

COMMUNITY BASED SUSTAINABLE FOREST MANAGEMENT FOR WATER RESOURCE CONSERVATION (COSFOM)

Report on Payment for Environmental Services Household Survey in Ukhrul town



October 2025

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List of Abbreviations

PES	Payments for Environmental Services
PHED	Public Health Engineering Department
ICIMOD	International Centre for Integrated Mountain Development
COSFOM-KfW	Project on Community-based Sustainable Forest Management for Water Resources Conservation in Manipur
VA	Village Authority

1 Introduction

The report at hand is summarising a proposed pilot on Payments for Environmental Services (PES) to be supported by the COSFOM project (chapter 2) and is analysing the results of a PES household survey conducted in Ukhrul town (chapter 3). Main conclusions and an outlook of upcoming activities is provided in chapter 4.

1.1 COSFOM Project Brief

The Project on “Community-based Sustainable Forest Management for Water Resources Conservation in Manipur (COSFOM-KfW)” is designed to improve or sustainably restore climate resilience of upper watershed ecosystems and to increase the adaptive capacity of forest dependent communities through SFM and water resource conservation.

Project success indicators (Phase 1) are defined as:

≥ 10.900 ha of poorly stocked degraded forest stands; 1.000 ha of jhum conservation buffer or other landscape connecting buffer zones; 750 ha of riparian forests managed in management plans

For at least 150 km of streams the ecological status is maintained or improved

Livelihood of 70% of targeted households/users of upper watershed forest dependent villages improved

Four result areas are defined as follows:

Result 1: Participatory watershed planning, coordination and monitoring

Result 2: Restoration & sustainable management of upper watersheds

Result 3: Security and improvement of livelihood

Result 4: Capacity building for community-based watershed management

2 Pilot on Payments for Environmental Services

2.1 Background

COSFOM Project is supporting 24 communities in Ukhrul with springshed rejuvenation following the six step protocol from ICIMOD¹. In this context of springshed management the Project is furthermore facilitating a village pilot on the concept of Payments for Environmental Services (PES).

Box 1: Definition Payments for Environmental Services

Payments for Environmental Services (also known as Payments for Ecosystem Services or PES), are payments to farmers or landowners who have agreed to take certain actions to manage their land or watersheds to provide an ecological service. As the payments provide incentives to landowners and managers, PES is a market-based mechanism, similar to subsidies and taxes, to encourage the conservation of natural resources.

Following initial consultation meetings with Shirui community in October 2024, a first concept note² on the proposed PES pilot was drafted. The concept has been shared and discussed with the PHED in

¹ ICIMOD (2018) Protocol for reviving springs in the Hindu Kush Himalayas <https://lib.icimod.org/record/34040>

² COSFOM (10.2024) Concept Note for Payments for Environmental Services – village level consultation in Shirui village

Ukhrul town and received positive feedback and the PHED articulated a clear interest in supporting the proposed pilot.

2.2 Technical proposal

In the proposed PES pilot, Shirui village community in general and the respective private forest owners in particular are identified as **service producers** while the entire Ukhrul town population as well as Choithar and Langdang village are identified as **service/water consumers**. Shirui is providing the entire drinking water supply for Ukhrul township through two water pipes as well as through privately operated water tankers.

2.2.1 Problem Analysis

Water consumers in Ukhrul town are facing increased water scarcity especially during lean season and often have to purchase additional water from private water tankers which is further draining household financial resources. Intensified water deficiency will increase the pressure on the local administration to ensure the livelihood and survival of the local population. If the PES pilot would be successful it could further contribute to an increased mutual trust and cooperation between local communities and the State and as such contribute to the overall peace process for Manipur State.

Main underlying causes are forest and spring degradation, lack of alternative income of local people which is often resulting in unsustainable land use practises and, frequent pipeline leakages especially during the ongoing construction of the Ukhrul Shirui National Highway 202 Project.

2.2.2 Key Interventions

Key interventions proposed by the project would include:

First, the application of **springshed rejuvenation** in the springscape of Shirui village, particularly at the Shirui mountain area. A detailed hydrogeological survey was conducted in cooperation with ICIMOD and a comprehensive survey report produced ³.

Second, the **Forest Area Closure** concept supported by COSFOM will improve forest protection and result in forest ecosystem rehabilitation for improved watershed protection, while **afforestation** efforts will further improve the groundwater situation. Both activities are ongoing under the current project phase.

Third, a cooperation with the PHED is envisioned to revive **service contracts** with households in Shirui village to monitor and maintain the 11km pipelines running from Shirui to Ukhrul town. Existing pipelines experience frequent failures due to lack of maintenance and result in lack of water supply for entire Ukhrul town, which can last up to a few weeks at a time. For the older pipeline, 13 villagers were employed in 1990 on a contractual basis of which only one remains today. For the 2nd pipeline, two villagers are contracted since 2024.

The technical concept is illustrated in Figure 1 below.

2.2.3 Payment Mechanism and Sustainability

Financial sustainability of the proposed concept could be ensured through water fees from mentioned water users. At present, water fees charged by the PHED remain at a comparatively low level and only around half of the households are paying connection fees, partly because they claim that the supply is not stable enough.

Water charges will best be designed as a voluntary contribution by water users instead of an enforced duty which might be challenging to enforce. In order to understand the general situation of water users and their potential willingness for a water fee to be paid to Ukhrul village, a detailed household survey was completed in September 2025.

