

COMMUNITY MANAGEMENT OF RURAL WATER SUPPLY

Community Water ^{plus}



IRC, The Netherlands

Understanding the resource implications of the 'plus' in community management of rural water supply systems in India: Himmotthan Water Supply and Sanitation initiative, Uttarakhand



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Community Water ^{plus} is a 20 case study research project managed by Cranfield University, UK, on behalf of the Department of Foreign Affairs and Trade (DFAT) of the Australian Government

Executive summary

Uttarakhand, with presence of mighty glaciers and perennial rivers, is a water rich state. Also, due to its topography, the state receives decent rainfall. Ironically, while Uttarakhand serves the water demand of other states of northern India, the population of Uttarakhand is facing a water crisis, especially pertaining to drinking water. Rudimentary infrastructure for the provision of safe drinking water is still absent in many parts of the hilly regions. Tata Trusts through Himmotthan and its partners in Uttarakhand and Himachal Pradesh has been working to address this situation by constructing taking a participatory community-based approach to developing 289 water schemes and above 5,000 rural sanitation units, thus benefiting more than 46,000 rural people of the states.

As part of the Community Water Plus project, this study set out to assess this experience in the State of Uttarakhand, specifically focusing at how the community management arrangements are developed during the project implementation, and how these are performing and supported after project completion. It validates the performance of the community-based management in terms of operation, maintenance and administration and the eventual service levels obtained by users in four villages of Jaunpur block of Tehri Gahrwal district. The assessment also includes an estimate of the resource implications of these community management and support arrangements.

The Himmotthan Water Supply and Sanitation Initiative involve three categories of organisations:

- The first category is formed by civil society organisations. This includes Himmotthan Society (an associate organization of Tata Trusts) itself, which help leverage funds for the initiative through Tata Trust and other like-minded agencies, whilst carrying out programme management and providing technical know-how to the activities. They roll-out each project in the field through Village Empowerment Committees (VECs), who have been assisted by a local Implementation Support Agency (ISA) which has been appointed by the Himmotthan/Tata Trusts. In this study we focus on one of them: the Himalayan Institute and Hospital Trust (HIHT).
- The second category of organisations is the government entities. The relationship between the NGOs and government is mainly coordination. Himmotthan Society liaises with the State and district governments on issues such as where to implement the programme, through the State Level Steering Committee and District Level Coordination Committee. Also, the initiative started off by building on good practices developed by the State government's rural water supply programme, Swajal, and improved upon those. Only recently, the relationship with the lowest level of Panchayat Raj Institution (PRI), the Gram Panchayats, has been strengthened to a more contributory one.
- The third category is the private sector, in the form of an independent agency that provides technical and oversight support to the programme.

All in all, this set-up is characterised as one of community-management, with NGO-support.

The water supply and sanitation initiative is implemented following a project cycle consisting of four phases: pre-planning (including pre-feasibility), planning, implementation and support to operation and maintenance. During the planning phase, communities can choose from three main technical options: gravity-fed piped scheme, pump scheme and rainwater harvesting. Given the terrain gravity-fed piped schemes are the most common technology. These typically consist of a protected spring or intake in a rivulet. The captured water is treated through roughing filters, in case of rivulate Slow Sand Filters are being used for water filtration. Water is then conveyed to the village, where there is a Clear Water Reservoir (CWR) and where water is chlorinated. Distribution takes place through a number of tap stands. Villages are very concentrated, and there are around 4-5 houses that share on tap stand. During implementation, villagers contribute around 10% of the capital cost.

Subsequently, as part of established exit policies (once the Trusts' support ceases), all assets created are handed over to the Village Empowerment Committee (VEC) for the operation and maintenance phase. They typically appoint a Village Maintenance Worker (VMW) to look after the scheme and each household pays a monthly charge to the VEC for maintenance of the scheme, and stipend of the VMW, necessary repairs and insurance against natural calamities. To ensure the better follow up of previous phases project a full time staff has been appointed by the Trust through HIHT furthering more systematic monitoring and support to phased-out VECs in topics such as chlorination and book keeping.

Furthermore, the programme is characterised by taking an integrated approach, including also full sanitation of the villages and spring source catchment protection activities to ensure long term sustainability of water sources.

This model is a case of community management with support. VECs carry out most of their operation, maintenance and administration activities reasonably well. They are supported in this by voluntary contributions from the community, in the form of community labour to maintenance works for example. There are some deficiencies observed also. For example, book keeping is rather basic and several inconsistencies were observed. A particular challenge in O&M is chlorination, as chlorinators – particularly their regulators - are not robust and get damaged quickly. The support provided by the Trust to phased-out villages in these aspects is therefore much appreciated by VECs and probably necessary to avoid that small issue become bigger problems.

A key area of support is around rehabilitation of damaged infrastructure, after floods and landslides, which occur with regularity in this mountainous area. Communities have insurances (administered via LSA) against damages to the head-works, caused by such events. But HIHT has directly financed some of these works during the 2013 disaster. Occasionally, local government have provided contribution to some repair costs.

The research validated that the infrastructures were functioning well and in good condition. All damages incurred during the 2013 floods have been repaired. None of the systems, which were are 8 years to 10 years old, are coming to the end of its life-span, also because population growth has been nil (or even negative, however the scheme have been designed keeping 20 years population growth in mind) in these villages, so capacities of the system are more than sufficient. The validation showed that the design service levels meet the standards norms of 40 lpcd for stand post and 70 lpcd for household connections. However, users report to take less water from their tap stands than what is designed for. This is likely to be a sub-estimation, as many users carry out some of the activities (doing the dishes and laundry) at the tap stands or at communal tanks. Other service level parameters, like quality, continuity and reliability do meet the standards. Though these systems provide a basic level of service, they do represent a huge improvement compared to the situation before – which could be witnessed in the nearby control village without any supply. Accessibility is very low there, as is satisfaction with the water situation.

Across the programme, the per person investment hardware costs varies from INR 5,000 to 7,000 /person, depending on the distance of water source from village, population and various other factors. In the three sample villages per person are on average INR 7,000 /person. On top of that comes another 25-30% for technical assistance and another 25-30% for software costs to train communities and raise awareness. This refers only the investment costs for water supply and corresponding catchment protection works. All in all, this comes to an average total investment of INR 15,000 /person. When assessing the costs, one has to take into account that the villages are very small, scattered, labour costs are very high (average 45 households per village) and poorly accessible with difficult topography (one had to be reached over a one-hour by foot from the main road).

