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LOCAL ADAPTATION TO CLIMATE CHANGE LACC PROJECT

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CLIMATE-RESILIENT WATER SAFETY PLAN

Guideline for Rural Gravity and Lift Water Supply Systems

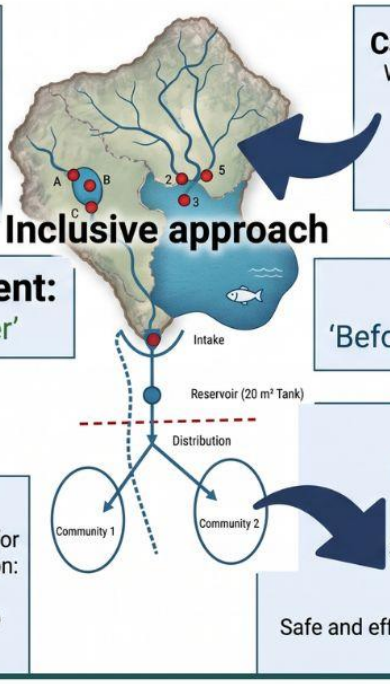
June, 2026

LACC's approach to Climate-Resilient WSP

Fully aligned with the 6-steps of DWSSM guideline for rural CR-WSP, with the following key approaches added:

Prevention measures:
Identification hazards and control measures (Step 3)
Incl. social vulnerability assessment
Action for improvement (Step 4)
Monitoring and Verification (Step 5)
Documentation and review (Step 6)
→ Fully aligned with this process

Catchment protection approach:
Water source conservation and protection
Springshed management actions
Community forest management
Nature-based solutions
→ Added to Steps 3-6



Disaster risk management:
'Before disaster' and 'after disaster'

Climate resilience:
'Before water source' and 'after water tap'

Response measures:
→ Disaster Response Plan added to WSP documents for scenarios on 1) structure damage and 2) contamination: Who does what, when, how needed action will be resourced and financed in the case of disaster? Who benefits?

Safe and efficient water use:
'water is a scarce resource'
'every drop counts'
Safe handling and storage at households
Multiple uses of water
Gray (waste) water management
Safe and efficient water use for nutrition and income generation
→ Added to Steps 3-6

Cowater International

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ACRONYMS

CR-WSP	Climate Resilient Water Safety Plan
DWSSM	Department of Water Supply and Sewerage Management
GEDSI	Gender equality, disability and social inclusion
HRBA	Human Rights -Based Approach
LACC	Local Adaptation to Climate Change (Project)
LGU	Local Government Unit Implementing the Project
MPN	Most Probable Number (when measuring coliform in water)
NTU	Nephelometric Turbidity Unit
O&M	Operation and Maintenance
PDRA	Participatory Disaster Risk Assessment
RVWRMP	Rural Village Water Resources Management Project
RVT	Reservoir tank
RWSSP-WN	Rural Water Supply and Sanitation Project, Western Nepal
SUSWA	Sustainable WASH for All (Project)
VMW	Village Maintenance Worker
WASH	Water supply, Sanitation and Hygiene
WHO	World Health Organization
WSP	Water Safety Plan
WUSC	Water Users and Sanitation Committee

CONTENTS

1 INTRODUCTION TO CLIMATE RESILIENT WATER SAFETY PLAN

BACKGROUND

Water Safety Plan (WSP) concept was originally created by World Health Organization (WHO) in 2004. WHO's idea was to create a holistic approach to risk assessment and risk management of a drinking water supply and its water quality. It includes the identification of the ways in which the identified risks can be managed, including methods to ensure that control measures are continuously worked in effective manner. This method has been widely recognized as the most effective way to ensure the safety of drinking water supply system and protect public health.

The WSP approach is increasingly being adopted globally as one of the best practices for the provision of safe drinking water. Among many other governments, the Government of Nepal rapidly adopted the WSP concept as a tool to prioritize water safety in all water supply schemes, having used the WSP concept since 2006 (DWSSM, 2021).

Local Adaptation to Climate Change (LACC) Project is the most recent descendant of decades-long continuum of government-to-government bilateral natural resource management sector support, including water supply, sanitation and hygiene (WASH) sector of the Government of Finland to the Government of Nepal through implementation of large-scale project modalities, continued practically non-stop since 1989.

WSP has been a part of project implementation since 2006 when the first phase of Rural Village Water Resources Management Project (RVWRMP) started in the mid-hills and mountains of the Sudurpaschim and Karnali Province of Nepal. It has since then been an integral part of the implementation modality of WASH schemes in the Finland and EU-funded projects, including RVWRMP Phases I-III (2006-2022), Rural Water Supply and Sanitation Project, Western Nepal (RWSSP-WN) Phases I-II (2008-2020), and Sustainable WASH for All (SUSWA) Project (2023-2027), implemented in the Karnali Province. These projects have developed slightly different versions of the WSP concept and developed them over time, based on sectoral trends and the varying local requirements.

LACC PROJECT'S APPROACH TO CR-WSP

In recent years, global climate change has continued at an accelerated rate, having profound impacts on Nepal, including extreme weather events leading to increased natural hazards. The natural hazards have undermined the sustainability of WASH services; Spring water sources, important for water supply in the rural hills and mountains, have been under an increased stress of degradation. Water supply systems encounter increasing risk of getting damaged by extreme weather events, such as prolonged droughts, rapid floods, heavy rains, thunder and hailstorms, and increased frequency of landslides. These accelerating shifts have led to consideration of climate resilience as the key factor in the WSP development process. The Climate-Resilient WSP can be seen as a result of this trajectory.

