community to operate and manage with minimum skills, they are not capable to withstand the effects of climate change. Rural water schemes are often sited in the nearby river banks, or located on places prone to runoff/flood. Therefore, to reduce schemes' susceptibility to effects of climate change and ensure continuous supply of safe water to rural communities, adaptation of the CR-WSP to the contexts of the rural community managed water supplies is important. The CR-WSP approach enables rural community water supply WASHCOs and Boards by involving operators and caretakers to conduct a comprehensive risk assessment to water supply systems and proactively manage the risks from catchment to point of consumption.

Furthermore, CR-WSP approach enables managers of the rural community water supplies to know the system thoroughly, identify where and how problems could arise, put multiple barriers and management systems in place to avert the problems before they happen and making all parts of the system work properly so as to ensure safety and quantity of water intended for human consumption.

2

CHAPTER

DEVELOPMENT AND IMPLEMENTATION OF THE COMMUNITY MANAGED RURAL WATER SUPPLIES



The development and implementation processes of the CR-WSPs for community managed water supplies have six interdependent tasks. CR-WSPs are a living document and are open to revision/amendment to adjust its implementation to conditions of individual water supply scheme, local needs and available resources to implement the plan. This implementation guidelines presents tasks to be accomplished by steps and clarifies what to be considered under each task during development, implementation, monitoring and evaluation of the water safety plans for community managed water supplies focusing on how to ensure safety and quantity of drinking water from catchment to point of consumption. Water safety planning process is illustrated in Figure 1 below.

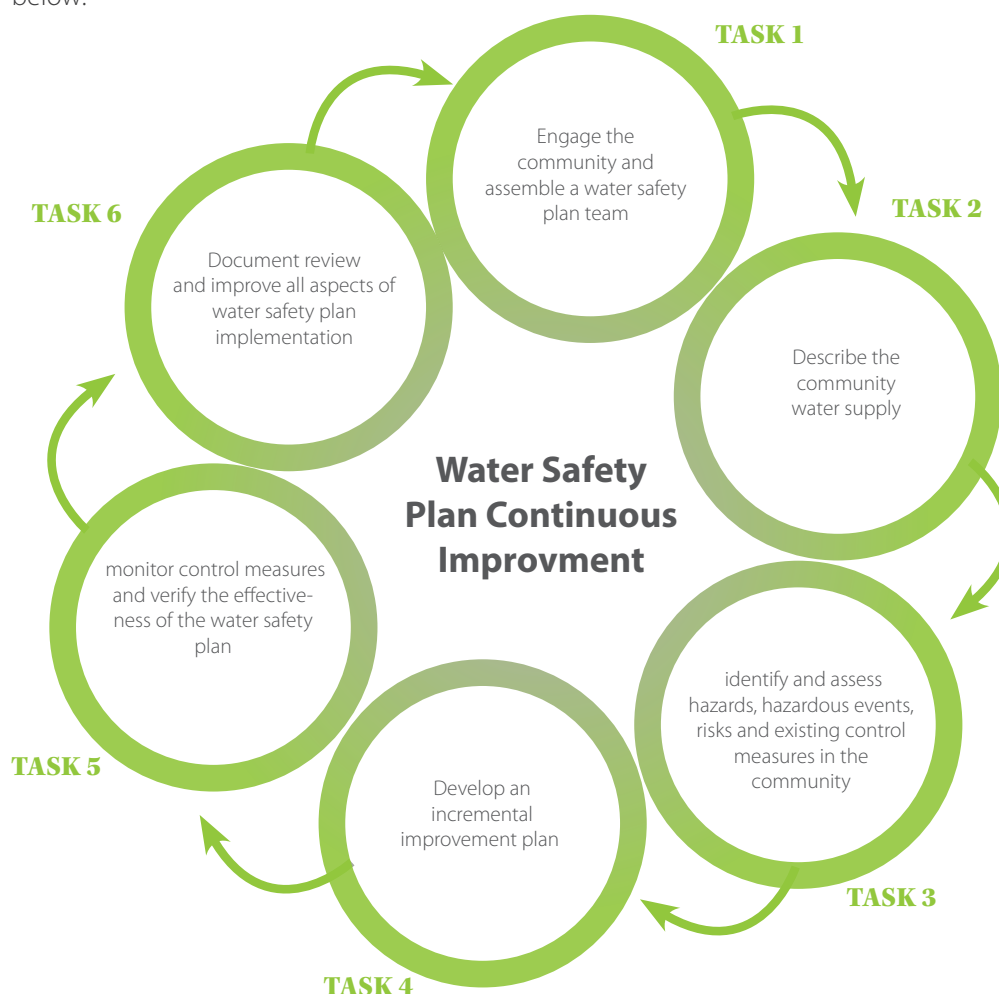


Fig. 1: Adapted from WHO WSP guidelines for small community water supplies (WHO 2012)

TASK 1 Ensure community engagement and form Kebele CR-WSPs team

TASK 1.1 Engage the community

Community engagement involves identification of key stakeholders and creation of awareness on CR-WSP concept and benefits among community leaders through consultation with stakeholders at Primary Health Care Unit (PHCU) cluster level to enhance the commitment of formal and informal community leaders and development workers, and to create clear understanding about CR-WSP approach and reach a consensus to take forward development and implementation of the community managed rural water supply water safety plans. Experiences of WSP implementation in rural communities of Asian countries such as Bhutan and Nepal have demonstrated that (WHO, 2012) active engagement of formal and informal community leaders

and community development workers at the very outset is one of the success factors for development and successful implementation of the water safety plans.

Therefore, a one-day introductory consultation meeting/sensitization should be organized with Kebele cabinet members, iddir and religious leaders, heads of water, health, education, agricultural development, environmental protection land use and administration and any other relevant offices and with partners working in the cluster of Kebeles ahead of time to create clear understanding on CR-WSP approach and its benefits from the viewpoints of ensuring sustainability and safety of their water sources.

Before arranging the community consultation meeting, the CR-WSP approach promoting body (Woreda CR-WSP technical working group) should make adequate preparatory works including:

- Identify key stakeholders and justify their importance (reasons why they are consulted that include the benefits of CR-WSP);
- Review records and reports of water, health, disaster preparedness and response, natural resource management and organize evidences on the effects of flood and drought on the community water supplies, safety of drinking water and associated health problems, etc. from secondary data sources;
- In addition, organize data on existing challenges to continuously supply water (such as reduction of yield, increasing demand due to population and temperature increase, frequent breakage and supply interruption), past experiences of flood and drought and its effect on their water supplies and associated burden of diarrheal diseases in the Kebele or cluster of Kebeles sharing the same micro watershed;
- Make preparation where and when to conduct the consultation meetings (arrange venue, schedule and necessary logistics);
- Convene the consultative meeting and create in depth and clear understanding that:
 - » CR-WSP is not a separate project/new program but is a tool designed to ensure water safety from catchment to point of consumption and to sustain services,
 - » CR-WSP is part and parcel of routine activities of the WASHCOs and rural WASH boards, health, education, the natural resource management, and of the WASH emergency preparedness and response, and it is a means to increase performances of the development sectors,
 - » CR-WSP approach is a means to achieve the national water quality standard specification, recommended water quantity, resilience of the supply system to climate change and, therefore, facilitate implementation of the government policy,
 - » CR-WSP approach safeguards health of the community by ensuring water safety through removal of contamination risks and threats to the sustainability of the water supply system,
 - » CR-WSP is a means to show practical case that communities have capacity and resources to solve water safety problem, sustainability of the supply and that it opens opportunities for formal and informal community leaders to ignite and facilitate participation of the communities in the activities that contribute to and sustain their social and economic developments, and
 - » CR-WSP creates a platform for improving partnership, cooperation and support network between WASH stakeholders and between neighboring Kebeles and villages.
- Identify core points/agendas to be discussed in small groups by meeting participants and reach a consensus on plenary discussions and identify agreed action points/way forward with timeline that lead to the next steps of the CR-WSP development.

TASK 1.2 Form/strengthen Kebele CR-WSP team

The Woreda CR-WSP technical working group (TWG) provides technical support to the Kebele CR-WSP team on the development and implementation of CR-WSP to community managed rural water supplies. The community managed rural water supply Kebele CR-WSP team is composed of formal and informal community leaders and professionals with different backgrounds on:

- operation and maintenance of rural community-managed water supply schemes,
- management of the rural WASH board,
- understanding of water quality standard specification and skills on water quality testing/analysis and

- sanitary surveys,
- water resource extension services,
- agricultural development/natural resource management,
- gender issues, with good understanding of gender and sustainable WASH implications on gender,
- institutional WASH (schools and health institutions),
- leadership of the social and religious institutions (iddir and church/mosque leadership), and
- promotion of hygiene and sanitation with good understanding of the socioeconomic dynamics in the population.

Decision to form Kebele CR-WSP team in rural areas of Ethiopia needs clear understanding of the spatial distribution (location) of the rural water supply schemes and micro-watersheds.

- There are places where more than one community water supply schemes are located and share the same micro-watershed in the same Kebele.
- There are also places where different water schemes are located in different micro-watersheds in the same Kebele.
- There are peculiar conditions where different water schemes situated in different/adjacent Kebeles are located in and share the same micro-watershed.
- There are conditions where a single rural WASH board leads overall management of all community managed water supply schemes in one woreda/district, and also where more than one rural WASH boards manage different schemes in the same woreda/district.

Therefore, wherever more than one scheme share the same micro-watershed in the same Kebele,

- The Kebele CR-WSP team should include the Kebele Administrator, Kebele Manager, Women's Affair, Sub-Kebele development committee chair, WASHCO chair persons of respective selected water schemes, iddir and church/mosque leaders and professionals from health institution, school, water and agriculture.
- In addition, if there are established/functional rural WASH boards at Kebele level, the board managers, and operation and maintenance workers are included in the Kebele CR-WSPs team.
- However, implementation of the improvement plan/activities specific to the scheme will be the responsibility of the WASHCOs, iddir and church/mosque leaders, village leaders, HDA leaders, and beneficiaries of that individual scheme,
- Whereas, improvement plan/activities in the shared spanning more than one Kebele or woreda, micro-watershed rests on the WASH committees /boards, village leaders, iddir and religious leaders and users of schemes located in the same micro-watershed.

Formation of the water supply scheme specific CR-WSPs team

- In a situation where different water schemes in the same Kebele are located in the different micro-watersheds, formation of scheme specific CR-WSP sub-team is important. Members could be the village leader, WASHCO members, scheme care taker, HDA leader, HEW responsible to that village, director of the school, iddir and religious institutions' leaders with technical and management support from Kebele CR-WSPs team.