Operation and minor maintenance costs are very low at INR 18 /person per year averaged across the three villages. This basically covers the costs of chlorination and small repairs and in one village the costs of a paid maintenance worker. Villagers take turns in doing maintenance works, like cleaning intake structures of the roughing filters and these in-labour contributions are included in the cost calculation as well.

Capital maintenance so far has only taken place after the mentioned floods. The annualised costs have been around INR 114 /person/year. Out of this amount, almost half could be claimed back from the insurance. The remainder was brought together by the communities themselves, the Gram Panchayat, and the project.

Finally, there are the costs of ongoing monitoring support, through the appointed of a staff by the project, for which a corpus has been established by the Trust. This amounts to around INR 42 /person/year.

The study concludes that through strong and quality-oriented support during project implementation, necessary capacity is built for community management of these gravity-fed schemes. Communities do manage their systems effectively – though also inconsistencies on chlorination were observed. The recently started systematic support to phased-out villages is a key mechanism to address these deficiencies, as it allows for targeted problem solving and refreshing capacity of the VECs, and for which there exists a strong community demand. The other aspect in which the communities do need and get outside support is the replacement of works after damages caused by floods. After such events, communities need external funding and insurance pay-outs, as these costs cannot cover by the community itself at current tariff levels. It is through this combination of strong community management, and outside support, that these systems have been functioning and providing a level service that meets the design standard for almost 10 years.

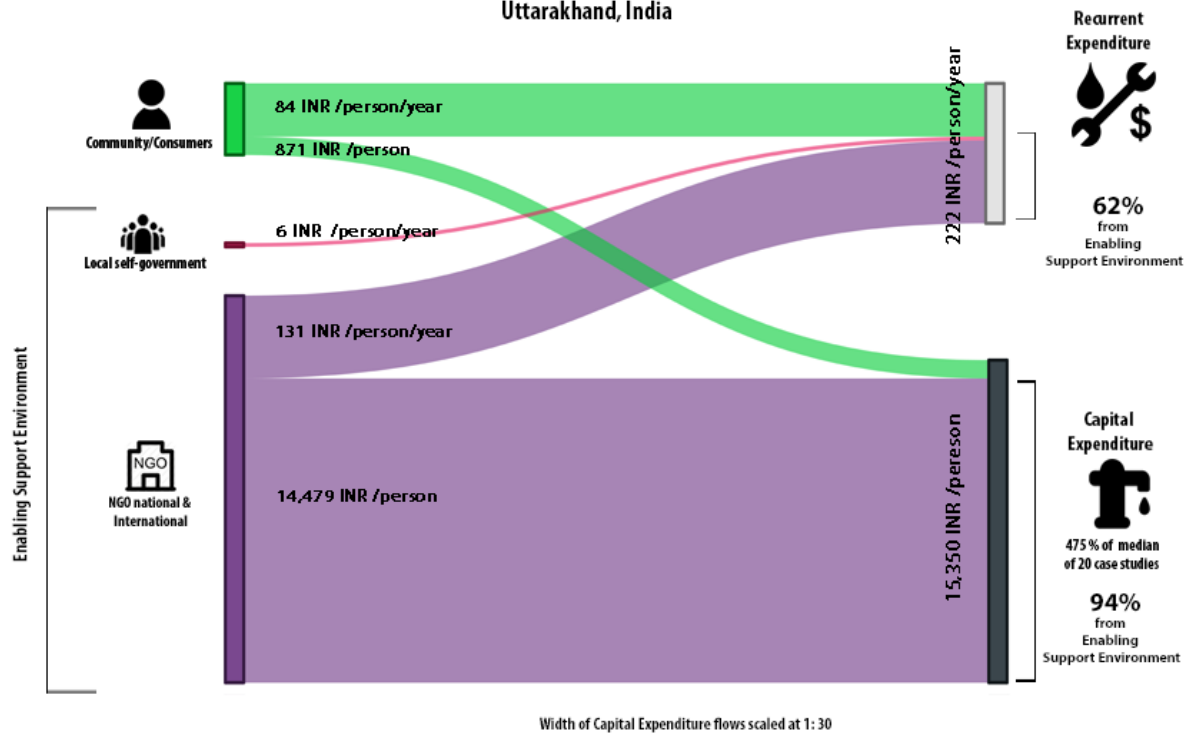
Uttarakhand Summary Cost Table - calculated as the average cost per person, that is averaging across the three 'successful' villages

Source of funds	Use of funds - implementation			Use of funds - annual recurrent					
	CapEx hardware	CapEx software	CAPEX TOTAL	OpEx labour & materials	OpEx power	OpEx bulk water	OpEx enabling support	CapManEx	RECURRENT EXPENDITURE TOTAL
Community/consumers	INR 678	INR 193	INR 871	INR 18	-	-	-	INR 66	INR 84
Local self-government	-	-	-	-	-	-	-	INR 6	INR 6
State government entity	-	-	-	-	-	-	-	-	-
State water supply agency	-	-	-	-	-	-	-	-	-
National Government	-	-	-	-	-	-	-	-	-
NGO national & international	INR 10,019	INR 4,460	INR 14,479	-	-	-	INR 89	INR 42	INR 131
International donor	-	-	-	-	-	-	-	-	-
TOTALS	INR 10,697	INR 4,653	INR 15,350	INR 18	-	-	INR 89	INR 114	INR 222
Median of 20 case studies			INR 3,231						INR 207
'Plus' %age	94%	96%	94%	0%	-	-	100%	42%	62%
Median of 20 case studies			95%						57%

Notes: NGO refers to the cost borne by HIHT and the Himmotthan Society

The Financial Flow Diagram, below, has been developed as an advocacy and communication tool. It aims to assist policy-makers and programme developers to visualise the 'plus' resource implications necessary for sustainable community-managed rural water supply services:

Financial Flows - Rural Water Supply Uttarakhand, India



Acknowledgements

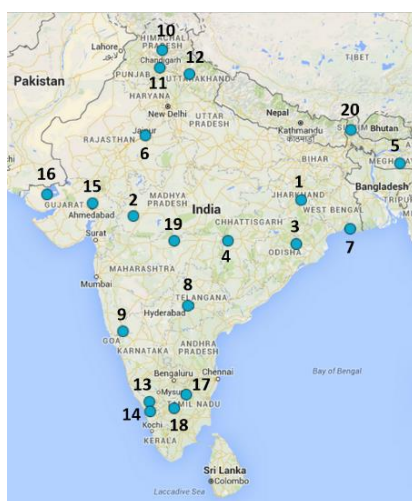
We would like to express gratitude to Himmotthan Society – particularly Mr. Vinod Kothari (Deputy Development Manager, Tata Trusts) and Dr. Malavika Chauhan—Executive Director Himmotthan - for enabling us to undertake this research on Himmotthan’s programme. Lots of thanks go to the team at Himalayan Institute Hospital Trust, who have guided and accompanied us. Particular thanks go to Mr. Nitesh Kaushik (Assistant Project Manager and Environment Specialist), Mr. AshvaniSaxena (Project Coordinator) and Mr. Belwal (Community Facilitator). The survey was supported by a team of 6 enumerators, to whom we extend our gratitude. Kim van Winkel (intern at IRC) supported the data cleaning and entry. Finally, our thanks go to the Village Empowerment Committees and community members who contributed their time to the discussions and interviews that lie at the basis of the results presented here.

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This research project has investigated twenty reportedly successful community-managed rural water supply programmes and approaches across India, from which we have subsequently developed understanding on the support needed to make community-management service provision successful and sustainable. The project has been implemented by a consortium of partners, including: the Administrative Staff College of India (ASCI), the Centre of Excellence for Change (CEC), Malaviya National Institute of Technology (MNIT), the Xavier Institute of Social Service (XISS) and IRC, The Netherlands with overall project coordination provided by Cranfield University, UK.



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The twenty case studies

- | | | | |
|----|------------------|----|----------------------------|
| 1 | Jharkhand | 11 | Punjab |
| 2 | Madhya Pradesh | 12 | Uttarakhand |
| 3 | Odisha | 13 | Kerala (Kodur) |
| 4 | Chhattisgarh | 14 | Kerala (Nenmeni) |
| 5 | Meghalaya | 15 | Gujarat (Ghandinagar) |
| 6 | Rajasthan | 16 | Gujarat (Kutch) |
| 7 | West Bengal | 17 | Tamil Nadu (Morappur) |
| 8 | Telangana | 18 | Tamil Nadu (Kathirampatti) |
| 9 | Karnataka | 19 | Maharashtra |
| 10 | Himachal Pradesh | 20 | Sikkim |

The twenty case studies are available also in four page summaries, both in Indian Rupees and in US Dollar (PPP) versions, accessible from the project website. A Policy Brief and a Research Brief There is also a synthesis report available, published by Earthscan, London.

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1 Introduction

1.1 Background to the topic and the Community Water^{Plus} project

Community management has long been recognised to be critical for rural water supply services. Indeed, community management has contributed significantly to improvements in rural water supplies. However those supplies are only sustainable when communities receive appropriate levels of support from government and other entities in their service delivery tasks. This may consist of easy access to call-down maintenance staff from government entities, or support from civil society organisations to renew their management structures and they may need to professionalize—that is, outsourcing of certain tasks to specialised individuals or enterprises.

In spite of the existence of success stories in community management, mechanisms for support and professionalization are often not institutionalised in policies and strategies. Success stories then remain pockets of achievement. Also, the necessary support comes at a price, and sometimes a significant one – though in many cases there is lack of insight into the real costs of support.

Community Water^{Plus} (Community management of rural water supply systems) is a research project which aims to gain further insights into the type and amount of support that is needed for community-managed water services to function effectively.

1.2 Overall objectives of the research and research questions

This research investigates 20 case studies of reportedly ‘successful’ community-managed rural water supply programmes across India in order to determine the extent of direct support provided to sustain services with a valid level of community engagement. The expected outcome – based on the empirical evidence from the 20 cases - of the project is to have a better understanding of the likely resource implications of delivering the ‘plus’ of successful community management ‘plus’, for different technical solutions, at a level of competence and bureaucratic involvement that is indicative of normal conditions across many low-income countries, and the possible trajectories for institutional development of effective support entities for community management.

In order to achieve that outcome, the project focuses on the following main research question:
What type, extent and style of supporting organisations are required to ensure sustainable community managed water service delivery relative to varying technical modes of supply?

This is further broken down in the following specific questions:

- What are the current modalities of successful community management and how do they differ in their degrees of effectiveness?
- What supporting organisations are in place to ensure sustainable water service delivery relative to alternative modes of supply?
- What are the indicative costs of effective support organisations?
- Can particular trajectories of professionalising and strengthening the support to rural water be identified?

This report provides the experiences of the water supply and sanitation initiative of Tata Trusts, through Himmotthan Society and its partner NGO Himalayan Institute Hospital Trust (HIHT) in Tehri Garhwal district in Uttarakhand. This report describes both the community management and support arrangement in detail, and assesses the effects of the support in terms of service delivery. It also provides an approximation of the costs involved in support.

After this introduction, Chapter 2 presents the concepts and methodology used for this study. Chapter 3 starts with a short description of the programme of Himmotthan Society, and how it has evolved. This chapter also includes the assessment of both Himmotthan Society and HIHT in terms of how they carry out their support roles. Chapter 4 presents the findings at community level, including the performance of the Village Empowerment Committees in their capacity of service provider. This also briefly discusses the role of Gram Panchayats, as the responsible local government organisation. In chapter 5 the service levels that users receive are presented. The sixth chapter presents both the investment costs and the recurrent costs of water supply in this programme, and the ways these costs are financed. The report ends with a concluding chapter and some recommendations. The annexes contain the detailed results of the various assessment tools that were used for this study.

1.3 Concepts and methodology

Community-management remains the predominant approach for rural water supply services delivery in low-income countries. It originated in response to the perceived limitations of the ‘public works department’ phase, and built on the insights around appropriate technology, eventually leading to the present ‘community management’ paradigm. Though this has undoubtedly brought benefits (Schouten and Moriarty, 2003; Harvey and Reed, 2006; Lockwood and Smits, 2011) and is often the most appropriate service delivery model, evidence shows that the community management approach is necessary but not sufficient for sustainable services (Harvey and Reed, 2006; RWSN, 2010).