LACC Project applies the most recurrent version of the WSP concept in Nepal. LACC Project's Climate Resilient Water Safety Plan (CR-WSP) is based on the existing Climate Resilient Water Safety Plan Guideline for Rural Piped Water Systems (2021), developed by the Government of Nepal, Department of Water Supply and Sewerage Management (DWSSM). The national guideline provides a solid technical foundation through a six-step planning process that the LACC project WSP guidelines follow,

with modified names and slightly revised contents: 1) Formation of WSP Team; 2) water supply system analysis; 3) identification of hazards and control measures; 4) action for improvement; 5) monitoring and verification; 6) review and documentation.

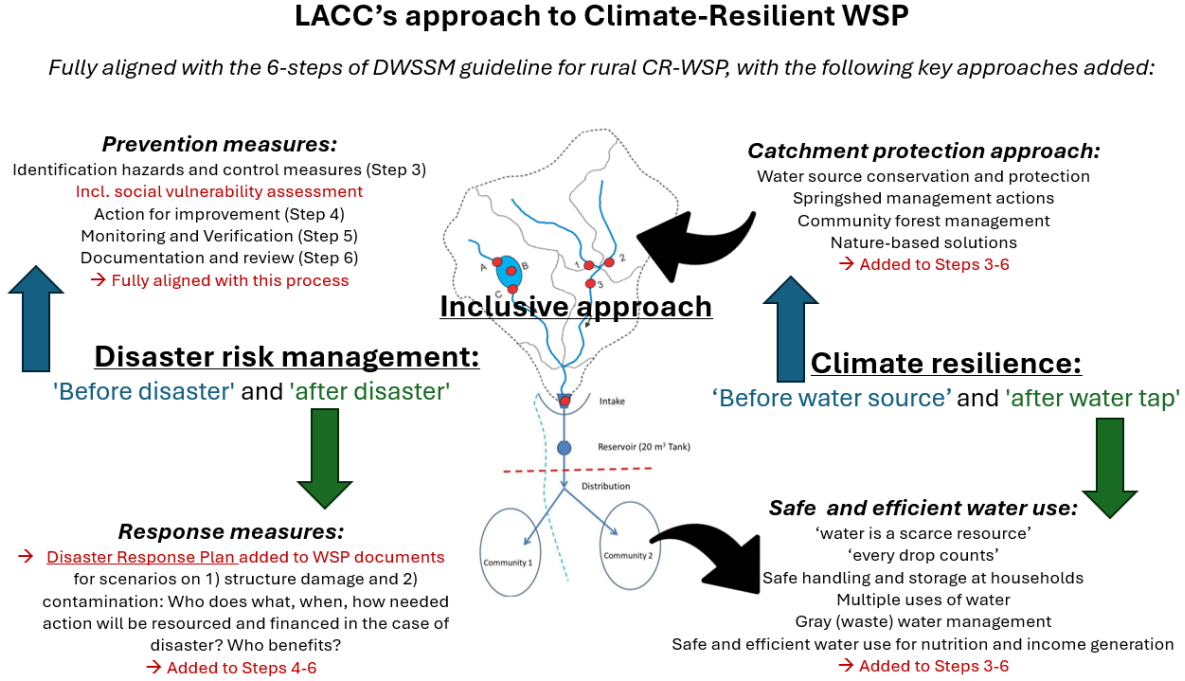
LACC CR-WSP also builds on the WSP approaches of the above-mentioned previous bilateral projects: RWSSP-WN developed a WSP++ concept that included, i.e., water tariff calculation methods for ensuring sustainable operation and maintenance (O&M) of the water supply systems, managed by WUSCs. RVWRMP and SUSWA brought, i.e., disaster response and emergency planning, as well as tariff calculation appliances, to their WSP concept. The foundation of LACC CR-WSP concept comes from RWSSP-WN, 2018 and DWSSM, 2021.

LACC builds on this foundation, adopting the applicable developments from the previous approaches while also simplifying the process and adapting it further to the current local contexts in Sudurpaschim and Karnali Provinces that are among the poorest and remotest rural regions of Nepal. In these localities, the systems are typically managed by local, voluntary-based Water Users' and Sanitation Committees (WUSCs) that hence are the key stakeholders of the CR-WSP development and implementation in remote, rural Nepal.

The LACC CR-WSP is currently an integral part of LACC Project's water supply and sanitation systems as well as multiple-use system (MUS) schemes that include water supply services implementation; It is a defined part of the Step-by-Step Manual for Water Supply Systems of the project that describes the water supply and sanitation scheme and MUS implementation process within the project. LACC CR-WSP revives the Step-by-Step Manual by enabling development of CR-WSP as a part of the preparatory phase of the implementation, i.e., while the water supply system is under the detailed surveying and design estimate stage. This is the most appropriate time to look at the potential risks and their mitigation measures with the community people; The best time to influence the risks and mitigate them is while planning the system, and before the construction starts. Another shift in traditional thinking is the necessity for simplifying the formation of committees by assigning the respective WUSCs as WSP Teams without a separate selection process.

LACC CR-WSP FRAMEWORK

LACC Project's CR-WSP is based on a novel framework (Figure below) based on the DWSSM (2021) 6-Step CR-WSP process description. LACC framework adapts it, including catchment protection planning, climate resilience measures that address risks both before the water source and after the water tap, and a disaster risk management perspective that considers preparedness before disasters and response after disasters. It also emphasizes social inclusiveness and participation throughout the process.



LACC CR-WSP takes an inclusive and participatory approach to the WSP process, emphasizing a) disaster risk management; and b) climate resilience as its core.

The disaster risk management side of the plan can be divided into two parts: Prevention measures and response measures. Preventing measures, i.e., caution before disasters (higher left side of the framework) have always been at the core of all WSP concepts. LACC is aligned with the 6-step process, replicating the approach for identifying these measures, but also adding a social vulnerability assessment to the toolbox to better consider the local social realities and to link the approach to Human Rights Based Approach (HRBA) and Gender Equality, Disability and Social Inclusion (GEDSI) considerations.

