

# Formulation of Pricing Policy for Rural Drinking Water

Final Policy Report  
December, 2015



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## List of Abbreviations

DDW	Department of Drinking Water
DPR	Detailed Project Report
EY	Ernst & Young
FGD	Focused group discussion
GG	Gravity Gadhera
GoI	Government of India
GoUK	Government of Uttarakhand
GP	Gram Panchayat
GS	Gravity Spring
HH	Household
KL	Kilo Liter
O&M	Operation & Maintenance
MLD	Million Liters per day
MVS	Multi Village Scheme
PHH	Pumping High Head
PLH	Pumping Low Head
PTW	Pumping Tubewell
R&M	Repair and Maintenance
RWSS	Rural Water Supply and Sanitation
SWSM	State Water and Sanitation Mission
SVS	Single Village Scheme
UJN	Uttarakhand Peyjal Nigam
UJS	Uttarakhand Jal Sansthan
URWSSP	Uttarakhand Rural Water Supply and Sanitation Project
UWSSC	User Water and Sanitation Sub-committee

## Executive Summary

Rural water supply and sanitation (RWSS) always had been a priority sector in Uttarakhand. Universal coverage of safe and potable water and sanitation has been a key development agenda of the state government. RWSS reforms in late 1990s and success shown by swajal project in Uttarakhand paved the path for demand-driven approach and thus sector-wide approach (SWAp) was evolved. This approach formed a critical part of the World Bank's country strategy for India. With this World Bank gave USD 120 million to GoUK to initiate the Uttarakhand rural water supply and sanitation project (URWSSP) in 2006. URWSSP commenced with a project development objective; 'To improve the effectiveness of RWSS services through decentralization and the increased role of the Panchayati Raj Institutions (PRI) and the involvement of local communities in the state of Uttarakhand'.

It is increasingly felt that pricing of water on cost basis is essential in order to ensure economic and financial viability and sustenance of water supply schemes. However, in case of rural households it is more important to consider this approach in a holistic manner and keep household's affordability and willingness to pay is reflected to develop a more acceptable pricing structure for all.

The prime objective of this assignment was to have a tariff regime that balances the twin objectives of meeting at least the operations & maintenance cost of water supply services and meeting the criteria of equity and affordability.

The 32 water supply schemes were reviewed on the dimensions of quantity and quality, based on the data collected. The water supply schemes were also correlated to the User Survey of the respective water supply schemes to understand the most important issues with services provided and existing tariff structure.

The analysis of cost structure for RWSS was carried out. While discussing the same, it was understood that there are two types of schemes as SWAp schemes and NON - SWAp schemes. In the former, the entire operational spectrum (financial operations from assigning staff to various schemes, fixing tariff and ensuring collection) lies with the UJS. The tariff against the O&M cost recovery is decided at the state level and is charged by the UJS. That means, the state controls the tariff decisions in non-SWAp schemes.

In case of SWAp schemes, the operational tasks are carried out by the respective GPs/UWSSCs. The tariff fixation is guided by the prevalent UJS rates (depending on the technology) in cases where Detailed Project Reports (DPRs) have been prepared. Revision of such tariff and its administration, however, is at the discretion of the GPs/UJWSSCs. For a large number of schemes, including some recent schemes, DPRs either have not been prepared or not available, leading to a situation of arbitrary initial tariff fixation. In a number of schemes tariff calculations were made based on inaccurate or insufficient data and based on questionable assumptions.

In analysis of the cost and sale of water per kiloliter, the following was observed:

- ▶ There has been about 34% increase in the demand raised by UJS from Rs 3,453.97 lakh in 2012-13 to Rs 4637.41 lakh in 2014-15
- ▶ During the corresponding period, the total amount collected increased to the tune of about 30%, from Rs 3242.32 lakh to 4222.36 lakh.
- ▶ The differential between the demand raised and the amount collected over a three year duration varied between 89% to 93%
- ▶ The amount collected in relation to the total expenditure invariably fell short in each of the three years. The deficit in 2012-13 was over 53%, in 2013-14 it was about 49% and in 2014-15 it rose to 54%. On an average the deficit in collection is around 50%.
- ▶ Over two third of the expenditure has been on account of salary (77% to 79%), followed by repair and maintenance that ranged in a narrow band of 15 to 16%, over three years.

- ▶ The third major cost component has been establishment expenditure which ranged in a slightly broader band between a low of 2.3 % to a high of 3.1%.
- ▶ Raw water cost had accounted for higher percentage in 2013-14 (0.58%) as compared to the other two years (0.18% in 2012-13 and 0.13% in 2014-15).

Based on the information the contingent valuation method was carried out. The following were the final observations:

To the question on if they are willing to pay more on improved water supply system, nearly 35.1 percent responded positively.

Household Income	Willingness to Pay				Total Household
	Yes	%	No	%	
Below 5000	47	32.2	102	67.8	149
Between 5000 to 10000	26	31.3	57	68.7	83
Between 10000 to 20000	17	44.7	21	55.3	38
Above 20000	21	45.7	25	54.3	46
Total	111	35.1	205	64.9	316

Households who have responded positively on willingness to pay out of those 45 percent are ready to pay INR 50 per month and 36 percent are ready to pay INR 100 per month. Nearly 18 percent are ready to pay just about INR 20 per month.

Household Income	Percent				Households Willing to Pay
	INR 20	INR 50	INR 100	INR >100	
Below 5000	23.4	40.4	36.2	0	47
Between 5000 to 10000	15.4	46.2	38.5	0	26
Between 10000 to 20000	23.5	47.1	23.5	5.8	17
Above 20000	4.7	52.4	42.9	0	21
Total	18	45	36	0.9	111

Statistical analysis was carried out to understand relationship between various variables. Correlation coefficient between willingness to pay and household size is  $-.347^{**}$  it implies that unit increase in household size will decrease willingness to pay by household. Household income and willingness to pay do not show significant correlation. Nearly 75.3 percent household rated system as very good but only 35.1 percent shows willingness to pay it shows there are certain hidden factors which influence people negatively.

Based on all the above studies the final prospective tariff has been proposed:

Domestic tariff				
SN	Description	Proposed		
		Gravity	Low Head	High Head
1	The tariff is per connection. If any household demands more than one connection, a	Tariff within a band of Rs 40 to 60 per month.	Tariff within a band of Rs 60 to 100 per month.	Tariff within a band of Rs 80 to 100 per month.

	proportionate increase in tariff will be made, subject to scheme capacity.	This band is kept flexible for review and adjustments once every three months, with the above suggested range	This band is kept flexible for review and adjustments once every three months, with the above suggested range	This band is kept flexible for review and adjustments once every three months, with the above suggested range
2	One time connection charges	Rs 1000	Rs 1200	Rs 1500
		This charge is per connection. Proportionate adjustments will be made for multiple connections. A part of this collection (up to 25%) can be retained by the GPs as major O&M fund to offset any emergency repairs and replacements		
3	One off social event charges	Any household intending to get additional supply for social events (marriage, community events, other social events etc), the owner will be billed additional charges. The quantum of additional charges will be at the discretion of the GP, subject to a maximum of Rs 250 per day. The proceeds under this head will be retained by the respective GPs, as a corpus fund for future use.		
<b>Institutional tariff (Public institutions)</b>				
	<b>Description</b>	<b>Proposed</b>		
		<b>Gravity</b>	<b>Low Head</b>	<b>High Head</b>
1	The tariff is per connection. If any institution requires more than one connection, a proportionate increase in tariff will be made, subject to scheme capacity.	Tariff within a band of Rs 60 to 80 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range	Tariff within a band of Rs 80 to 100 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range.	Tariff within a band of Rs 100 to 150 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range
2	One time connection charges	Rs 1200	Rs 1500	Rs 1800
		This charge is per connection. Proportionate adjustments will be made for multiple connections. A part of this collection (up to 25%) can be retained by the GPs as major O&M fund to offset any emergency repairs and replacements. The GP or the state retains the right to offer a discount on this to public institutions or not to charge at all		
<b>Commercial tariff</b>				
	<b>Description</b>	<b>Proposed</b>		
		<b>Gravity</b>	<b>Low Head</b>	<b>High Head</b>
1	The tariff is per connection. If	Tariff within a	Tariff within a	Tariff within a

	any commercial establishment demands more than one connection, a proportionate increase in tariff will be made, subject to scheme capacity.	band of Rs 50 to 60 per month, depending on the nature of commercial entity. This band is kept flexible for review and adjustments once every three months, with the above suggested range	band of Rs 100 to 150 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range.	band of Rs 120 to 200 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range
2	One time connection charges	Rs 1500	Rs 1800	Rs 2000
		This charge is per connection. Proportionate adjustments will be made for multiple connections. A part of this collection (up to 25%) can be retained by the GPs as major O&M fund to offset any emergency repairs and replacements		

# 1 Introduction

## 1.1 About RWS in Uttarakhand

India has invested approximately USD 2.5 billion in the last two decades to provide and improve drinking water supply for over 700 million rural people. However, providing adequate, reliable, affordable and sustainable drinking water to all rural areas is still very challenging. Government of Uttarakhand (GoUK) has shown the same concern in the past and thus prioritized rural water supply and sanitation as a key area of its development agenda.

It is increasingly felt that pricing of water on cost basis is essential in order to ensure economic and financial viability and sustenance of water supply schemes. However, in case of rural households it is more important to consider this approach in a holistic manner and keep household's affordability and willingness to pay is reflected to develop a more acceptable pricing structure for all.

The Swajal Project (introduced in then Uttar Pradesh), in particular, took pride in the fact that 'in addition to contributing towards the capital costs, the communities undertook full responsibility for operation and maintenance (O&M) of the water supply system, including paying all costs and to accomplish this, they levied user charges at differential tariff rates from both household connection holders and public tap stand users' (*Padiyar and Verma, p. 9*). Subsequently, the National Water Policy of 2002 endorsed the fact that the community must pay 100% of the operation and maintenance costs, with consideration to poorer sections of society. The extract of the National Water Policy on user charges is reproduced in the Box below:

### **National Water Policy on user charges**

The National Water Policy 2002 on user charges states: "There is a need to ensure that water charges for various uses should be fixed in such a way that they cover at least the operation and maintenance charges of providing the service initially and a part of the capital costs subsequently. These rates should be linked directly to the quality of service provided. The subsidy on water rates to the disadvantaged and the poorer sections of the society should be well targeted and transparent."

*Source: National Water Policy, Ministry of Water Resources, Government of India, 2002*

The Uttarakhand state, which bifurcated from Uttar Pradesh in November 2000 has a population of 10.11 million as per the 2011 census, of which 7.02 million (69.45 percent) live in the rural areas, spread over the 7,562 village-level local governments called the Gram Panchayats (GPs), in 16,623 villages and 39,967 habitations.

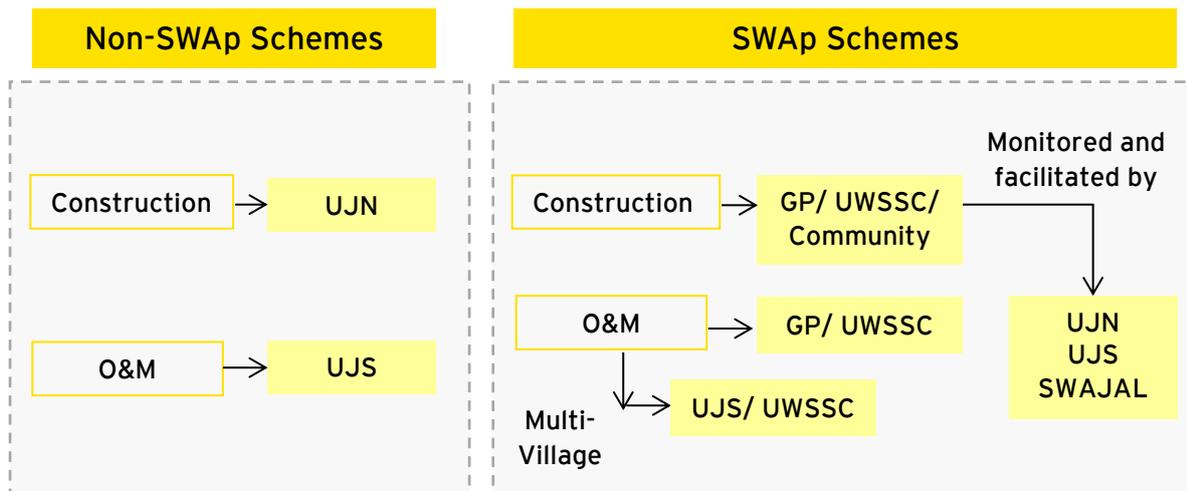
The current institutional setup is centralized with the two large public utilities, Uttaranchal Peyjal Nigam (UJN) that mainly constructs, and Uttaranchal Jal Sansthan (UJS) that mainly operates and maintains most of the existing water schemes. The exception to this are the 1,146 schemes built and operated by the village water and sanitation committees (VWSCs) under the first World Bank-funded Uttar Pradesh and Uttaranchal Rural Water Supply and Environmental Sanitation Project (Swajal) and about 2,448 single-village schemes (SVSs) which have been transferred to the GPs.

The Government of Uttarakhand (GoUA) has prioritized RWSS as a key area of its development agenda in its Tenth Plan (2003-07). GoUA envisages universal coverage of safe and potable water and sanitation by the end of its Eleventh Plan (2008-12).

The Govt. of Uttarakhand has three main institutions - Uttarakhand Peyjal Nigam (UJN), Uttarakhand Jal Sansthan (UJS), and Swajal Project - Project management Unit (S-PMU) for providing water supply and sanitation services. GoUK has established the State Water & Sanitation

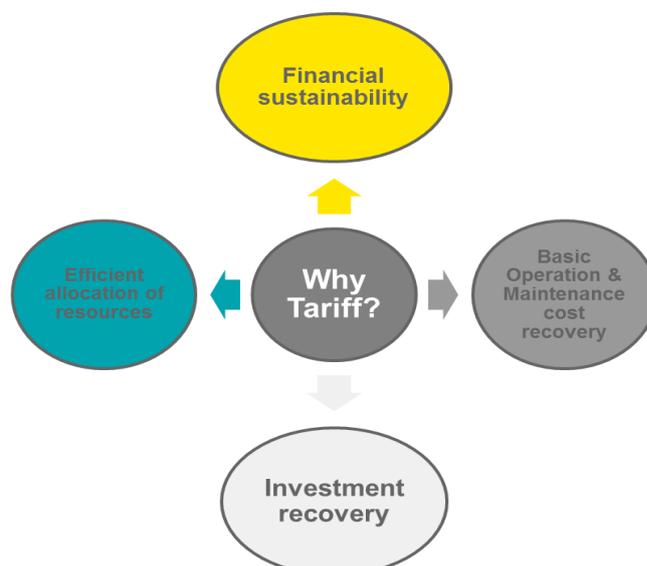
Mission (SWSM) at the State level and District Level & Sanitation Mission (DWSM) at the district level for implementing the policy guidelines and reform principles for the RWSS sector. For non-SWAp schemes, UJN is primarily engaged in construction of drinking water schemes whereas UJS is mainly carrying out functions of O&M of the schemes handed over to them by UJN. For SWAp schemes, the implementation of schemes is done by UWSSC / GPs under the supervision of UJN. 37 multi-village schemes where executed in demand driven mode wherein the bulk supply is managed by UJS and the internal village supply is maintained by UWSSC. UJS, SWAJAL and the O&M is totally taken care by UWSSC/GPs as shown Exhibit 1-1.