The hypothesis is that sustainable services delivery requires a combination of community engagement and community management of appropriate technology with the necessary government institutional support (potentially including a level of out-sourcing to the private sector). We see that there is the need to professionalise the support elements of community-management in order to provide on-going support. The needs and possibilities for this differ widely and the need for institutional/functional segmentation and resulting differentiation of support, most likely according to technology use, needs to be further investigated.

Ultimately, we believe that for successful community management, proper support is needed to deliver water services that are: *effective* in terms of quantity, accessibility, quality and reliability; *equitable* in that all rural households can access services irrespective of gender or social status, indeed that there is a bias towards the poorest who most benefit from good public health provision; sustainable or *viable*, in that there are adequate resources available, from whoever, to ensure the continuation of the service; *efficient* such that the minimum resources are used to deliver the desired quality of outputs; and *replicable* such that approaches can work at scale across different localities, not being dependent upon particular situations or leaders.

Building on these principles and applying general insights from the theoretical literature on participation and partnerships, the research identifies several “community-engaged approaches” to ensuring the fulfilment of the human rights to water. These are illustrated in Figure 1 below and include: 1) direct provision with community involvement, 2) community management with direct support and 3) professionalised community-based management. These three broad approaches represent different levels of balance of what communities themselves do, and the extent to which they are supported by external agencies. We believe that these different approaches are closely related to factors such as average income levels, cost of technology, development status and context and that across the demand and cost continuum it is expected that the intensity of community involvement will vary.

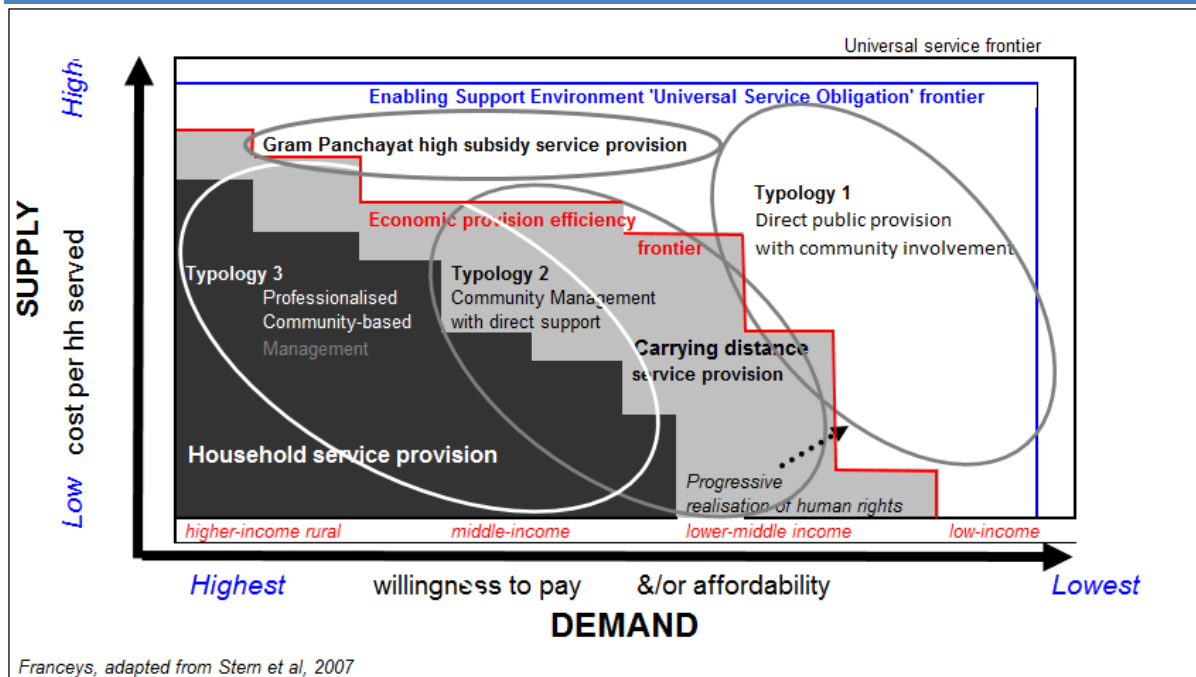


Figure 1: Application of *plus* approaches in relation to demand and costs of water supplies. Source: adapted from Franceys and Gerlach (2008) after Stern et al. (2007)

Key to all three models is the presence of what is called an 'enabling support environment' within the Indian context. The enabling support entities (ESE), that make up this environment, fulfil what Lockwood and Smits (2011) call service authority and monitoring functions, such as planning, coordination, regulation, monitoring and oversight, and direct support functions, such as technical assistance. The main objective of such support is to help communities in addressing issues they cannot solve on their own and gradually improve their performance in their service provider functions. Within this research, we will seek to classify the varying types of community management and the necessary enabling support environment, and get a further understanding of which models are functioning best. An interrelated objective will be to identify the resource implications of this *plus*, economic as well as financial, which is needed to deliver demonstrably successful, sustainable water services across these typologies.

1.3.1 Elements of research

The focus of this research is thus to investigate successful cases of community-managed rural water supplies, and in that assess the type and size of support that has been deployed to make it successful. What can be considered successful can be understood at various levels: at the level of service that users receive, at the level of the service provider carrying out its tasks with a certain degree of community engagement, and at the level of partnership between the support entities and the service provider. The research will therefore assess the degrees of success across various elements, as summarised in Figure 2, and further elaborated below.