A bigger annex to the DWSSM CR-WSP concept is an increased emphasis on response measures, i.e., acting after a disaster has occurred (lower left side of the framework). In practice this translates to introduction of Emergency and Disaster Response Plan as a part of the CR-WSP, identifying roles and responsibilities, sources of resources, financing plans, and planned action timelines in the cases of a) contamination; and b) structural damage on the system.

The climate resilience side of the plan extends the focus from 'source to tap' approach by accounting for what happens 'before water source' (higher right side of the framework) – that is within the spring shed / catchment – and 'after water tap' – that is the water uses. LACC applies a catchment / spring shed protection approach to 'before water source', including water source conservation,

implementation of nature-based solutions, spring shed management actions, and community forest management activities if the water source is located within such areas. The idea is to protect and improve the state of the water resources the communities depend upon.

The other part of the climate resilience concept within the plan is accounting for what happens 'after water tap' (lower right side of the framework). Ensuring safe and efficient water use includes actions such as safe water handling and storage at households, promotion of multiple uses of water, including nutrition and income generation, and gray water management. These actions reflect understanding that water is a precious and scarce resource, and thus every drop counts.

The framework presents in a nutshell the rationale of CR-WSP and steers the 6-step planning process towards essential facets. Anyhow, it is important to keep in mind that WSPs are always system-specific; they depend on local community dynamics, selected technological solutions for supplying water, environmental surroundings, and locally significant climate-induced natural hazard phenomena. Every WUSC needs to select the adaptation measure appropriate to them and make plans for application in the local situation and system context. LACC CR-WSP provides general directions and identifies key aspects to look at in this process, supporting local users in the planning process.

2 STEPS FOR PREPARING A CLIMATE RESILIENT WSP

This guideline provides a generally applicable six-step planning process description for creating a CR-WSP in LACC Project's working context. They are based on the national guideline (DWSSM, 2021), modified to fit the context and LACC working modalities, as well as adapted to the LACC CR-WSP framework: 1) Formation of WSP Team; 2) water supply system analysis; 2) identification of hazards and control measures; 4) preparation of WSP and taking action; 5) monitoring and verification; 6) review and documentation. The foundation of LACC CR-WSP concept comes from RWSSP-WN, 2018, and DWSSM, 2021.

The best time to influence the risks and mitigate them is while planning the system, and before the construction starts. Therefore, the CR-WSP formulation shall be part of the preparatory phase of the implementation. This is the most appropriate time to look at the risks and their mitigation measures in participatory cooperation with the community people. In existing systems requiring repair or rehabilitation, the WSP shall be revised and updated as per LACC CR-WSP concept. For this, orientation shall be provided to the WUSC members to familiarize them with the CR-WSP concept during preparatory phase, which will support the effective preparation and implementation of the plan.

ACTION POINT: CR-WSP preparation process shall be shifted to the preparatory phase of implementation of new schemes

STEP 1: FORMATION OF WSP TEAM

WUSC members have been democratically selected by water users to manage the water system. WUSC is therefore authorized by the local community for scheme O&M. According to the LACC Step-by-Step Manual for water supply and MUS systems, social inclusion and gender balance shall be maintained in the WUSC composition, ensuring a proportional degree of the seats including the key position are given to respective ethnic groups and half of the seats are given to women. This procedure ensures proportional participation in decision making, ensuring that the voices and priorities of marginalized groups are heard and influence key decisions, including the CR-WSP preparation and renewal.

Within the LACC Project, the WUSC shall be appointed as the WSP Team by default, optionally strengthened with the trained and appointed VMWs and water quality focal persons, without a separate selection process. This simplifies the committee formation processes within single schemes – there is no need for selecting multiple committees for one water supply scheme as the authority for managing the scheme overall has been given to the WUSC. The automatic selection of the WUSC members as the WSP Team enables the WUSC to meet their responsibilities as the managers of the system by using the CR-WSP as a tool for sustainable O&M. If necessary, the WUSC may appoint a separate voluntary team for the task. This voluntary task force shall operate under the supervision of the WUSC.

ACTION POINT: WUSC shall be appointed as the WSP Team by default.

The WSP Team is dedicated to preparation, implementation, monitoring, verification, and renewal of the CR-WSP. The WSP Team shall conduct steps 1-6 of the CR-WSP preparation and renewal. The completion of these steps shall be facilitated by LGU and LACC staff as a part of the Step-by-Step protocol. A format for the details of the WSP Team is available in this guideline as **Format 1** and a checklist for water supply operation and maintenance and management protocol can be found as **Format 2**.

STEP 2: WATER SUPPLY SYSTEM ANALYSIS

The WSP Team shall form a good understanding of their existing / planned water supply system as whole, and in terms of its components and their existing / planned locations. The purpose and operation processes of different components must be clear to all WSP Team members. A checklist for water supply system scheme details can be found as **Format 3** and a template for scheme layout can be found as **Format 4.** You may find **Format 5** for measuring the quantity of water flow / discharge at the water source.

The WSP Team shall:

- List all existing / planned structures of the scheme and identify water flows within the system (Format 3); Describe the source characteristics in terms of discharge, seasonality/reliability, and record the findings (Format 3);
- Draw a community/layout map (Format 4) of the water supply system, showing all existing / planned components (catchment, source, pumps and pumping stations, power system (electrical or solar), intake, stream crossing, collection and distribution chambers, washout and air valves, transmission and distribution lines and tap stands), community features (houses/clusters, buildings, roads) and environmental features (forests, grazing grounds, rivers etc.);
- Apply a catchment / spring shed protection approach to 'before water source'. Define the water catchment (surface water source) / spring shed area (spring source) of the water intakes. Different land use patterns and possible signs of catchment degradation (e.g. deforestation, overgrazing, soil erosion, settlements, agricultural practices involving the use of pesticides in the upstream area) as well as areas of landslides and floods should be observed and discussed. These should be recorded on the community map (Format 4); and
- Visiting any nearby traditional alternative water point sources to identify their existing characteristics (quality, seasonality, reliability) should be identified (Format 5).