If different schemes in the adjacent Kebele share the same micro-watershed:

- Kebele CR-WSP team of both Kebeles meet together, exchange information on the causes of hazards/sources, share control measures and corrective actions, prepare joint implementation schedule and mobilize resources to implement catchment improvement plan/activities, and jointly monitor performances.
- Whereas, scheme specific improvement plan/actions rest on the respective Kebele CR-WSPs team, iddir and religious leaders, WASH committees and the users.

In general, the Kebele/scheme level CR-WSPs team includes:

- Kebele administrators,
- WASH board managers,
- Kebele manager
- Board operation and maintenance worker,

- WASHCO members and scheme caretakers,
- Environmental health officer from Primary Health Care Unit (PHCU),
- Director of the primary school,
- Agricultural/natural resource extension worker,
- Water resource management extension worker (where appropriate),
- Kebele women's affair,
- Religious, cultural and iddir leaders, and
- Non-governmental organizations (NGOs) working on WASH projects (where appropriate).

In a condition where PHCU and schools cannot assign professionals to their different catchment Kebeles, the same professional (Environmental health and school director) also serves as a CR-WSPs team member for all catchment Kebeles.

TASK 1.3 Mapping of the Kebele CR-WSPs team members

Kebele CR-WSP team and scheme level team members should be mapped by their names, their roles in the Kebele and the reason for being selected as CR-WSPs team member and contact addresses. During development and implementation of the CR-WSP, team members have complementary roles. To avoid overlapping roles, core responsibilities specific to each member is described below (Table 1).

Table 1: Distribution of Kebele CR-WSPs team members by their roles in the Kebele

Full name	Roles in the Kebele	Interest in the water supply	Contact address (mobile phone)
	Kebele administrator	Increased household access to safe and adequate water	
	Kebele manager	Lead all rural community development including water supplies	
	Rural WASH board manager	Safety, quantity and sustainability of the rural community managed water supplies	
	WASH board operation and maintenance worker	Continuous and uninterrupted, safe, and sustainable water supply to the community and institutions	
	Water Scheme/point care takers	Continuous and uninterrupted adequate and safe water supply to the community	
	Water quality and environmental health officer	Compliance of the drinking water with compulsory national drinking water quality standard specification, provision of recommended quantity of water, reduction of prevalence/incidence of water borne diseases and open defecation free(ODF) community through realization of water supply service provision indicators (Quantity, quality, continuity, coverage, cost/affordability and, in some cases, sanitary risk assessment). These professionals (where available) have technical knowledge and skills, and can serve at cluster of Kebeles on water quality /testing and conduct sanitary survey to the water supply systems.	
	Natural resource management workers	Soil and water resource conservation through watershed management, and work on actions that increase quantity and sustainability of the drinking water sources and prevention of source depletion due to the effects of climate change	



Full name	Roles in the Kebele	Interest in the water supply	Contact address (mobile phone)
	Agricultural extension worker	Work on reduction in the use of agrochemicals such as pesticide and fertilizer in order to minimize hazardous events and hazards to water supply sources	
	School teacher	Continuous and uninterrupted safe water supply to school community, ODF school, and elimination of absentees due to water borne diseases, and lack of mistral hygiene facility	
	Water resources development extension worker depending on local context	Conservation of water resources, continuous supply of safe water to the community	
	Health extension worker	Safe water at point of consumption, adequate water for drinking and personal hygiene, reduction of WASH related disease burden, ODF community and safely managed private water sources	
	Women, youth and child affairs	Access to safe water with reasonable distance and in the yard, reduced physical pain to women and more time for child care, adequate water for domestic use and child care	
	Women development army leader	Access to sustainable safe water sources, safe water storage in the home, personal hygiene, ODF village and safely managed private water sources	
	Social and religious leaders	Followers access to safe water at home and in the church, safe holy water, religious norms respected, ODF community	
	NGOs	Improved access to safe water supplies and improved sanitation facilities and good hygiene	

TASK 1.4 Organize capacity building training program for Kebele CR-WSPs team

Building technical knowledge and skills of the CR-WSP team on the steps to be followed (tasks) during development and implementation of CR-WSP is important. The woreda CR-WSP-TWG makes necessary preparation for the training such as:

- Identification of venue for theoretical and field exercise, logistics, and facilitators;
- Informing the local administration (Woreda and Kebele leaders) that practical field exercise is to be conducted in selected village; and,
- Making field work easier through involvement of responsible officer from the woreda water or health office.

Plan for training of the Kebele CR-WSP team is indicated in Table 2 below. The training process should employ adult/experiential learning technique primarily aimed at creating in-depth understanding on:

- The national WASH policies, strategies, national water quality standard specifications, and forming and leading team work;
- Climate change/weather variability and its effects on drinking water supplies;
- Concepts, principles and tasks of the climate resilient water safety plan;
- How to describe water supply systems, identify hazards, hazard events and to characterize risks and existing control measures;
- How to develop and implement an incremental improvement plan, how to monitor control measures, and verify effectiveness of the water safety plan; and,
- How to document, review and improve all aspects of water safety plan implementation.

Finally, the CR-WSP team prepares action plan for CR-WSP process with timeline and submit to the local government (Woreda and Kebele Administrator) and the WASH board office/manager for approval.

Table 2: Training program on development and implementation of water safety plans for members of the Kebele CR-WSPs team

	Topics and training methodology	Time
Day 1	Introduction to the training workshop	1 hr
	Brainstorm, explain/discuss the national water and health policies specific to water safety, national water quality standards targets, recommended quantity and distance to collect water	2 ½ hrs
	Team composition, team forming, roles, and leading team work towards performance	1 hr
Day 2	Climate change/weather variability and its effect on the drinking water supplies	45 mts
	Concepts, principles and tasks of climate resilient water safety plan	
	Brainstorm, explain and discuss • How to support water committee or water board in developing CR-WSPs How to describe water supply systems,	45 mts 1 hr
Day 3	How to identify hazardous events and hazards to water quality and quantity and reliability of existing water supply system	1 ½ hrs
	How to identify and validate effectiveness of the existing control measures	2 ½ hrs
	How to assess risks	1 ½ hrs
	Orientation on how to use the sanitary survey and household level hazardous events and hazard assessment tools/instruments and field exercises (work)	
		2 ½ hrs

	Topics and training methodology	Time
Day 4	Practical exercise	
	Field visit to selected community managed water supply and conduct system description, identify hazards and hazard events and existing control measures from catchment to point of use	3 hrs
	Discuss in group: identify hazardous events and hazards by process steps, identify existing and validate the effectiveness of the control measures and assess the risks	2 hrs
	Explain and discuss on how to develop and implement an incremental improvement plan,	1 ½ hrs
Day 5	Explain and discuss on how to monitor control measures, and verify effectiveness of the water safety plan	2 hrs
	How to document, review and improve all aspects of water safety plan implementation	
	Prepare team activity plan (when to accomplish tasks) with timeline	2 hrs
	General discussion, agree on way forward	1 ½ hr
		1 hr

Table 3: Kebele CR-WSP team members' roles in the Kebele and their duties during CR-WSP development and implementation

S. No	Team members roles in the Kebele	Expected duties of the team members	Remarks
1	Kebele Administrators	<ul style="list-style-type: none"> ● Play a decisive role in creating favorable political environment for CR-WSPs development processes and its implementation ● Make decisions on catchment demarcation, social safeguarding, mobilization of community resources (labor, material and cash) during CR-WSPs implementation and provide administrative and legal solutions to community concerns related to water uses, vandalism, looting and illegal connections and maintaining peoples motivation ● Lead annual CR-WSP implementation reviews 	Political leadership (CR-WSPs team member)
2	Rural WASH board manager	<ul style="list-style-type: none"> ● Make decision on the assignment of right technical staff during planning and human, material, financial resources during CR-WSPs implementation ● Provide copies of records and reports on the water supply schemes layout maps, type and size of materials, age, leakage and wastage rate, catchment delineation/determination, equipment and spare parts for operation and maintenance ● Actively engage in the identification of hazards and risk levels, setting of priority control measures and corrective actions ● Play leadership role during implementation of control measures and corrective action/improvement plan, operational monitoring, and participate in the semi- annual and annual CR-WSP implementation reviews 	CR-WSPs team leader

S. No	Team members roles in the Kebele	Expected duties of the team members	Remarks
3	Kebele managers	<ul style="list-style-type: none"> ● Provide management advice to Kebele administrators on critical issues that need political decisions such as catchment demarcation, replacement of properties and compensation (social safeguards) for households due to catchment demarcation, building of reservoirs, distribution lines, and water points. Also provide advice on how to settle/solve disputes that might arise between upstream and downstream communities (social safeguards). ● Coordinate and provide management guidance to water, health, agriculture, and school professionals during CR-WSP development and periodically monitor implementation processes, assist on the documentation of successes, best practices, operational challenges, and lessons learned ● Provide management support to WASHCOs, village leaders, HDAs, and HEWs on the mobilization of the community resources (labor, material, cash) during implementation of the water safety plans such as catchment treatment <p>Actively engage in the semi- annual and annual CR-WSP implementation reviews</p>	CR-WSP team member
4	Board operation and maintenance worker	<ul style="list-style-type: none"> ● Provide information during system description of overall the rural water schemes in the Kebeles ● Provide data and record/document on frequency of system breakage, type of the schemes, age, size, length, yield, and materials of the system ● Identify, document, and provide information on leakage and wastage rate if the scheme is motorized deep borehole or gravity springs with distribution system, specifications of equipment and spare parts for operation and maintenance, on the major cause for supply interruptions ● Actively engage in the identification of hazards and risk levels, setting of the priority control measures and corrective actions ● Responsible for implementation of the control measures and corrective action/improvement plans, operational monitoring and take part in the semi- annual and annual CR-WSP implementation reviews 	CR-WSPs team member
5	Water Scheme/point care takers	<ul style="list-style-type: none"> ● Provide information for system description specific to the WASHCO managed water schemes, data on frequency of breakage, type of the scheme, yield, age, down time, specification of equipment and spare parts for operation, repair and maintenance, and major cause for supply interruptions, ● Actively engage in identification of hazards and risk levels, and setting of the priority control measures and corrective actions ● Responsible for implementation of the control measures, corrective action/improvement plans, operational monitoring and in the CR-WSP implementation reviews 	CR-WSPs team member



