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RVWRMP III Study Brief

Water Tariff Analysis in Private Tap Systems of Water Supply Schemes



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1. Introduction

A water tariff is the money collected from water supply scheme users to cover the Operation and Maintenance (O&M), and possibly other costs of the scheme. The water tariff is important for ensuring finance for continuous scheme maintenance throughout the scheme design period of 15-20 years, and hopefully beyond.

Equitable tariff collection encourages the stakeholders to pay their share and it enables good scheme management. Equitability sometimes means, e.g., that the poorest and otherwise disadvantaged households are excluded from the tariff payment altogether, based on a joint community decision. This requires that the families are aware of and agree upon the situation of the specifically disadvantaged households within the community.

The water tariff is used to raise sufficient funds for running costs. The running expenses involve regular monitoring, repair of damaged structures and replacement of components, and ideally a possibility for service level improvement and scheme extension. The running costs should also cover the running Water Users Committee (UC) and Village Maintenance Worker (VMW) costs. The UC is responsible for scheme management and decision-making, while the VMW is typically the responsible person for conducting scheme monitoring and maintenance works.

The water tariff can be also used to cover larger investment costs in the case of significant damage caused by hazards, such as landslides, and at the end of the scheme life cycle. A part of the collected tariff is typically saved as an O&M Fund in a bank or cooperative account. The UCs typically get reasonable interest for the savings in cooperatives or banks, along with some services: For instance, cooperatives typically offer O&M funding for the UCs that are cooperative members. The accumulating savings enable a stronger buffer towards unexpected events that may damage the scheme, as well as a possibility to cover a remarkable part of the scheme rehabilitation costs.

A major problem with savings is the inflation – the interest from the savings should ideally exceed the inflation rate. In Nepal, the official inflation has traditionally fluctuated at around 10%, but since 2016 it has decreased to around 5% annually. RVWRMP experience from last decades indicate that cooperatives have typically been able to provide a sustainable interest rate that exceeds the inflation, while the banks less so.

However, the RVWRMP experience shows that the rural communities in Sudurpaschim and Karnali Provinces are unable to fully cover large investment costs alone, without any external support. The newly established Rural Municipalities (RMs) can mitigate this challenge if they take seriously their responsibilities to provide water supply and sanitation (WASH) for all the citizens. Alongside substantial RM support and cooperative funding, the UCs' own O&M Funds should ideally be sufficient to cover the rehabilitation cost of the scheme once the life cycle of the scheme has surpassed.

With RVWRMP III ending in 2078/2079, it is crucial to study the operation and maintenance of the project's water schemes. This study contributes to the need by investigating current water tariff collection patterns and related management practices in private tap schemes. The study also finds out if the fully functional and actively managed UCs have a more sustainable water tariff collection than the other UCs. The study results provide guidance and ideas for UC members and field staff in how to calculate and implement water tariffs even after the project's completion.

2. Defining and calculating the water tariff

RVWRMP's Step-by-Step process (Post-construction Phase) involves a water tariff definition and calculation exercise for the supported schemes within the Water Safety Planning and O&M Regulation Preparation Workshop. The outcome is a defined sustainable water tariff proposal for the particular scheme. The water tariff rate is finally decided by the UC and is approved in mass meeting of users and/or General Assembly. The tariff is typically decided based on the paying capacity of the users/consumers as well as to cover the running operational expenditures to operate the scheme and to pay the VMW salaries and possible other costs.

Water tariff calculation has to cover, in simplified terms, two costs: 1) The actual running/operational costs; and 2) The UC's share of the investment recovery cost. At the very least, revenues from water tariffs should cover the running costs: Cost of labor, materials, goods, rents, running management costs, and services used in producing water. Investment recovery is the amount of money needed to be saved to cover the rehabilitation investment costs (or hazard recovery cost) in the future. The UC should be able to cover part of that costs, and therefore it needs to cover more than just the running costs in the tariff. In general, the UC saves a part of the collected tariff in cooperative or back accounts for this purpose.