ACTION POINT: Water supply system analysis remains an unchanged part of CR-WSP. LACC CR-WSP includes instructions for both gravity-fed and lift system analysis. The risks on the scheme plan should be assessed in the preparatory phase of the system.

STEP 3: IDENTIFICATION OF HAZARD RISKS & CONTROL MEASURES

After the system analysis, the next step is to analyze different hazards that can disrupt safe supply and safe quality of water. The WSP Team should visit the existing / planned water supply scheme area from the water catchment to the existing/planned taps and identify risks to safe water quality, and environmental and climate-induced hazards that can affect safe water supply or the service level.

Identification of hazards and control measures may utilize Participatory Disaster Risk Assessment (PDRA) tools such as hazard mapping, seasonal calendar, transect walks, vulnerability and capacity assessments, historical timelines, and risk matrix. These tools help communities to systematically identify climate induced hazards, socially differentiated vulnerabilities, and locally appropriate mitigation measures through participatory analysis rather than just technical observation. The use of these tools strengthens community ownership, improves inclusion of local knowledge, supports GEDSI-sensitive planning and makes hazard identification and adaptation planning more evidence-based and actionable. Description of these tools are commonly available online.

Step 3.1. Hazard risk identification

To identify direct and indirect hazards that can affect safe water supply, the WSP Team shall discuss the current rainfall patterns, including amount of precipitation and its seasonal distribution, as well as the variability of discharge in the source, assessed under Step 2. This can be based either on statistics or on community knowledge, including people´s experience in extreme weather events or changes in the climate patterns. The WSP Team shall also discuss climate-induced hazards, such as magnitude and frequency of flooding, source depletion and dry-up, expanding gullies and landslides, and their possible impacts on water resources, quality of water and scheme structures. These hazards and their possible implications for water resources and the scheme shall be observed during the inspection of the water catchment and the water supply existing / planned structures;

WSP Team shall identify actions and solutions that help to prevent or reduce the occurrence of potential hazards.

- good springshed / watershed management practices
- preservation and rehabilitation of community forests
- use of nature-based solutions for slope stabilization or spring/intake protection
- regular monitoring, repair and maintenance needs
- water treatment techniques, scheme design solutions
- quality control of used materials and construction quality

Solutions via spring shed/catchment approach: Water source conservation, implementation of nature-based solutions, spring shed management actions, and community forest management activities if the water source is located within such areas. The idea is to protect and improve the state of the water resources the communities depend upon.

ACTION POINT: Catchment / spring shed approach, including water source conservation, nature-based solutions, and community forest management actions, are a part of CR-WSP hazard risk reduction strategy.

Step 3.2. Water quality risk identification

To identify risks to safe water quality, the WSP Team shall track down the possible areas and ways of water contamination while visiting each existing / planned scheme structure. Water turbidity at the source should be observed. Once the water supply system is completed, the WSP Team shall conduct the water quality test at least for the bacterial contamination of the water by using a "Presence or Absence Vial" (**Format 6** for records).

WSP Team shall identify actions and solutions that help to prevent or control contamination, for instance, in following ways:

- Preventive hazardous activities at source and catchments
- Removal of contaminants by using water treatment techniques
- Preventing re-contamination in the distribution by controlling leakage and ingress of pollutants and maintaining residual chlorine
- Preventing re-contamination in the tap and households while using water.

A preventive approach is a wiser investment than a treatment system because the system itself can enhance risk if it is not under proper operation.

ACTION POINT: Water quality testing to be conducted as a part of CR-WSP when the water supply system is ready to commence as completed.

Step 3.3. Financial risk identification

To identify risks to financial sustainability, CR-WSP involves a calculus for sustainable water tariff level to cover daily operating costs and minor repair and maintenance investments (**Format 7**). Tariff is a tool for raising sufficient funds for regular operation and maintenance activities, repairing damaged structures and replacement of components, implementing improvements and upgrading scheme service level, and paying for the VMW running costs. The calculus should identify a sustainable water tariff level, and the CR-WSP process should lead to community commitment for paying an adequate tariff. RWSSP-WN introduced calculus and SUSWA, among others, created an application for making the tariff calculus easier. These calculators can be utilized when making the calculus and seeking community commitment. Calculating the tariff and respective pre-commitment from the community is essential especially for lift schemes where the pumping and scheme running costs are higher.

ACTION POINT: Water tariff calculation and community commitment to be conducted as a part of CR-WSP assessment.

Step 3.4. Social vulnerability risk identification

To identify risks related to social vulnerability in times of emergency or disasters (closer instructions and assessment in **Format 8**), the CR-WSP team shall conduct a vulnerability assessment as an integral part of the hazard and risk assessment process. The purpose of this assessment is to identify households and population groups that may face greater difficulty in the following subjects during climate-induced events, disasters, or system failures. The social vulnerability assessment in CR-WSP can be used to strengthen by assessing who is most at risk of unsafe or unreliable drinking water service, why they are at risk, where those risks are concentrated, and what actions are needed to reduce them. In LACC Project, social vulnerability could be considered alongside technical and water quality risks because access, reliability, affordability, mobility, social exclusion, climate hazards, and gender power relations all affect whether people can safely obtain and use drinking water.