S. No	Team members roles in the Kebele	Expected duties of the team members	Remarks
6	Water quality and environmental health officer	<ul style="list-style-type: none"> Determine baseline level of the physicochemical and microbiological quality status of the community managed water supply schemes at source, storage, distribution points, and at the point of consumption Periodically monitor critical water quality parameter during implementation and advise the CR-WSP team to operational monitoring/inspection when critical limits are surpassed Provide expertise support on the treatment/disinfection of the drinking water when need arises Describe the socio-economic dynamics of the community and health status of the catchment population Identify behavioral and environmental health related hazards, hazard events, and determination of risk levels from catchment to the point of consumption Actively engage in identification of the control measures and corrective/improvement actions Implement CR-WSP plan particularly on the removal of hazard events related to hygiene and sanitation behaviors and environmental health, and engage in the semi- annual and annual CR-WSP implementation reviews 	Woreda health office/PHCU staff (catchment Kebeles' CR-WSP team member)
7	Natural resource management workers	<ul style="list-style-type: none"> Identify sources and types of pollution in the catchment of the water source due to various socio-economic activities (agriculture, local cottage industry, etc.) Actively engage in identification of potential hazards, hazard events, and determination of risk levels, Actively engage in identification of the control measures and corrective/improvement actions Implement CR-WSP plan particularly on the demarcation of micro-watershed, soil and water conservation activities such as development of recharge ponds and terracing in the upstream of the water source, plantation of shallow rooted plants and flood control Actively engage in the semi- annual and annual CR-WSP implementation reviews 	Kebele agricultural Development staff (CR-WSPs team member)
	Agricultural extension workers	<ul style="list-style-type: none"> Identify sources and types of pollution in the catchment of the water source due to various socio-economic activities (agriculture, local cottage industry, etc.) Actively engage in identification of potential hazards, hazard events, and determination of risk levels, Actively engage in identification of the control measures and corrective/improvement actions Implement CR-WSP plan particularly on the removal of hazard events in the catchment and soil and water conservation activities Actively engage in the semi- annual and annual CR-WSP implementation reviews 	

S. No	Team members roles in the Kebele	Expected duties of the team members	Remarks
8	School teacher	<ul style="list-style-type: none"> ● Provide data of the school water supply scheme including age, type, yield, operation and maintenance status, major causes of supply interruption, and specification of equipment and spare parts for operation, repair and maintenance, ● Actively engage in identification of hazards, hazard events, and determination of the risk levels, and identification of priority control and corrective actions for both school water supply and community managed schemes ● Implement CR-WSPs particularly in the improvement of school hygiene and sanitation, specific control and corrective actions to school water supply schemes, awareness creation and mobilization of the students and school communities on concepts and benefits of CR-WSPs approach, promotion of safe water chain in the school and surrounding communities ● Actively engage in the semi- annual and annual CR-WSP implementation reviews 	Catchment Kebeles' CR-WSPs team member
9	Water resources development extension worker	<ul style="list-style-type: none"> ● Role of the water resource development worker overlaps with rural WASH boards. But where there is no WASH boards, provide detail data for each water supply schemes existing in the catchment Kebeles/villages including type, age, yield, micro-watershed, status of WASHCOs, operation and maintenance status, major causes of supply interruption, common community concerns, and specification of equipment and spare parts for operation, repair and maintenance ● Actively engage in identification of hazards, hazard events, and determination of the risk levels, and identification of priority control and corrective actions for each community and school managed water supply schemes ● Implement control measures, corrective actions, and improvement plans to community managed and institution managed rural water supply schemes, operational monitoring, zoning of micro-watershed/catchment, and promotion of safe water chain. ● Actively engage in the semi- annual and annual CR-WSP implementation reviews 	Catchment Kebeles' CR-WSPs team member



S. No	Team members roles in the Kebele	Expected duties of the team members	Remarks
10	Health extension worker	<ul style="list-style-type: none"> ● Provide data on the coverage and status of household hygiene and sanitation services and its utilization, open defecation practices, household water storage and handling practices, solid and liquid waste disposal, challenges to sustain the household and community sanitation infrastructures such as due flood and termite problem, water logging, soil condition, etc. ● Provide data on the number, operation and management status of household owned hand dug wells, and seasonal variation of the well productivity ● Actively engage in identification of hazards, hazard events, and determination of the risk levels, and identification of priority control and corrective actions for each community managed water supply schemes, during fetching, transportation and at point of consumption ● Implement control measures, corrective actions, and improvement actions particularly on promotion of improved hygiene and sanitation behaviors, supporting the communities to achieve open defecation free (ODF) environment, ensuring safe water handling practices, promotion of hand hygiene at critical times and provide support on household water treatment and safe storage practices during emergency situation ● Actively engage in operational monitoring and conduct regular inspection to water supply schemes and periodic household and community contamination risk assessments and take corrective action with CR-WSP team, ● Actively engage in the semi- annual and annual CR-WSP implementation reviews 	Kebele and water scheme/points CR-WSPs team member
11	Kebele Women, Youth and Child Affair	<ul style="list-style-type: none"> ● Provide information on observed and perceived health, economic and social impacts of unsafe water consumption specific to women and children, travel and physical burden of women to collect water from long distances when nearest water sources dry due to drought or damaged by floods, ● Actively engage in identification of hazards, hazard events, and determination of the risk levels, and identification of priority control and corrective actions for each community managed water supply schemes, during fetching, transportation and at point of consumption ● Mobilize women/health development armies (HDAs) on improvement of household hygiene and sanitation conditions, and household safe water storage practices and achieving ODF environment, and cleaning of the surroundings of the water points ● Actively engage in operational monitoring from catchment to point of consumption and take part in the semi- annual and annual CR-WSP implementation reviews 	Kebele CR-WSPs team member

S. No	Team members roles in the Kebele	Expected duties of the team members	Remarks
12	Women Development Army leader	<ul style="list-style-type: none"> ● Represent the water users and lead implementation of corrective actions and improvement plans expected from the households/ women in their catchment areas and households by mobilizing 1:5 women leaders ● Regularly conduct inspection to household sanitation and hygiene status and household water storage practices in their village and households ● Prepare schedule for 1:5 women leaders and motivate to clean surrounding of the community water supply schemes and distribution points ● Conduct operational monitoring to their catchment villages, households, and water points and check for implementation of the corrective actions <p>Actively engage in the water supply scheme level quarterly CR-WSP implementation reviews</p>	Water scheme/ point CR-WSPs team member
13	Community based organizations (Iddir, Church/Mosque) leaders	<ul style="list-style-type: none"> ● Provide data on church/mosque managed holy water sources, grave and other religious and cultural sites and water supply schemes such as age, type, depth, length, size, operation and repair status, and on the safety of the water ● Involve in identification of hazards, hazard events, and determination of risks and implementation of corrective measure for all water supply schemes in the catchment Kebeles/villages and of the religious institutions ● Teach their members, followers and their religious children on the importance safeguarding water sources from contamination, taking necessary actions to make drinking water safer at sources, during transportation and in the household and safe handling of holy water at household level linking with articles in the wholly / religious scriptures ● Mobilize their members and followers to take part in the implementation of corrective actions and improvement actions through showing their commitment by contributing labor, materials and cashes where and when required ● Establish norms and Influence sanitation behaviors of the water users and support the community achieve ODF status and to sustain the good behaviors, to discipline/reprimand antisocial behaviors such as vandalism, looting and illegal connections ● Work with local administrative bodies in solving any upstream and downstream community concerns, catchment demarcation, etc. ● Actively take part in operational monitoring and in the semi- annual and annual CR-WSP implementation reviews 	Catchment Kebeles' and water scheme/ points CR-WSPs team member

S. No	Team members roles in the Kebele	Expected duties of the team members	Remarks
14	Non- Governmental Organizations (NGOs)	<ul style="list-style-type: none"> ● Provide technical, financial and logistic support the Kebele CR-WSP team during system description, system layout mapping, hazard identification, risk analysis and identification of the priority control measures ● Provide technical, material and financial support to rural WASH boards and WASHCOs on implementation of the capital intensive improvement plans ● Provide program management support through organizing training for the CR-WSP team on the concepts, development and implementation of the CR-WSPs, adaptation/preparation or updating of the standard operational manuals (SOPs) and translation of SOPs in to local languages, sensitization of operation and maintenance staff of rural WASH boards and artisans on SOPs, technical advice on operational and verification monitoring and researches ● Support on organizing and facilitation of the semi- annual and annual CR-WSPs implementation reviews, and on documentation of best practices, challenges, lessons learned and facilitate establishment of networks and information exchange between CR-WSPs team in the neighboring Kebeles and best performing CR-WSP teams somewhere else 	Project catchment Kebeles' CR-WSPs team member

TASK 2: Description of the community water supplies

Task 2.1 Map all water sources in the Kebele

There are different types of water supplies in the same Kebele. Some areas/villages may use gravity spring/ motorized deep borehole with storage reservoir(s), community/village water distribution points, and with household connection, and some areas/villages of the Kebele depend on point sources like hand dug well, shallow well, spot spring, rain water harvesting system and/or household owned hand dug well (self-supply).

The water supply description (mapping), therefore, should include all community water supplies in the Kebele starting from water sources' catchments/micro-watersheds (drainage area) to the household (consumer). Draw a simple sketch map of all water sources in the Kebele and social resources using pen and flip chart that indicate catchment/source of the water, reservoir, distribution system and the household (social mapping exercise) including sanitary survey tools to assess the potential sources of contamination to different sources of the community water supplies.

The following Figure 2A shows layout of a gravity spring with catchment/source, storage reservoir, distribution points and point of use (Household level). Figure 2B illustrates examples of layout of the community water supply systems and some households in the community use both unprotected and protected water sources at the time.