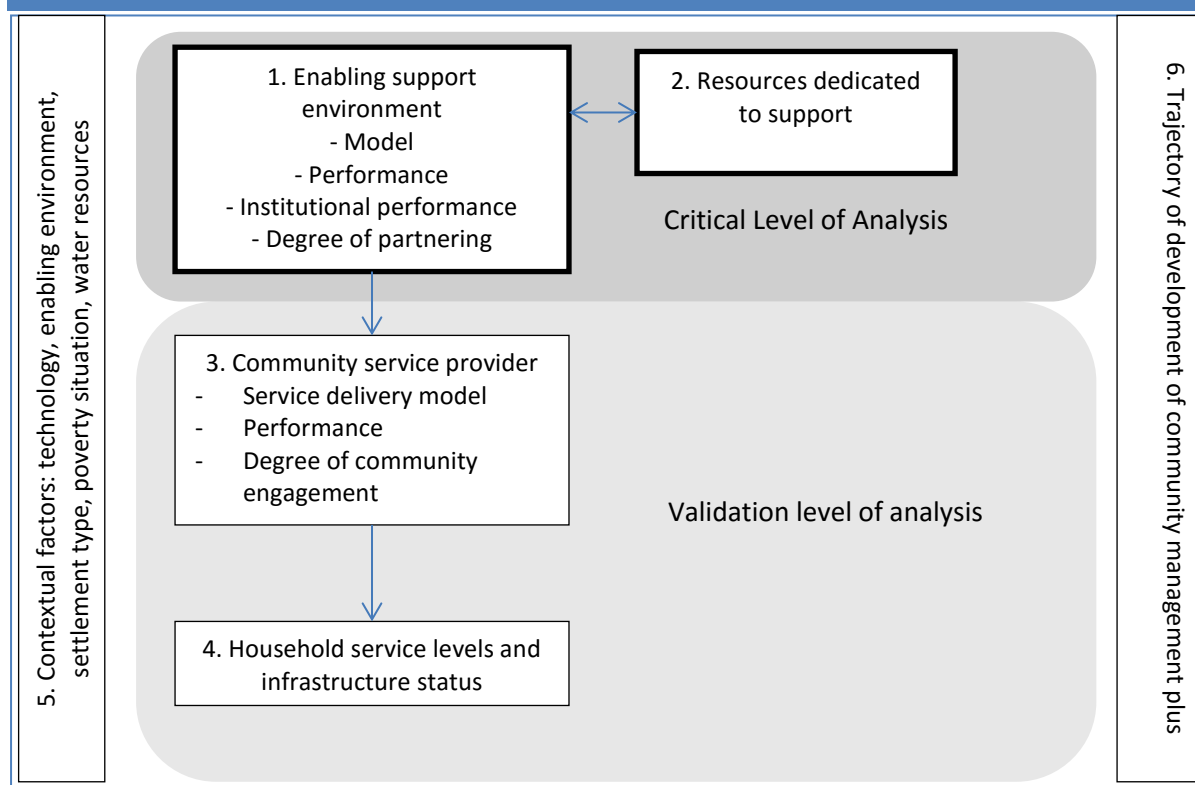


Figure 2: Elements of the research

For further explanation of the research approach please see: “Understanding the resource implications of the ‘plus’ in community management of rural water supply systems in India: concepts and research methodology”, Smits, S., Franceys, R., Mekala, S. and Hutchings P., 2015. Community Water Plus working paper. Cranfield University and IRC: The Netherlands; <http://www.ircwash.org/projects/india-community-water-plus-project>

1.3.2 Case study selection

In selecting twenty successful case studies, the research has scanned over 161 community-managed rural water supply programmes in India, covering a combined population of nearly 50 million people. Through a detailed process of selection using both secondary data and pilot visits, 20 programmes were selected to become case studies.

In this scan, Uttarakhand came out already as one of the states with an apparently strong community-management approach in its state-wide government programme, the World Bank-assisted Uttarakhand Rural Water Supply and Sanitation Project (URWSSP). Several cases from this programme have been included in the compendium of good practices of rural water supply schemes (WSP and MDWS, 2015). When further zooming into the experiences in Uttarakhand, it was decided, to rather carry out the case study on Himmotthan’s water supply and sanitation initiative which had taken on many of the core principles and elements of the Government programme, and further expanded on those. By focusing on a civil society experience, it was also felt that it would better complement the other case studies in the project, which already contained many state-driven programmes. This by no means implies that the Himmotthan initiative is considered more successful than the State government programme, nor does this report seek to make any such comparison.

Within the intervention areas of the Himmotthan initiative, TehriGarhwal district, and more specifically the Jaunpur block, was selected for the case study. This is one of the blocks in which the programme has been active for the longest time, and in which thus systems could be studied that have

been functioning well for almost a decade. Also logistical reasons played a role – as this area was relatively accessible – though still at a two-drive from the main centre of Mussoorie.

1.3.3 Data collection and analysis

In order to have information on each of the research elements, this case study carried out the following data collection methods in July-August 2015:

Table 1: Data collection methods

Unit of analysis	Data collection methods
Enabling support environment	5 Key informant interviews with staff of Himmatan Society and HIHT Review of literature
Service providers	3 Focus group discussions with Village Empowerment Committee members (in the 3 intervention villages) 3 Infrastructure checks (in all intervention villages) 2 Key informant interviews with (former) Pradhans
Households	98 Household surveys (30 in each village, and less in the smaller villages) 1 Focus group discussion with village members (in the control village) 2 Focus group discussions with women groups (in 3 villages)
Resource dedication	Review of project budgets Review of community financial registers

The data were processed in 4 databases (one for each of the units of analysis). These databases contain scoring tables for amongst other the performance of the enabling support entities, the service providers, the degree of partnering and participation and the service levels that users receive (for details of the scoring, see the project's research methodology and protocols (Smits et al., 2015)).

2 The Himmotthan water supply and sanitation initiative

2.1 Rural watersupply in Uttarakhand

Uttarakhand has a relatively low coverage in water supply, with almost 62% of habitations fully covered, and the remainder partially covered (MDWS, 2015). Only few habitations are not-covered.

The Government of Uttarakhand is carrying out ambitious rural water supply activities, including the World Bank-assisted Uttarakhand Rural Water Supply and Sanitation Project (URWSSP), also called Swajal that has been running in its current form since 2005. This project is executed through three agencies: Uttarakhand Peyjal Nigam (responsible for multi-village schemes), Uttarakhand Jal Sansthan (responsible for schemes operate and maintained by the government) and a Project Management Unit (for schemes maintained by the Gram Panchayats).

The construction of water supply systems in Uttarakhand is challenging, due to the mountainous environment. Gravity-fed schemes form often the only feasible option, but these are relatively expensive to develop. Sources are often far away from villages, requiring long distances of main pipes and good protection of the head works against the frequent landslides and floods. The low accessibility of many villages means that transporting materials for construction is relatively expensive.

The same low accessibility has meant that operation and maintenance by the Uttarakhand Jal Sansthan has often been deficient. If systems are damaged by landslides, or experience leakages, it has often taken a long time for the government technicians to come and carry out the repairs. So, though gravity-fed have clear advantages such as no pumping costs involved and in principle continuous supply, the benefits often haven't materialised because of no repairs in case of break-downs.