There are two common ways to define water tariff in the Project area: Uniform sum payment per household (or per tap in shared community tap systems) per period, and a water consumption-based payment per period. The uniform sum payment is naturally suitable for schemes that do not have a metering system, whereas the consumption-based payment method is recommendable for schemes that have installed water meters for the end users. A payment method that combines the two is also possible, but not used in the surveyed schemes.

In the **uniform rate method**, a defined lump sum is charged per household or tap, irrelevant to amount of water used by the users, as shown below:

$$\text{Water tariff rate (NPR/m/hh)} = \frac{\text{operational costs} + \text{investment recovery (NPR/m)}}{\text{no. of households (or taps)}}$$

In the **consumption rate method**, the water tariff is set according to the quantity of water consumed in each household (or other metered user), as shown below.

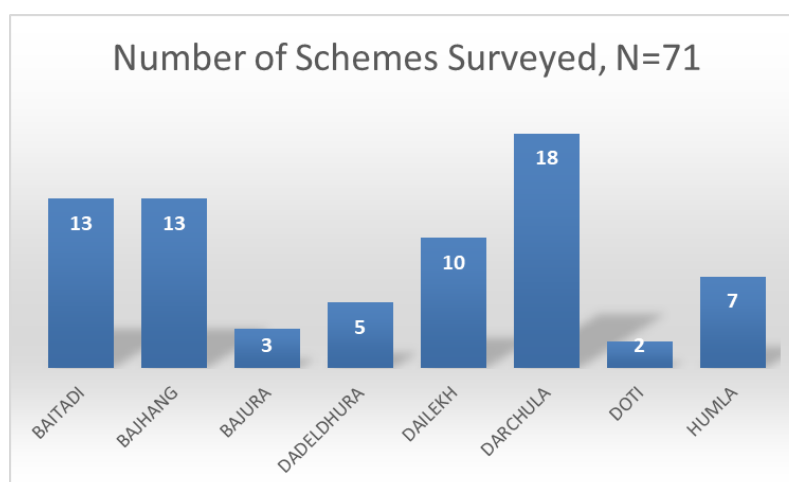
$$\text{Water tariff rate (NPR/litre)} = \frac{\text{operation cost} + \text{investment recovery (NPR/m)}}{\text{water use per metered user (l/m)}}$$

3. Survey data collection and analysis methods

3.1. Questionnaire and sample

Data collection from private tap water supply schemes is carried out with a questionnaire. The questions are based on the tasks we have found to be most important over the years for maintaining sustainable and functional schemes. A study published by RVWRMP staff explored the important features for scheme functionality and sustainability, involving community inclusiveness, right institutions, O&M regulations and WSP, smart system design, linkages to livelihoods, social inclusion, and technical assistance¹. They are part of the Step-by-Step process that RVWRMP uses to implement water supply schemes.

The questionnaire was divided into three main themes: system, management, and water tariff. The data was collected from UC representatives and VMWs by RVWRMP's District and Municipal level staffers. A total of 71 water schemes from 8 districts were surveyed for the analysis – see the details in the figure below. 66 were solely water supply schemes while 5 were MUS schemes. A majority (87%) of the schemes were completed recently in 2076/77 or 2077/78. At the time of data collection, 69 of the schemes were physically completed and 4 schemes were physically completed but financially not yet cleared. Given sample mainly consisted of relatively recently completed schemes, the data reflects the status in the beginning of the schemes' life cycles.



The questions in the survey are as follows:

System functionality

1. Is the quantity of water available to you as per design?
2. Is water available to you year-round as per design?
3. Is water quality tested?
4. Is there always clean water in your tap? (Always, Mostly, Sometimes)

Management

5. How are you organised for operation and maintenance of the water supply system?
6. Who maintains the system?
7. Additional income other than water tariff
8. Where is the O&M fund kept? (Bank, Cooperative or mobilized within the community)

¹ White, Pamela; Badu, Indra; & Shrestha, Parikshit. 2015. Achieving sustainable water supply through better institutions, design innovations and Water Safety Plans – an experience from Nepal. Practical Paper. Journal of Water, Sanitation and Hygiene for Development. IWA Publishing 05.4.