In short, this step assesses how vulnerable groups are:

- access safe and sufficient water and sanitation services;
- afford water tariff payments;
- participate in decision-making;

This includes, but is not limited to, persons with disabilities, elderly people, pregnant women, children, female-headed households, marginalized communities, economically disadvantaged households, and settlements located in physically vulnerable areas. The assessment shall be carried out during the CR-WSP risk identification and community consultation stage through WUSC-level discussions, mass meetings, household observations, scheme level CR-WSP training and formulation exercises, and interaction with vulnerable groups. The findings shall be documented in Format 8.

As a result, LACC identifies the most vulnerable groups of people and considers tailored approaches to secure access to safe water and sanitation services. LACC CR-WSP shall include improvement activities to integrate these aspects in water supply system management.

ACTION POINT: Social vulnerability assessment to be conducted as a part of CR-WSP assessment.

STEP 4: PREPARATION OF WSP AND TAKING ACTION

After identifying the hazards and risks to ensuring existing / planned safe supply and safe quality drinking water, the WSP Team shall discuss and decide on the control and mitigation measures to prevent the hazard, to minimize the risks and to adapt to the changes. The WSP Team shall identify **short-term and long-term activities** and assess needs of internal or external support. Questions related to 'who' and 'by when' need to be answered with clear roles and responsibilities. WSP Team shall write down the findings of the assessment in **Format 9a-b** as well as an emergency and disaster response plan as **Format 9c,** as the key part of the CR-WSP documentation (see Step 4).

- Short-term plan **(Format 9a)** will consist of regular (day to day) activities and minor improvement measures that can be implemented with WUSC´s own resources (without external support). The short-term plan should focus on prevention of water contamination

through various control measures. Similarly, simple activities for preventing natural hazards and reducing risks (e.g. raising awareness, control of deforestation, prevention of future water catchment degradation, early warning systems, implementation of nature base solutions & simple technologies) should be included in the short-term plan.

- Long-term plan **(Format 9b)** should include major mitigation and adaptation activities to natural hazards, as well as major repair and upgrading works of water supply system. Implementation of the long-term activities may require outside support (whether technical or financial) or long-term saving by the users; such requirements should be already mentioned in the plan.

ACTION POINT: Short-term and long-term plans to be conducted as the key parts of CR-WSP documents.

Emergency and Disaster Response Plan (Format 9c). Additionally, the WSP Team shall discuss and decide on the control measures to respond to a potential disaster, whether it is contamination or structural damage – the so-called Emergency and Disaster Response Plan. The WSP Team shall identify actions and assess needs of internal or external support. Questions related to 'who' and 'by when' need to be answered with clear roles and responsibilities. The response to contamination or structural damage consists of immediate actions that can be implemented with WUSC´s own resources; mid-term actions and identification of needed resources and financing mechanisms. The plan should focus on response to the immediate threat to water service delivery.

CR-WSP prepared by the WSP Team shall be approved in a mass meeting in which the users and committee members shall commit for its implementation. Short-term measures shall be implemented immediately and/or on regular basis (e.g. regular maintenance, control of deforestation). Long-term measures can be implemented gradually.

ACTION POINT: Emergency and disaster response plan to be conducted as a new part of CR-WSP key plan documents.

STEP 5: MONITORING AND VERIFICATION

WSP Team shall prepare a monitoring plan based on the Formats 9a-c and commit to implement and monitor the CR-WSP implementation taking place. The monitoring plan consists of indicators for each potential hazard, frequency, and responsible persons. Operational monitoring is the monitoring of hazards and controls as a part of normal operations. It is done at source, distribution, and consumption areas by respective WSP Teams, VMWs or another person appointed for the task. Verification/review monitoring is a more systematic monitoring event done by the WSP Team periodically for verification of the status of the identified risks and control measures taken place, potentially leading to additional action and a review of the CR-WSP if needed.

ACTION POINT: Monitoring and verification remain an unchanged part of CR-WSP.

STEP 6: DOCUMENTATION AND REVIEW OF WSPS

The implementation of CR-WSP is not a one-time event. The plan should be reviewed at a regular interval of time. The status and relevance of CR-WSP should be periodically reviewed within the WSP Team to ensure that WSP is updated and meets the requirements of the status of operations. The review process is done by revisiting Steps 2-5 and by revising and updating the CR-WSP document accordingly. New actions should take place to implement the revised/reviewed CR-WSPs.

ACTION POINT: Documentation and review remain an unchanged part of CR-WSP.

3 CLIMATE RESILIENT WATER SAFETY PLAN FORMATS

FORMAT 1: DETAILS OF CR-WSP TEAM

Scheme:	Team Formation Date:
Local Government:	Cluster Name:
Ward No.	

S. N	Mr/Ms. Name	Cluster Name	M/F	Designation	Remarks
1					
2					
3					
4					
5					
6					
7					
8					
9					

FORMAT 2: WATER SUPPLY SCHEME MANAGEMENT, O&M

Water Supply Scheme Operation, Maintenance and Management					
Scheme Name:					
Total scheme cost:			Scheme design period:		
S.N	Status of water supply scheme	Yes/ No/data	If No		
			How to Manage	By whom?	When?
1	WUSC registration				
2	WUSC bank account				
3	WUSC regular meeting (At least one bi-monthly meeting)				
4	Financial and stock management				
5	Proper management and storage of tools and components				
6	Public auditing				
7	Annual general assembly				
8	Selection and Mobilization of VMW				
9	Implementation of O&M directive of WUSC				
10	Regular minor maintenance and repair work				
11	Operation and maintenance fund				
12	Regular collection of water tariff				
13	Practicing water scheme insurance				

FORMAT 3: SCHEME DETAILS

Scheme Name:	No. of household:
Local Government Name:	Population:
Construction Start Date:	Ward No.:
Construction Completed Date:	VMW(s) Name:
Support Agencies/Projects:	WUSC's account No:
WUSC's Registration No:	Bank or Finance company:
WUSC's registration date:	