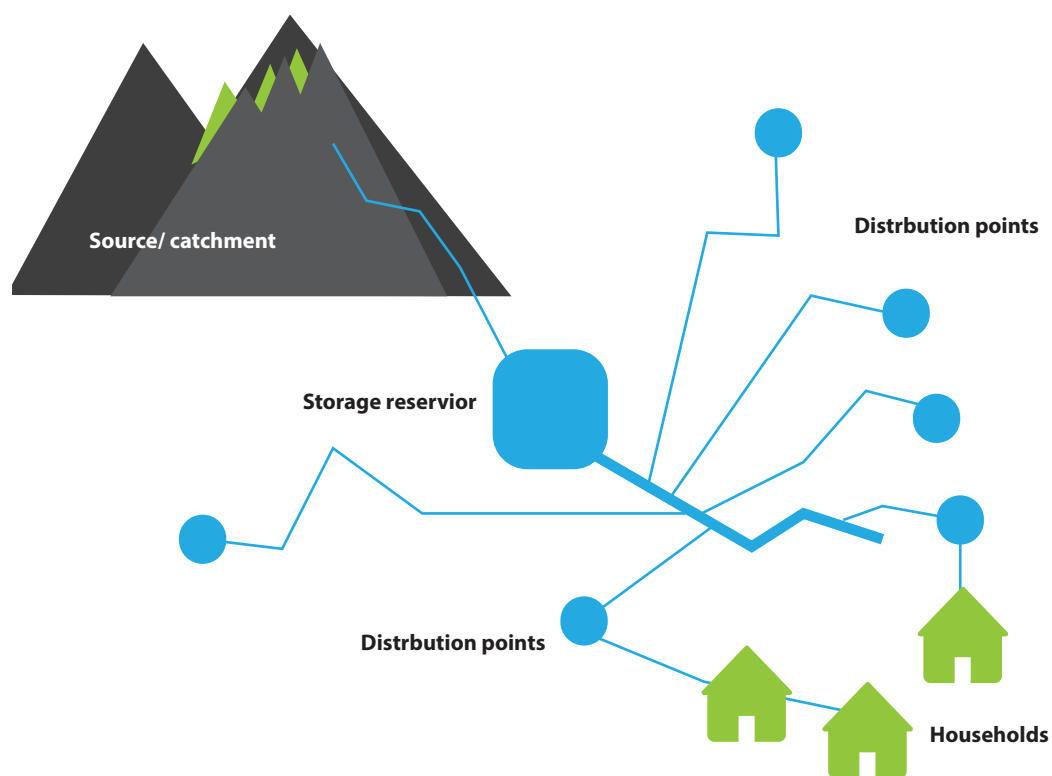


Figure 2A: Gravity Spring with storage reservoir and distribution points

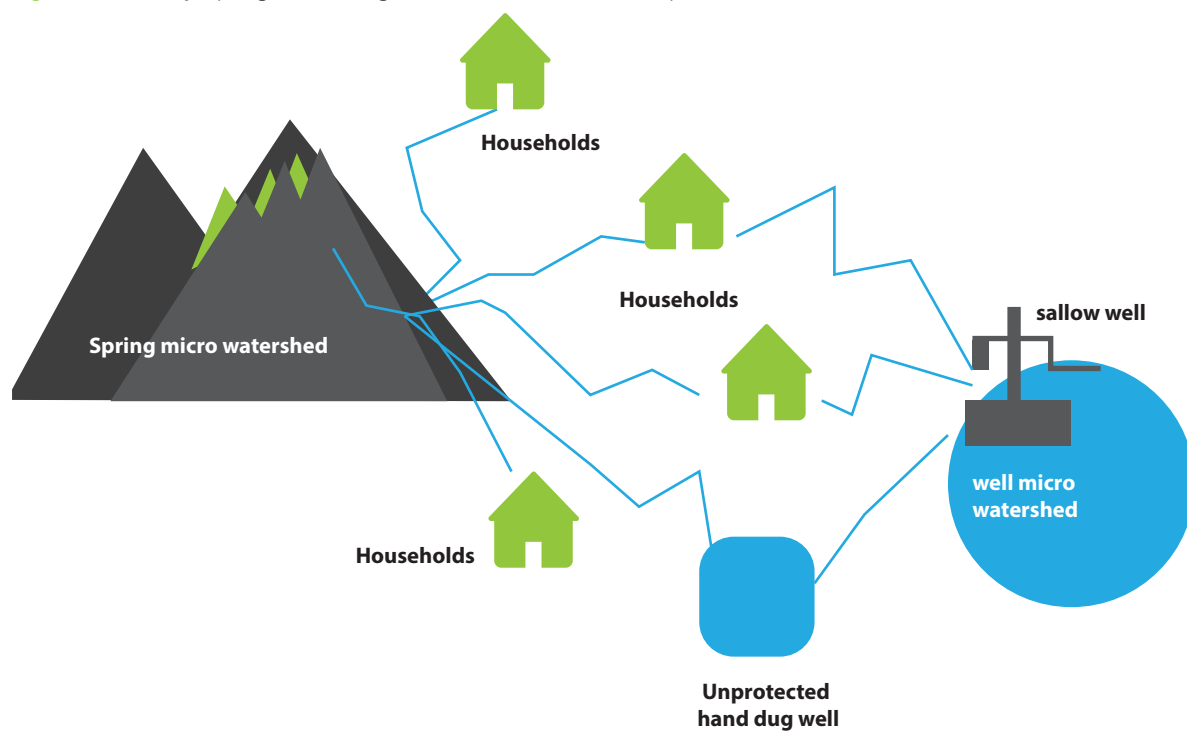


Figure 2B: HH using water from protected and unprotected sources

- If WASHCOs/rural WASH boards have scaled/sketch map of all community water supplies, update information and re-draw the sketch after walking the complete system, from the catchment to the consumer.
- If map is not available, as each WASHCO (artisan) is represented in the Kebele CR-WSPs team, first exercise social/community water point mapping on the ground and locate infrastructures and social resources like road, Kebele office, school, health post, church/mosque, economic activities in the catchment such as agriculture, cattle grazing, common defecation sites, surface runoff ways, mining, etc.. Discuss and refine the map. Then, copy all what is located on the ground on flip chart.

Use knowledge/skills of CLTSH facilitation (tool #2) - Social and sanitation mapping exercises

Task 2.2 Collect additional supporting information

Make visits and visually observe all components of the community water supplies from their catchment/micro watershed (drainage areas) to point of consumption (household water handling practices) and collect detailed information on each component of the community water supply systems. Use community water supply system description data collection instrument and sanitary survey tools adapted from WHO rural CR-WSPs field guide 2012.

Detailed information about the catchment/micro-watersheds and the water source, including description of:

- Location and type of the water source (gravity spring, motorized deep borehole, hand dug well, shallow well, spot spring, rain harvesting system and private hand dug wells),
- If the source is ground water- depth, describe discharge rate, and depth of casing,
- Different purpose of water use (drinking, food preparation, bathing, hygiene, animal watering, irrigation, gardening, etc.),
- Topographic features of the catchment land (plain, gorge, slope, erosion, for possible danger from flooding,
- Ownership of the catchment land, and land use for economic and social activities including agriculture, cattle grazing, mining, waste disposal, common defecation sites, etc.,
- Existing affirmative action such as soil and water conservation interventions in the catchment land,
- Current and future demand (adequacy of the water for users),
- Water source quality and sources of pollution due to different type of the socio-economic development activities in the catchment areas,
- Kind of hazard events (contaminants from different sources in the catchment areas) including organic, inorganic, agrochemicals mainly fertilizer and pesticide, and/or chemical wastes,
- Current physical, microbiological and chemical qualities of the water (recent data from the woreda health and/or water resource offices). If secondary data is not available, consult health office to collect water samples and make quality testing and analysis from outlets of the sources, reservoirs, distribution points,

and household taps and household storage containers,

- Changes of the source discharge rate (yield/quantity) during design phase versus current rate and reliability of the source taking in to consideration population growth rate (water demand),
- Condition of the wellhead works/spring box, possible intrusion of surface runoff, access to animals, cracks, pool of water on the platform, etc., and
- Condition of human and animal waste disposal Sanitation.

Detailed information about the storage reservoir, distribution lines and public stand posts (gravity spring and motorized scheme), including:

- Capacity (volume), location (site), service age, design and structure of the reservoirs, materials used, and their position of inlet and outlet valves, overflows, manhole cover, shape of top cover slab, vent pipe, etc.
- Presence of protection/fencing from human and animal access such as cattle, birds, rodents, etc.
- Type, size, length, and age of pipe materials and accessories used (GIP, uPVC, HDPE, etc.)
- Check for possible entrance of contaminated water through the basement/wall/top of the reservoirs, (check for any structural defects),
- Check location where pipe laid and valves are sited like points where pipe crosses the flood drainage ditches, ponds, river, exposed parts, etc.,
- Check for areas where frequent leakage, breakage and supply interruption occurred (information/data can be obtained from operation and maintenance workers),
- Check for back flow of contaminated water from inspection/valve boxes,
- Check for pool of water over the cover slab, cracks, air vent pipe open due to wire mesh damage, fencing, birds droppings and nests, uncovered inspection man-holes, uncovered outlet pipe/valve boxes, etc. and other conditions that increase chance of entry of contaminants,
- Check for illegal connections, vandalism, etc., and
- Check for presence of fence and proper door for the community distribution points, drainage and cleanliness of the platform, presence pool of water for insect breeding, conditions of human and animal faeces in the surrounding, condition of meter /valve box, leakage, functionality of taps, etc..

Detailed information about spot spring, hand dug and shallow well, rain water harvesting:

Spring Box

- Check for proper construction of the spring box (wall, cover, inspection hole, overflow pipe, pool of water /mud on the cover-slab, cracks, whether people wash cloth on the cover slab, etc.),
- Check for runoff/flood ways leading towards spring box, surface water pool, latrine, human and animal faeces, crop farm, mining, cattle barn uphill or around the spring,
- Check for presence of proper fencing with door, flood diversion ditch, and heavy traffic road crossing over water bearing spring micro catchment, and
- Check for water quality (microbiological and physicochemical).

Hand dug and shallow boreholes fitted with hand pump

- Check for construction status of the well headwork,
- Check for presence of human and animal faeces in the surrounding, latrine and waste disposal sites, farms, animal shed, fencing with proper door, pool of water and mud on the well head, cracks, etc.,
- Check for runoff/flood ways leading towards the headwork of the well, and
- Check for water quality (microbiological and physicochemical).

Rain water harvesting

- Check for type of roofing material, birds and rodent nest and droppings, insects, and dust/debris on the rain water contact surfaces such as in the gutter, dropdown pipes, and on the roof surface,
- Check for presence of filtration and disinfection/chlorination practices,
- Check for practices/knowledge of flashing away the first 10-15 minutes rain before collecting rain water,
- Check for cleanliness and proper cover of collection reservoir (cistern) and pumps used to rise water to overhead tanker, and

- Check for water withdrawal practices of the households.