³ MFD & ICIMOD (04.2025) Hydrogeological Assessment in and around Shirui village in view of Payment for Ecosystem Services from Ukhrul township

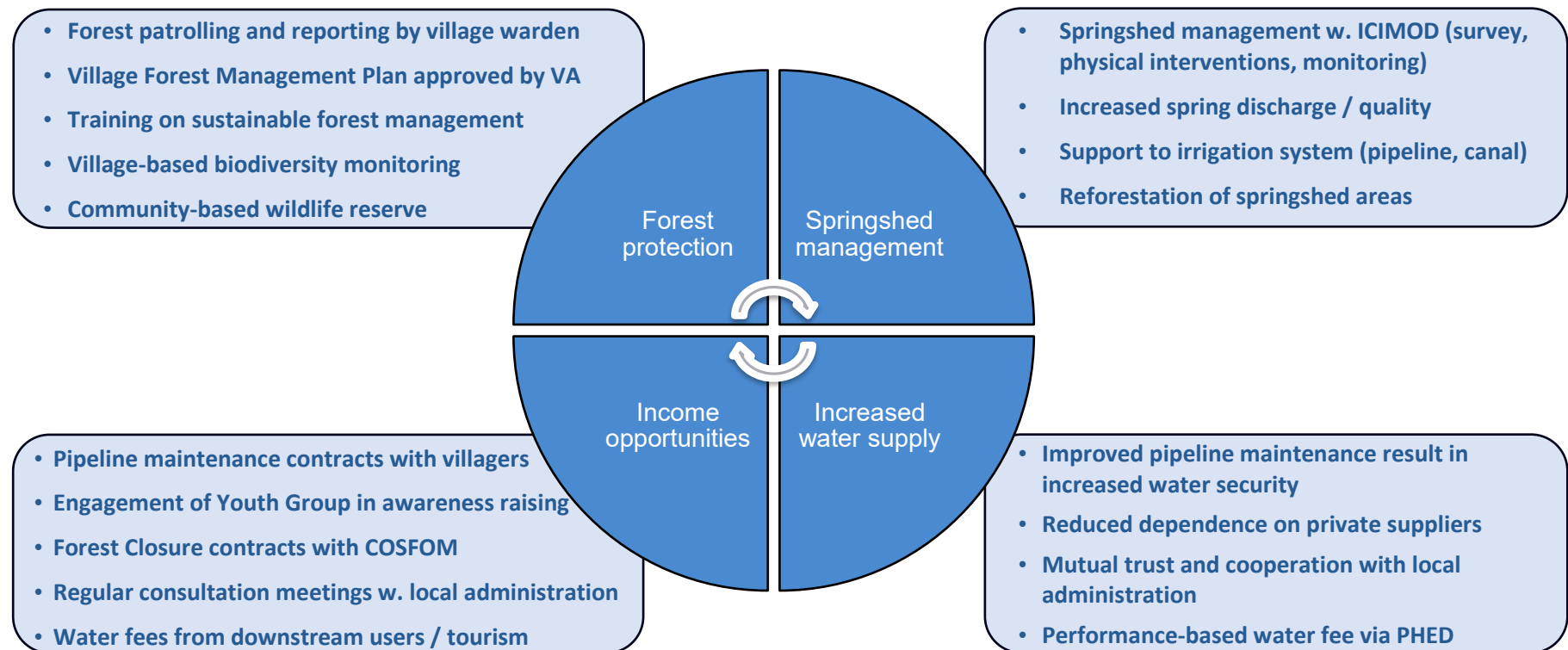


Figure 1: Technical concept Payments for Environmental Services pilot Shirui village

3 PES Household Survey

A comprehensive household survey for Ukhrul town was designed and implemented in September 2025 with survey interviews conducted by five local NGOs along a standard questionnaire. The analysis is providing important qualitative and quantitative information regarding the technical feasibility of the proposed PES pilot and will be utilised to adjust the technical concept to exactly match the local socio-ecological conditions for Shirui village and Ukhrul town.

3.1 Objectives

The objectives of the household survey was to obtain and analyse:

- information on the current water supply situation for households in Ukhrul town and their main sources of water during monsoon and lean season;
- the financial impact of increased water scarcity for households along different wealth classes;
- the potential willingness for payment of a water fee subject to an improved water supply situation;
- the general satisfaction with the current State operated water supply system through the PHED.

3.2 Methodology

Standard questionnaires provided in Tangkhul language (see Annex 1 for an English version) were developed in cooperation with the technical advisor from ICIMOD and a total of 220 household interviews completed, roughly translating into a sampling intensity of around 0.5% of the entire population of Ukhrul town.

Box 2: Calculation of Sample Intensity**As per Census 2011**

- Total Ukhrul town population: 27,187 (Males: 13,917, Females: 13,270)

As per AI generated estimate for 2025 (no updated figures are available)

- Total Ukhrul town population: ~ 30,000 people

Time requirements per household interview were estimated at around 20 minutes only.

3.3 Results

Main results are discussed in the following chapters while the raw data is stored as original survey form in hardcopy.

Digital data entry was conducted by PMU officers in Imphal and an analysis automatically generated via an MS EXCEL database.

3.3.1 Part 1: General Description

A total of 49% of female as well as 51% male interviewees were consulted, exactly reflecting the gender balance as per households census in 2011 (48.8% female and 51.2% male) .