**Exhibit 1-1: Responsibility Framework**



## 1.2 Tariff Overview - RWS in Uttarakhand & Elsewhere in India

Water tariffs determine the level of revenues that service providers receive from users in centralized or de-centralized environment for sourcing, treatment and distribution of freshwater. Water pricing is an important economic instrument for improving water use efficiency, enhancing social equity and securing financial sustainability of water utilities and operators. It is imperative to recover the operation and maintenance cost to ensure sustainability of water supply schemes. Decentralization was followed for schemes under SWAP, funded by World Bank.



In Uttarakhand, most of the private water connections are non-metered and the method of levying water charges is fixed charge per house per month or per connection per month or per tap per month. *The Water connection and charges are set by UWSSC for demand driven schemes and by UJS for supply driven schemes. Application for connection of water supply is received by the concerned authority (UWSSC / UJS) and executed post submission of connection charges.*

*Water supply schemes operated and maintained by agencies outside UJS have different tariff structure. The tariff structure is different for various technologies and varies from Rs. 55 to Rs. 150 per month for supply driven schemes. The Project Appraisal Document of the World Bank assisted Uttarakhand Rural Water Supply & Sanitation Project (URWSSP) provides that water charges in all the Single Village Schemes (SVSS) under operation and maintenance of sector institutions or GPs shall be a minimum of Rs 5 per household per month for hand-pumps and for stand-posts and Rs 45 per household per month for private connections, subject to a maximum (cap) of Rs 10 for hand-pumps/stand-posts, and Rs 55 for private connections. The water charges collected by the GPs/UWSSCs are deposited in the bank accounts and used solely for activities related to water supply. In case of Multi Village Schemes (MVSs) it is a maximum of Rs. 55 per month per household for both intra-village and bulk water supply. For high cost MVS, the O&M requirements in excess of the affordable level by the communities should be transparently provided through state subsidy.*

As a part of the pricing policy study, a household survey covering 300 households was carried out. The household surveys results indicate that close to 76% of these households have reported to be paying water charges on a regular basis. Almost 64% the households have expressed satisfaction with regard to the water charges paid by them vis-a-vis the quantity/quality of water supply received. Further, an overwhelming majority (88%) of the households having tap connections have paid for one time installation cost.

The review of one time connection charges in other states indicate that it was lowest (Rs. 526.60/- per household) in Himachal Pradesh and highest (Rs. 1840.00/- per month per household) in West Bengal. The proportion of household regularly paying water charges varies from 100% in Himachal Pradesh to 76.9% in West Bengal and the average monthly charges varies in proportion of Rs. 53.80 in Assam to Rs. 12.70 in Himachal Pradesh with no variations in the water charges among the households belonging to the different social categories. For Stand-post a flat Rs. 10 per Household is charges in the states of Karnataka, Himachal Pradesh, Assam and West Bengal. The review clearly indicates that every state levies water supply charges in rural areas to ensure sustainability of the schemes, although the pricing structure and pricing policy varies from state to state. The detailed cases of four states have been presented in Annexure.

## 2 About the Assignment

### 2.1 Genesis for the study

Levying a reasonable amount as user fees is a policy imperative for schemes under UJN, UJS and Swajal from the perspective of improving and ensuring sustainable service levels. It is very important to have a tariff regime that balances the twin objectives of meeting at least the the operations& maintenance cost of water supply services and meeting the criteria of equity and affordability. This is also in line with the spirit of good governance in the rural water sector in India. EY has reviewed the present tariff structure in the above context. The main objective of the study is:

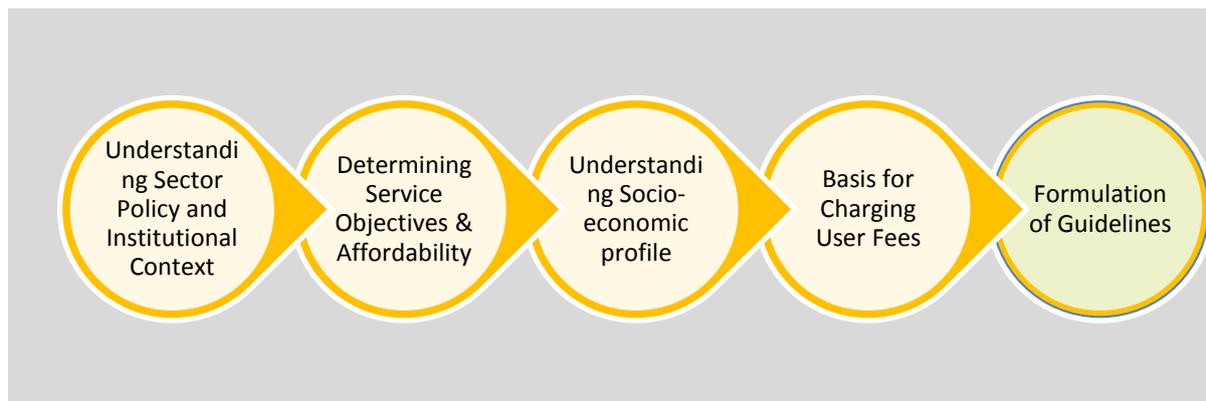
**To assist the Government of Uttarakhand in formulating the State Tariff Guidelines for Rural**

**Water Supply that will contribute to enhanced sustainability and financial self-sufficiency as well as good governance of the rural water sector.**

## 2.2 Approach & Methodology

The broad framework to formulate a successful pricing policy/ tariff guideline will include:

**Exhibit 2-1: Broad Framework for the exercise**



The methodology to be followed to execute the exercise is detailed out below.

### 1. Kick-off Meeting and Concept paper:

The engagement was initiated with the kick-off meeting; wherein consultants had discussions with SWSM, Uttarakhand officials. This meeting helped EY in understanding the overall requirement of the client and in streamlining the efforts to align with the expectations. Following the kick-off meeting, a concept paper was prepared on the proposed study which was discussed with the SWSM officials and their consent was received.

### 2. Identification of Schemes:

The study was conducted in total 30 RWSS schemes including; (i) 15 water supply schemes managed by sector institutions based on supply driven approach, and (ii) 15 schemes on demand driven demand approach. After understanding the institutional context and sector policy of the state the schemes were identified. The selection of these schemes was based on various parameters which are discussed in detail in Section 2.2. Based on the factors 32 schemes were finalized to be taken up for further study.

### 3. Field Survey:

A structured questionnaire was prepared to conduct the field survey and it is enclosed as Annexure - 1

The questionnaire has been developed to get the information related to the water supply schemes from the respective implementation agencies. The survey included understanding of service level targets with respect to the tariff, understanding the community requirements, affordability of households, their willingness and ability to pay, and perceived economic benefits out of those service provisions.

Interactions with the key members of institutions were held, in parallel to the scheme visits, so as to gather an understanding of the existing tariff regime, process of tariff fixation, billing and collection system, community participation etc.

#### **4. Analysis:**

The 32 water supply schemes were reviewed on the dimensions of quantity and quality, based on the data collected. The water supply schemes were also correlated to the User Survey of the respective water supply schemes to understand the most important issues with services provided and existing tariff structure.

The following aspects were analyzed:

- ▶ Issues of users regarding water supply.
- ▶ Annual requirement of recurring operations and maintenance expenditure for various technologies in supply driven and demand driven schemes;
- ▶ Existing tariff structure with reference to realistic requirements of operation & maintenance cost and the affordability of people of various socio-economic profiles.
- ▶ Tariff fixation in relation to technology that would be realistic and acceptable to the community and sustain the services as well.

#### **5. Formulation of Final Report on Tariff Guidelines:**

After discussions with all the key stakeholders, a new tariff guideline would be formulated which shall be submitted to SWSM.

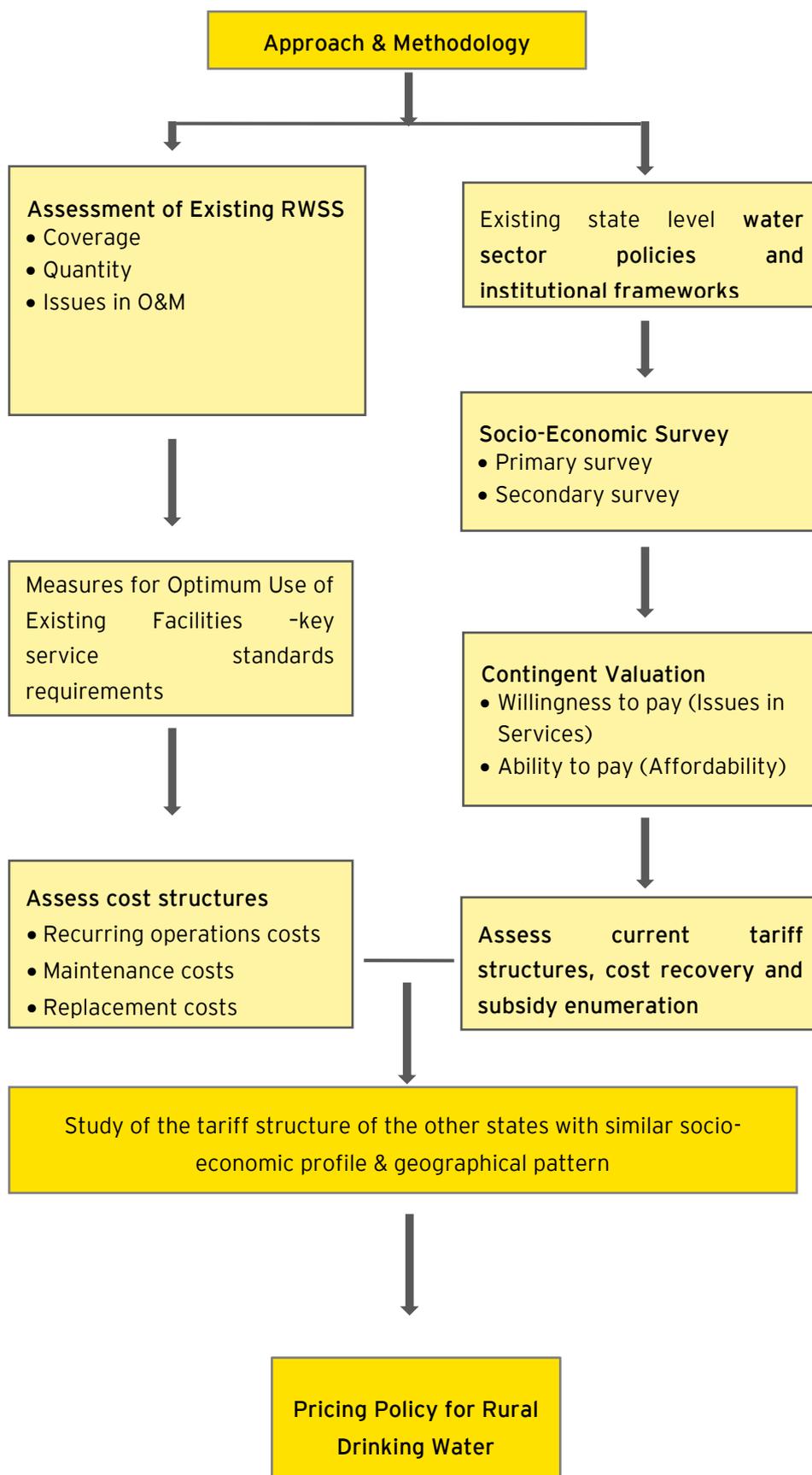
This final report covers the following aspects in detail:

- ▶ The tariff guidelines focusing on 100% O&M cost recovery with different tariff rates through cross-subsidization
- ▶ Technology wise process of target fixation
- ▶ Provision for annual tariff revisions
- ▶ Subsidy for pumping schemes

In many states of India, rural water supply department are working towards volumetric tariff, formulation of guidelines for 100% O&M recovery through cross subsidization etc. This will be captured in detail as case studies in the draft report.

The pictorial representation of the approach and methodology is shown in Exhibit 1-2.

Exhibit 2-2: Pictorial representation of Approach and Methodology for the exercise



## 3 RWSS – Cost & Tariff Assessment

### 3.1 Analysis of Cost Structure

While discussing the cost and tariff management of rural water in Uttarakhand, it is important to underline the differences between non-SWAp and SWAp schemes. In the former, the entire operational spectrum (financial operations from assigning staff to various schemes, fixing tariff and ensuring collection) lies with the UJS. The tariff against the O&M cost recovery is decided at the state level and is charged by the UJS. That means, the state controls the tariff decisions in non-SWAp schemes.

In case of SWAp schemes, the operational tasks are carried out by the respective GPs/UWSSCs. The tariff fixation is guided by the prevalent UJS rates (depending on the technology) in cases where Detailed Project Reports (DPRs) have been prepared. Revision of such tariff and its administration, however, is at the discretion of the GPs/UWSSCs. For a large number of schemes, including some recent schemes, DPRs either have not been prepared or not available, leading to a situation of arbitrary initial tariff fixation. In a number of schemes tariff calculations were made based on inaccurate or insufficient data and based on questionable assumptions.

#### I. Review and analyze operations and maintenance cost components

The objective of an efficient operation and maintenance of a water supply system is to provide safe drinking water as per designed quality and quantity, with adequate pressure at convenient location and time at competitive cost on a sustainable basis.

We discuss below the processes of tariff fixing under the two categories separately:

##### **Non – SWAp Schemes:**

As per the order issued by Govt. of Uttarakhand, the construction of the schemes is entrusted with Uttarakhand Jal Nigam and the operation and maintenance of the schemes have been entrusted with Uttarakhand Jal Sansthan. Following are the cost components considered for operation and maintenance:

- ▶ **Salary cost including complete establishment cost** - Salary of regular staff - 900 in number, PTC - 1800 in number, outsourced through contractor - 1200 in number. The establishment cost is also considered while calculating the total office expenditure.
- ▶ **Power cost** -The expenditure towards power is 100% subsidized by the Government of Uttarakhand.
- ▶ **Repair and Maintenance cost** - The expenditure incurred towards breakdown maintenance of the water supply schemes. However major CAPEX, are covered under the grant from the Government of Uttarakhand.
- ▶ **Chemical Cost** - Full chemical treatment cost for ensuring proper quality of water.

It is important to highlight the fact that the **expenditure towards power is 100% subsidized** by the Government of Uttarakhand.

##### **SWAp Schemes:**

The schemes under the decentralized approach are constructed and maintained by the respective GPs / UWSSCs. The following are cost components considered for operation and maintenance:

- ▶ **Salary cost including complete establishment cost** - The salary of Scheme maintenance worker (SMW) and other staff directly working towards maintenance of the water supply scheme. .
- ▶ **Power cost** - Expenditure towards power is a major cost component.
- ▶ **Repair and Maintenance cost** - The expenditure incurred towards breakdown maintenance of the water supply schemes.
- ▶ **Chemical Cost** - Full chemical treatment cost for ensuring proper quality of water.

## II. Review and analyze guidelines/strategies for optimum asset utilization

### Guidelines for Assessment of O & M

In the assessment of O&M costs and replacement costs of different options, the following cost variable to be considered:

- ▶ **Regular operation of a system, including;**
  - manpower
  - power consumption (either electricity or fuel)
  - chemicals
  - support services (transport, stationary, tools, etc.)
- ▶ **Need for regular preventive maintenance and monitoring include:**
  - cleaning of components (wells, rainwater tanks, intakes, treatment units, storage reservoirs, treatment systems)
  - servicing of pumps and equipment
  - replacement of parts and items such as filter media (pumps in distribution systems including water meters, and in treatment units)
  - water quality testing
- ▶ **Need for funds for any contingency/ unforeseen events**
  - breakdown of pumps
  - pipe bursts
  - failures of treatment systems
  - technical advice and guidance
- ▶ **Need for periodic overhauling and replacements**
  - pumps
  - treatment systems
  - structures such as intakes, tanks, treatment units, etc.
  - Improvements foreseen during designing
- ▶ **Assessment of Cost**
  - Components of Costs

### 1. O & M Cost

- (i) Manpower

**For gravity Schemes**, the input of the caretaker may be full time or part time. If scheme serving more than 100 households or having treatment systems such as slow sand filters, roughing filters or continuous chlorination, a full time caretaker would be need. If scheme is small and does not involve complications, a part-time caretaker would be sufficient.