The URWSSP has therefore put lots of emphasis on community management, putting the responsibility for operation and maintenance clearly with organised village committees (Ministry of Finance and World Bank, 2013). In order to achieve such community management, also decision-making during the construction of the systems has been decentralised to Gram Panchayat and village level. The URWSSP has therefore been designed with characteristics such as: communities constructing their own systems, users contributing in cash to the initial development costs, and the establishment of water committees, trained for operation and maintenance, and village-level financial management and accountability (Ministry of Finance and World Bank, 2013). The programme has also followed an integrated approach between water supply development, sanitation and catchment protection works, in order to improve water resource sustainability.

2.2 Origins of the Himmotthan water supply and sanitation initiative

Himmotthan was born out of an initiative of the Tata Trusts. The Trusts implements different types of rural development programmes across the country, and had initiated a programme of work, named Himmotthan Pariyojana, in Uttarakhand in 2001. The focus of this programme was to incubate innovative development ideas through pilot projects, and to develop strategies for their further upscaling. It has been doing so in different but related thematic areas of livelihoods, livestock and fodder, agriculture, forests, education and water and sanitation. In 2007, for better field coordination and to provide hands on support to the programmes an independent agency Himmotthan Society, was registered which is an associate organization of the Tata Trusts.

In 2004, the Tata Trust's activities in Uttarakhand received due recognition from the Government of Uttarakhand. An, MoU was signed between the Trust and the state government in which both parties

agree to collaborate on rural development issues in the state for an initial ten years period. The agreement was renewed for another ten years in 2014 until 2024.

One of the first areas of work of Himmothan Pariyojana was the water and sanitation initiative which would bring water supply to villages, coupling it with increasing sanitation coverage to 100 per cent and spring - source protection. This water and sanitation initiative has by now gone through three phases, the most recent one having run from 2011 to 2014. This water and sanitation programme, from the onset has been using many of the elements of the World Bank-supported Swajal project model, building high quality infrastructure with project funding support along with a strong focus on community empowerment during the initial construction and community management for operation and maintenance.

2.3 Organisations in the Himmotthan water supply and sanitation initiative

The water supply and sanitation initiative involves – apart from Himmotthan – a number of other organisations (see Figure 3). The figure shows that the support organisations can be broadly divided into three branches. The core and central branch shows four levels of civil society organisations. These coordinate with a second branch of government entities (from State down to district and Gram Panchayat). A third branch of private sector organisations is involved in several support functions.

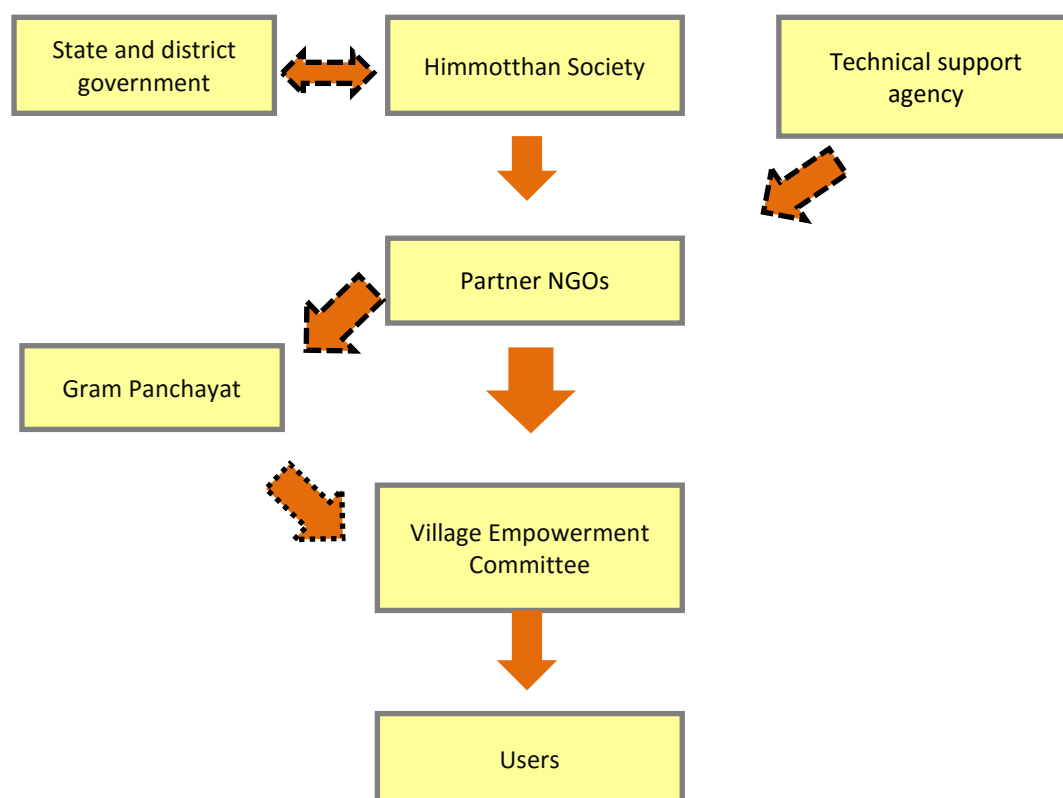


Figure 3: Organisations involved in the Himmotthan water supply and sanitation initiative

The broad responsibilities of these organisations, and relationships between them, are as follows (more detailed information on the responsibilities is provided in Appendix 1).

Civil society branch

- **Himmotthan Society.** With a staff strength of 40 full time professionals (see Appendix 2 for the organogram of Himmotthan), its main focus is on programme management, funding, as and when needed the technical advice and monitoring.
- **Partner NGOs, including Himalayan Institute Hospital Trust (HIHT).** The actual implementation of the programme at village levels is done by Village Empowerment Committees (VECs) through the support of by five partner NGOs of which HIHT is one, and the one we focus on only in the scope of this study. The relationship between Himmotthan and the partner NGOs is guided by a grant agreement. These grants cover not only for the physical works, but also for the NGO's staff time required to do community mobilization and training, as well as ensuring high quality work on the ground. HIHT is an organisation providing 17 staff members focused on the Himmotthan water supply and sanitation initiative.
- **Village Empowerment Committees.** At village level, the partner NGOs interact primarily with what are called Village Empowerment Committees. These are set-up at the start of planning of any intervention. VECs are responsible for actual field implementation and post project Operation and Maintenance of the assets created under the project. It is also responsible for acting at the community decision-making body during the project implementation. After project completion, these committees remain in function, but now responsible for operation and maintenance. Up till 2013, these were registered as independent societies. But since then, they are established as sub-committees of the Gram Panchayats – so have now formally moved from the civil society branch to the PRI branch.
- **Users.** These are thus represented primarily through the VECs and more recently through their Gram Panchayat members. Through these bodies they can influence the decision-making of the project implementation and on the ongoing operation and maintenance. They also have obligations, particularly in terms of the provision of an upfront financial contribution and monthly tariff payment, as well as occasional labour contributions to maintenance works.