Following a wealth ranking in four categories a majority of interviewees represented the class “medium” with 56%.

A total of 89% of interviewees did not hold any position in the local administration. Household employed in the local administration represented 41% of the better-off households while only one these households was classified as poor.

The number of heads per household are relatively evenly distributed with around 5 children with the highest number of 13 children recorded in a better-off family and thus only slightly exceeding the average of 4.7 members as per 2015-2016 surveys⁴.

The survey sample is therefore considered to be representative for the overall population in Ukhrul town.

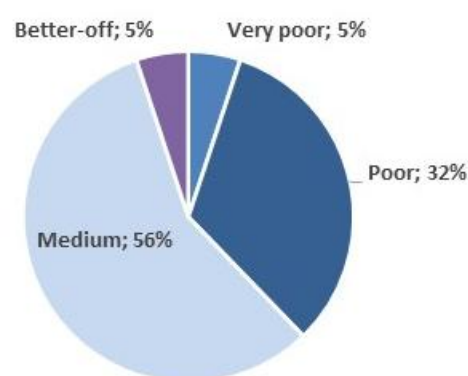


Figure 2: Wealth ranking

3.3.2 Part 2: Household Survey Data

The following paragraphs are summarising the results from the household survey.

I. Water Source

The water sources for households in Ukhrul town are differing significantly depending on monsoon or lean season as illustrated in the graphic below with households referring to the availability of each type of water source.

With only 52% of respondents mentioning to have a PHED pipe connection for their household, the importance of water tankers becomes very evident and is placing a heavy financial burden especially on poorer households. The high percentage of 71% of reliance on water tankers is partly due to the fact that the PHED pipe connection remains rather unreliable. Water supply during monsoon season is predominantly from rain water, while springs maintain a stable water supply throughout the entire year.

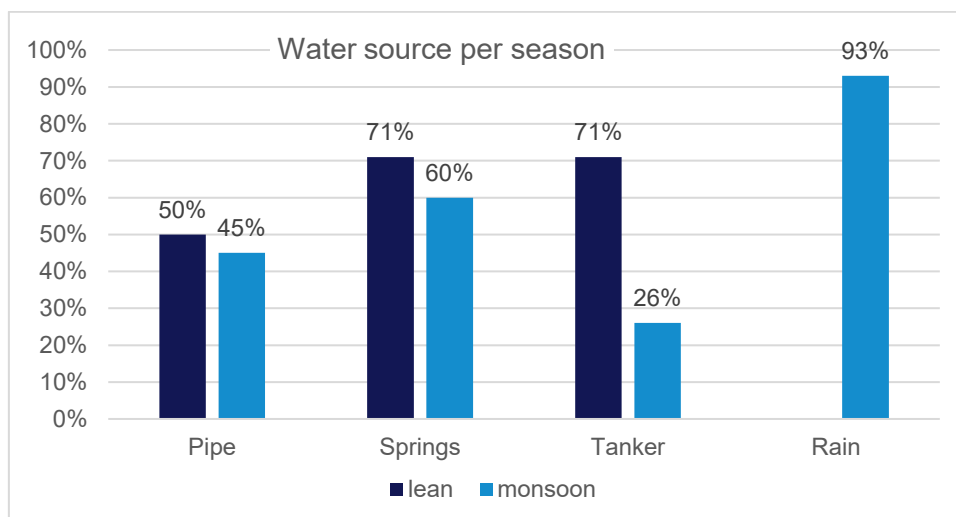


Figure 3: Water source per annual season

The following graphs are illustrating to which extend households are relying on a specific water source disaggregated by monsoon and lean season. Interestingly no statistic correlation was found between availability or absence of a PHED pipe connection and dependency on water tankers

⁴ International Institute for Population Sciences (IIPS) and ICF. 2018. National Family Health Survey (NFHS-4), India, 2015-16: Manipur. Mumbai: IIPS.

during lean season, which again might reflect the unreliability of the existing PHED pipe connections which are extremely prone to breakages. At present only two metal pipes are connecting Shirui with Ukhrul further highlighting the extreme impact of a single pipe breakage along the route. Breakages often remain unrepaired for up to two weeks with two breakages observed by the CTA during recent field visits alone.

The importance of water tankers is furthermore not correlated to the importance given to natural springs in the neighbourhood of a respective household in Ukhrul town. However 47% of respondents mentioned that they receive at least 50% of their water supply from natural springs alone. Only 28% of respondents mention to not supplementing their water supply by tankers at all.

An increased reliability of the PHED water pipe connection would therefore clearly reduce overall expenses for water supply for the entire population in Ukhrul town.

The rather important contribution of natural springs to the water supply in Ukhrul was not expected and it is recommended to conduct a spring inventory for Ukhrul town, as baseline for potential springshed management activities which could be supported either by PHED or the COSFOM project itself.