Water Tariff

9. Does your scheme have water tariff fixed?
10. if yes, what is the basis of water tariff (Equal for All or Based on Water Consumption)
11. What is the Minimum water tariff in your water supply scheme?
12. Are you satisfied with the rate of water tariff?
13. Who decides the water tariff?
14. Is water tariff collected regularly?
15. Who collects water tariff?
16. Is water tariff card and register updated?
17. What are the expenditure headings, from water tariff collected?
18. Is water tariff reviewed?

3.2. Grouping methodology for comparison

The study compares water tariff collection between better and worse managed UCs, as well as between the fully functional and less-than-fully functional schemes. The functionality status were grouped to 'fully functional' and 'less-than-fully functional'. The UC management status were grouped to 'well-managed' and 'worse-managed'.

The division to groups was made based on differences in a few indicator responses: Regarding functionality status, we used Questions 1-3 to make the division. These questions were related to quantity, availability and quality of the supplied water (see above for the questions). If all the responses to Q1-3 were 'yes', the functionality was grouped as 'fully functional', and if any of the responses to Q1-3 was 'no', the functionality was grouped as 'less-than-fully functional'.

Regarding management, we used Question 5 to make the division: The question is "How are you organised for operation and maintenance of the water supply system?" The options were predefined: a) established and active (meeting regularly several times a year); b) established and semi-active (Annual meeting held); c) established and inactive (no meeting held); d) not established. If the response to Q5 was 'a' or 'b' the management status of those schemes was considered to be 'well-managed', and if the response to Q5 was 'c' or 'd' the management status of those schemes was considered to be 'worse-managed'.

4. Survey findings

4.1. Water tariff collection status (Q9 – Q18)

A majority of the UCs collected water tariff, but not all. Out of 71 schemes, 58 (83%) stated that they have a fixed water tariff (Q9). Out of these 58, 40 schemes (69%) had a fixed, uniform water tariff per household, while 18 (31%) were based on water consumption at the household (Q10). This means that a majority of the water users paid a lump sum tariff. The tariff ranged from 20 to 100 NPR per month per household (Q11).

The survey indicates that the water tariff is collected regularly in those schemes where the VMW is responsible for collecting it, and the community together decides the rate. Typically, VMW is the person appointed to collect the tariff – also in metering-based systems. The water tariff was collected by the UC in 30% of the schemes, while in the rest 70% it is collected by the VMW (Q15).

Most of the running expenditures were related to VMW salary, fittings for repairs and maintenance and in some cases office expenses. In 95% of the schemes, respondents were satisfied with the water tariff rate (Q12). In 84% of the schemes, the water tariff was decided by the community together, while in 16% it was decided by the UC (Q13). The water tariff cards and register were being updated in 69% of the schemes, while in 31% they were not (Q16).

Most schemes still collect the same tariff that was decided upon system completion. The water tariff was reviewed regularly in as few as 10% of the schemes (Q18). The low result in Q18 can be explained by the fact most of the surveyed schemes were completed recently, hence they hadn't reached the stage of needing to review the tariff.

4.2. Water tariff comparison between 'better' and 'worse' schemes

The UCs were divided into two groups for comparing the water tariff collection in well-managed and functional schemes with the less well-managed UC's (see Section 3 for how this was done). The performance in water tariff collection was compared between the two groups. The results show very clear evidence of difference between the groups:

- 90% of the well-managed UCs collected tariff (vs. 50% in worse-managed UCs)
- The well-managed UCs collected an average tariff of 64 NPR/m (vs. 34NPR/m) – that is an 88% difference in the rate
- 86% of the UCs collected water tariff in well-functional schemes (vs. 67% in less-functional schemes)
- The average tariff rate in well-functional schemes was 60 NPR/m (vs. 36 NPR/m in less-functional schemes) – that is a 67% difference.