Government branch

- **State and district government.** Himmotthan works in close coordination with State and District government. All its water supply and sanitation projects are approved by State Level Steering Committee (SLSC), which is headed by the Chief Secretary of the State and at project district a District Level Coordination Committee (DLCC), approve the projects the committees consisting all line department heads including department of drinking water supply and sanitation. This serves primarily a coordination purpose, avoiding duplicity between government and Himmotthan, and ensuring that the systems developed with Himmotthan support comply with government standards and regulations.
- **Gram Panchayats.** Earlier the role of Gram Panchayats in the water supply and sanitation initiative was limited. Though the Pradhans (presidents) of the Gram Panchayats often had a strong role in mobilizing communities to apply for support and putting forward those applications to HIHT or Himmotthan on behalf of villages, they didn't have any role in project implementation or operation and maintenance. Keeping the long term sustainability and better O&M in mind, Gram Panchayats were involved on the current sets of projects. Gram Panchayats can secure maintenance from the small funds they receive from Government. Also, the strong sanitation agenda of the central government that came to power in 2014 meant that Panchayats would be the nodal agencies for all sanitation works, likely to get grants directly in their accounts. Himmotthan, in its MoU with the Uttarakhand government in 2014, made a strong case for handing over all the water supply schemes to the Panchayats and took a decision for no longer setting up registered village level societies.



"The water situation in my village was dire: the existing government-built water system had only one stand post, with not more than a trickle of water. We had to walk three kilometres to fetch water from a mountain source. During my work in a neighbouring village I came across the work of Himmotthan. When I was elected as a Pradhan in 2008, the first thing I did was to convince the people in my area to also apply for a water supply scheme from Himmotthan".
Sangeeta Ramola, former Pradhan of Gawana Gram Panchayat

Private sector branch

- **Technical support agency:** An independent agency (ENV-DAS is one of them) hired by the Trusts provides technical support in designing water supply systems to the partner NGOs, and provides implementation oversight support as well.

2.4 Project cycle

A key characteristic of the Himmotthan water supply and sanitation initiative is the structured and integral project cycle. This project cycle (see Figure 4) has consisted over four phases: from pre-planning and planning to implementation and operation and maintenance. Since a year, also support has been provided to what are called the 'phased-out' villages, where the systems are running. This could be seen as a fifth phase in the cycle. Each of the phases will be elaborated in more detail below.

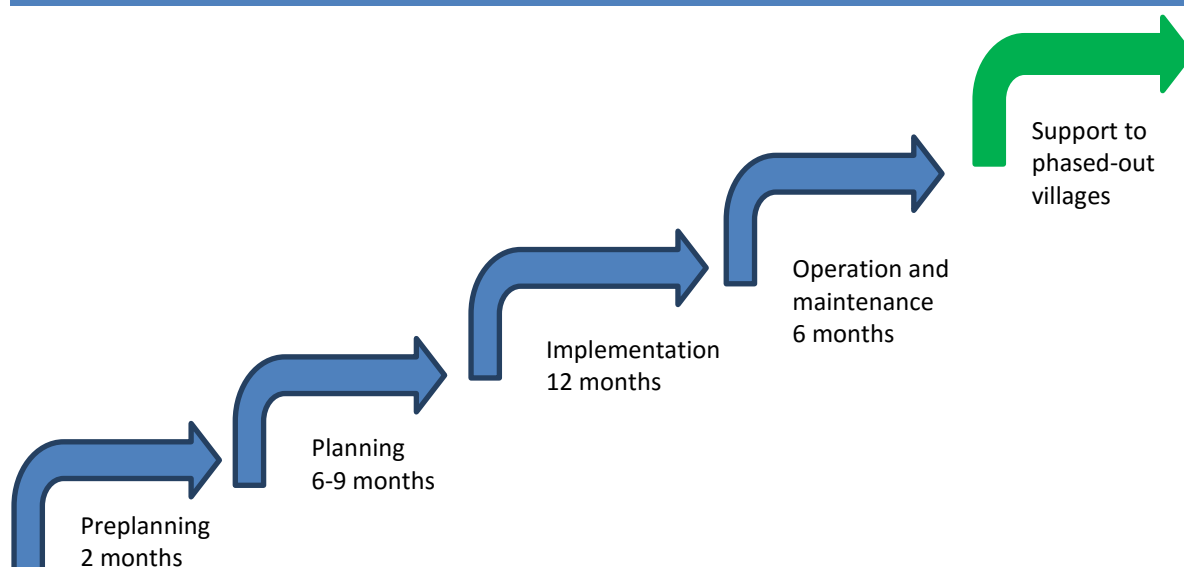


Figure 4: Project cycle of the Himmotthan water supply and sanitation initiative

Pre-planning phase. This phase serves to identify potential clusters of villages where the initiative can be implemented, and to carry out a pre-feasibility assessment of any community request. For this phase, NGOs are provided with a small grant from Himmotthan to assess the actual need of villages in that cluster and whether there are available water sources of sufficient volume to meet the demand.

An ISA, have a presence on the ground in the area, many people are aware of the water supply systems developed by the project supported by Himmotthan. They therefore do also receive many requests and applications from neighbouring villages. In such cases, the NGO will also need to assess the feasibility of the application. The criteria for the pre-feasibility assessment, as defined by the ISAs (NGO), include:

Felt need by the community

- The potential time saving per day is more than 2.5 hours
- Current per person water availability is less than 25 litres per person per day (lpcd)
- The majority of households depend on a polluted source

Technical feasibility

- There is an undisputed perennial source available that is sufficient to meet the village needs
- The village is ready to make itself open defecation free

Sustainability and willingness to pay

- The community is willing to make a 10-15 % contribution to the capital costs
- The community is willing to assume 100% operation and maintenance costs

Planning phase. The objective of this phase is to develop the Detailed Technical Reports of the works to be done, including budgets. Before the planning starts, community mobilization and awareness raising measures are undertaken. This culminates in the formation of a Village Empowerment Committee.