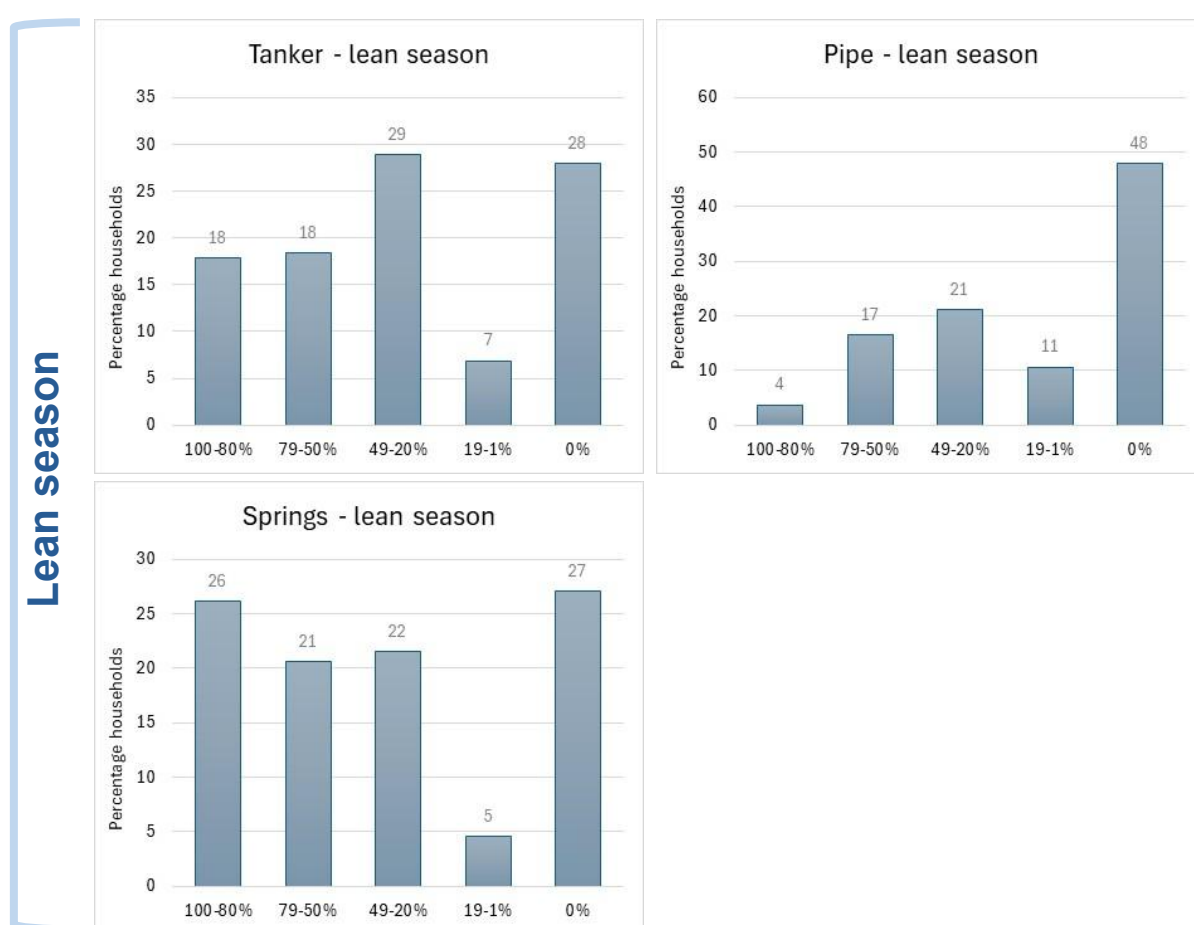


Figure 4: Importance of different water sources during lean season

A clear difference is observed during monsoon season with rain water and springs being the most important water source. Even during monsoon season nearly 20% of the respondents still rely on water tankers for at least 20% of their water supply. Similar to the lean season around 50% of respondents are not relying on the PHED connection at all.