The main findings are also tabulated below:

	Number of UCs interviewed (N)	Water tariff collected (%)	Average tariff rate (NPR/m)
<i>All</i>	71	83	58
<i>Well-managed</i>	57	90	64
<i>Worse-managed</i>	14	50	34
DIFFERENCE	43	40	30 (88%)
<i>Fully functional</i>	65	86	60
<i>Less-than-fully functional</i>	6	67	36
DIFFERENCE	59	19	24 (67%)

The apparent differences between the groups are very clear, so they can be concluded to be significant, despite the relatively small sample size of worse-performing UCs. It is notable regarding the functionality that the differences between the two groups were large despite the differences being relatively minor in the selected few indicators that were used for the group formation. It means that single indicators reflected the larger picture well, and that water tariff collection is very sensitive to UC management activity and scheme functionality.

4.3. Information on functionality and management status (Q1-Q8)

Almost all the surveyed schemes were well functional and a large majority of them were adequately managed. This was expectable given the post-construction support by RVWRMP, and the recent completion dates of the majority of the schemes: A majority (87%) of the schemes were completed recently in 2076/77 or 2077/78 (within 2 years from the data collection).

Regarding system functionality, out of the surveyed 71 schemes, in 68 schemes (96%) the quantity of water available was reported to be as per design (Q1) and in 69 schemes (97%) water was available all year round (Q2). 67 schemes (94%) noted that water quality has been tested (Q3). 62 schemes (87%) stated that there is always clean water from the tap, while the rest, 9 schemes (13%) stated that they mostly had clean water from the tap (Q4).

Regarding scheme management, 48 (68%) were established and active, meaning that they held regular meetings several times a year (Q5). 3 schemes (4%) considered themselves to be semi-active, with an annual meeting held since establishment. Of the rest, 4 (6%) were established, but had not held annual meetings and 16 (23%) were not yet established. 60 responses (85%) indicated that the VMW maintains the water supply system, while 10 (14%) stated that it is the UC (Q6). In one scheme responsibility was shared between the VMW and the UC. Regarding the O&M fund (Q8), 38 schemes (54%) kept it in the bank, 28 (39%) with the cooperative, 3 (4%) in the community and 2 (3%) in cash (probably due to being recently established).

5. Conclusion and Recommendations

In sum, a majority of the UCs collected water tariff, but not all. The survey indicates that the water tariff is collected regularly in those schemes where the VMW is responsible for collecting it and the community together decides the rate. Typically, the VMW was the person appointed to collect the tariff – also in metering-based systems. Most of the respondents were satisfied with the tariff rate. The rate was generally defined by the community together. Additional income is gathered generally from interest earned from depositing the tariff in cooperative holding accounts. Most of the running costs were related to VMW salary, fittings for repair maintenance, and office expenses.

The well-managed UCs, and UCs that maintain functional schemes are significantly more likely to collect a water tariff, and to do it at a sustainable rate, than do the UCs that have even slight management or functionality issues. It is therefore crucial for water tariff collection that the UCs are active and that the O&M process functions well, and arguably the other way around: Sustainable water tariff collection enables active O&M and scheme management.

We recommend special emphasis should be placed on the establishment of active UC and O&M processes for all schemes. Water tariff setting and collection is an indication of active scheme management, and a regularly collected tariff also enables sustainable UC operation and scheme maintenance. Recently completed schemes still need to facilitate water tariff collection in Water Safety Plan trainings. The water tariff rate should be discussed in each Annual General Meeting and adjusted accordingly to cover actual expenditures and to prepare the O&M fund for future challenges. Most schemes had the same tariff for each household regardless of water use – in the future water use efficiency would benefit from broader use of meter-based tariff. Cooperatives have typically been able to provide an interest rate for savings that exceeds the inflation, while the banks not, and hence we recommend the UCs to carefully consider where to save the water tariff.