S.N	Details	#/unit	Remark
1	Intake (type of source)		
2	Discharge at source(s) (liters per second)		
3	Collection Chamber/tank (Intake, RVT)		
4	Pump, capacity		
5	Pumping main, Length		
6	Transformer/solar (Number/ capacity)		
7	Length of electricity line/Armod Cable		
8	Electrical poles		
9	Panel board (switch board)		
10	Lightening arrestor/earthing		

11	Distribution RVT, capacity		
12	Distribution Chamber		
13	Valve Chamber		
14	Air Valve		
15	Wash Out		
16	Total pipeline length: Transmission pipe length: Distribution pipeline length:		
17	Public/Institutional taps		
18	Private taps		
19	School toilets (number of cabins)		
20	School water supply		
21	School hand washing stations / other WASH interventions		
22	Household toilet		
23	Institutional toilet		
24	Other Structure		

FORMAT 4: COMMUNITY MAP AND SCHEME LAYOUT WITHIN CATCHMENT AREA

Scheme Name:
Local Government Name:
Prepared by: Date:

FORMAT 5: WATER QUANTITY

(Water discharge measurements should be taken at least in 3 months, water volume in liter and time in second and, fill data of alternative water points.).

Date of Water Discharge Measurement	Source 1	Source 2	Source 3	Source 4	Source 5	Remarks
	Name of Source and Type	Name of Source and Type	Name of Source and Type	Name of Source and Type	Name of Source and Type	
	Litre:	Litre:	Litre:	Litre:	Litre:	
	Time:	Time:	Time:	Time:	Time:	
	Litre:	Litre:	Litre:	Litre:	Litre:	
	Time:	Time:	Time:	Time:	Time:	
	Litre:	Litre:	Litre:	Litre:	Litre:	
	Time:	Time:	Time:	Time:	Time:	
	Litre:	Litre:	Litre:	Litre:	Litre:	
	Time:	Time:	Time:	Time:	Time:	
	Litre:	Litre:	Litre:	Litre:	Litre:	
	Time:	Time:	Time:	Time:	Time:	
	Litre:	Litre:	Litre:	Litre:	Litre:	
	Time:	Time:	Time:	Time:	Time:	
	Litre:	Litre:	Litre:	Litre:	Litre:	
	Time:	Time:	Time:	Time:	Time:	
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	Time:	Time:	Time:	Time:	Time:	
	Litre:	Litre:	Litre:	Litre:	Litre:	
	Time:	Time:	Time:	Time:	Time:	

FORMAT 6: WATER QUALITY TEST RESULTS

Water Test by:	Equipment:

Place (add structures as necessary)	**Date**	**Parameter**					
		Coliform	**Turbidity**	**pH**	**Ammonia**	**Hardness**	**Nitrate**
		(MPN) /100ml	**NTU 5 (10)**	**6.5-8.5**	**1.5 mg/l**	**500 mg/l**	**50 mg/l**
Source (Intake) 1							
Source (Intake) 2							
Reservoir Tank 1							
Reservoir Tank 2							
Reservoir Tank 3							
Tap 1							
Tap 2							
House 1							
House 2							

*Unit may differ depending on testing method.

Note: E-coliform should be tested in water source, reservoir tank (RVT), tap and household at location. The quality of water to be tested before and after WSP implementation and each year after rainy season at least for the bacterial contamination.

FORMAT 7: WATER TARIFF CALCULATION

The concept of water tariff has been introduced to raise sufficient funds for regular operation and maintenance activities, repair of damaged structures and replacement of components, for implementation of improvement or upgrading scheme, and pay for the VMW or other labor work etc. The O&M fund is vital for smooth operation of water supply schemes.

Methods of calculating water tariff

Flat Rate Method:

In this method, flat rate is charged, irrelevant to amount of water used by the users. This is calculated for household cost for water use per month. This method is applicable to small scheme.

Annual operation expenditure cost

$$\text{Monthly household water tariff rate} = \frac{\text{Annual operation expenditure cost}}{\text{No. of households in that year x 12 months}}$$

Annual operation expenditure cost+ annual cost recovery

$$\text{Monthly household water tariff rate} = \frac{\text{Annual operation expenditure cost + annual cost recovery}}{\text{No. of households X 12 months}}$$

Consumption Rate Method:

In this method the water tariff is charged according to the volume of water consumed.

Annual operation expenditure cost

$$\text{Per liter water tariff rate} = \frac{\text{Annual operation expenditure cost}}{\text{No. of beneficiary population x 365x liter per capita per day (ie. Annual water consumption in liters)}}$$

Annual operation expenditure cost+ annual cost recovery

$$\text{Per liter water tariff rate} = \frac{\text{Annual operation expenditure cost + annual cost recovery}}{\text{No. of beneficiary population x 365x liter per capita per day (ie. Annual water consumption in liters)}}$$

FORMAT 8: SOCIAL VULNERABILITY ASSESSMENT

Guiding Questions for Social Vulnerability Assessment

- Where are the households of least reliable access to safe drinking water throughout the year, including the dry season, monsoon, floods, droughts, landslides, and source depletion periods?

- Which households face greater difficulty collecting, or storing water because of distance, disability, age, illness, or discrimination?
- Which groups suffer through physically remote, uphill/downhill from the seasonally cut off, or exposed to flooding, landslides when the main system fails?
- Do women, older persons, persons with disabilities face extra time, safety, privacy, or dignity burdens while collecting and using water?
- Are caste, ethnicity, or social norms limiting participation in user committees, complaint systems, tariff decisions, or repair prioritization?
- Are there public institutions and service points (schools, health posts, markets, and temporary shelters) serve during the disaster and emergency?
- Are there coping strategies prepared during shortages, exposure to contamination, or protection risks?