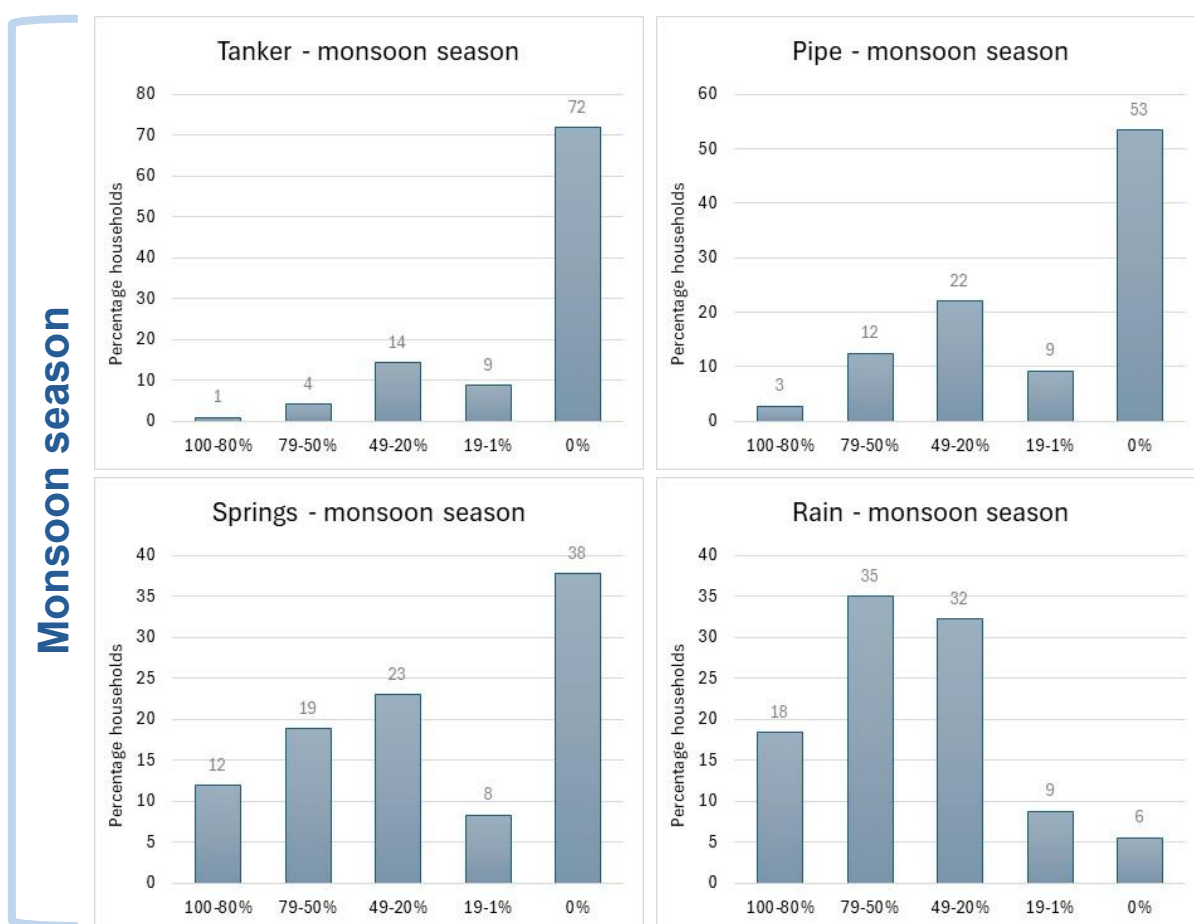


Figure 5: Importance of different water sources during monsoon season

Availability of springs per household in Ukhurul town varies from absent to 8 of which a maximum of 5 per household are utilised. On average 1.5 springs per household are located in their neighbourhood which is again underscoring the importance of springshed management not only in remoter villages but inside Ukhurul town itself.

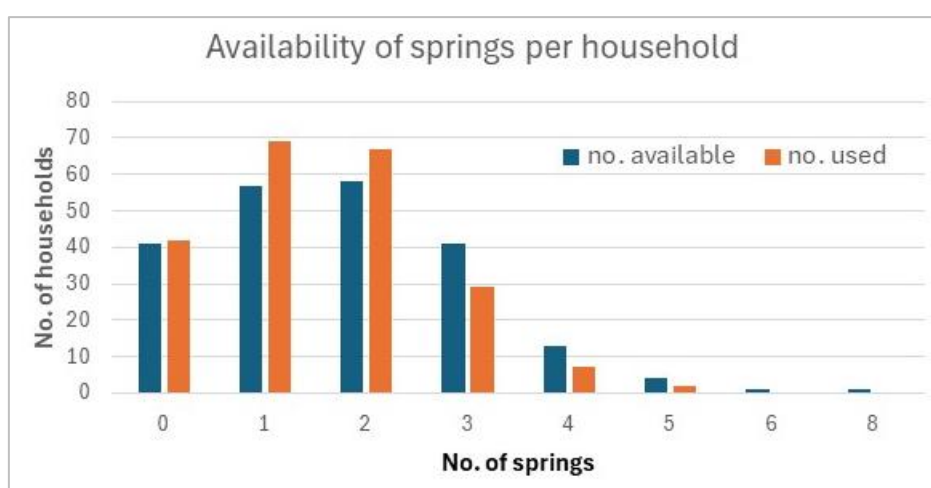


Figure 6: Availability of natural springs per household in Ukhurul town

Around 58% of respondents rated their accessible springs as important for their daily water supply, while 23% mentioned them as their only source of water, while only 8% rated them as neglectable. Despite the overall importance of local natural springs, a strong dependency on Shirui water supply will always remain and will only increase in the coming years. A holistic water supply concept

therefore will always have to be designed two-pronged with Shirui springsheds as main water supply, and local springs in Ukhrul town as second resource especially during lean season to reduce the dependency on costly water tankers.

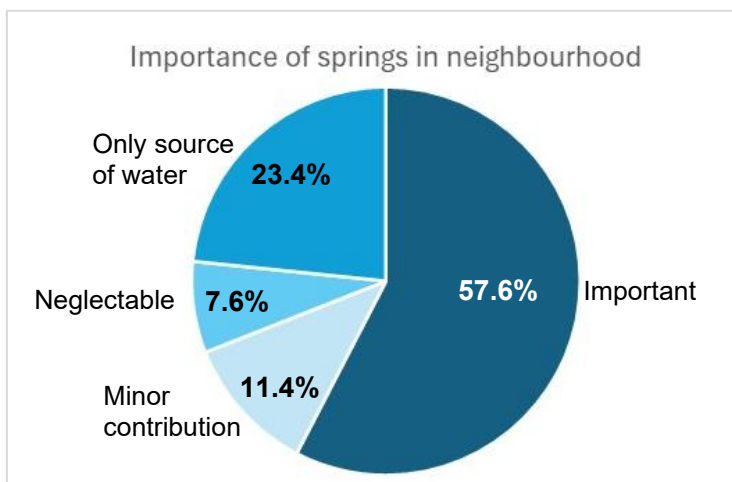


Figure 7: Importance of natural springs in Ukhrul town

An average of 6 water tankers per year are ordered per household with a maximum of 24 water tankers mentioned by a single household. Around half of all interviewed households order around 3 water tanks per year on average. When extrapolated to the entire population in Ukhrul a rough estimate on the huge overall expenses on basic daily water supply becomes evident.