Detail information about transportation household water treatment and storage practices

- Check for type, size (volume), treatment and safe storage practices,
- Water withdrawing mechanisms including cleanliness of utensils, and
- Human and animal waste disposal practices including child faeces,

General supportive information about the community water supplies

- Education and training (knowledge and skills) of operation and maintenance workers (technicians and artisans, care takers),
- Human power, materials (tools and spare parts), and finance available for operation and maintenance (resource management practices of WASHCOs and Boards),
- Record keeping (documentation and reporting) and auditing documents,
- Community/Kebele access to and usage of the basic and improved hygiene and sanitation facilities, household water treatment and storage practices, and ODF status of the village/Kebele Solid and waste water collection and disposal, domestic animal shedding practices, general personal hygiene conditions of children, etc.,
- Availability and knowledge of the water quality standards of the technicians/artisans, and HEWs,
- Some general highlights on communities' perception/compliant about access, adequacy and quality of the water and compliant on behavior of the caretaker, water fetching schedule, cost, and use of alternative water sources, etc., and
- Information on legal status of the WASHCO, procedure for tariff setting, amount of money collected, accounting and auditing procedures, operation and maintenance cost, etc.

Conduct analysis of primary data collected during mapping and field visits to community water supply systems (from catchment to point of consumption) and from the secondary sources and sort-out mechanisms (how, when and frequency) through which contaminants could enter into the source, reservoir, distribution lines, community water distribution points and in the household (hazard events) and type of the contaminants (hazards). Identification of hazards and hazard events will be addressed in detail under Task 3 below.

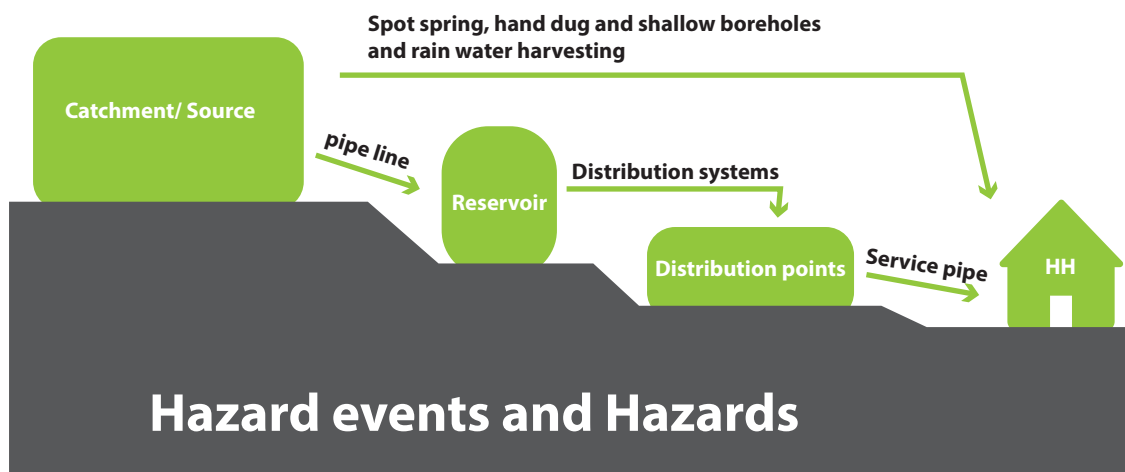


Fig.3 : Analysis of primary and secondary data collected during community water supply mapping and system description

Task 3: Identify hazards and hazardous events, evaluate existing control measures and assess risks

After completion of the mapping and description of all community water supplies in the Kebele or cluster of Kebeles and analysis of the primary and secondary data collected during the field visits, the CR-WSP team makes a thorough discussion and identify the situation that could threaten the safety and adequacy/quantity of the community water supplies, evaluate effectiveness of the existing control measures and assess level of associated risks to the quality and quantity of the drinking water sources. Shallow community water supplies (hand dug wells, perennial springs are at high risk of drying due to high water demand by the growing population and prolonged drought seasons in low land and drought prone areas of the country.

3.1 Identify hazards and hazardous events

Situations that threaten the safety of community water supplies include mechanisms through which contaminants (hazards) could enter in the water supply system at source, distribution line, reservoir, distribution system, community distribution points and/or in the households and the type of dangers (hazards) that affect the safety of the drinking water.

Hazardous events: are the mechanisms through which hazards enter into the water supplies. For example; it could be runoff entering the water sources, pipe leakage and breaks, power interruption, pool of dirty water on the slab of reservoir, open valve boxes, human/animal faeces around water source, in the valve box or on the distribution point platform, handling water in the dirty and uncovered jerry cans, etc.

Hazards: are contaminants including microbiological (pathogenic microorganisms), chemical (arsenic, fluoride), physical (turbidity) and/or lack of water

Control Measures: is an activity or a barrier put in place to prevent/reduce/eliminate hazardous events from entering the water supply system. Example; flood diversion ditch prevents runoff from the water sources, fencing of water source, reservoir, and distribution point prevents animals, chlorination to kill/remove pathogenic microorganisms, training of caretakers/artisans, etc..

Risk: is the likelihood that a hazard will cause harm together with its consequences

Analysis of the hazardous events and hazards requires clear understanding of the point where it happens in each process steps (points it enters in the water supply system), when it happens (seasonality – during rainy or dry season), why it happens (associated factors like human activities, water supply system itself, operation and maintenance capacity of the WASHCO/the board), and/or behaviors of the water users, etc.), and the frequency of a hazardous event could happen and associated severity of its consequences.

Therefore, analysis requires investigating linkage between occurrence of the hazardous event and possible hazards likely to enter in to drinking water supplies, identification and validation of the existing control measures and associated level of risks to health of the water users. For instance, runoff due to heavy rainfall washes faecal matter and enter in the water source (such as hand dug wells and shallow boreholes), the water source is contaminated by faecal pathogens (bacteria, which is hazard), and the likelihood of the diarrheal disease breakout is high among communities that are collecting water for drinking and domestic use from that borehole. Through this processes, CR-WSP team discuss, think about ***how likely a hazardous event is to occur*** and ***how serious it might be*** (given the effectiveness of existing control measures), and assigns a risk level and then identify priority risks that need special consideration.

Task 3.2 Identify existing control measures and evaluate their effectiveness

Furthermore, CR-WSP team should evaluate effectiveness of existing control measures; whether it provides adequate protection to water supply system from contamination. Usually you may find fence that is not intact and with no door, perceived quality of water flowing through pipe system, incomplete message, etc. provide false feeling of safety to the water users though it does not provide adequate protection. Therefore, effectiveness of the existing control measures put in place at source, reservoir, distribution system, distribution points and in the household should be assessed based on the following measurements.

- Preventing contaminants from entering the source of water,
- Removing the contaminants from the water,
- Inactivation/killing the hazards (pathogens), and
- Preventing recontamination of water during distribution, storage and handling.

Evaluation of existing control measure provides insight whether it is adequate enough to remove or eliminate the identified risk or whether it needs requires additional control measures. Therefore, after analyzing the existing control measures, summarize information collected during description of the water supply systems and sanitary inspection and household level contamination risk assessment using the following template (Table 4)

Table 4: Example of identified hazardous events paired with hazard type and condition of existing control measures, importance of the hazardous event and additional control measure needed

Hazardous events (at each component of water supply system)	What type of hazard (microbial, chemical, physical) is there due hazardous event?	Is this hazardous event under control? (Existing control measures and validate their effectiveness)	Risk level: high, medium or low? (How important is this hazardous event? How frequently does it happen?)	What additional control measures are needed? (These will be further developed in Task 4.)
Open defecation around the borehole, deep cracks on the well head platform runoff washes faeces and enters in to the well	Microbial contamination	No control measure	Highly important because majority of the households are open defecators and contamination is there during rainy season	<ul style="list-style-type: none"> • Building flood diversion ditch, • Sanitation and hygiene promotion through CLTSH • Maintenance of well headwork
Almost all visited households collect and store water in dirty jerry can (plastic water container) and kept uncovered, children and dog direct access to the container	Microbial contamination	Health education at Primary Health Care Unit. knowledge improvement is not sufficient to remove microbial contamination and requires improvement of skills on how to safely store water and access to HH water treatment products	Highly important because it happens throughout the year	Promotion of household water treatment and safe storage practices through demonstrations and household visits, and improving supply chain of the point-of-use water treatment chemicals/products
Flood/Heavy rain damage the headwork of the borehole and consequently runoff washed animal and human faeces, and agrochemical from uphill grazing and crop land and directly enters the well,	Microbial and chemical contaminants, turbidity	Diversion ditch exist. However not able to protect run off of heavy rain	Highly important and common during rainy season of 3-4 months of the year	Build flood protection dike uphill of the borehole and rehabilitate the well and repair infrastructures Promoting Integrated Pest Management approaches to manage pests

Drought resulted in lowering of the ground water table and as a result hand dug and shallow well dried,	Water scarcity due to decreased recharge (yield) of shallow ground water sources	No control measure	Highly important (every 2-3 years). Due to the event people turned to unsafe source	Watershed/catchment management (demarcation and construction of an artificial recharge ponds, plantation of shallow rooted grasses and trees, flood control during rainy season) Using climate down scaled information/data when selecting, designing and constructing rural water technologies Replacement of the hand dug and shallow wells and infrastructures with more drought tolerant/resilient deep boreholes
Hand pump broken due to continuous pumping and lack of greasing of moveable parts (lack of regular preventive maintenance)	Physical (system is not working)	No control measure	Highly important 2-3 months the system is out of function and people turned to unsafe sources	Proactive operation and preventive maintenance with supply chain Regular inspection of the water supply infrastructures
Apron is not sealed due to poor workmanship	Microbial and chemical	No control measure	Highly important and during rainy season	Standard workmanship and rehabilitation /maintenance of the upper 3 meters of well and head works
Leakage of pipe(gravity fed system) due to pipe breakage	Microbial and chemical	No control measure	Highly important and during rainy season	Regular visual inspection of the pipe distribution systems and repair/ replace the Broken parts

Task 3.3 Assessment of risks associated with each identified hazards

There are two methods to make risk assessment. The descriptive risk assessment is the easiest method to determine risk level, prioritize and decide actions. It depends on expert/CR-WSP team judgment (Table 5).

The second method is risk ranking method which is more complex and depends on likelihood of the hazardous event to happen and associated severity of its consequences. Risk score is the product of likelihood and consequences (Box 1).

RISK = Likelihood * Consequence used in box 2.

Table 5: Descriptive risk assessment method

Risk Level	Meaning	Notes
High or significant	Clearly a priority	Actions need to be taken to minimize the risk. Proposed actions should be documented in the improvement plan and implemented based on priorities and available resources.
Medium	Medium priority	Currently no impact on drinking water safety, but requires attention in operation and/or possible improvement in the medium and long term to continue minimizing risk.
Low or insignificant	Clearly not a priority	Actions may be taken but not a priority, or no action is needed at this time. The risk should be revisited in the future as part of the CR-WSP review process.