Vulnerable Group Categories to Consider

Vulnerability should be defined locally through consultation with water supply scheme users, but the assessment should at minimum consider the following categories. These groups may overlap, and intersectional disadvantages should be recognized.

- Women: especially those responsible for water collection, caregiving, breast feeding, menstrual hygiene management, and care work during supply interruptions.
- Persons with Disabilities: people with physical, sensory, psychosocial disabilities who may face barriers in reaching sources, using taps, understanding risk communication.
- Elderly age people and chronically ill people: those with reduced mobility or greater susceptibility to dehydration, infection, and service disruption.
- Pregnant women, infants, and children: groups with heightened health risk from contaminated water and poor continuity of supply.
- Dalit (and other socially excluded caste groups): where discrimination and unequal representation may reduce access, voice, and benefit from the scheme.
- Disaster-prone, and climate-exposed households: settlements in steep slopes, river corridors, drought-prone areas, or areas with drying springs etc.
- Institutions serving vulnerable people: schools, health posts, birthing centers, and other public places that require reliable safe water.

Risk Mapping

Risk mapping should combine social, spatial, and service information so the CR-WSP team can identify where vulnerable people are located, what hazards affect them, and how severe the consequences are when the system fails. During the preparatory phase the water supply scheme prepared social maps, landslide and exposure zones, contamination points, road construction points, drainage, temporary

settlements, alternative sources, households exposed to hazards, user committee records of previous disasters, focus group discussions etc. Those could be reviewed for risk mapping discussion, and prioritization matrix can be used like High Priority, Medium Priority and Low Priority based on frequency, impact and coping capacity. The map and prioritization should be reviewed with the Water Users Committee to verify accuracy.

Inclusive Mitigation Actions

Inclusive Mitigation actions could help to reduce both technical water safety risks and unequal social impacts. Actions should be specific, budgeted, assigned responsibility, and time frame within the CR-WSP plan. Examples of mitigation action can be rehabilitation, household connections, place taps on safe routes, built handrails or accessible platforms and locate taps within reasonable distance (for persons with disabilities) protect springs and catchments, improve drainage, protect vulnerable infrastructure, protect alternative sources for disaster periods, water storage and treatment including chlorination procedures at point of use, promote representation of women, persons with disabilities, Dalit in the WSP team, accessible visual materials and public notices for persons with low literacy and persons with disabilities, water supply and sanitation in emergency situation, storage of spare parts and use during service interruption etc.

Formats for social vulnerability assessment

S.N.	Settlement / Ward / Tole	Identified Vulnerable Group(s), who are they?	Estimated number of households/ Population affected	Nature of Vulnerability / Risk (Lack of access, lack of affordability, disability etc.)	Main causes of the vulnerability	Existing coping mechanisms / support systems	Impact during disasters or extreme weather situations	Required Mitigation/Adaptation or Improvement Measures	When? Timeline of action	Responsible person. Who?	Support needed from WUSC/ Palika/ Project/ Community	Priority and follow up mechanism
1		persons with disability		Disability	Physical mobility	Priority in support rescue	Injury or casualty	Easily escape mechanism during disaster		local rescue team	LDMC	
2		Elderly persons		Weakness and less mobility	Physical mobility	Priority in support rescue	Injury or casualty	Easily escape mechanism during disaster		local rescue team	LDMC	
2		Pregnant women		Mobility	Physical		Injury, miscarriage	Training and equipment to rescue team		local rescue team	LDMC	
4		Children		Mobility	Infection		Falling sick, widespread disease	Child friendly shelter/ rapid medical action		local rescue team	LDMC	
5		Climate induced vulnerable/flood insecure HHs		Disaster risk	Flood, landslide, drought etc		Injury/casualty	Early warning system, weather alarming system		local rescue team	LDMC	
6		Dalits		Discrimination/Social exclusion	Social Strata/religious		Social discrimination while using public source	Awareness/ re-construction HHs connection		Response as soon as possible	LDMC	

FORMAT 9: WATER SAFETY PLAN FORMATS

Format 9a: Short-term plan

Water Safety and O&M Plan **Hazard and risk assessment, Short-term plan preparation, implementation and monitoring**		
Regular maintenance and minor repair, control, adaptation and mitigation work (preventive works)		
Scheme Name:	Cluster Name:	Total Taps:
Local Government Name:	Ward No.:	Name of VMW:

Structure and Place	Risk	Cause of risk (Present Condition)	Yes /No	Immediate or regular works?	Implementation		Monitoring		
					When	By whom	When	By whom	Implementation status (done/not done)
1. Catchment	Catchment degradation; Depletion of water in the source	Deforestation or degraded vegetation (sparse trees, bare soils) in the catchment							
		Over-grazing or excessive collection of fodder; bare soils							
		Agricultural practices							
		Soil erosion, sedimentation in downslopes, dust storms							
		Rills or gullies							
		Landslide							
		Flood							

Structure and Place	Risk	Cause of risk (Present Condition)	Yes /No	Immediate or regular works?	Implementation		Monitoring		
					When	By whom	When	By whom	Implementation status (done/not done)
	Regular activities for the conservation of catchment								
2. Source/ intake	Contamination or depletion of water source, migration of water source; washing away of intake structures	Drying or depletion of the source							
		Frequent erosion around the source							
		Risk of landslides close to intake							
		No fencing or damaged fence							
		Access of people or animals to the source							
		Open defecation or unsafe use of toilet in the settlement above the source							
		Damage of intake cover							
		Danger of turbid water or fragments of soil entering the intake							
		Open source							
		Leakage of water from intake structure							