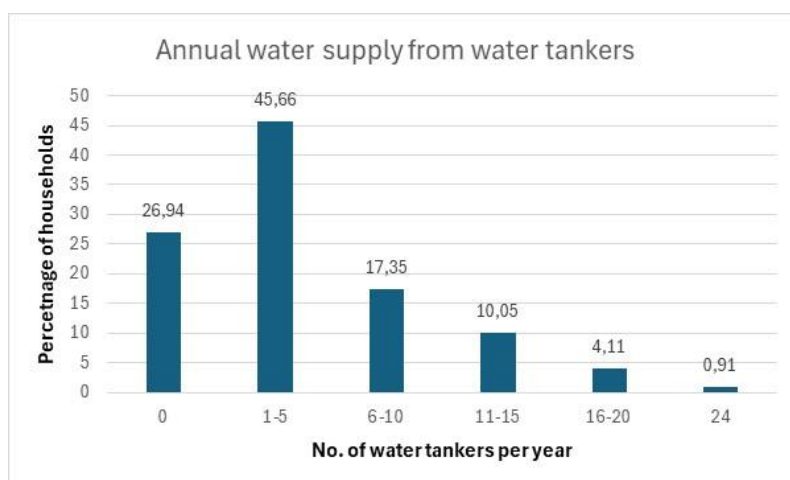


Figure 8: Annual number of water tankers ordered per household

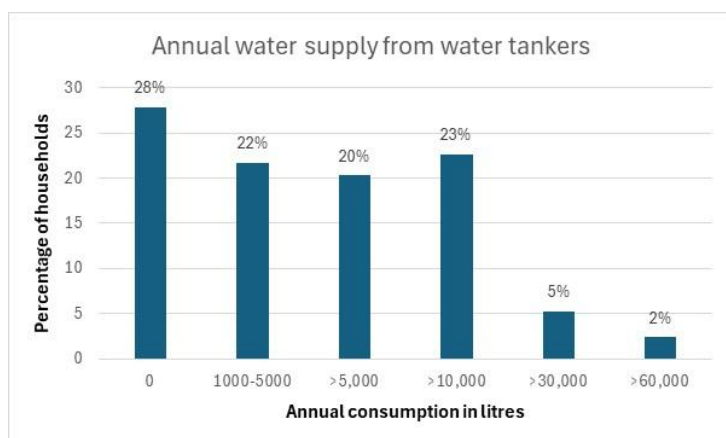


Figure 9: Annual water supply per household from water tankers

As a rough estimate an average of 15,000 litres per annum are supplied by water tankers to a household which is using this service (73.2% of respondents). This would translate into annual expenses for only water of 7,500 INR per annum which would translate into ½ month of paid labour (in compassion daily labour wages for unskilled labourers are currently around 400-500 INR per day in Ukhrul district).

Despite a general price of 6,000 INR per 12,000 litre tanker which is widely observed in Ukhrul, the household survey data ranged from 4,000 INR up to over 20,000 INR per 12,000 litre tanker for unknown reasons and is therefore not further utilised in this analysis.

II. Administrative water charges

As mentioned before, only about half of the households are having a PHED water pipe connection of which again half of them is sharing the connection with other families. On average, 1.9 households are sharing one connection with up to 7 households mentioned as maximum.

Administrative water charges are only due for each connection but the actual water consumption is not measured nor charged. Thus, a shared water connection effectively halves the actual water fees. Rather low connection costs are clearly reflected in the overall acceptance with a clear majority rating the price as “reasonable”.

Water charges rated by surveyed households

Low 7%	Reasonable 74%	Too High 19%
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Table 1: Water charges rated by surveyed households

Despite a standard rate applied by the PHED for the entire district, respondents mentioned charges from between 100 INR to 200 INR (average 143 INR) and in two cases even 800 INR, which is most likely referring to a total of eight connections.

In fact, water fees in Ukhrul remain below average as observed in the wider region and if the service through a more reliable water supply could be ensured an increased water charge for related activities in Shirui village would most likely be welcomed by Ukhrul citizens. Awareness on the importance of Shirui as sole water supplier is high with 86%, however at present no payments for their producer services are channelled back to the community, apart from charges of around 500 INR per water tanker at the village gate.

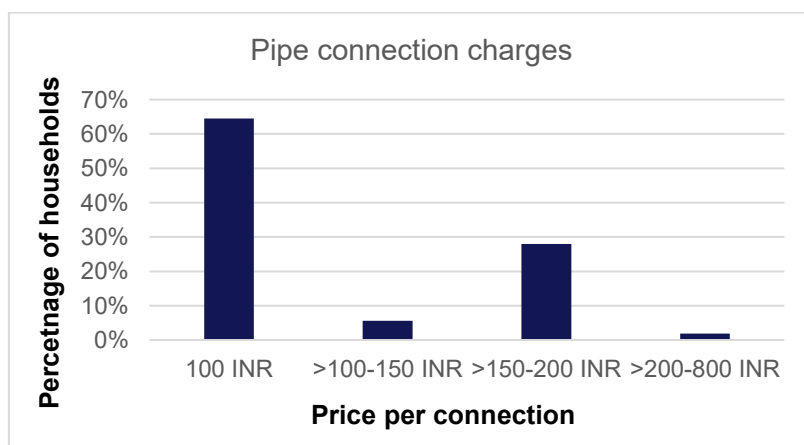


Figure 10: Pipe connection charges per month

III. Satisfaction with District water supply system

When evaluating the level of satisfaction with the services provided by the PHED pipe connection, only 6% rated the services as good or excellent. The vast majority rated services as unreliable.