**For pumping schemes** unless the service area is very small, serving only a group of households, a full time caretaker is needed. If the service area and population is very large (more than 400 households), or if the pumping scheme is complicated, then more than one caretaker would be needed.

(ii) Energy

The energy required to pump water could be calculated using the following standard equation.

$$\text{The energy input of the motor} = (QH\rho g / \eta_{\text{pump}} * \eta_{\text{mot}} \times 1/\text{p.f} \times 1/100) \text{ kw}$$

Where,

p.f. - Power factor is considered in 3 $\phi$ , 400v

Q - Rate of flow m<sup>3</sup>/s $\mu$

H - Total Head

$\rho$  - Density of Water (1000 kg/m<sup>3</sup>)

g - Acceleration of gravity (9.8 N/m<sup>2</sup>)

$\eta_{\text{pump}}$  - Efficiency of the pump

$\eta_{\text{mot}}$  - Efficiency of the motor

Consider the number of pumping hrs/day to be "t",

$$\text{Power requirement for motor} = Z \times t \text{ kw/day} \times 30 \text{ days/ month}$$

(iii) Chemicals

The chemical used for pumping schemes and gravity schemes will depend on the type of treatment. In the most cases, the treatment would be chlorination with bleaching powder.

The quantity of bleaching powder (of strength 33%) could be assessed as follows:

The dosage of chlorination shall be 0.2 PPM (residual chlorine) for spring and 0.5 PPM (residual chlorine) for stream source.

The cost of transport should be considered in assessing the cost of chlorination.

(iv) Materials (for regular repairs and breakdowns)

The requirement of materials and cost for regular repairs and breakdowns depend on the nature of the facility.

**Piped Gravity Schemes**

Aspect	O & M Need	Requirement of Resource/ Inputs	Involvement of Costs
Regular operation of the system	<ul style="list-style-type: none"> <li>Valve operations, inspection of intakes, tanks, pipelines, valves</li> </ul>	<ul style="list-style-type: none"> <li>Caretaker</li> </ul>	<ul style="list-style-type: none"> <li>Regular payment to caretaker by GP/ UWWCs</li> </ul>
	<ul style="list-style-type: none"> <li>Preparing and administering chlorine solution</li> </ul>	<ul style="list-style-type: none"> <li>Caretakers, chemicals</li> </ul>	<ul style="list-style-type: none"> <li>Payment for chemicals by GP/ UWWCs</li> </ul>
	<ul style="list-style-type: none"> <li>Purchasing of chlorine</li> </ul>	<ul style="list-style-type: none"> <li>Transport</li> </ul>	<ul style="list-style-type: none"> <li>Payment for transport by GP/ UWWCs</li> </ul>

Aspect	O & M Need	Requirement of Resource/ Inputs	Involvement of Costs
	<ul style="list-style-type: none"> <li>• Inspection /operating the slow sand filters, roughing filters</li> </ul>	<ul style="list-style-type: none"> <li>• Caretaker, tools</li> </ul>	
	<ul style="list-style-type: none"> <li>• Reading domestic water meters, preparing bills, distributing to consumers, collection of payments</li> </ul>	<ul style="list-style-type: none"> <li>• Caretaker/meter reader, printed bills, record books, stationary etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Regular payment to the personnel</li> </ul>
Preventive maintenance and monitoring	<ul style="list-style-type: none"> <li>• Cleaning of intake, storage tanks, chambers, inspection of pipelines, valves, maintaining drainage</li> </ul>	<ul style="list-style-type: none"> <li>• Caretaker</li> </ul>	<ul style="list-style-type: none"> <li>• Regular payment to the caretaker</li> </ul>
	<ul style="list-style-type: none"> <li>• Replacement of defective valves, painting of structures, small repairs</li> </ul>	<ul style="list-style-type: none"> <li>• Caretaker, spare parts, tools, materials</li> </ul>	<ul style="list-style-type: none"> <li>• Purchases of materials</li> </ul>
	<ul style="list-style-type: none"> <li>• Overhauling the slow sand filters, roughing filters (if present)</li> </ul>	<ul style="list-style-type: none"> <li>• Labour, tools, replacement materials, transport</li> </ul>	<ul style="list-style-type: none"> <li>• Payment for the materials and services</li> </ul>
	<ul style="list-style-type: none"> <li>• Repairing domestic water meters</li> </ul>	<ul style="list-style-type: none"> <li>• Caretaker/ pipe fitter, transport, outside assistance</li> </ul>	<ul style="list-style-type: none"> <li>• Payment for transport, outside agency</li> </ul>
	<ul style="list-style-type: none"> <li>• Water quality testing</li> </ul>	<ul style="list-style-type: none"> <li>• Organising by GP/ UWWCs</li> </ul>	<ul style="list-style-type: none"> <li>• Payment for transport, cost of testing</li> </ul>
Attending to breakdowns	<ul style="list-style-type: none"> <li>• Pipe bursts, failures of treatment facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Caretaker, outside assistance</li> </ul>	<ul style="list-style-type: none"> <li>• Payment for materials, outside assistance</li> </ul>
Periodic overhauling and replacement	<ul style="list-style-type: none"> <li>• Overhauling treatment facilities, replacement of structures</li> </ul>	<ul style="list-style-type: none"> <li>• Materials, labour, funds</li> </ul>	<ul style="list-style-type: none"> <li>• Payment for material, labour and services</li> </ul>

### Piped Pumping Schemes

(Relevant O & M needs stated under gravity scheme above should be considered, in addition to those mentions below)

Aspect	O & M Need	Requirement of Resource/ Inputs	Involvement of Costs
Regular operation	<ul style="list-style-type: none"> <li>Cleaning and dusting pumps and electrical switch gear</li> </ul>	<ul style="list-style-type: none"> <li>Operator</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> </ul>
Preventive maintenance	<ul style="list-style-type: none"> <li>Servicing rotating parts of the motor and pump</li> </ul>	<ul style="list-style-type: none"> <li>Mechanic</li> </ul>	
	<ul style="list-style-type: none"> <li>Servicing all electrical contacts, terminals, cleaning interior</li> </ul>	<ul style="list-style-type: none"> <li>Electrician</li> </ul>	

- (v) Other payments (for outside assistance, for water quality monitoring, transport, stationary, any rents involved for office, stores etc.)

An allowance should be made for periodic water quality testing and payment outside assistance in case of a major problem.

The water quality monitoring should be carried out at least once every six months in the case of *pipe borne water supply schemes for villages*.

The frequency depends on the nature of the source, and the possibility of contamination.

Cost per test for bacteriological quality is approximately Rs 650/-.

The testing of water quality in common shallow wells need to be carried out as and when required.

Residual chlorine tests need to be performed once a day for schemes where chlorination should be regularly carried out. The cost of reagents for this testing needs to be considered.

Allowance for outside assistance, transport (for purchasing materials, repairs, sending water samples, and other requirements), purchase of stationary and printing, any rents of buildings involved etc. should be made.

- (vi) Contingencies

In order to cater for any unforeseen expenditure, an allowance should be made for contingencies. An amount equivalent to 5% of total of the above costs is normally sufficient. (The assessment could be made more accurately by the GP/ UWWCs at a later stage based on the experience gained in operating a particular scheme).

## 2. Replacement Cost

- (i) Replacement cost of the components

The replacement cost of components needs to be assessed in order to make sufficient

funds available when the need for replacement arises. This amount should be included in the tariff rate collected from the users, and hence, it is appropriate to assess this amount along with the cost of operation and maintenance.

Component/ Part	Useful Life Time	Value Considered for Replacement Cost
Pumps and accessories	10 years	Total value of the pump and accessories
Chlorinator equipment	10 years	Total value of equipment
Civil structures (Tanks, intakes, Filters etc)	20 years	Total cost less unskilled labour component
Pipe lines (GI and PVC)	20 years	Total cost less unskilled labour component

In the case of incorporating any existing structures into the proposed scheme, the above given time periods and values should be adopted by considering them individually as appropriate.

The calculation of the monthly contribution towards the replacement cost could be carried out in the following manner;

- ▶ Assuming that the present value of a certain component considered for replacement is S (value in the column 3 above), and the useful lifetime in years is N.
- ▶ Assuming that the rate of inflation is I per annum, and bank interest rate is R per annum. (both as percentages)

Then, the cost of the component year in N would be equal to  $S(1+I)^N$

To collect this amount in the N<sup>th</sup> year, it is assumed that the annual collection is A. (for the purpose of this calculation, equal collection every year is assumed) If this amount is deposited in the bank (at an interest rate of R), the total amount collected in the Nth year is given by,

$$A \frac{[(1+R)^N - 1]}{R}$$

This amount is equal to  $S(1+I)^N$

Hence, the annual contribution required, A is:

$$A = S(1+I)^N / \{[(1+R)^N - 1] / R\}$$

The monthly contribution could be found by dividing the above by 12 (i.e. A/12) For practical purposes, values of I and R could be assumed as 6 % and 12% respectively.

### 3. Computation of Monthly Cost

The total cost which is to be recovered from the users should be calculated as follows;

Cost Items	Monthly Cost		
	Year 1	Year 10	Year 15
Total O & M cost of production and distribution			
Recovery of replacement cost within the years of replacement period			
Total monthly cost of production/ expenditure			

In case the portion of the tariff related to the replacement cost is beyond the affordable level of the community, then a percentage should be recovered with the tariff and the balance be arranged at the time of replacement by an appropriate authority or by some alternate funding arrangement such as an insurance scheme, a loan, etc. The percentage to be recovered to be discussed and decided with the PMU. In the case of recovering only a portion of the replacement cost, attempt should be made to recover at least the cost of mechanical and electrical equipment.

An analysis of the above data reveals the following issues which need to be addressed in order to be able to formulate guidelines for cost and tariff management:

- i. There is no uniformity in what constitutes cost, both in SWAp and non-SWAp schemes. While the former includes only the cost of direct staff engaged in operation and maintenance of the schemes, the latter has a rather opaque calculation of staff cost where proportionate salary cost of staff/management up to and including the Chief General Manager is considered.
- ii. Secondly, there is wide variation in power costs among SWAp schemes. Our field survey indicated that power constituted from 46% (Sabhawala scheme) to 85% (Lal Dang scheme) of the total operating cost of such schemes using comparable technology. No energy audit has been carried out to ascertain if the charges levied are as per actual consumption and if there is a scope for efficiency improvement.
- iii. In non-SWAp schemes the entire cost of electricity is being absorbed by the state government and it is not loaded to the schemes. Lack of reliable data makes it difficult to arrive at a precise quantification of the magnitude of this subsidy.
- iv. A major issue in respect of non-SWAp schemes is the poor collection record, particularly those schemes where assets are aged and almost outlived their utility. At the same time, such schemes are burdened with heavy O&M charges, as salary of indirect staff is also built in. For instance, in one of the schemes surveyed (Kausani) it was found that no tariff is collected from any of the 214 household connections and 12 stand posts which are drawing water from the scheme. The scheme was commissioned in 1971 and is stated to be due for de-commissioning. As the salary component of O&M costs is very high, cost recovery will meet only 27% of the O&M charges, even if the tariff is collected from all consumers. Considering the fact that two-third of the schemes are non-SWAp and only one third falls under SWAp, uniform approach in calculating O&M costs is critical in arriving at a rational tariff policy. .
- v. The issues in SWAp schemes are more in the nature of institutional deficiencies and lack of capacity of the stakeholders. Our survey indicated that in many of the sample GPs/villages, the UWSSCs have not been constituted after fresh GP elections. In some cases, the issue has been deeply politicized, with imbalance in power equations with the outgoing and incoming elected bodies. Mandatory

provisions in the by-laws to provide for membership of the previous head of WSSC/Sarpanch as a member of the successor WSSC (as in Punjab) will ensure continuity of policies and approaches and ensure insulating provision of water from political considerations.

- vi. It was also noticed that the capacity of the UWSSC/GPs to manage the schemes is inadequate in many cases. Handholding by UJS became necessary even after formally handing over of the schemes to GPs/UWSSCs. In some cases, coercive methods like the use of revenue recovery proceedings by Revenue Department to recover water dues were used. This may turn out to be counter-productive
- vii. In many cases, deadlines to handover commissioned schemes to GPs/UWSSCs are not adhered to and they continue to be managed by the UJS.
- viii. Discussions with the senior management of SWSM indicated a weak commitment towards the idea of full cost recovery of O&M in respect of SWAp schemes and this is perhaps reflected in the tardy implementation of the handing over and continued running by UWSSCs/GPs of handed over schemes. This is bound to impact the sustainability of the schemes in the long run.

### III. Analysis of cost and sale of water per kiloliter

The cost recovery for the Operation & Maintenance is imperative to ensure high quality of services. The analysis of the cost and sale of water per kiloliter of water has been carried out for both the approaches under which the rural water schemes are operated and maintained.

#### Non SWAp Schemes:

The cost recovery for the Operation & Maintenance is imperative to ensure high quality of services. The analysis of the cost and sale of water per kiloliter of water has been carried out for both the approaches under which the rural water schemes are operated and maintained.

The following three year macro level data with respect to Uttarakhand Jal Sansthan, have been collected and analyzed:

S.No	Description	Cost (in lakhs.)		
		2012-13	2013-14	2014-15
1.	<b>Total Demand raised</b>	<b>3453.97</b>	<b>3670.13</b>	<b>4637.41</b>
2.	<b>Total Amount Collected</b>			
a.	Meter Cost	2372.31	2625.91	3225.82
b.	Stand post	119.96	123.62	174.93
c.	Sewer Sheet cost	2.07	4.73	7.12
d.	Other Sources	747.98	536.45	814.49
<b>Total</b>		<b>3242.32</b>	<b>3290.71</b>	<b>4222.36</b>
3.	<b>Total Expenditure</b>			
a.	Salary	4860.07	5175.26	6044.01
b.	Establishment Cost	170.90	209.08	182.23
c.	Chemicals	9.18	32.59	43.80

S.No	Description	Cost (in lakhs.)		
		2012-13	2013-14	2014-15
d.	Raw Water Cost	11.44	38.91	10.54
e.	Fuel and Lubricant	20.86	39.52	79.20
f.	Repair and Maintenance	904.59	1073.67	1267.48
g.	Car and fuel cost	105.23	121.63	115.18
h.	Other Expenditure	22.79	16.56	24.63
<b>Total</b>		<b>6105.06</b>	<b>6707.22</b>	<b>7767.07</b>

The table clearly highlights the following situation, over the past three years:

- ▶ There has been about 34% increase in the demand raised by UJS from Rs 3,453.97 lakh in 2012-13 to Rs 4637.41 lakh in 2014-15
- ▶ During the corresponding period, the total amount collected increased to the tune of about 30%, from Rs 3242.32 lakh to 4222.36 lakh.
- ▶ The differential between the demand raised and the amount collected over a three year duration varied between 89% to 93%
- ▶ The amount collected in relation to the total expenditure invariably fell short in each of the three years. The deficit in 2012-13 was over 53%, in 2013-14 it was about 49% and in 2014-15 it rose to 54%. On an average the deficit in collection is around 50%.
- ▶ Over two third of the expenditure has been on account of salary (77% to 79%), followed by repair and maintenance that ranged in a narrow band of 15 to 16%, over three years.
- ▶ The third major cost component has been establishment expenditure which ranged in a slightly broader band between a low of 2.3 % to a high of 3.1%.
- ▶ Raw water cost had accounted for higher percentage in 2013-14 (0.58%) as compared to the other two years (0.18% in 2012-13 and 0.13% in 2014-15).