Source: Adapted from the SCWS WSP Manual (Table 3.3)

✓ Box 1: Risk Ranking Method

		CONSEQUENCE			
			No/minor impact	Moderate impact	Major impact
			1	2	3
LIKELIHOOD	Unlikely	1	1	2	3
	Possible	2	2	4	6
	Likely	3	3	6	9

Risk score	Risk level	Description			
≤2	Low	Clearly not a priority			
3-5	Medium	Medium –long term priority. Requires some attention			
≥6	High	Clearly a priority. Requires urgent attention			

Source: Adapted from the SCWS WSP Manual (Tables 3.5 & 3.6)

✓ Box: 2 Definitions of likelihood of hazardous event to happen and consequences

Likelihood level	Assigned score	Description
Unlikely	1	Could occur sometimes but has not been observed; may occur only in exceptional circumstances
Possible	2	Might occur sometimes; has been observed occasionally
Likely	3	Will probably occur in most circumstances; has been observed regularly
Consequence level	Assigned score	Description
No/minor impact	1	Minor or negligible water quality impact (e.g. aesthetic impact, not health related) for a small percentage of customers; some manageable disruptions to operation; rise in complaints not significant
Moderate impact	2	Minor water quality impact (e.g. aesthetic impact, not health related) for a large percentage of customers; clear rise in complaints; community annoyance; minor breach of regulatory requirement
Major impact	3	Major water quality impact; illness in community associated with the water supply; large number of complaints; significant level of customer concern; significant breach of regulatory requirement

Source: Adapted from WHO SCWS WSP manual

TASK 4 Develop and implement an incremental improvement plan

Following identification of highly important risks and listing of additional control measure needed to reduce the risk (see Table 4 above), the CR-WSP team should develop a realistic improvement plan. Designing of the control measures requires appraisal of existing internal and external resources, and then requires prioritizing of the control actions to be taken in the short, medium and long terms by taking into consideration the severity of the problem, available limited resources, and capacity to implement.

Task 4.1 Identify control measures to improve drinking water safety

Development of the control measures in small community water supply systems requires starting from small doable actions, and then move to stepwise implementation.

For example, some improvement actions like fencing of the water sources, reservoir and distribution points can be implemented at very low cost (i.e., use locally available materials, labor and local skills). In addition, household level control actions such as safe water storage practices require minimum knowledge, skills and efforts. However, other control measures such as demarcation of the catchment land may require budget for compensation for land and property owners, replacement of distribution pipe lines or water pumps could also require budget for purchase/procurement, transportation and installation.

It is also important to develop and implement an integrated and complementary control measures for each of the priority risks identified at source, distribution points/system, during transportation and at household level. For example, the following table illustrates complementary control measures (Table 6).

Table 6: Complementary control measures to reduce risk of drinking water contamination (protected gravity spring water supply system)

Source catchment	Storage	Distribution point	Household
Demarcation of the watershed /catchment, prohibition of agricultural activities, and fencing. Community awareness creation on the health effects of agricultural chemicals	Fencing, flood diversion ditch, sealing man-hole cover, cutting large trees and chlorination/ disinfection	Fencing, flood diversion ditch, regular site cleaning,	Use of narrow necked storage container, keeping water storage container covered and clean and placing the container off-floor. Community education on the importance of safe water storage practices

Task 4.2 Develop an incremental improvement plan

After listing of the possible control measures to be implemented at each stage of the water supply system (Table 4), CR-WSP team should prepare an incremental improvement plan taking into account capacity of the community to implement and available resources. The following criteria can support the CR-WSP team to select priority control measures and to develop and implement incremental improvement plan.

- The level of risk associated with each hazard and hazardous event (as discussed in task-3 above),
- Appropriate control measures to address each risk and how to implement,
- Identify and assign responsible person or organization to carry out the control measure,
- Determine time when the control measure (s) is implemented,
- Determine the estimated costs of the control measures (allocate budget), and
- Identify knowledge and skill gaps to implement the control measures and train the responsible body.

As mentioned above, development of an improvement plan requires critical analysis of actions that can be implemented with locally available resources and capacities, and that require additional resources, and technologies. In short, each improvement plan of action should be feasible and practical with implementation timeline and cost. In a condition where resources are not available to implement permanent control measures

(e.g. provision fluoride free safe water source), CR-WSP team can plan for temporary control measures (e.g. use of household defluoridation chemicals) until resources are made available.

Incremental improvement plan is an important tactic/approach to initiate community participation (in kind and in cash), local government attention to cover costs that cannot be covered by the community, and to attract attention of non-governmental organizations and private sectors to engage in the implementation of the plan. Therefore, CR-WSP team should devise mechanisms through which different resources (materials, skills, fund, etc.) can be mobilized to realize implementation of the improvement plans. Furthermore, an improvement plan needs to be documented and timely shared (communicated) with those responsible for its implementation and with other stakeholders to attract their involvement and engagement. The following template (Table 7) illustrates an incremental improvement plan:

Table 7: Examples of an Incremental Improvement Plans (IIPs)

Hazardous event	Improvement plan		Responsible person/ organization	Implementation timeline	Estimated implementation cost (in ETB)
	Control measures	Actions			
Animals walkways cross over the Spring cap/ box and animal faeces observed on the spring box and contaminants could wash into the spring	Exclude animal access to spring box	Divert animal walkways downstream from the spring box Fencing of the spring box	WASHCO and the community/ users	December 10, 2014	ET Birr 100.00 (labor, logs, skills is contributed by the users) and nail is purchased
Runoff directly flows and passes over the spring box and box cover is muddy during rainy season and contaminants could enter the spring protection box	Divert runoff up stream Watershed based soil and water conservation measures	Dig diversion ditch uphill of the spring box Implement soil and water conservation measures upstream of the spring	WASHCO and water users, Woreda office of agriculture, Kebele Agriculture Development Agent	December 15, 2014	Labor contribution by the community
Residents wash clothes on the platform of the spring box and contaminated water could pass through platform and contaminate the water	Avoid/discourage washing of cloths on the spring box	Community education Fencing of the spring box Fixing barbed wire on the cover of the spring box	WASHCO and health extension worker	December 20, 2014	ET Birr 300.00 for purchase of barbed wire. Local skill is used for fixing wire on the capping box
Cattle graze in catchment land/ watershed and animal faeces could enter the water sources with runoff during rainy seasons	Delineation/ demarcation and fencing of the catchment	Consultation with catchment authority and compensation for land and property owners	WASHCO and local government, Woreda Office of Agriculture	October 2015	ET Birr 100,000.00 for compensation and fencing of the catchment zone

Task 5 – Monitor control measures and verify the effectiveness of the control measures

The main purpose of Task-5 is to provide guidance on how to confirm whether the community managed water supply system is operating properly and the designed CR-WSP is providing adequate safety to the drinking water and protecting health of the community. It includes both operational monitoring and verification monitoring to the water supply systems.

Operational monitoring is an ongoing observation or inspection to assess whether the water supply system is operating properly using observation checklists. It is a regular activity to check whether control measures are able to remove and/or reduce potential risks of contamination, and important to timely detect water quality problems so that corrective actions can be taken before supplying water to the community.

Whereas, verification monitoring is an action taken to confirm water quality targets are being achieved, water supply systems are operating properly, and CR-WSP is functioning. Verification monitoring is based on water quality testing, internal and external auditing of the adequacy of the CR-WSP, and checking of the consumer satisfaction. Auditing usually employs sanitary inspection tools to check whether the control measures are in place to remove/reduce identified risks.

Task 5.1 Establish an operational monitoring program

In short, operational monitoring is about evaluation of improvement plan activities are effectively implemented. It is a routine activity of the WASHCO and/or the WASH Board aimed at validating whether improvement plans are adequately reduced or eliminated hazardous events and associated hazards and to take corrective actions.

In summary, sanitary inspection to the water supply systems using observation checklists, and water quality testing for very important parameters such as fecal coliforms, free residual chlorine, pH, and turbidity are common elements of the operational monitoring that is regularly conducted by the rural WASH board/Committee with the support from the woreda CR-WSPs-TWG (either by Woreda Health Offices, or Woreda Water Resource Offices. Regular sanitary inspection to protected water supply sources such as hand dug and shallow boreholes and spot springs can be done by the scheme caretaker, health extension workers (HEWs) or by the staff of primary health care unit who are members of the Kebele CR-WSP team.

In addition, there should be a critical limit for each of the control measures and quality parameter so as to compare results of the water quality testing and sanitary inspection against the critical limits, and to take corrective action if limits are surpassed. For example, intact fencing no animal access to water distribution points can be taken as a critical limit, damaged fencing can be taken as a breach of the critical limits and fencing can be taken as an example of improvement plan/action. If fence is damaged, it is considered as critical limit is surpassed and inform the WASHCO to take corrective actions (maintenance of the fence). According to the national Compulsory Ethiopian Standard Drinking Water Specification (CESDWS 2013), the critical limit for bacteriological quality is zero faecal coliform per 100ML of water, and 0.2 to 0.5 mg/L free residual chlorine at the distribution point. Therefore, in addition to the routine visual inspection of the water supply systems, the WASHCO/WASH Board conducts water quality testing with the support of the Woreda CR-WSP TWG, and internally check the quality of the water against the national drinking water quality standards.

The following table describes the frequency, responsible body, critical limits and possible corrective action of an operational monitoring of the water quality (Table 8).

Table 8: Operational monitoring of small community rural water supply systems (hand dug well fitted with hand pump)

Where	What	When	Who	Critical limits or target condition	Corrective actions if critical limit surpassed
Hand dug well fitted with hand pump	Fence Platform Runoff way	Monthly sanitary inspection	Sanitarian/ HEWs/WASHCO	Fence is intact Platform is not cracked and is clean Flood water cannot pass over head work	Repair fence and platform Clean mud and dirt on the platform Dig flood diversion ditch
	Turbidity	Every week	Woreda Water Office	<5 NTU	Check for intrusion of runoff through cracks on the headwork and casing
	Residual Chlorine	Every week	Woreda Water Office	Cl ₂ : 0.2-0.5mg/L	Check Cl ₂ residual and measure volume of water in the well and disinfect
	Fecal coliform	Every six month	Woreda Water Office	0 faecal coliform count/100ML	Check for intrusion of runoff through cracks on the head work and casing, and disinfect the water
HH water storage	Residual chlorine	Every six months	PHCU/ Sanitarian	Cl ₂ : 0.2mg/L	Promote household water treatment, and safe water storage practices

Source: Adopted from WHO water safety plan manual (WHO 2009)

Task 5.2 Verification monitoring of CR-WSPs



Fig 4: Verification Monitoring, adopted from WHO WSPs training manual 2012

The purpose of the verification monitoring is to confirm that the water supply system is capable of consistently supplying safe drinking water and that the CR-WSP is working effectively. It is conducted externally by surveillance/regulatory agency such as by sub-regional public health laboratories and/or by the woreda health office. Verification monitoring has three elements including; (I) compliance monitoring (II) internal and external auditing and (III) water users' satisfaction survey.