Satisfaction with District water supply system

Excellent 1 %	Good 5%	Acceptable 21%	Unreliable 73%
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Table 2: Satisfaction with District water supply system rated by surveyed households

Main shortcomings as per survey results are ranked in the table below.

District water supply system shortcomings			
Insufficient	52 %		
Periodical lack	27 %	No answer	17 %
Water quality	3 %		

Table 3: District water supply shortcomings rated by surveyed households

An average of 79 days with insufficient water supply was stated by respondents and might be the most important reason for the low ranking.

Intensified water deficiency – expected as result of further immigration to the district centre and overall climate change will increase the pressure on the local administration to ensure the livelihood and survival of the local population. If the PES pilot would be successful it could further contribute to an increased mutual trust and cooperation between local communities and the State.

IV. Willingness for Payments for Environmental Services

One of the key questions remains with the willingness of the Ukhurul citizen to pay for an improved water supply with the finance to be utilised to maintain springshed rejuvenation in Ukhurul and to compensate private forest owners for their forest monitoring and protection.

From 179 replies only 7.3% (13 respondents) articulated their reluctance for an increased payment (5 belong to the wealth class “poor”; 8 to the wealth class “medium”). An overwhelming 166 interviewees stated their willingness for an increased payment level subject to improved services.

Finally interviewees were asked to quantify the amount they would be willing to add to their current monthly connection fee if better services could be provided due to improved springshed management and pipeline maintenance.

Out of the 166 respondents who articulated their willingness (6 did not quantify any amount), 50% would add between 50-100% extra fee to their current water bill (the detailed analysis is provided in the graph below).

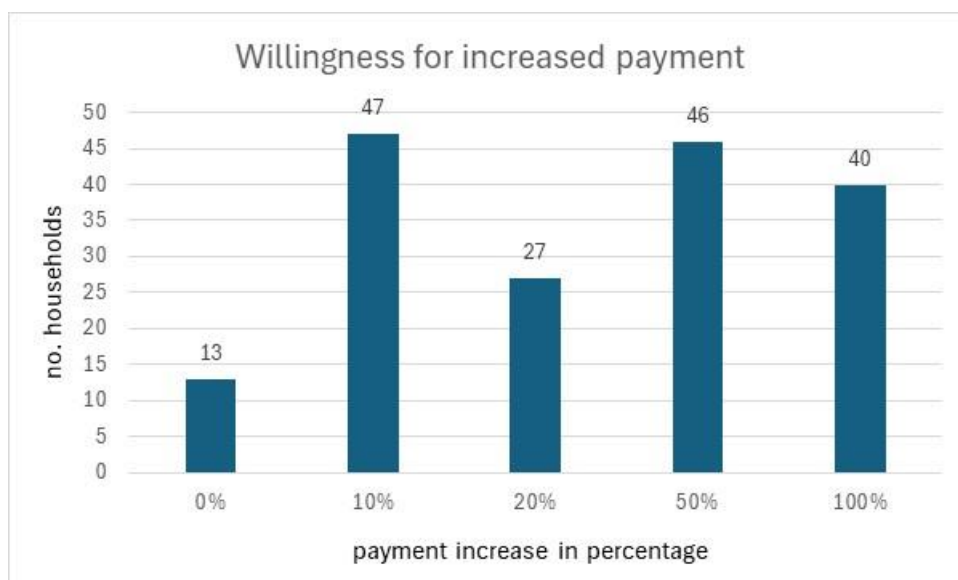


Figure 11: Households willingness for additional payment for improved services

When extrapolating the survey results to the entire population of Ukhurul town, an estimated amount of 183,000 INR for Payments for Environmental Services could be generated, which would translate into only around 46 INR per month per willing household.

Estimated population in Ukhrul town (2025)	39,000	person
Estimated households (4.7 heads per hh)	8,298	household
Households with pipe connection (52%)	4,315	household
Households willing to add. payment (92.7%)	4,000	household
Total monthly additional payment	183,199	INR
Annual additional payment	2,198,388	INR

Table 4: Potential finance generated for PES as per survey results

When applying the current rate for unskilled labour a total of ~ 400 labour days per month could be generated for PES related activities like forest protection and pipe line monitoring / maintenance.

When comparing the average cost of a household that is using water tanker services (average 625 INR/month), the additional voluntary payment (46 INR/month) would only account for roughly 7% of these cost.

4 Conclusion and Recommendations

The PES household survey has provided valuable baseline data to better understand the water supply and demand situation in Ukhrul town. These insights are crucial for designing a feasible and sustainable Payments for Environmental Services (PES) mechanism.

The findings confirm both the urgent need and the strong local support for improved water services. By linking community willingness to pay with upstream conservation actions through a PES mechanism, Ukhrul can establish a sustainable model that ensures reliable water supply, incentivizes resource stewardship, and strengthens local livelihoods.