### III. Review the current tariff regime

A tariff for water services, which is appropriate price for a consumer of these services is expected to pay, may have several objectives, cost recovery and financial sustainability.

The current tariff regime has been studied for both Non-SWAp and SWAp schemes. A distinction has been made between Non-SWAp and SWAp schemes. In non-SWAp schemes tariff is determined based on a combination of two factors i.e. number of connections per household and the technology type, increase in tariff being directly proportional to both the factors. Between one tap connection to four tap connections, the tariff increases by almost two times, whereas between technologies the gravity schemes attract lower tariff and the increase is linked low head and high head types by a factor of 1.2 to 1.3 .

#### Non-SWAp Schemes:

For non-SWAp schemes the tariff is determined by the state agencies, given the historical context. The charges increase on linear pattern, increase being linked to the number of taps per household. The rate is primarily determined by the state agencies, although the criteria are not well defined and not so transparent. The agencies do charge an increase of 15% annually, on the base tariff.

There is no uniformity in the tariff of SWAp schemes, and it varies from scheme to scheme, from GP to GP. The study indicates that on an average, it is the tune of Rs 50 per household per month.

The following are the current tariff for the schemes operated under non-SWAp schemes:

S.No	Description	Current Tariff (Rs.)		
		Gravity	Low head	High head
1.	One tap	55.00	60.00	67.00
2.	Two tap	67.00	75.00	90.00
3.	Three tap	90.00	112.00	135.00
4.	Four tap	112.00	135.00	150.00

#### SWAp Schemes:

The tariff for SWAp schemes is pre-determined during the DPR phase. The tariff calculation is directly linked to the estimates of the first year O&M expenditure. The DPRs specify the following formula to calculate the O&M expenditure:

- ▶ Maintenance Cost
  - ¾% of Building works CAPEX
  - ¼% of Pipeline works CAPEX
  - ½% of Mechanical work CAPEX.
- ▶ Chemical cost (100%)
- ▶ Manpower cost (100%)

Based on the above, the tariff is calculated for all the schemes individually. There are no guidelines for tariff increase in SWAp schemes and it is left to the discretion of the UWSSCs.

### 3.2 Analysis of Tariff Structure

Based on the above tariff regime, the structure was studied with respect to Operation & Maintenance.

#### Non-SWAp Schemes:

As per the tariff structure the tariff varies with the technology of the schemes. In discussion with UJS, it is clear that the power cost is 100% subsidized by the state government and the tariff has a loading for recovering the power expenses. From the case studies report, it has been observed that the cost recovery in pumping tube-well schemes is above 100% wherein the collection efficiency is less than 80%.

#### SWAp Schemes:

The discussions with the UWSSC/ GPs and sector institutions, revealed that the schemes under SWAp mode are devoid of indexation and the expenditure against operation and maintenance is accounted for in the following ways:

- ▶ **Collection of tariff as per the frequency set by UWSSC / GP** - UWSSC collects tariff regularly to meet the expenditure towards O&M. Under the pumping schemes tariff is collected monthly to ensure timely payment against electricity charges.
- ▶ **Collection of money with no set frequency** --The field studies indicate that most of the gravity schemes do not follow any set frequency and the tariff is collected for O&M entirely based on need (as and when required).

## 4 Affordability Analysis using Contingent Valuation Method

Willingness to pay (WTP) is an expression of demand for a service. It is a strong prerequisite for cost recovery being a measure of user satisfaction of a service and the desire of users to contribute to ongoing access to that service. To know people's willingness to pay for improved water supply, a survey was carried out in villages covered under rural water schemes.

### Methodology

Two methods of data collection were used to collect household data in the study area i.e. i) household questionnaire and ii) key informant interviews.

A questionnaire with open-ended and closed-ended questions was administered to households. The questionnaire consisted of the following five sections: i) General information covering Name of village, district, scheme name, type of scheme ii) Demographic information, iii) Socio-economic information, iv) Water quality and willingness to pay, v) Satisfaction on existing water supply system. Interviews were conducted with the head of the household.

### Sample Size

There are three agencies providing water supply services in villages of Uttarakhand. As prescribed in Terms of Reference 30 villages were selected for the survey. In selection of villages due weightage was given to each agency. Schemes implemented by Uttarakhand Jal Sansthan and Uttarakhand Jal Nigam are supply driven schemes and schemes implemented by Swajal is demand driven scheme. Total 316 households were selected for the survey out of which 78 percent were supply driven schemes and 22 percent were demand driven schemes. Stratified sampling was adopted to cover all the 13 districts of the State.

### Data Analysis and Empirical Findings

#### Socio-Economic Profile

Among 316 selected households 89 percent respondent were males and 11 percent were females. Average size of household covered under the study is 4. Caste category analysis shows that 76 percent belongs to general category and 11 percent belongs to Other Backward Class (OBC); the percentage of schedule caste and schedule tribe is very small. Nearly 38.9 percent households have agriculture as the primary occupation and 15.2 are employed in private sector. Nearly 14.9 households are involved in petty business. When questions were asked about monthly income 46.2 percent responded that they have monthly income less than 5000 and 26.3 percent have monthly income in the range of 5000 to 10000. Nearly 12 percent households have income in the range of 10000 to 20000 and 14.6 percent have income more than 20000.

#### Water Supply - Existing Situation

##### Sources and Duration of Water Supply

Questions were asked about sources of drinking water and for other use. Nearly 98.7 responded that for drinking purpose they fetch water from water supply schemes and for other purpose they are dependent on private bore wells. On the duration and supply (days) 65.8 percent responded that the duration of water supply is in the range of 10 to 30 minutes and 12 percent responded that they are getting water for 60 to 120 minutes per day. Nearly 99 responded that they are getting water supply for all seven days in a week.

##### Water Quality & Quantity

Nearly 89.8 percent responded that they are satisfied with the quantity and 96.4 responded that they are satisfied with quality of water supply. Question regarding disruption in the last 6 months nearly 88.1 percent responded that they have not faced any disruptions and 12.8 responded that

they have faced disruptions for 2 days.

### Water Charges and Payment Mechanism

Information from respondents were collected regarding water bill, payment frequency and agency involve in collection. Nearly 85.2 percent responded that they are regularly receiving water bills, of which 89.8 percent are regularly paying water charges. On frequency of payment nearly 25.6 percent household are paying monthly and 37.4 percent are paying once in two months. Households paying quarterly are 22.7 percent and those paying half yearly are 10.6 percent.

### Satisfaction on Rural Water Schemes

Respondents were asked to rate rural water schemes on scale from poor to very good. Nearly 62 percent responded that water quantity is very good and 73.7 rate quality as very good. On water bill collection system 63 responded that it is very good and on water tariff 63.6 percent responded that it is very good. Nearly 75.3 respondents rated overall system as very good.

Particulars	Satisfaction Level in Percentage			
	Poor	Average	Good	Very Good
Satisfaction on Water Quantity	0.6	11.4	25	62
Satisfaction on Water Quality	1.3	6	18.7	73.7
Satisfaction on Water Bill Collection System	2.5	8.9	22.2	63
Satisfaction Water Tariff	3.2	11.4	18.4	63.6
Satisfaction on overall system		5.4	19	75.3

### Willingness to Pay on Improved System

To the question on if they are willing to pay more on improved water supply system, nearly 35.1 percent responded positively.

Household Income	Willingness to Pay				Total Household
	Yes	%	No	%	
Below 5000	47	32.2	102	67.8	149
Between 5000 to 10000	26	31.3	57	68.7	83
Between 10000 to 20000	17	44.7	21	55.3	38
Above 20000	21	45.7	25	54.3	46
Total	111	35.1	205	64.9	316

Households who have responded positively on willingness to pay out of those 45 percent are ready to pay INR 50 per month and 36 percent are ready to pay INR 100 per month. Nearly 18 percent are ready to pay just about INR 20 per month.

Household Income	Percent				Households Willing to Pay
	INR 20	INR 50	INR 100	INR >100	
Below 5000	23.4	40.4	36.2	0	47
Between 5000 to 10000	15.4	46.2	38.5	0	26

Between 10000 to 20000	23.5	47.1	23.5	5.8	17
Above 20000	4.7	52.4	42.9	0	21
Total	18	45	36	0.9	111

Statistical analysis was carried out to understand relationship between various variables. Correlation coefficient between willingness to pay and household size is  $-.347^{**}$  it implies that unit increase in household size will decrease willingness to pay by household. Household income and willingness to pay do not show significant correlation. Nearly 75.3 percent household rated system as very good but only 35.1 percent shows willingness to pay it shows there are certain hidden factors which influence people negatively.

## 5 Key Issues and Challenges in O&M

Some of the key issues and challenges in O&M cost discovery and tariff determination are described below:

“As Is” scenario of water service delivery in Uttarakhand (How the costs are loaded)

Cost component	Non-SWAp cost loading	SWAp cost loading
Salary and establishment	Salary of regular staff - 900 in number, PTC - 1800 in number Outsource through contractor - 1200 in number . The establishment cost is also considered while calculating the total office expenditure.	The salary of Scheme maintenance worker (SMW) and other staff directly working towards maintenance of the water supply scheme.
Repair & maintenance	<b>Power cost</b> -The expenditure towards power is 100% subsidized by the Government of Uttarakhand. <b>Repair and Maintenance cost</b> - The expenditure incurred towards breakdown maintenance of the water supply schemes. However major CAPEX, are covered under the grant from the Government of Uttarakhand.	<b>Power cost</b> - Expenditure towards power is a major cost component. <b>Repair and Maintenance cost</b> - The expenditure incurred towards breakdown maintenance of the water supply schemes. <b>Chemical Cost</b> - Full chemical treatment cost for ensuring proper quality of water.
Chemicals	Full water treatment cost	Full water treatment cost
Power	Zero cost load (fully subsidized by GoUK)	100% of power cost (for pumping schemes)
Annual escalation	15% each year	No defined policy. It is left to the discretion of respective GPs and therefore, there is a great variation between schemes

### SWAp Schemes:

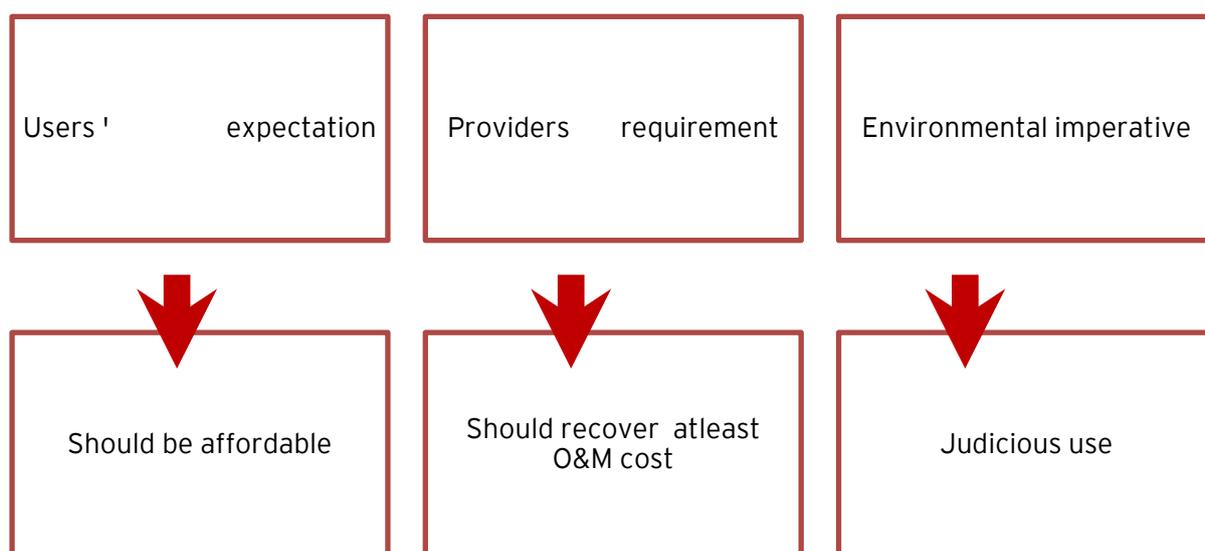
- ▶ **No funds are available “on call” at local service providers level for any major CAPEX:** Tariff is collected based on the O&M expenses incurred for a particular scheme and consequently, UWSSCs/ GPs do not have any excess amount with them to meet contingency expenses. In some schemes, a surplus is observed, but they are exceptional.
- ▶ **Irregular collection of revenue:** There is a great variability between schemes/villages in the frequency of billing and collection. We need to achieve consistency in this regard to ensure that all schemes/villages are treated equally across the state.
- ▶ **No governance & regulatory framework for financial management:** The governance and regulatory framework needs strengthening. Tariff revision should be devoid of inconsistencies between schemes and irregularities.

### Non-SWAp Schemes

- ▶ **System inefficiency:** It is observed that two types of inefficiencies are endemic to the system; i) the differential between the demand raised and the amount collected over a three year duration ranged between 89% to 93% ii) At an aggregate level, there exists gap between total expenditure incurred and amount collected. On an average the deficit in collection in relation to amount billed stands around 50%. This gap is filled by the state government via cross subsidization between urban and rural schemes. This needs a serious revisit.
- ▶ **Variable tariff for different technologies:** Varied tariff is charged for gravity, pumping low head and pumping high head. The expenditure on electricity is fully subsidized. This runs contrary to the transparent costing philosophy and works as a penalty on payment to SWAp schemes. (see below point 4)
- ▶ **Loading of total establishment cost of UJS to the consumer:** The costs such as salary up to the level of (please fill), building rent etc are billed as establishment cost, which unfairly escalates the O&M costs. It also runs contrary to the transparent costing philosophy (see below point 4). The staff deployment per scheme is done on an ad-hoc basis, rather than based on requirement per scheme (depending on technology or number of connections)
- ▶ **Total cost of the UJS is recovered from consumers (urban and rural):** During discussion with the officials of UJS, it was found that urban consumers are charged higher than their rural counter-parts and thus the loss suffered from O&M collection through rural areas is overcome by the collection from urban consumers.