Task 5.2.1 Compliance Monitoring

Compliance monitoring usually based on the water quality testing for faecal indicator organisms and harmful chemicals such as fluoride, nitrate, and Arsenic; and the test results are checked against national drinking water quality standards. It is carried out by external body such as public health laboratories or by woreda health office. The following template illustrates compliance monitoring plan (Table 9).

Table 9: Sample template for compliance monitoring plan

Date: _____	
Type of the small community water supply	Hand dug well fitted with hand pump
Sampling frequency	Every six month
Parameters tested	Fecal coliform, residual chlorine, turbidity and fluoride or any other based on the situation
Responsible person to collect the sample	Sanitarian from woreda Health office (officer)
Sampling location	Pump spout and from HH water storage container
Place at which sample is tested/investigated	Chlorine residual, turbidity is tested at field and fecal coliform and chlorine tested at office using rapid water quality testing kit
CR-WSP team member and bodies to which test results reported	WASHCO Board, woreda water resource and health offices

Task 5.2.2 Internal and external auditing

Auditing is important to maintain quality of CR-WSP implementation. Internally, CR-WSP implementation reviews can be made by WASHCO/WASH board (responsible for operation of the water supply system). CR-WSPs implementation reviews are also conducted by independent team of professionals who have good understanding about water supply systems, water safety plan and of the drinking water quality. For example, team/technical committee formed from rural WASH executive board, woreda water resource and health offices. The internal audit team assesses whether hazardous events are fully removed, risks are averted, whether appropriate control measures are identified for each risk, and appropriate operational monitoring procedures are put in place, critical limits are set to monitor proper implementation of the control measures, and whether verification monitoring is conducted regularly.

Whereas, the public health authorities (regulatory unit of the woreda health office or sanitarian from the PHCU) uses sanitary inspection tools to verify/assess whether or not CR-WSPs as a whole are effectively implemented, hazardous events are removed and associated risks are averted adequately. It also collect water samples from a representative points (source, outlet of the reservoir, public stand posts and from the consumer water storage containers) and conducts water quality testing and verify whether it meets the compulsory standard drinking water specification (CDWSS 2013), and provide feedback to the WASHCO/WASH Board.

Task 5.2.3 Water users' satisfaction

Verification process also encompasses assessment of water users' satisfaction with the quality/safety, quantity/adequacy, reliability, continuity, and cost of the drinking water and is important indicator whether water supply system is properly operating. Water users might have complaint on taste, color or odor of the water and they may divert to alternative unsafe water sources if their voice is not heard. Therefore, water users' satisfaction surveys should be conducted on a regular basis to get feedback on the quality of the drinking water.



Task 5.3 Documentation and sharing of the monitoring results

For the purpose of learning and decision making, all operational and verification monitoring data should be documented and shared with relevant stakeholders such as rural WASH board members, local government, and health authorities. Sharing of information could increase government interest and commitment to support implementation of the CR-WSPs, and to scale up the approach in other areas, and /or to inform allocation of resources. Monitoring information to be documented and shared among stakeholders include: findings of the sanitary surveys, water quality testing/monitoring results, actions taken to remove/eliminate or control hazardous events from catchment to point of consumption during normal and incident situations, etc.

Task 6: Document, review and improve all aspects of the CR-WSP implementation

Task 6.1 Document management procedures

Climate resilient water safety plan includes establishment of clear management procedures to document actions taken when the water supply system is operating under normal condition (standard operation procedures- SOPs) and when the system is operating in incident situation (corrective actions) when critical limits are surpassed.

Sometimes, incident situation such as flood and/or drought may occur and create loss of control of the system, and could result in damage of the water supply infrastructure, drying and/or gross contamination. Therefore, assessment of past trends of drought and floods is important to develop emergency preparedness and response plan and the standard operation procedures (SOPs) on how to operate the system during unanticipated disaster (emergency situation such as flood and drought), identification of the specific activities to be carried out by WASHCO under normal conditions and during emergency situation.

The following are examples of standard operation procedures important for community managed rural water supply systems.

The following are examples of standard operation procedures (working manuals)

Operational Procedures under normal conditions

- Prepare/update the operational manual that is used for operation and maintenance of rural water supply schemes, water sampling, quality testing and surveillance, disinfection, and household water treatment and safe storage practices, WASHCO and board management guidelines,
- Prepare/update procedure for record keeping and reporting (list of reportable key parameters, failure reporting forms, users' claim form, etc.),
- Develop system of communication between WASHCO/rural WASH boards and health sector/regulator particularly on sharing of compliance monitoring results.

Management procedures to deal with incidents

- In addition to climate and weather information collected from the nearest meteorological stations, CR-WSP team organizes community/expertise consultation workshop and identify trends of climatic changes that occurred during the past years/decades (based on the histories and experiences of the elders or on meteorological data, make prediction for possible impacts on the water supply system and establish baseline for future monitoring, and
- Prepare/update clear description of actions required in the events of deviations from the critical limits.

Depending on the type and complexity of the emergency situation, develop/update the response action which could vary from:

- Modification of treatment of existing sources, or temporary use of alternative sources with appropriate water treatment, or water tracking during worst water scarcity,
- Use of alternative water sources with household water treatment and safe storage practices in cases of gross damage and contamination with existing water supply schemes, and
- Proper documentation of these emergency response actions in the emergency management procedures.

In addition, address the following issues in the emergency response procedure:

- Prepare response and monitoring actions,
- Identify responsibilities of internal and external stakeholders,
- Develop/update communication strategies (rules for internal information sharing/exchange mechanism, with the regulatory, with media and the public),
- Develop/update user manual for distribution of emergency supplies, surveillance procedures, etc.

Task 6.2 Development of the CR-WSP supporting activities

Development and availing of the standard operational procedures (user manuals) for implementation of CR-WSP under normal condition and during incident condition is not sufficient by itself. Thus, there should be activities that support the CR-WSP team, WASH committees, rural WASH boards, and local artisans and scheme caretakers develop necessary knowledge, skills, and commitment to develop and implement CR-WSP approach, and capacity to manage water supply systems to deliver safe water. Therefore, need based designing and implementation of the CR-WSP support programs includes ensuring availability of the standard operational manuals, equipment, and in-service trainings and operational researches.

Therefore, start supporting programs from simple actions:

- Organize in-service training for laboratory professionals/analysts on quality control/calibration of testing equipment, and on water quality testing and sanitary inspection,
- Review of existing operation and maintenance manuals for each small community managed rural water supplies and train existing local artisans and caretakers (in-service training programs) by employing cascaded training approaches (master ToT at national and regional level, then sub-regional, then training of small community water supply operators),
- Organize in-service/refresher training for local artisans, scheme caretakers, and sanitarians on management of small community water supplies, operation and maintenance, and on preventive maintenance of the rural water supply schemes,
- Strengthen hygiene and sanitation promotion interventions to reduce contamination risk at source, in the distribution systems and at household level,
- Identify potential areas of water sources and the supply systems that are likely to be affected or damaged by possible disasters (flood) and prepare necessary protective/preventive measures including training of operators, and sensitization of communities,
- Strengthen soil and water conservation (watershed management) interventions conducted by agricultural sectors and by the communities to improve ground water storage/recharge through development of recharge ponds and contour trenches; and to protect the water facilities from damage due to flood,
- Provision of the woreda water and health offices with rapid water quality testing kits,
- Furthermore, identify researchable issues to generate evidences for informed decision making including:
 - » Testing/adoption of the best practices,
 - » Changes in the concentration of chemical hazards due to climate change, and other economic activities in the watershed such as use of agrochemicals,
 - » Level of customer/water users' satisfaction,
 - » Changes in the pattern of WASH borne diseases (under-five diarrhea), and
 - » Changes in water sources resilience to climate change (increase in ground water recharge and reduced impacts of extreme weather events on the water sources)



Task 6.3 Regularly review the CR-WSP

It is expected from the CR-WSP team to periodically meet to review and learn from CR-WSP implementation experiences and new procedures. Reviewing the CR-WSPs could be done whenever there are significant changes in community water supply systems such as flooding, and/or policy changes on the land use and changing of the water supply system equipment to climate resilient technologies (example, diesel pumps to solar pumps, iron pipes to PVC pipes, etc.) or supply expansion. In addition, reviews are important to address improvement plan that need consorted actions of different stakeholders and to strategize fund raising mechanisms.

CR-WSP review process starts from Task-1 and stepwise goes through all tasks and update system description, identify whether there exists new hazards and hazardous events, unaddressed risks, new control measures and/or corrective actions if existing control measures are inadequate to remove risks, and to revise the improvement plan and implementation timelines. CR-WSP review may include reorganization of the management of the rural water supply system, salary structure of the WASH board, roles and responsibilities and standard operation procedures.

CR-WSP reviews should be done following emergency incidents such as flooding and droughts. Even though the government makes necessary preparedness and response plans, WASH emergencies continue to occur and usually affect community managed rural water supply systems. Therefore, post emergency joint review is important to document best practices and identify gaps to be considered/filled in the future as part of the drinking water supply emergency preparedness plan. These might include further risk assessment, revision of operating procedures, and/or training of operators on the possible causes of incidents and emergencies, etc. to be incorporated in the revised CR-WSP.

The need for regular review of the CR-WSPs depends on the following situations:

- **Urgent** review of CR-WSPs when critical changes or problems occurred in the water supply systems (e.g. contamination exceeding critical limits) and to make operational/physical audits and take corrective measures,
- **Quarterly** to assess progresses made on implementation of quick wins and solve ambiguity/confusions related to CR-WSP implementation, which is carried out by the Kebele CR-WSP team and Kebele cabinet,
- **Annually** to identify successes, challenges and learn from experiences and update the CR-WSP, and
- **Biannually** to review the whole processes of CR-WSP implementation, outputs, and its effectiveness from the viewpoints of ensuring water safety and meeting health based targets.