Structure and Place	Risk	Cause of risk (Present Condition)	Yes /No	Immediate or regular works?	Implementation		Monitoring		
					When	By whom	When	By whom	Implementation status (done/not done)
	Regular activities for the protection, operation and maintenance of source/intake (e.g. maintaining rough filter if high in turbidity/particles)								
3. Electro-mechanical elements (Pump, Transformer/ solar panel, MCB/Panel board, Lightening Arrestor/ Earthing, electricity line, poles, Water level electrode)	Water supply system stops functioning	Damaged							
		Rusted							
		Lack of repair or replacement							
	Regular activities for operation and maintenance of pumps (e.g. cleaning the inlet screen, checking the valve, run pumps alternatively)								

Structure and Place	Risk	Cause of risk (Present Condition)	Yes /No	Immediate or regular works?	Implementation		Monitoring		
					When	By whom	When	By whom	Implementation status (done/not done)
	Regular activities for operation and maintenance of Transformer/solar panel (e.g. cleaning the solar panels, checking wire connections, monitoring voltage & ampere)								
	Regular activities for operation and maintenance of MCB/Panel board (e.g. monitor the voltage protection guard (VPG) and miniature circuit breaker (MCB))								
	Regular activities for operation and maintenance of other electrical parts (poles, lines etc.) (e.g. checking there is gap between electrical wires, condition of poles)								
4. Transmission and distribution line	Contamination of water through pipelines; Washing away of pipeline by flood, landslide, fire; damages by cutting.	Pipeline in landslide prone zone							
		Exposed pipeline in the ground							
		Pipeline damaged by nails/pegs							
		Leakage from pipeline							
		Pipeline joint connected by plastic or clothes							

Structure and Place	Risk	Cause of risk (Present Condition)	Yes /No	Immediate or regular works?	Implementation		Monitoring		
					When	By whom	When	By whom	Implementation status (done/not done)
		Damage of pipe support block							
		Rusting of fittings							
		Pipelines in flood zones							
		Open pipeline in forest fire zone							
	Regular activities for operation, repair and maintenance of pumping main and distribution pipelines (e.g. inspect for leakages or other damage)								
5. Distribution chamber, reservoir tank, other chambers and structures	Contamination through structures (Collection chamber, crossing, interruption chamber, wash out, air valve, distribution chamber,	No fencing around structures							
		Settlement near structures							
		Completely damaged or cracks on covers of structures							
		Valve chamber damaged							
		Cracks and leakage from structure							
		Pollution around structures							

Structure and Place	Risk	Cause of risk (Present Condition)	Yes /No	Immediate or regular works?	Implementation		Monitoring		
					When	By whom	When	By whom	Implementation status (done/not done)
	reservoir tank, break pressure)	Pollution inside structures							
		Water logging around structures							
		Water logging in the chamber having fittings							
		Flooding of structures (e.g., during monsoon)							
		Leakage from fittings							
		Landslide /Flood							
	Regular activities for operation, repair and maintenance of RVTs								
	Regular activities for operation, repair and maintenance of valve chambers of RVTs and other valve chambers including the fittings in them								
6. Taps	Contamination from taps	Cracked or broken tap stands							
		Dirty tap platforms							
		Leakage from the tap structure							

Structure and Place	Risk	Cause of risk (Present Condition)	Yes /No	Immediate or regular works?	Implementation		Monitoring		
					When	By whom	When	By whom	Implementation status (done/not done)
		Pollution around tap structure							
		Unmanaged drainage of wastewater from taps							
		Multiple temporary pipes hanging from a single public tap stand to convey water to individual households (Not applicable in private connection)							
		Washing dishes in taps							
		Water drained to the roads							
	Regular activities for cleaning, operation, repair and maintenance of public tap stands								
7. Use of water and sanitation & hygiene behaviors at household level		Water pots are not properly cleaned before use							
		Water pots are not covered							
		No filtering or boiling of water							
		Dirty utensils are used to drink water							
		Pollution/poor waste management around houses							

Structure and Place	Risk	Cause of risk (Present Condition)	Yes /No	Immediate or regular works?	Implementation		Monitoring		
					When	By whom	When	By whom	Implementation status (done/not done)
		Open defecation or unmaintained toilets							
		No habit of hand washing with soap after using toilet							

Name of the people involved in monitoring the existing condition

S.N.	Name	Signature	S.N.	Name	Signature

Format 9b: Long-term plan

Water Safety Plan **Water Supply Scheme long-term planning, Implementation and Monitoring**		
Major repair, upgrading and risk reduction activities		
Scheme Name:	Cluster Name:	Total Taps:
Local Government Name:	Ward:	Name of VMW:

Location and Structure	Present status	Long-term activities	Source of funds (internal or external)	Implementation		Monitoring		
				By when?	By whom?	By when?	By whom?	Implementation status (done/not done)
1. Catchment								
2. Intake/source/ RVT								
3. Transformer/								

Location and Structure	Present status	Long-term activities	Source of funds (internal or external)	Implementation		Monitoring		
				By when?	By whom?	By when?	By whom?	Implementation status (done/not done)
solar panel								
4. Other electrical elements (Panel board, Lightening arrestor/ earthing, Water level electrode)								

Location and Structure	Present status	Long-term activities	Source of funds (internal or external)	Implementation		Monitoring		
				By when?	By whom?	By when?	By whom?	Implementation status (done/not done)
5. Electrical line/poles								
6. Pump/ pumping main pipe								
7. Distribution RVT and other chambers								
8. Pipelines								

Location and Structure	Present status	Long-term activities	Source of funds (internal or external)	Implementation		Monitoring		
				By when?	By whom?	By when?	By whom?	Implementation status (done/not done)
9. Taps (public/ private)								

Names of the people monitoring the existing condition	

Format 9c: Emergency and disaster response plan

Water contamination:

	Actions:	Source of funds and needed resources	Implementation	
			By when	By whom
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Damaged scheme structures:

	Actions	Source of funds and needed resources	Implementation	
			By when	By whom
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

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