## 6 Recommendation

Three most important stakeholder categories (users, providers and custodians of environment) have different expectations while determining water tariff. These stakeholder groups often work at cross purposes. While the users' (consumers') expect the services to be made available to them at a minimum cost (affordable), the service providers keep the economic interest (cost recovery) at the core of their service delivery. The third dimension that is important but often not factored-in is the environmental perspective. The custodians of environment advocate for judicious use of water (should discourage indiscriminate use), which has long-term environmental implication. The expectation of three different categories of stakeholders that has direct implication to water tariff determination is presented in the diagram below:



The differing level of expectations as presented above, provide the contextual framework for designing an appropriate water tariff policy that is acceptable to all. Accordingly, we propose to draw a policy guideline with the following objective:

To assist the Government of Uttarakhand in formulating the State Tariff Guidelines for Rural Water Supply that will aim at achieving full recovery of O&M costs, thus contributing to enhanced sustainability, financial self-sufficiency as well as good governance of the rural water sector keeping, environmental safeguards in focus

### Philosophical Framework for pricing determination

The price discovery and subsequent determination of water tariff are guided by the following philosophical framework:

- ▶ Recognize the reality that service delivery has an associated economic cost, which includes water sourcing, laying down distribution network, treatment to make water fit for human consumption, and providing supply at users' end
- ▶ Water is a human right, but it is also an economic good. Therefore, recognize it as a finite resource and attach a value to its use
- ▶ Demonstrate the desirability of recovering full cost of O&M expenditure or at least major components across categories

- ▶ Acknowledge the fact that there exists a “payment culture” among rural households in Uttarakhand. This is an extremely positive feature that stands the test of times. To ensure that this culture is sustained and promoted across user categories, no “tariff shock” is given to any class of users by negatively loading calculation of O&M costs
- ▶ Ensure consistency and transparency in tariff determination and its administration
- ▶ Provide a regulatory certainty so that trust and confidence of users’ with the system is further strengthened
- ▶ Provide built-in incentive for conservation of water (environmental objective)
- ▶ Recognize the importance of reliability and assured quality of service
- ▶ Recognize water tariff determination is a political process. However, the cost of economic interests of the state has to kept as a top most priority

Periodic tariff adjustments to achieve cost recovery should become a central theme to improving service efficiency. The water supply schemes of UJS, UJN and Swajal currently take a hit financially for internal and external factors. They finance the shortfall between revenue and costs using subsidies from the government and by using financial instruments such as depreciation of capital. This operational adjustment is justified with the assumption that it meets the principles of social equity. However, the end result is characterised by low tariff, poor service, discrimination amongst providers and restricts access to poor households. This is not to negate the use of subsidies as an equity tool, but they should be judiciously applied and administered. Ideally, subsidies should be applied under the following circumstances: (i) where treated water uses have long-term beneficial effects on human health (ii) where the transaction costs of measuring the quantity of use are either not feasible (e.g. metering difficulties) or very high and (iii) where treated water for the poor is regarded as a basic human need and the costs are beyond the affordability parameters of poor households.

This Rural Water Supply Tariff Policy Guideline is a framework for the application of a sound tariff structure, across the state and across technologies. It is assumed that over a period of time, all non-SWAp schemes will be transformed to take shape of SWAp schemes. Consequently, it is recommended to follow a uniform tariff policy for SWAp and non-SWAp schemes. Consequently, this will ensure ease of policy administration and clarity of policy framework. This guideline does not recommend a rigid or a pre-fixed tariff across schemes. It suggests a “tariff band” within which scheme-specific and technology-based tariff can be adjusted. This policy operates in the historical background that for all the on-going schemes (both SWAp and non-SWAp), the initial capital costs are not loaded to the schemes and these costs are absorbed by the state. Therefore, capital cost recovery is not the objective of this policy. It is a step towards recovering only O&M costs (in full or a part of it, depending on the scheme) that includes direct scheme management expenditures and a nominal mark-up to build a corpus for emergency works.

This policy framework has been developed within a set of limitations observed during the assessment.

- ▶ The assessment towards policy development suffers from lack of credible cost data; most of the DPR related data are either outdated or not available.
- ▶ GPs have a difficulty in separating capital, replacement and recurrent costs. At present, there is a great deal of variations in determining tariff across GPs, indicating a lack of universal pattern.
- ▶ Determining household level and sector level subsidies are either unknown or not clearly defined.
- ▶ Equity objectives are not explicitly considered in the existing cost recovery principles. In practice, the concerned GPs have latitude to decide on this, thus allowing them open for varied interpretation.

Consequently, the policy framework broadly suggests the following:

- ▶ If 100% O&M cost recovery becomes a policy objective, water supply services will become highly unaffordable to a large majority of users. Therefore, this policy attempts to recover the O&M cost to the best extent possible.
- ▶ The state level income and expenditure data and willingness to pay survey findings support the above contention.
- ▶ The macro level income and expenditure data indicate that on an average each household spends about 54% of its income on food items that includes payment towards water. Extremely high charge on water services is likely to drain household resources further, placing the equity objective at risk.
- ▶ It is noteworthy to highlight that there is a “positive payment” culture in the state, mainly in schemes under SWAp. This needs to be sustained and encouraged.
- ▶ The willingness to pay study results show that although the users are willing to pay more for water services, about 64% of the respondents are willing to pay between Rs 20/ to Rs 50/per household per month. Only 36% of the households are willing to pay between Rs 50/ to Rs 100 per household per month. It is clear that households are unwilling to pay beyond the ceiling of Rs 100/ per month. This constituted an important input for developing this tariff guideline and therefore, the maximum tariff is kept at Rs 100 per household per month, for domestic services.
- ▶ Considering the above factors, it becomes necessary for the state government to continue to subsidize or fully absorb some of the high cost components (e.g. power, salary of higher rung staff and establishment cost). Alternatively, the state government will need to help the GPs and state level service providers to access alternate source of funds with low financing costs. Estimating the type of such funding avenues and the quantum of funds is outside the scope of this study.
- ▶ Since the O&M costs are likely to escalate, an indexation has been determined based on the average annual rate of inflation of a basket of cost components. This is estimated to be about 5% per annum based on the inflationary trends of a basket of components.

#### Other policy imperatives

- ▶ The state agencies need to accurately estimate or update cost figures and ensure a credible and transparent cost loading method
- ▶ The state needs to support the GPs in effective financial management, revenue collection, bookkeeping and accountability to ensure full and smooth transition to SWAp mode.
- ▶ There is a need to identify avenues for incentivizing environmental protection practices to ensure water source sustainability and water conservation by GPs.
- ▶ It is essential to arrive at uniformity in cost loading between SWAp and non-SWAp schemes. This can be achieved over a period of next three to five years, beginning from FY 2015-16.

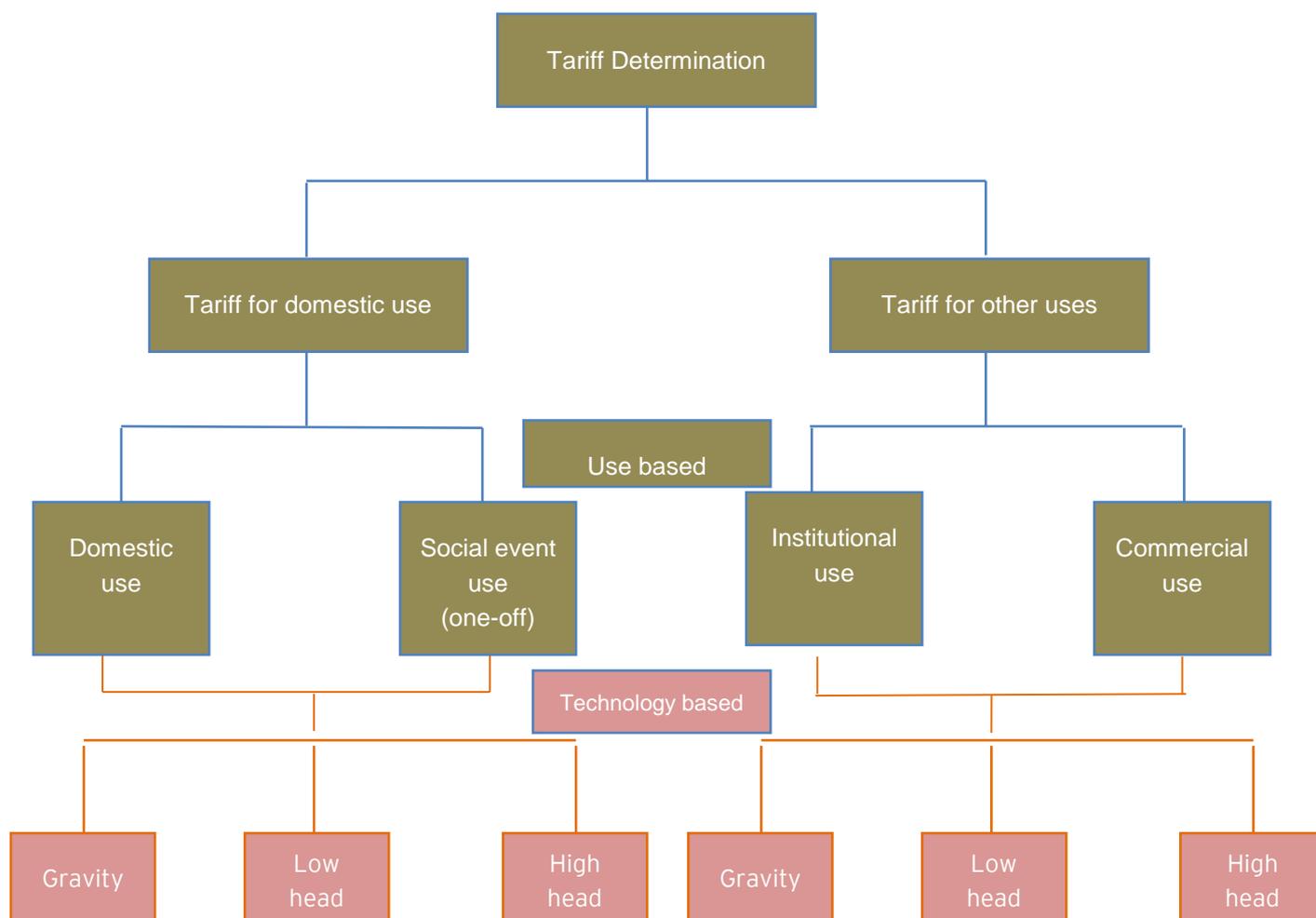
#### Recommended cost components and loading factors

Component	Description	Recommended cost loading
Repair & maintenance and material cost	Consumables, chemicals, tools, fast wearing spare parts and equipment	100%
Staff and operational cost	Field based staff for everyday system operations, routine preventative	100% (See management cost below)

Component	Description	Recommended cost loading
	maintenance, repairs, and minor rehabilitation works, billing, supervision, power	
Power cost	Electricity charges for running pumps	For high cost pumping schemes, power need to be subsidized by the state at an agreed rate. It can range from 20% to 100% depending on the scheme, paying capacity of users, state policy etc. However, till all schemes are transformed into SWAp mode, a uniform approach between SWAp and non-SWAp schemes needs to be adopted. This can be achieved gradually over a period of next five years. Until then, it is suggested to apply 100% subsidy to both SWAp and non-SWAp schemes uniformly.
Management cost	Some part of management time	10% to 15% (based on the assumption that a maximum of 15% of higher level managerial time is invested in scheme operation related matters)
Establishment cost	Building rent, office space, tours and travel	0%
Financial cost	interest on loans and advances, amortization, equipment and supply network depreciation	0%
Environmental cost	Catchment protection and conservation	0% cost loading; some incentive to be provided to GPs for outstanding work in environmental protection such as source sustainability, water conservation and harvesting.
UWSC cost	One time registration cost, meeting costs and documentation cost	100%. UWSCs are voluntary associations. No fee/salary to be paid to the members.
Inflation	To be linked to general inflation level (expected @ 5% on annual basis for a basket of cost components)	100%. This is applicable only to user charges and excludes one time connection charges.

## Recommended pathway for O& M cost recovery

Given the above policy framework and the current tariff structure, the following paths may be adopted for O&M cost recovery.



## Rationale for tariff recommendation

### Background

Poor cost recovery is one of the primary concerns of rural water supply schemes across India. Costs of electricity, maintenance, manpower, chemicals and other costs are either subsidized (partly or fully) or do not find a legitimate space in price determination. Uttarakhand is not an exception, although the state has encouraged and sustained a “positive payment” culture. This contention is validated by the willingness to pay survey.

The Rural Water Supply Tariff Policy Guideline as recommended in this report is a framework for the application of a reasonably sound tariff structure, across the state and across technologies. It is assumed that over a period of time, all non-SWAp schemes will be transformed to become SWAp schemes. Consequently, it is recommended to follow a uniform tariff policy for SWAp and non-SWAp schemes. This will ensure ease of policy administration and clarity of policy framework. This guideline does not recommend a rigid or a pre-fixed tariff across schemes. Instead, it suggests a “tariff band” within which scheme-specific and technology-based tariff can be adjusted.

To understand the overall cost scenario and to provide a basis for price discovery, the consultants

have analysed the state level data aggregates of the total water supplied, amount spent and average production cost per kilo litre in rural areas (both gravity and pumping) for the year 2014-15. The results are presented in the table below:

#	Category	Volume/Amount
1	Water production (KL)	166811862 KI
2	Water sold amount (KL)	116768303.4 KI
3	Unaccounted water (KL)	500435586 KI
4	Annual Expenditure with electricity	Rs. 12570.54 lakh
5	Expenditure without electricity	Rs. 9642.60 lakh
6	Average production cost (with electricity)	Rs. 20.03 KI
7	Average production cost (without electricity)	Rs. 16.36 KI

### 1. Electricity Charges as an operational cost component

Electricity charges under non-SWaP schemes are completely or partly subsidized, making the true estimates of cost of production difficult. This becomes the hidden cost of providing services. The electricity cost for the past three years is tabulated below. This comprises the major part of operational cost.

	Opening balance	Demand raised (current)	Total demand raised	Total collected
2012-13	201482	9123.49	210605.5	8608.22
2013-14	201997.3	9750.63	211747.9	18524.9
2014-15	193223	10239.99	203463	16555.11

Note: This data reflects the urban and rural schemes combined. Disaggregated urban-rural data is not available. Approximately 30% of the cost is taken as expenditure for rural schemes.

Currently, the electricity bills from electricity department are sent to the unit offices, where the detailed abstracts are extracted and then sent to nodal office and to the finance department. The finance department at the state level approves and sanctions the amount and then payment to electricity department is routed through UJS account. This is a long process that takes six months to one year. This cost is not factored in while calculating operational cost and considered as indirect subsidy given to the agency by the state government.

### 2. Source of Revenue and Funds

The rural water supply schemes of Uttarakhand rely on different sources of revenue and funding to meet their operational expenditure.

- ▶ Revenue mobilization by providing new connections every year. On an average each of the 29 unit level offices releases around 1000 connections every year, thus totalling to about 29,000 to 30,000 new connections every year.
- ▶ Funds allocated through NRDWP
- ▶ Funds allocated via District Plans
- ▶ Funds allocated directly by State Plans

The total number of private connections across the state under UJS is estimated to be 1, 73,504 and the number of stand post connections is much higher than the private connections (2, 48,000). On an average, 29,000 to 30,000 new connections are released by the state agencies; the new connection fee thus collected is spent entirely to meet operational expenses. Between 2012-13 and 2014-15, the UJS received funds from NRDWP to the tune of 1,374.76 lakh (annual average). In 2012-13 it was a low of 143.74 lakhs and in 2013-14 it hit a high of 2271 lakh, and in 2014-15 it slid to 1709.56 lakh. The financial statement of UJS does not reflect this amount. A separate balance sheet is prepared to account for this component. The funds received from State plans and district plans also varied significantly between 2012-13 and 2014-15. 50% of the funds received from state and district plans are used to meet operational expenses and the balance 50% is used for non-operational purposes. Generally, these funds are also scheme specific which cover the salary for outsourced contractual workers/ PTC for that particular schemes, repair works, chemicals and extension of schemes.

## 1. Context for tariff recommendation

The above factors in solo or in combination make the true cost discovery an extremely complex task. While it is desirable to recover 100% of the O&M scheme costs, administrative reality dictates that it is not feasible to achieve this goal in the short term. Considering the multiple factors, the consultants have made some recommendations pitching it on the past experience and collective judgment of the team, with a professional disposition. The following aspects were used for the judgment that leads to tariff recommendations.