REFERENCES

1. WHO, Water Safety Planning Manual for small community water supplies, 2012.
2. WHO, Water safety plan: a field guide to improving drinking-water safety in small communities, WHO 2011.
3. WHO/AusAID, Drinking water safety planning, a practical guideline for pacific Iceland communities. WHO/SOPAC Joint Contribution Report 193 WHO/IWA, A road map to support country- level implementation of the water safety plan, 2010.
4. WHO/IWA, Water Safety Plans facilitators' handbook, 2012 (http://www.who.int/about/licensing/copyright_form/en/index.html).

ANNEXES

Annex 1: Organization and support mechanism for development and implementation of CR-WSPs for community managed rural water supply systems

The technical working group that is formed to provide technical support for development and implementation of the CR-WSP for utility managed water supply also support the community managed water supply CR-WSPs.

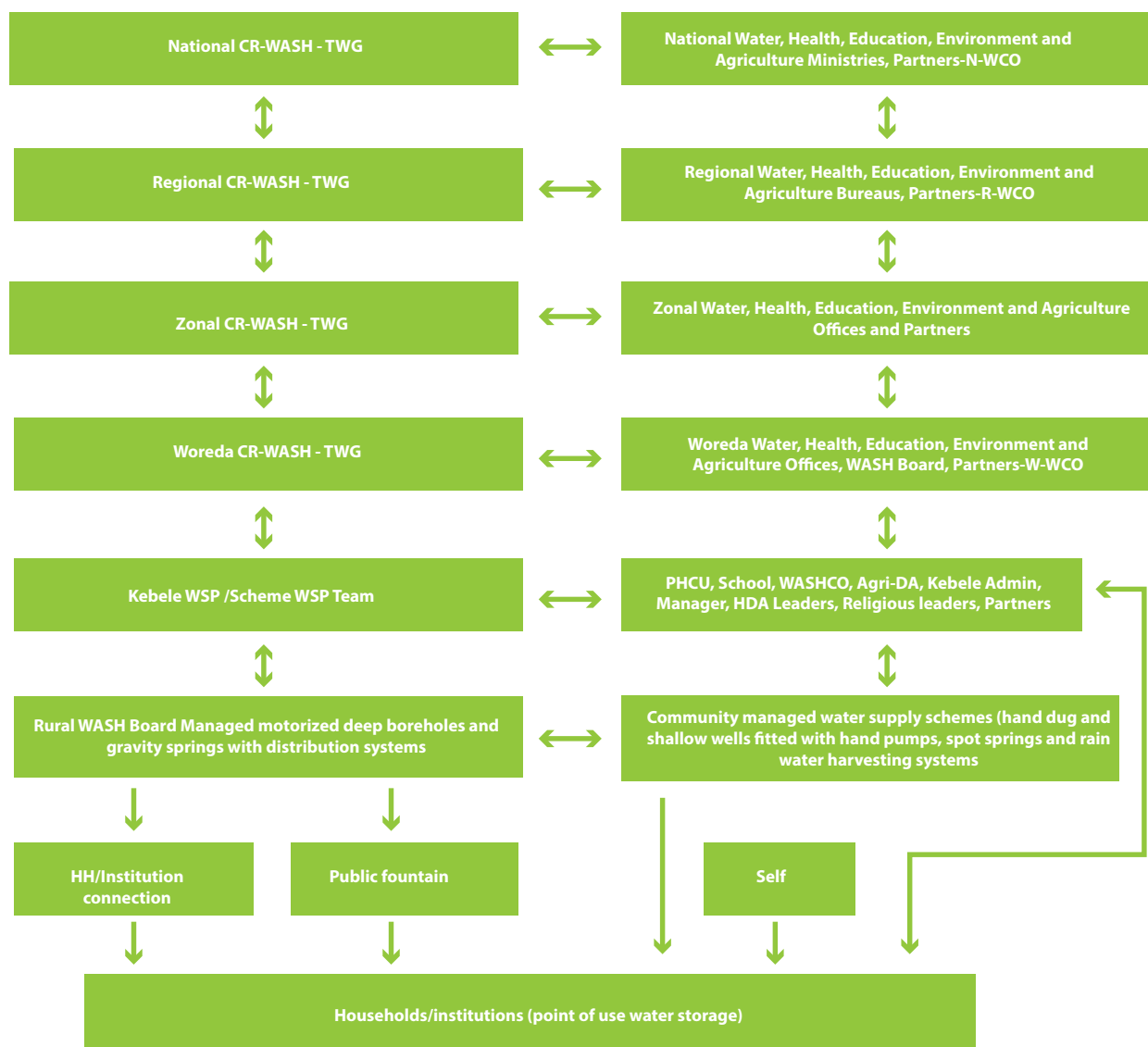


Fig.5:Organization and support mechanism for community/board managed water safety plan

Annex 2: Responsibilities of the Kebele CR-WSP team

- Prepare detailed activity, milestones and logistics plan for development of CR-WSP,
- Review/analysis of existing documents including system design and layout, records and reports on operation and maintenance activities,
- Conduct site visits from source to point of use, observe operational practices, identify potential sources of hazards, hazard events, and prepare map of the community water supply system,
- Map hazardous events, identify and validate existing control measures, analyze risks (considering likelihood and consequences), and plan improvements needed to reduce risk to acceptable levels,
- Establish operational monitoring plans for each control measure (including corrective actions),
- Conduct field visit periodically to check for proper implementation of operational and observation/in-spection of implementation of corrective measures from source to point of use,
- Conduct customers' satisfaction survey using qualitative and quantitative techniques,
- Provide management support to the utility operators and water quality analysts including facilitation of development/updating of the standard operating procedures (normal and emergency situation), emergency response plans and training of operators,
- Produce and submit monthly, quarterly and annual performance reports to the next higher woreda TWG and the TWGs send back report feedback with recommendation,
- Conduct annual CR-WSP implementation reviews, and
- Conduct quarterly and biannual reviews as well as following incidents to evaluate effectiveness of CR-WSPs and document practical lessons and share with stakeholders.

Annex 3: Community water sources inspection (sanitary survey) checklist

The community managed rural water supplies have multiple sources including motorized deep boreholes, and gravity springs, hand dug and shallow wells, spot springs which are supplied to the population through public distribution points and/or connected to HHs (in case of gravity springs scheme). Thus, sanitary survey tool kits that encompass different supply steps and water sources will be developed/adapted from first edition drinking water quality guidelines, volume 3, (WHO 1985) as an addendum to this implementation guidelines.

Annex 4: Household level hazardous event observation/assessment checklists**Household Water, Sanitation and Hygiene Practice**

HH identification Code _____		
I. General Information		
1. 1. Source of Water _____		
2. 2. Does the water source is improved?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
3. 2. Does the Household use any type of Household Water Treatment methods of means?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4. If yes please observe and mention _____		
5. 4. Average amount of water collected daily _____ liter		
6. 5. Water containers per household Container with capacity of 20 liter ____ and capacity of 10 liter _____		
II. HH Water Contamination Risk factor Assessment		
1. Is drinking water kept in a separate container (ask to be shown this)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
2. Is the Water stored in the narrow necked container (<=7.6cm diameter)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
3. Is the water storage container covered with its lid?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4. Is inside of the water storage container kept clean?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

5.	Is the water storage container placed off floor (>30 CM above the floor)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
6.	Is outside of the water storage container kept clean?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
7.	Does water taken/drown from the container by pouring?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
8.	Is the utensil/cup used to draw water from the container kept clean?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
9.	Is the utensil/cup used to draw water from container kept away from floor and stored in the shelf/sling on the neck of the container?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
10.	_____		
Total Score Yes_____/9 No_____/9			
11.	11. How often is the container cleaned?		
I.	Every day_____	II. Every week_____	III. Every month_____
		IV. Rarely_____	V. Never_____
12.	12. How is the container cleaned? _____		

Over all conclusion Risk rating No 0-2 Low; 3-5 medium; 6-8 high; 9-12 very high

III. Availability, use and operation of Latrine and hand washing facility and domestic hygiene		
1.	Does the household have latrine?	Yes____ No____
2.	If yes, observe condition and functionality of the latrine and hand washing facility	
HH latrine observation checklist		
I.	Does the latrine have wall that provide privacy?	Yes <input type="checkbox"/> No <input type="checkbox"/>
II.	Does the latrine have wall have adequate height (>1.7m)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
III.	Does the latrine have door/curtain?	Yes <input type="checkbox"/> No <input type="checkbox"/>
IV.	Does the latrine have intact/cleanable floor/slab?	Yes <input type="checkbox"/> No <input type="checkbox"/>
V.	Does the latrine floor/slab have squat-hole cover?	Yes <input type="checkbox"/> No <input type="checkbox"/>
VI.	Does the latrine have roofing?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Latrine use/functional		
I.	Is there fresh foot path leading to the latrine?	Yes <input type="checkbox"/> No <input type="checkbox"/>
II.	Is there splash of urine/water on the floor/slab?	Yes <input type="checkbox"/> No <input type="checkbox"/>
III.	Is there fresh stool in the latrine pit?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Cleanliness (hygiene condition)		
I.	Is the fecal matter or dirty on the floor of the latrine?	Yes <input type="checkbox"/> No <input type="checkbox"/>
II.	Is there fecal smear on the squat-hole?	Yes <input type="checkbox"/> No <input type="checkbox"/>
III.	Is the latrine pit full (sludge >= 0.5m from the floor/slab)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
IV.	Is there stool around the latrine/dwelling house?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Knowledge of Hand Washing with soap during critical time(probe for all possible)		
When do you consider hand washing with soap is important?		
I.	After defecation/ visiting toilet _____	
II.	Before eating	
III.	Before feeding a child	
IV.	Before preparing/handling food____	
V.	After assisting children in defecation/ cleaning bottom	

VI. Others _____		
Cleanness of the house and compound comment on the following		
I. Is inside of dwelling house kept clean?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
II. Is household solid/garbage disposed of in the pit/composted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
III. Is household Liquid waste collected and poured/disposed in soak away pit?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Over all conclusion Risk rating No 0-2 Low; 3-5 medium; 6-8 high; 9-12 very high

Improved latrine: Provide privacy, safety and comfort to the users and interrupt disease transmission. i.e., preclude faeces from water source, soil and flies.

- Count YES and add for Q 1+2+3+4+5 and divide for 5 for each household. Then, calculate mean score for total of observed household during risk assessment

Latrine use/functionality: if all or either of the three proxy indicator exists is considered the latrine is in use

Latrine cleanliness (hygienic use): if the latrine is hygienically kept, proxy indicators Q10, 11, 12 and 13 should not exist. Therefore,

- Count NO and add for Q10+11+12+13 and divide by 4 for each household. Then, calculate mean score for total of observed household during risk assessment