4.1 Conclusion

1. Water Supply Deficiencies

The existing water supply system in Ukhrul town faces significant challenges in both capacity and reliability. Consequently, household respondents expressed low levels of satisfaction with the current services provided by the Public Health Engineering Department (PHED).

2. Dependence on Natural Springs

Natural springs continue to serve as a critical water source, with over 50% of households identifying them as important and more than 20% relying exclusively on them. Springs remain a dependable source even during the lean season.

3. Limited Reliability and Low Fee Recovery

Prolonged and frequent water shortages have led to a reluctance among residents to pay monthly water fees. Currently, only about half of households are connected to the PHED piped water system, and many share single connections - further reducing per household fee contributions. Existing monthly fees are notably lower than comparable rates in the region.

4. High Dependence on Water Tankers

Due to the shortcomings of the piped system, over 70% of households rely on water tankers to meet their needs. This alternative is substantially more expensive - on average, more than six times the cost of PHED water connection fees.

5. Willingness to Pay for Improvement

Encouragingly, over 90% of respondents expressed a willingness to contribute additional payments for an improved and more reliable water supply system.

6. Potential for PES Mechanism

Based on the survey results, an appropriately designed PES scheme could generate

resources equivalent to approximately 400 labour days per month. These funds could support springshed management, forest protection, and pipeline service contracts benefiting community members in Shirui village.

4.2 Recommendations and Way Forward

To build on the survey findings and operationalize a PES mechanism for Ukhrul town, the following actions are recommended:

Awareness and Community Engagement

Enhance public awareness in Ukhrul town

Develop a targeted communication campaign to increase understanding and willingness to contribute to voluntary water charges. Engage local traditional authorities such as the Naga Long to ensure cultural legitimacy and community buy-in. This should include community meetings, handouts, and posters.

Strengthen awareness in Shirui village

Conduct outreach programs on the responsibilities and opportunities associated with PES participation, continue forest protection measures, commence springshed management and promote labour-based service contracts for pipeline maintenance.

Institutional Coordination and Financial Mechanisms

Collaborate with PHED

Explore and formalize payment collection mechanisms, fund management systems, and procedures for transparent administration and monitoring of PES revenues. Develop clear frameworks for contracting community members from Shirui village for relevant services.

Policy and Legal Facilitation

Utilize the Manipur State Roundtable on Springshed Management to guide the legal and procedural aspects of PES implementation, including adjustments to existing water payment structures.

Technical and Environmental Interventions

Implement Springshed Management Activities

Initiate targeted conservation and restoration measures based on the hydrological assessments conducted by ICIMOD.

Establish an Impact Monitoring System

Design and implement a monitoring framework that tracks both water discharge and quality at the Ukhrul water treatment plant and at key natural springs in Shirui village. This will enable continuous assessment of PES impacts and inform adaptive management.

Annex 01: Ukhrul Household Survey Form COSFOM



Ukhrul Household Survey Form COSFOM



(I) Basic Information (Do not record the name of the interviewee)

1) Date of interview: _____	5) Wealth ranking (e.g., economic status; house owned/rented): Very Poor ☐ Poor ☐ Medium ☐ Better-of ☐
2) ☐ Female ☐ Male	6) Position in administration: None ☐ Yes ☐ _____
3) Tang / Locality: _____	7) Name of recorder: _____
4) No. of heads in family: _____	

(II) Water supply

8) What is your source of water for your family? (multiple answers possible)

a) During **lean season**: PHED water pipe ☐ Spring ☐ water tanker ☐

Estimate the percentage of each? Water pipe ____ % Spring ____ % Water tanker ____ %

b) During **monsoon season**: PHED water pipe ☐ Spring ☐ Water tanker ☐ Rainwater ☐

Estimate the percentage of each? Water pipe ____ % Spring ____ % Water tanker ____ % Rainwater ____ %

9) How many springs are in your neighbourhood? _____

10) How many springs are you allowed to fetch water from? _____

11) How important are these springs for your overall water supply?

Neglectable ☐ Contribute only little ☐ Important ☐ The only source of water ☐12) How many times did you use water tankers this lean season? Never ☐ If yes ☐ how many times? _____

Capacity in Liter of water per truck? _____

13) How much are you charged per water tanker? Amount of water in Liter _____ Money paid _____ INR

14) Do you have a PHED water pipe connection? Yes ☐ No ☐15) Do you share the water connection with other families? No ☐ Yes ☐ how many _____16) Do you know where the water from the pipe is coming from? No ☐ Yes ☐ name village/source _____17) Do you pay monthly fees for your pipe connection? No ☐ Yes ☐ If yes, how much _____ INR/month18) Do you think this level of payment is ...? Low ☐ Reasonable ☐ Too High ☐

19) How satisfied are you with the water supply system from PHED?

Unreliable ☐ Acceptable ☐ Good ☐ Excellent ☐

20) What are main shortcomings you experienced so far?

Insufficient overall water supply ☐ Periodical complete lack of water ☐ Water quality not good ☐

21) How many days you did not get any piped water during this lean season? _____ days

22) What do you think are the main reasons for insufficient water supply? Please describe
_____23) Would you be willing to pay a higher monthly fee if the water supply would improve? No ☐ Yes ☐24) If yes, how much would you be willing to add to current monthly fee? 10% ☐ 20% ☐ 50% ☐ 100% ☐**Thank you for your participation in the interview and your contribution to the Project**

Please use the back side of the questionnaire for any notes or additional information