- ▶ Operational and economic analysis of the data collected from 30 schemes, including MVS.
- ▶ The data extracted from the DPRs that were made available to the team. The data presented in the DPRs were dated and not adequate to test the economic efficiency of schemes to extrapolate to the current times.
- ▶ GPs have a difficulty in separating capital, replacement and recurrent costs. At present, there is a great deal of variations in determining tariff across GPs, indicating a lack of universal pattern.
- ▶ Determining household level and sector level subsidies are either unknown or not clearly defined.
- ▶ Team's own experience and judgment based on a set of factors such as i) opinions gathered during interactions with user groups ii) user expectations, affordability and their willingness to pay for better services iii) findings during stakeholder consultations and iv) desk research on water tariff policy and practices in other states sharing similar geographical, political and economic conditions
- ▶ Equity objectives are not explicitly considered in the existing cost recovery principles. In practice, the concerned GPs have latitude to decide on this, thus allowing them open for varied interpretation.
- ▶ This policy framework operates in the historical background that for all the on-going schemes (both SWAp and non-SWAp), the initial capital costs and some operational costs such as electricity charges are not loaded to the schemes and such costs are absorbed by the state. Therefore, capital cost recovery or full cost recovery is not the objective of this policy. It is a step towards recovering only O&M costs (in full or a part of it, depending on the scheme) that includes direct scheme management expenditures and a nominal mark-up to build a corpus for emergency works.

## 2. Final assimilation of Policy

In the final analysis, the policy framework considered the following aspects while recommending the band based tariff:

- ▶ If 100% O&M cost recovery becomes a policy objective, water supply services will become highly unaffordable to a large majority of users. Therefore, this policy attempts to recover the O&M cost to the best extent possible.
- ▶ The state level income and expenditure data and willingness to pay survey findings support the above contention.
- ▶ The macro level income and expenditure data indicate that on an average each household spends about 54% of its income on food items that includes payment towards water. Extremely high charge on water services is likely to drain household resources further, placing the equity objective at risk.
- ▶ It is noteworthy to highlight that there is a “positive payment” culture in the state, mainly in schemes under SWAp. This needs to be sustained and encouraged.
- ▶ The willingness to pay study results show that although the users are willing to pay more for water services, about 64% of the respondents are willing to pay between Rs 20/ to Rs 50/per household per month. Only 36% of the households are willing to pay between Rs 50/ to Rs 100 per household per month. It is clear that households are unwilling to pay beyond the ceiling of Rs 100/ per month. This constituted an important input for developing this tariff guideline and therefore, the maximum tariff is kept at Rs 100 per household per month, for domestic services.
- ▶ Considering the above factors, it becomes necessary for the state government to continue to subsidize or fully absorb some of the high cost components (e.g. power, salary of higher rung staff and establishment cost). Alternatively, the state government will need to help the GPs and state level service providers to access alternate source of funds with low financing costs. Estimating the type of such funding avenues and the quantum of funds is outside the scope of this study.
- ▶ Since the O&M costs are likely to escalate, an indexation has been determined based on the average annual rate of inflation of a basket of cost components. This is estimated to be about 5% per annum based on the inflationary trends of a basket of components.
- ▶ The state agencies need to accurately estimate or update cost figures and ensure a credible and transparent cost loading method
- ▶ The state needs to support the GPs in effective financial management, revenue collection, bookkeeping and accountability to ensure full and smooth transition to SWAp mode.
- ▶ There is a need to identify avenues for incentivizing environmental protection practices to ensure water source sustainability and water conservation by GPs.
- ▶ It is essential to arrive at uniformity in cost loading between SWAp and non-SWAp schemes. This can be achieved over a period of next three to five years, beginning from FY 2016-17.

### Proposed tariff structure

With the objective of achieving the four key principles of water supply services (O&M cost recovery, economic efficiency, equity, and environmental sustainability), an appropriate tariff policy is designed. *The tariff proposed is based on the how much the schemes are charging at this point of time and user satisfaction for the same.* The proposed tariff structure is summarized below.

Domestic tariff				
SN	Description	Proposed		
		Gravity	Low Head	High Head
1	The tariff is per connection. If any household demands more	Tariff within a band of Rs 40 to	Tariff within a band of Rs 60 to	Tariff within a band of Rs 80 to

	than one connection, a proportionate increase in tariff will be made, subject to scheme capacity.	60 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range	100 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range	100 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range
2	One time connection charges	Rs 1000	Rs 1200	Rs 1500
		This charge is per connection. Proportionate adjustments will be made for multiple connections. A part of this collection (up to 25%) can be retained by the GPs as major O&M fund to offset any emergency repairs and replacements		
3	One off social event charges	Any household intending to get additional supply for social events (marriage, community events, other social events etc), the owner will be billed additional charges. The quantum of additional charges will be at the discretion of the GP, subject to a maximum of Rs 250 per day. The proceeds under this head will be retained by the respective GPs, as a corpus fund for future use.		
<b>Institutional tariff (Public institutions)</b>				
	<b>Description</b>	<b>Proposed</b>		
		<b>Gravity</b>	<b>Low Head</b>	<b>High Head</b>
1	The tariff is per connection. If any institution requires more than one connection, a proportionate increase in tariff will be made, subject to scheme capacity.	Tariff within a band of Rs 60 to 80 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range	Tariff within a band of Rs 80 to 100 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range.	Tariff within a band of Rs 100 to 150 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range
2	One time connection charges	Rs 1200	Rs 1500	Rs 1800
		This charge is per connection. Proportionate adjustments will be made for multiple connections. A part of this collection (up to 25%) can be retained by the GPs as major O&M fund to offset any emergency repairs and replacements. The GP or the state retains the right to offer a discount on this to public institutions or not to charge at all		
<b>Commercial tariff</b>				
<b>SN</b>	<b>Description</b>	<b>Proposed</b>		
		<b>Gravity</b>	<b>Low Head</b>	<b>High Head</b>

1	The tariff is per connection. If any commercial establishment demands more than one connection, a proportionate increase in tariff will be made, subject to scheme capacity.	Tariff within a band of Rs 50 to 60 per month, depending on the nature of commercial entity. This band is kept flexible for review and adjustments once every three months, with the above suggested range	Tariff within a band of Rs 100 to 150 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range.	Tariff within a band of Rs 120 to 200 per month. This band is kept flexible for review and adjustments once every three months, with the above suggested range
2	One time connection charges	Rs 1500	Rs 1800	Rs 2000
		This charge is per connection. Proportionate adjustments will be made for multiple connections. A part of this collection (up to 25%) can be retained by the GPs as major O&M fund to offset any emergency repairs and replacements		

*Efficient management of both the cost and revenue spectrums will be a big step forward for setting a water tariff policy that aims at achieving full recovery of O&M costs, enhanced sustainability, financial self-sufficiency and good governance.*

## Annexure - RWSS overview of other states in India

One of the key concerns of rural water supply schemes is poor cost recovery. The main problem lies in the negligible or near zero tariff collection system. Costs of electricity, spare parts, manpower and chemicals and are either not assessed fully or do not find a legitimate space in price determination. The sector policy at the national level recommends states to take a call on the tariff structure, considering the differential connection charges and different tariff structure for house connection and supply through street stand post. It also focuses on equity while administering tariff regime. As per the recommendations of the XII Finance Commission, effective recovery mechanism to be in place and Gram Panchayats to be empowered to collect user charge for O&M.

Financial incentives for GPs/VWSCs to ensure efficient O&M are the most important issue in ensuring the long-term sustainability of rural water supply schemes. Keeping this in focus, many states have placed emphasis on regular collection of water tariff by the users and some of the successful examples (Himachal Pradesh, Andhra Pradesh, Jharkhand and Kerala), are summarized below.

### Rural Drinking Water Tariff in Himachal Pradesh<sup>1</sup>

The drinking water supply tariff in Himachal Pradesh is governed by the Himachal Pradesh Water Supply Act, 1968. The Irrigation and Public Health Department (IPH) is the apex level department that provides the overarching policy directive for rural and water supply. For tariff determination, the department distinguishes rural from urban; the tariff for urban being substantially higher than rural. However, in both the sectors, the policy differentiates between domestic and commercial tariff. The following table presents the change in rural water supply tariff over the past five years (2009-10 to 2013-14), as compared to the base year of 2009-10.

Category of charges		Domestic (non-metered)		Commercial (metered)	
		Amount	% increase over base year (2009-10)	Amount	% increase over base year (2009-10)
Connection Charge		Rs 100/ per connection (one time)	No change	Rs 200/ per connection (one time)	No change
Consumption Charge	2009-10	Rs 10/ per connection per month	NA	Rs. 8 per KL subject to minimum of Rs. 100/- per month	NA
	2010-11	Rs 16.05/ per connection per month	60.50%	Rs 12.85 per KL subject to minimum of Rs. 100/- per month	60.60%
	2011-12	Rs 17.10/ per connection per month	71%	Rs 14.20 per KL subject to minimum of Rs.	77.5%

<sup>1</sup> Reference for Himachal Pradesh - Guidelines for transfer of operation and maintenance of rural water supply schemes to PRIs-(Complete Schemes), Government of Himachal Pradesh and Government of Himachal Pradesh, Department of Irrigation and Public Health, No. IPH-B(C) 10-1/2004 Dated: Shimla-1712002, the 15/6/2005, Notification

Category of charges		Domestic (non-metered)		Commercial (metered)	
		Amount	% increase over base year (2009-10)	Amount	% increase over base year (2009-10)
				100/- per month	
	2012-13	Rs 19.50/ per connection per month	95%	Rs 15.65 per KL subject to minimum of Rs. 100/- per month	95.6%
	2013-14	Rs 21.45 per connection per month	114.5%	Rs 17.20 per KL subject to minimum of Rs. 100/- per month	115%

The Irrigation and Public Health Department policy specifies that there will be an increase of 10% in tariff every year. The tariff is charged per connection; with proportionate increase in charges for multiple connections. As the table above indicates, while there has been no change in the one-time connection charges, the consumption charges have been increased to the tune of about 115%, as compared to the base year of 2009-10. The percentage of 115% increase turns out to be substantial because of the low base figure.

To facilitate devolution of the rural water supply responsibilities to GPs, the department has laid down detailed guidelines. The guidelines cover three specific aspects i.e. i) financial ii) operational and iii) technical. The key aspects of the financial and operational guidelines (relevant to this assignment) are furnished below:

#### Financial Aspect

- ▶ The IPH to provide financial assistance to GPs on a quarterly basis to meet O&M expenditure. This includes energy cost.
- ▶ The assessment of the requirement of the funds to be done by the respective GPs with the help of AE, IPH.
- ▶ One time grant of 10% of the capital cost of the scheme to be released to the GPs to meet recurring expenditure
- ▶ The GPs are at liberty to fix water tariff, subject to the criteria that it cannot be less than the minimum tariff fixed by the government. The minimum will be fixed by the government from time to time.
- ▶ Water tariff collection is the responsibility of the respective GPs. The entire amount collected will be retained by the GPs, which is to be used for development works in the GPs.
- ▶ The GPs are authorized to impose any penalty or compensation; the amount so collected to be retained by the respective GPs.

#### Operational Aspect

- ▶ The operation of the distribution system to be done twice a day. It is limited only to opening and closing of valves in the distribution network along with periodic chlorination of the Sector Storage Tanks.
- ▶ The time required for the distribution task is on an average not more than 2-3 hours a day.
- ▶ Simple maintenance to be carried out by a local person selected by the GP.
- ▶ The GPs are responsible for the appointment of required O&M staff.

- ▶ Only skilled workers with notified qualifications to be appointed. The qualification criteria are set out by IPH.
- ▶ The wages are to be settled with the Assistant Engineer of IPH depending upon the work but not exceeding the amount fixed by the government for contractual workers.
- ▶ The person appointed should preferably a resident of the same GP.
- ▶ The complete task of operation and maintenance (operation of treatment plant, regulating the flow, opening and closing of valves in distribution system, chlorination, checking leakage, checking misuse and pilferage etc) to be carried out periodically by the O&M staff.

## **Andhra Pradesh rural water supply <sup>2</sup>**

Some salient features of Andhra Pradesh rural water supply are summarized below.

- ▶ The GPs contribute towards the cost of all new investments (amount not to exceed 10% of capital cost or Rs. 500 per household, whichever is lower), through funds collected from beneficiary households.
- ▶ The community contribution for the Scheduled Caste (SC), Scheduled Tribe (ST) and BPL households is on a concessional basis (amount not to exceed 5% of capital cost or Rs. 250/- per household, whichever is lower).

### **Fixation of O&M tariff by GP-WSCs**

- ▶ While designing the tariff, the main principles of equity, affordability and willingness to pay will be taken into consideration on actual cost basis, duly making a suitable provision for escalation, in both cost as well as tariff.
- ▶ The tariff setting and O & M of the SVS is the responsibility of the concerned GP-WSC in coordination with GPs.
- ▶ The O & M of the common facilities (bulk water supply) for the MVS is the responsibility of the MVS-WSC.
- ▶ In case of high cost schemes, where the O&M cost of the common facilities exceeds the community contributions (amount due from community and not amount actually collected) from various GPs, this is subsidized by the GP for SVS and ZP for MVS.
- ▶ The Government provides scheme based direct /indirect subsidy when large repairs or replacements are required.
- ▶ The per capita O&M cost of common facilities is estimated for MVS duly including electricity charges, disinfection cost, system & staff cost, & repairs & renewal cost.
- ▶ The cost of intra-village facilities will be similar to SVS excepting that cost of power is much less or not there at all since there may not be any pumping within the village; and there are no disinfection costs as disinfection is done at the source outside the village.

### **Guidelines for estimation of tariff for O & M of SVS / MVS**

- ▶ The O&M of SVS and intra-village facilities of MVS is the responsibility of concerned GPWSC in coordination with GPs and common facilities for the MVS is the responsibility of the MVSWSC concerned.

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<sup>2</sup> Reference for Andhra Pradesh: RWS&S - Andhra Pradesh Rural Water Supply and Sanitation Project (APRWSSP) (World Bank assisted) - Implementation of SWAp (Sector Wise Approach) GO.MS No: 4, 04-01-2013

- ▶ Collection of water charges/ O&M user charges (by GP-WSC), as fixed by the GP-WSC in the Gram Sabha to maintain the scheme to the desired level by GP-WSC.
- ▶ It is to be noted that escalation of 5% per annum in both cost as well as tariff can be provisioned for.

Monthly tariff estimation per household is shown in the table below.

	Common facilities	Intra village facilities	Total
Per-capita O&M cost per annum	50	15	65
Average house hold size	5		
O& M cost/hh/annum	250	75	325
O&M cost/hh/month	20.83	6.25	27.08
Proposed tariff/hh/month	30		

### Jharkhand rural water supply <sup>3</sup>

In Jharkhand, the VWSCs have been able to successfully generate revenues through efficient tariff collection. The tariff collection ranges from 35,000 (Vrindavanpur village with 120 households) to 10 lakh (Nuamundi Village with 192 households). Additionally, SWSM is aware that services which rely on the users to finance ongoing running costs will only be sustainable if the willingness of users to pay is sustained. To achieve the willingness of users to pay for the services, the SWSM through policy interventions has ensured transparency and accountability in the functioning of VWSCs. Additionally, the government has provided institutional support to the VWSCs for their improved performance on an-going basis. One of the support strategies included reducing energy charges (cost of energy constituted around 80% of the O&M). In 2011, a separate service category was allotted for rural drinking water supply managed by GPs/VWSCs through the Jharkhand State Electricity Regulatory Commission (JSERC)

The success stories of RWSSs in Jharkhand highlight the following facts

- ▶ VWSCs can deliver high-quality water supply services when a committed state government devices solution that is acceptable to the community.
- ▶ Sustainability of the schemes can be ensured when consumers agree to pay tariffs on time promptly and the government rewards their willingness to pay by ensuring transparency and accountability in the functioning of the VWSCs
- ▶ Providing appropriate incentives for sustaining the willingness to pay encourages users in a big way.
- ▶ The government's willingness to provide policy and institutional support to the communities for addressing dynamic issues promotes sustainability.

### Water supply and tariff collection by GPs in Jharkhand

- ▶ Baliapur Rural Pipe Water Supply Schemes covers 3 Gram Panchayats in Dhanbad District
  - Individual users pay a fee of Rs. 170 per month.
  - The committee allows use of stand post for households who cannot afford to pay individual tariff. Such households pay a token charge of Rupees 1 per Day for Water Withdrawal.
- ▶ Mahudi Water supply schemes are situated in Saranda Forest in West Singhbhum District
  - The VWSC took charge in 2010 and there were only 98 connections

<sup>3</sup> References for Jharkhand: Based on the report of authors Sudhir Prasad and Kallol Saha

- Presently water is supplied to more than 300 households.
- One time connection fee of Rs 318 and monthly fee of Rs 100 are collected from all users.
- ▶ Bhandara Rural Pipe Water Supply scheme is situated in the bank of Koel River in the southern part of Lohardaga District
  - Established in 2009, the VWSC has generated around Rs 68,000
  - The scheme is lifeline to 250 households
  - More than 80% of whom belong to socio economically disadvantaged section.
- ▶ Ghaghra Rural Pipe Water Supply scheme situated at a distance of 80 KM from Ranchi city
  - In June 2013 VWSC took charge and started a drive for new water connection
  - In four months' time demand rose to 100 new connections
  - The present revenue generation is to the tune of Rs. 5000/- per month
  - This amount meets minor repair, O & M and electricity costs

### **Kerala rural water supply <sup>4</sup>**

The key challenges that the state government of Kerala faces in the rural water services delivery are i) dispersed settlement pattern and urban and rural settlements residing in a contiguous stretch (typical Kerala settlement pattern) and ii) many weaker sections generally live in elevated areas with limited access to water services. This escalates the cost of service delivery and poses challenges to equity.

The Kerala Water Authority (KWA) demonstrated that addressing such issues is possible using demand driven approaches, with specific focus on covering poor households while incorporating all aspects of sustainability.

Mookannur village in Ernakulam district, residents had to walk uphill to collect water from a distance of 300-400 meters. The Swajaldhara incorporated a new approach for implementing a demand-driven water supply scheme with a mandated 10 per cent contribution from the beneficiary community and the remaining 90 per cent being borne by the government.

The estimated cost for the project was 19 lakh with beneficiary contributions amounting to Rs 750 per household. Poor households were allowed to pay the beneficiary contribution in six installments. In addition to the membership fee and beneficiary contribution, the households had to incur an expenditure of approximately Rs 2,000 each for connections from the main distribution line to the meter. The project was commissioned in 2008. After the successful commissioning and operation of the scheme, there were additional demands for new connections. Demand from 30 poor families compelled the user group to reduce the membership fees and retain the initial Rs 750 connection charges and provide metered connections to these 30 households. In 2012, when the regular connection charges were Rs 5,000 per household, the user group arranged sponsorships for those households. Currently, 525 families are provided with metered house connections by KSS.

An elected 13-member executive committee of the user group manages the scheme. It also has the authority to decide on issues concerning O&M, including fixing tariff and connection charges, and improving coverage. The billing and collection are also carried out by the group. Meter reading is done within the first five days of a month. The meter readers also prepare the bills at the time of meter reading and hand them over to the households. All expenses incurred on O&M are borne by the user group. The user fees are grouped into two categories as follows:

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<sup>4</sup> References for Kerala: Review of Rural Water Supply Effectiveness in India, Report Number: 44789, World Bank, 2008

Basic Tariff	Tariff for additional consumption
Rs 30/7kl	Rs 6/kl for consumption between 8 and 15 kl Rs 10/kl for consumption between 15 and 25 kl Rs 30/litre for consumption >25k

## Annexure 1: Questionnaires

### Data Collection for Schemes - Demand Driven Scheme

#### Part A: Village Level Information

1. Name of Scheme: \_\_\_\_\_  
Parent project  Additional Financing Project
2. Name of Implementing Agency: \_\_\_\_\_
3. Name of the District: \_\_\_\_\_
4. Name of Block : \_\_\_\_\_
5. Name of GP/ villages under the scheme : \_\_\_\_\_
6. Name of GP Pradhan / UWSSC President
  - a. Name: \_\_\_\_\_
  - b. Telephone No: \_\_\_\_\_
7. Detail of Contact Person from whom information has been gathered:
  - a. Name: \_\_\_\_\_
  - b. Telephone No: \_\_\_\_\_
8. Total HH in the Scheme: \_\_\_\_\_
9. Population benefitted by the scheme : \_\_\_\_\_
10. No. of SC Household in the Scheme : \_\_\_\_\_
11. No. of ST Household in the Scheme : \_\_\_\_\_
12. No. of OBC Household in the Scheme : \_\_\_\_\_
13. No. of BPL HHs in the Scheme: \_\_\_\_\_

### Part B: Water Supply Information

1. Type/ technology of water supply scheme:

Gravity-Spring (GS)  Gravity-Gadhera (GG)  Pumping tube well (PTW)

2. Commissioning date of water supply scheme: \_\_\_\_\_

3. Total number of habitation covered under the scheme: \_\_\_\_\_

4. Total Volume of water supplied currently: \_\_\_\_\_

5. Total number of stand posts installed at commissioning : \_\_\_\_\_

a. No. of Fully Functional: \_\_\_\_\_

b. No. of Non-Functional: \_\_\_\_\_

6. Total number of private connections at commissioning : \_\_\_\_\_

7. Total number of private connections at present : \_\_\_\_\_

a. No. of Fully Functional: \_\_\_\_\_

b. No. of Non-Functional: \_\_\_\_\_

8. Number of connections paying tariff: \_\_\_\_\_

9. If Water Supply System is Partially Functional or Non Functional then specify the reason/problem in detail:

a) (Time for which water is not available in a day,

b) any damage to the water supply system,

c) leakage

d) irregular water at source, insufficient water

### Part C: Financial

1. Name and contact of the Treasurer of the scheme: \_\_\_\_\_
2. Is O&M tariff collected:    Yes        No
3. Present actual tariff per HH being charged: \_\_\_\_\_
  - a. Private Connections: \_\_\_\_\_
  - b. Stand posts: \_\_\_\_\_
4. Frequency of collecting O&M charges: (NA if O&M tariff is not collected)
 

Monthly     Once in two months     Quarterly     Half-yearly

Yearly     Not Regular
5. Date of tariff revision (If applicable) \_\_\_\_\_
6. Total O&M amount deposited during the planning phase: \_\_\_\_\_
7. One time connection fee for new private connection after scheme's commissioning: \_\_\_\_\_
8. Financial year wise breakup of the O&M amount collected in last 5 years:

S.No.	Financial Year	Tariff (Rs.)	Total Amount collected without arrears		Number of HHs who contributed in O&M amount during the year	
			(Rs)		Stand Post users	Private connection
			User fees	Penalty		
1	2014 - 2015					
2	2013 - 2014					
3	2012 - 2013					
4	2011 - 2012					
5	2010 - 2011					
<b>Total</b>						

9. Financial year wise breakup of the O&M amount expenditure in last 5 years:

S.No.	Financial Year	Amount spent on salary (a)	Amount spent on electricity dues (b)	Amount spent on Chemicals (c)	Any other expenditure (d)	Total Amount spent (Rs.) (a+b+c+d)
		(Rs)	(Rs)	(Rs)		(Rs)
1.	2014 - 2015					
2.	2013 - 2014					
3.	2012 - 2013					
4.	2011 - 2012					
5.	2010 - 2011					
<b>Total</b>						

10. Is the Scheme Insured:    Yes        No
11. If yes, amount invested in Insurance of Scheme: \_\_\_\_\_

12. If no, is UWSSC willing to insure the scheme: Yes  No
13. Is the scheme insurance renewed every year: Yes  No
14. Balance in UWSSC account pass book at the end of the year (latest): \_\_\_\_\_
15. Is demand and collection of dues register maintained: Yes  No
16. Is receipt for the payment issued: Yes  No
17. Is there separate O&M Account in the bank: Yes  No
18. Is collected amount regularly deposited in the bank (O&M Account) : Yes  No
19. If applicable, is the lease rent paid to forest department till date: Yes  No
20. Major reasons for non-payment of O&M charges by some of the households:

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**Part D: Institutional**

1. Is UWSSC constituted: Yes  No
2. What is the composition of UWSSC: Men  Women
3. How many GP/ UWSSC meetings have taken place after commissioning of the scheme: \_\_\_\_\_
4. Are minutes of the meetings maintained regularly: Yes  No
5. Have bylaws been framed for O&M recovery: Yes  No
6. Have bylaws been adopted/implemented: Yes  No
7. How many community wide meetings have been called after commissioning of the scheme: \_\_\_\_\_
8. Is the community involved in O&M activities Yes  No
9. Whether Social Audit Committee has been formed Yes  No
10. What is the composition of Social Audit Committee: Men  Women
11. What is the number of official staff deployed for handling the scheme:
  - a. Scheme Maintenance Worker (SMW): \_\_\_\_\_
  - b. Plumber/ Fitter: \_\_\_\_\_
  - c. Operator: \_\_\_\_\_
  - d. Any Other: \_\_\_\_\_
12. No. of Men/ women trained for scheme management: Men  Women

**PART E: Information to be collected from the DPR**

1. Total water demand as per DPR: \_\_\_\_\_
2. Total Capital Cost of the Project: \_\_\_\_\_
3. Total Community Contribution Contributed for Capital Investment: \_\_\_\_\_
4. Tariff as per DPR (during commissioning):
  - a. Stand Posts
  - b. Private Connections
5. Estimated Annual O&M revenue: \_\_\_\_\_
6. Estimated Annual Recurring O&M cost: \_\_\_\_\_

S.No.	Particulars	Amount (in Rs.)
1	Annual Maintenance Cost of Work	
2	Annual Staff Charges	
3	Annual Expenditure on Chemical	
4	Annual Expenditure on Electricity	
5	Any Additional Reserve fund	



## Data Collection for Schemes - Supply Driven Scheme

### Part A: Village Level Information

14. Name of Scheme: \_\_\_\_\_  
Parent project  Additional Financing Project
15. Name of Implementing Agency: \_\_\_\_\_
16. Name of the District: \_\_\_\_\_
17. Name of Block : \_\_\_\_\_
18. Name of GP/ villages under the scheme : \_\_\_\_\_
19. Name of GP Pradhan / President
- a. Name: \_\_\_\_\_
- b. Telephone No: \_\_\_\_\_
20. Detail of Contact Person from whom information has been gathered:
- a. Name: \_\_\_\_\_
- b. Telephone No: \_\_\_\_\_
21. Total HH in the Scheme: \_\_\_\_\_
22. Population benefitted by the scheme : \_\_\_\_\_
23. No. of SC Household in the Scheme : \_\_\_\_\_
24. No. of ST Household in the Scheme : \_\_\_\_\_
25. No. of OBC Household in the Scheme : \_\_\_\_\_
26. No. of BPL HHs in the Scheme: \_\_\_\_\_

### Part B: Water Supply Information

10. Type/ technology of water supply scheme:

Gravity-Spring (GS)  Gravity-Gadhera (GG)  Pumping tube well (PTW)   
SVS  MVS

11. Commissioning date of water supply scheme: \_\_\_\_\_

12. Total number of habitation covered under the scheme: \_\_\_\_\_

13. Total Volume of water supplied currently: \_\_\_\_\_

14. Total number of stand posts installed at commissioning : \_\_\_\_\_

a. No. of Fully Functional: \_\_\_\_\_

b. No. of Non-Functional: \_\_\_\_\_

15. Total number of private connections at commissioning : \_\_\_\_\_

16. Total number of private connections at present : \_\_\_\_\_

a. No. of Fully Functional: \_\_\_\_\_

b. No. of Non-Functional: \_\_\_\_\_

17. If Water Supply System is Partially Functional or Non Functional then specify the reason/problem in detail:

e) (Time for which water is not available in a day,

f) any damage to the water supply system,

g) leakage

h) irregular water at source, insufficient water

**Part C: Financial**

21. Name and contact of the Treasurer of the scheme: \_\_\_\_\_

22. Is O&M tariff collected: Yes  No

23. Present actual tariff per HH being charged: \_\_\_\_\_

a. Private Connections: \_\_\_\_\_

b. Stand posts: \_\_\_\_\_

24. Frequency of collecting O&M charges: (NA if O&M tariff is not collected)

Monthly  Once in two months  Quarterly  Half-yearly

Yearly  Not Regular

25. Date of tariff revision (If applicable) \_\_\_\_\_

26. Total O&M amount deposited during the planning phase: \_\_\_\_\_

27. One time connection fee for new private connection after scheme's commissioning: \_\_\_\_\_

28. Number of connection paying water tariff: \_\_\_\_\_ -

29. Financial year wise breakup of the O&M amount collected in last 5 years:

S.No.	Financial Year	Tariff (Rs.)	Total Amount collected without arrears		Number of HHs who contributed in O&M amount during the year	
			(Rs)		Stand Post users	Private connection
			User fees	Penalty		
1	2014 - 2015					
2	2013 - 2014					
3	2012 - 2013					
4	2011 - 2012					
5	2010 - 2011					
<b>Total</b>						

30. Financial year wise breakup of the O&M amount expenditure in last 5 years:

S.No.	Financial Year	Amount spent on salary (a)	Amount spent on electricity dues (b)	Amount spent on Chemicals (c)	Any other expenditure (d)	Total Amount spent (Rs.) (a+b+c+d)
		(Rs)	(Rs)	(Rs)		(Rs)
1.	2014 - 2015					
2.	2013 - 2014					
3.	2012 - 2013					
4.	2011 - 2012					
5.	2010 - 2011					
<b>Total</b>						

31. Is the Scheme Insured: Yes  No

32. If yes, amount invested in Insurance of Scheme: \_\_\_\_\_
33. If no, is UWSSC willing to insure the scheme: Yes  No
34. Is the scheme insurance renewed every year: Yes  No
35. Balance in UWSSC account pass book at the end of the year (latest): \_\_\_\_\_
36. Is demand and collection of dues register maintained: Yes  No
37. Is receipt for the payment issued: Yes  No
38. Is there separate O&M Account in the bank: Yes  No
39. Is collected amount regularly deposited in the bank (O&M Account) : Yes  No
40. If applicable, is the lease rent paid to forest department till date: Yes  No
41. Major reasons for non-payment of O&M charges by some of the households:
- \_\_\_\_\_
- \_\_\_\_\_

**Part D: Institutional**

13. Is there any person appointed for the scheme as maintenance worker: Yes  No
14. Were beneficiaries discussed during tariff revision: Yes  No
15. If yes, how? \_\_\_\_\_
16. What is the process for depositing tariff
- a. Deposited in the Bank
  - b. Given to the person with the village who deposits in the bank
  - c. Deposited in the institution office
  - d. A person comes from the institution to collect tariff
17. What is the number of official staff deployed for handling the scheme:
- a. Scheme Maintenance Worker (SMW): \_\_\_\_\_
  - b. Plumber/ Fitter: \_\_\_\_\_
  - c. Operator: \_\_\_\_\_
  - d. Any Other: \_\_\_\_\_

**PART E: Information to be collected from the DPR**

7. Total water demand as per DPR: \_\_\_\_\_
8. Total Capital Cost of the Project: \_\_\_\_\_
9. Total Community Contribution Contributed for Capital Investment: \_\_\_\_\_
10. Tariff as per DPR (during commissioning):
- a. Stand Posts
  - b. Private Connections
11. Estimated Annual O&M revenue: \_\_\_\_\_
12. Estimated Annual Recurring O&M cost: \_\_\_\_\_

S.No.	Particulars	Amount (in Rs.)
1	Annual Maintenance Cost of Work	
2	Annual Staff Charges	
3	Annual Expenditure on Chemical	
4	Annual Expenditure on Electricity	
5	Any Additional Reserve fund	



## Pricing Policy - HH Survey

1. Name of Appraiser : \_\_\_\_\_
2. Date of Visit : \_\_\_\_\_

### House-hold Survey - Scheme wise

1. Name of Scheme: \_\_\_\_\_
2. Name of Implementing Agency: \_\_\_\_\_
3. Name of the District: \_\_\_\_\_
4. Name of Block : \_\_\_\_\_
5. Name of GP : \_\_\_\_\_
6. Name of the Village: \_\_\_\_\_

### Part A: Household Level Information

1. Name of Head of the HH : \_\_\_\_\_
2. Details of HH:

S. No.	Family Member	Male/ female	Age	Occupation
1				
2				
3				
4				
5				
6				

3. Is the head of the household (Choose a single response)

SC  ST  OBC  General  Don't Know

4. What is the HH income per month?

Below 5,000  5,000 to 10,000  10,000 to 20,000  Above 20,000

### Part B: Water related Information

1. Is the water supplied from scheme the Primary Source of water for drinking:  
Yes  No
2. If No, what is your primary source for drinking water?
  - a. Private Borewell
  - b. Stand Post
  - c. Public Bore well/ Hand pump
  - d. Open Well
  - e. Stream
  - f. Gadhera
  - g. Spring
  - h. Tanker Supply
  - i. Any Other
3. Is the water supplied from scheme the Primary Source of water for other purposes (Bathing, cleaning etc.):  
Yes  No
4. If No, what is your primary source for water for other purposes?
  - a. Private Borewell
  - b. Stand Post
  - c. Public Bore well/ Hand pump
  - d. Open Well
  - e. Stream
  - f. Gadhera
  - g. Spring
  - h. Tanker Supply
  - i. Any Other
5. Is there any alternate source you use for arranging water?
  - a. Private Borewell - Neighbours
  - b. Stand Post
  - c. Public Bore well/ Hand pump
  - d. Open Well
  - e. Tanker Supply
  - f. Stream
  - g. Any Other
6. How much money is spent for arranging water from alternative source per month  
0 (Zero)  Up to Rs. 50  Rs. 50 to 100  Rs. 100 to 250   
Rs. 250 to 500  Above Rs. 500
7. How much time is spent in collecting and carrying water from alternate source  
Upto 10 minutes  10 minutes to 1/2 hour  1 hour  1 to 2 hours   
2 to 4 hours  more than 4 hours
8. How much money is spent in purifying water of other source  
0 (Zero)  Up to Rs. 50  Rs. 50 to 100  Rs. 100 to 250   
Rs. 250 to 500  Above Rs. 500

### Private House Connection

9. If you have a private house Connection, how many days a week do you get water?  
[1] [2] [3] [4] [5] [6] [7]
10. How many times a day do you get water supply?  
Once  Twice  Thrice  More
11. What is the duration of water supply?  
½ hour  1 hour  1 to 2 hours  2 to 4 hours  more than 4 hours
12. What time of day when you get water supply?  
5:30AM-9.30AM  12Noon-3PM  3PM-6PM  7PM-9PM  No Fixed Time

### Stand -Post

13. How many days a week do you get water from the stand-post?  
[1] [2] [3] [4] [5] [6] [7]
14. How many times a day do you get water supply?  
Once  Twice  Thrice  More
15. What is the duration of water supply?  
½ hour  1 hour  1 to 2 hours  2 to 4 hours  more than 4 hours
16. What time of day when you get water supply?  
5:30AM-9.30AM  12Noon-3PM  3PM-6PM  7PM-9PM  No Fixed Time
17. How far is the Stand-post from the house?  
Up to 100 Mtrs.  100-500 Mtrs.  500-1000 Mtrs.  Above 1 Km
18. Mention the container through which you get water from stand-post?  
a. Bucket (Mention Capacity - 10 litre, 20 litre etc.)  
b. Rubber Pipe  
c. Any Other
19. How much time does it takes to get water?  
<5 min  >5 - 10 min  10 min to 30 min  30 min to 1 hour   
more than 1 hour

### If Any other Source

20. If you do not have a House Connection or stand-post, how far do you have to go to your source?  
Up to 100 Mtrs.  100-500 Mtrs.  500-1000 Mtrs.  Above 1 Km
21. If you any other source than house connection or Stand-post, how much time does it take to get water? (Mention capacity of container - 10 litre, 20 litre etc.)  
<5 min  >5 - 10 min  10 min to 30 min  30 min to 1 hour   
more than 1 hour
22. How much water is used per day in litres for your household (No of Buckets)  
a) Drinking Water  
b) Other Uses

*Note: Capacity of storage can be used to estimate the use*

23. Quality of water as per the following parameters?

	Dry months (Summer & Winter seasons)				Wet months (Rainy season)			
	Individual connection		Public Stand Post		Individual connection		Public Stand Post	
Mention the colour of water which you are using	Coloured	Colourless	Coloured	Colourless	Coloured	Colourless	Coloured	Colourless
Mention the Odour of water which you are using	Normal	foul Smell	Normal	foul Smell	Normal	foul Smell	Normal	foul Smell
Taste of water which you are using	Good	Bad	Good	Bad	Good	Bad	Good	Bad
Iron, Salinity and residual of chlorine	Present	Absent	Present	Absent	Present	Absent	Present	Absent

24. Are you satisfied with the quantity of the water: Yes  No
25. Are you satisfied with the quality of the water: Yes  No
26. If you are not satisfied, then what extra is expected?
- More amount of water
  - More pressure in water
  - Better quality - colour, odour, taste
  - Better Filtration
  - Any other
27. Has there been any disruption in supply in last 6 months (number of days) \_\_\_\_\_
28. Is there adequate pressure in the tap water? Yes  No
29. Do you receive monthly/ quarterly bills for water consumption? Yes  No
30. Which Agency Issues these bills?
- GP
  - UWSSC
  - Sector Institution
31. What are the payment options for the water bills?
- Directly at the Bank
  - Bank Correspondent
  - Through and private agent
  - Concerned person at GP
  - Concerned person at UWSSC
  - To SMW
  - Any other
32. Do you pay water charge against the bill? : Yes  No
33. If yes, then what is the frequency of the payment?
- Monthly  Once in 2 months  Quarterly  Half yearly  Yearly  Irregular
34. If No, reason for non-payment of bill? \_\_\_\_\_

35. Has there been any disruption in supply in last 6 months (number of days)/ \_\_\_\_\_

36. Is there adequate pressure in the tap water?

37. Diseases occurred to the family members in last six months

S. No.	Family Member	Male/ female	Age	Occupation	Diseases Occurred	No. of affected days
1						
2						
3						
4						
5						
6						

Note: Water Borne Diseases: Diarrhea, Vomiting & Stomach Problem, Jaundice, Gastric Disorder, if any other

### **Part C: Affordability and Willingness**

1. Are you satisfied with the amount/ bill paid against the service?
2. If not, then what are the reasons for unsatisfaction?
  - a. Water quality
  - b. Water quantity
  - c. Disruptions in water supply
  - d. Low pressure in water
  - e. Supplied for very less time
3. If services are improved, then are you willing to pay more? Yes  No
4. If Yes, then how much? Rs. 20  Rs. 50  Rs. 100  more than Rs. 100

### **Part D: User Satisfaction Rating**

Can you rate your satisfaction level with regard to Water supply scheme?

S.No.		Very Good	Good	Average	Poor	Very poor
1	Overall satisfaction level with regard to Water supply scheme					
2	Is the quality of water supply satisfactory					
3	Is the quantity of water supply satisfactory					

4	Is the tariff collection system satisfactory					
5	Are you satisfied with the tariff amount					
6	Satisfaction about improved environmental conditions					

## Annexure 2: Scheme names

	Scheme Name	Imp. agency	District Name	Block Name	Village Name
<b>Supply Driven Schemes</b>					
1	Sabhawala Water Supply	UJS	Dehradun	Sahaspur	Sabhawala
2	Srinagar Water Supply	UJS	Pauri Garhwal	Khirshu	Srinagar
3	Maletha Water Supply	UJS	Tehri	Kirtinagar	Maletha
4	Ratuda Water Supply	UJS	Chamoli	Karanprayag	Ratuda
5	Roshanabad Water Supply	UJS	Haridwar	Bahadrabad	Bahadrabad / Roshanabad
6	Kausani Pumping Water Supply	UJS	Bageshwar	Garud	Kausani
7	Nainoli Water Supply	UJS	Almora	Hawalbag	Nainoli
8	Kaladungi Gramin Water supply Scheme	UJS	Nanital	Kotabag	Kaladungi
9	GadarPur Gramin water supply scheme	UJS	U.S.Nagar	Gadarpur	Gadarpur Gramin
10	Lal Dang Water Supply	UJS	Haridwar	Bahadrabad	Lal Dang
11	Bagon Water Supply	UJN	Tehri	Thauldhar	Bagon
12	Kishanpur Water Supply	UJN	Uttarkashi	Bhatwari	Kishanpur Karuli
13	Maithani Water Supply	UJN	Pauri Garhwal	Bironkhal	Maithana
14	Selthani (Dubtali) Water Supply	UJN	Almora	Dhaura Devi	Dubtali
15	Pustola Pumping Water Supply	UJN	Pithoragarh	Berinag	Pustola
<b>Demand Driven Schemes</b>					
1	Nortuwala Water Supply	UJS	Dehradun	Doiwala	Bagi
2	Fatehpur Water Supply	UJS	Dehradun	Doiwala	Jeevanwala
3	Khitoli Water Supply	UJS	Bageshwar	Garur	Kajuli
4	Indira Nagar Water Supply Scheme	UJS	Dehradun	Sahaspur	Baljawari
5	Shirikot Khandah W.S.S	UJS	Pauri Garhwal	Khirshu	Shirikot
6	Raidul Water Supply	UJN	Pauri Garhwal	Pauri	Raidul
7	Dhamdhama Water Supply	UJN	Chamoli	Karanpariyag	Dhamdhama
8	Pattarkhani Water Supply	UJN	Bageshwar	Garur	Sirkote
9	Ginatigaon (Bhandar c ) Water Supply	UJN	Nainital	Kotabag	Ginatigaon
10	Dhalani w.s.s	UJN	Dehradun	Vikash Nagar	Dhalani
11	KehriGaon Water Supply Scheme	SWAJAL	Dehradun	Sahaspur	Kehrigaon
12	Rampur Water Supply	SWAJAL	Rudraprayag	Augustmuni	Khankra
13	RopaTok Water Supply	SWAJAL	Champawat	lohaghat	Forthi
14	Dhaari Single Village Gravity W.S.S	SWAJAL	Uttarkashi	Naugaon	Dhaari
15	Aamhat Water Supply	SWAJAL	Pithoragarh	Berinag	Aamhat
16	Parwal Water Supply Scheme	SWAJAL	Dehradun	Sahaspur	Parwal

17	Kandoli Water Supply	SWAJAL	Dehradun	Sahaspur	Kandoli
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### Annexure 3: Key Informants and Facilitators for the surveys and data collection

S.No.	Name	Designation	Contact
1	Sanjay Saini	Pradhan (Roshanabad, Haridwar)	9639621188
2	Himanshu Nautiyal	J.E, UJS, Haridwar	8899343697
3	Vinod Kumar	J.E, UJS, Tehri Garhwal	
4	Amar Singh	Pradhan (Kishanpur Karuli, Uttarkashi)	9458621642
5	Dharmendra Singh	Official, Uttarkashi	9456527589
6	Ravi Singh	Pradhan (Kausani, Bageshwar)	
7	Ashok Bhatt	Official, Bageshwar	9410156944
8	Raklesh Bamrada	Official, Haridwar	9411322084
9	Dyal Singh	Pradhan (Bagaon, Tehri Garhwal)	
10	S.S. Bhandari	Official, Tehri Garhwal	7830600190
11	Trilok Singh	Pradhan (Pustola, Pithoragarh)	9568521899
12	Shekhar Rotaila	Official, Pithoragarh	9627581900
13	Shankar Lal	Pradhan (Dubtali, Almora)	9412104075
14	Neema Shah	Official, Almora	9411764745
15	Parwati Devi	Pradhan (Nainoli, Almora)	9675855541
16	Purananchandra Upadhya	Official, Almora	7351659917
17	Bala Devi	Pradhan (Sabhawala, Dehradun)	9411723796
18	Rajandar Singh	Official, Dehradun	911723796
19	Harish Chand Kandwal	Pradhan (Ratuda, Chamoli)	
20	Mr. Bisht	JE, UJS, Chamoli	9690406083
21	R.K. Tiwari	Official, U.S.Nagar	7535801609
22	Ranveer Singh Negi	Pradhan (Raidul, Pauri Garwal)	7500992867
23	Subhash Chandra Sundriyal	Official, Pauri Garhwal	9411093617
24	Hemalata Dobhal	Pradhan (Dhaari, Uttarkashi)	8937828536
25	Sita Ram Dobhal	Official, Uttarkashi	9639827613
26	Purna Nanda Tiwari	Pradhan (Bagi, Dehradun)	9410702132
27	Ram Singh	UWSSC Member, Bagi	
28	Ramesh Singh Bisht	Pradhan (Dhamdhama, Chamoli)	9837980761
29	Dalveer	Official, Chamoli	

S.No.	Name	Designation	Contact
30	Sundar Das	Pradhan (Jeevanwala, Dehradun)	9897146904
31	Vivek Kumar	UWSSC Member, Jeevanwala	
32	Pradeep Malashi	Pradhan (Khankra, Rudraprayag)	8057232732
33	Pramanand Bhatt	Official, Rudraprayag	8954205462
34	Hazi Naushad	Pradhan, Parwal, Dehradun	9837784984
35	M.Gushir	UWSSC Member, Parwal	
36	Meer Singh	Pradhan (Kandoli, Dehradun)	9412918548
37	Giridhari Singh Bhandari	Pradhan (Shirikot, Pauri Garhwal)	9760752995
38	Bhagwati Prasad	Pradhan (Forthi, Champawat)	8449949499
39	Mohan Chandra Bagoli	Official, Champawat	9411347107
40	Leela Sharma	Pradhan (Baljawari, Dehradun)	9756980819
41	Prema Barthawal	Pradhan (Ginatigaon, Nainital)	8650687224
42	Narendra	Official, nainital	8958986094
43	Kavita Devi	Pradhan (Aamhat, Pithoragarh)	8859653455
46	Daan Singh	UWSSC Member, Aamhat	
47	Seema Devi	Pradhan (Kehri gaon, Dehradun)	9634484840
48	Ravi Loshiya	A.E., UJS (nainital)	8193036947
49	Sher Singh	Pradhan, Kaldungi, nainital	9412943763