This planning is led by the ISA, with the help of the external technical support agency, but with participation of the community, through its VEC around a range of issues. In this different technical options are discussed. During the focus groups with VECs they all commented that they analysed three technical options: gravity-fed systems, pumping systems and rainwater harvesting tanks. But in

general, gravity-fed systems are preferred as the cheaper option particularly for operation and maintenance.

On some parts of the plans, no negotiation is possible. A community contribution of at least 10% of the capital cost of the water supply project is required. VECs have to open up two separate bank accounts: for capital expenditure works and for operations and maintenance works.

The results of this phase are captured in two reports: a first report consists of the plans for water source catchment conservation and development as well as for sanitation; a second report details the water supply construction works, as well as the operations and maintenance costing. In addition, more detailed Community Action Plans are made including on information and knowledge sharing, monitoring and evaluation, and operation and maintenance.

Implementation phase. This is the phase where the water supply and sanitation infrastructure is built, where capacity building of the VEC and hygiene promotion activities are carried out and where the mechanisms for financing operation and maintenance are put in place.

- The first step in this phase is the construction of toilets by all households as that is a pre-condition for the implementation of water supply infrastructure.
- Once that is completed, the planned water supply system is constructed as well as any household-level rainwater harvesting tanks. An initial water quality testing is included in this step is well.
- Also any catchment protection works, which is based on the geo-hydrology of the source, are undertaken such as, percolation pits, ponds, plantation, brush wood check dam, fencing in the land around the source or putting in protection works around the intake structures.
- Capacity building of the VEC is done throughout this phase and cover issues such as roles and responsibilities of the VEC and the users community, water quality management including chlorination, financial management and procurement, oversight over construction works and conflict resolution
- Hygiene promotion is done through health camps, targeted awareness-raising towards mothers and children, and activities at schools and fairs.
- Financial management by the VEC is started, initially of the funds related to the construction of the works, but later on also the collection of tariffs for operation and maintenance. Mentoring support is provided to the VEC in book keeping. Also, once the system is built, an insurance policy is filed for the system – a mechanism that will be further elaborated in chapter 6.

During the implementation phase, the technical support agency (Himmotthan/ENV DAS India) provides oversight. The ISA partner submits Quarterly Progress Reports -both financial and narrative- to Himmotthan.

Operation and maintenance. Up to recently, this phase consisted of half a year of mentoring and accompaniment by the ISA to the VECs in their operation and maintenance activities. That is, the VEC would already be fully responsible for these activities, but the ISA would regularly monitor how VECs would be doing to correct any issues in aspects such as chlorination, book keeping of conflict management. Through this one year of hand-holding, it was considered the VEC would be fully operational and able to manage their systems on their own.

Support to phased-out villages. This is a phase that is not yet formally part of the project cycle but one that de facto has emerged. As through a corpus fund provided by the project a full time staff is providing O&M support and mobilizing the community as many a time ISA/Himmotthan often get requests for advice or support from communities whose systems are already running. Sometimes these are small questions on for example the repair of the regulator of the chlorinators that can be addressed almost on the spot. Sometimes, they are requests for major support, when a landslide may have damaged a major pipe. Since two years a full-time community facilitator – funded through the Himmotthan Society initiative - whose sole responsibility is to provide ongoing support to these phased-out villages. He does so through a combination of on-request and supply-driven approaches. The on-request approach implies he gets a phone call from a phased-out village or is asked whilst being in one of the project areas, with a question or situation. He then tries to solve this through a visit and meetings with VEC and community. In addition, he regularly visits clusters of villages with functioning systems, whereby focus is on VECs learning from each other.



Photo 1: Mr. Belwal, community facilitator, receives requests from 'phased-out' villages for advice, but also carries out scheduled monitoring and support visits

Summarizing, very intensive support is provided to communities during the implementation cycle – from pre-planning to implementation, followed by hand-holding during the first year of operation and maintenance. The ad hoc and demand-based support to phased-out villages that has happened is now being structured through the community facilitator. The type of support that is provided across these phases is comprehensive and covers a broad range of topics and issues, from book keeping to chlorination and from water resources management to training. Further details are provided in Appendix 3.

2.5 Scale of operations, achievements and impacts

Himmotthan is currently working with 70,000 households over 632 villages across 9 districts of Uttarakhand and even Himachal Pradesh. In 133 of these villages, have water and sanitation interventions taken place, numbering to a total of 289 water systems (some revenue villages have two separate systems, because of topography reasons, as we will see in chapter 4). The third phase of the initiative covered 43 villages, numbering to 1852 households, equivalent to some 12,122 people. These numbers do indicate several key points related to the scale of operations:

- Many of the villages are very small, with an average of 43 households per village. This means that **per person costs are likely to be high**. Any project has certain fixed costs of project management, studies, designs and so on, that don't depend much on the size of the project. These fixed costs weigh in more in small projects than in bigger ones. This will be explored in more detail in chapter 6.
- The scale of operation is relatively small compared to the water and sanitation needs of the State. With a rural population of almost 7 million people in Uttarakhand, it means the Himmotthan initiative has so far reached around 1% of the rural population. Himmotthan's management is aware of this relatively small scale of operation. It also sees it not to be the role of Himmotthan to reach a much higher scale, but rather to share good practices from Himmotthan's initiative with the Government and complementing the effects wherever possible.

Two external evaluations were conducted of the Himmotthan water supply and sanitation initiative in 2010 and the most recent one in 2012 (Knowledge Links, 2012). The latter concluded that the Himmotthan initiative has had an impact in terms of drudgery (time spending reduced by 2.5 hours), water availability (gone up to 59 liters per person per day), which in turn resulted in both productive use of water (kitchen gardening) and hygienic practices (more frequent washing and bathing).

2.6 Performance of the support entities

An assessment was made of the performance of the support entities in their respective roles, against a number of predefined scores as per the research protocol (see Appendix 4). In that, we have limited ourselves to the two central ones: Himmotthan Society and ISA (HIHT), as they are the ones who interact most directly with the communities in the project cycle and focus on establishing the bases for community management.

Overall, it can be concluded that both Himmotthan and HIHT are highly professional organisations, with clearly articulated missions. This mission is also supported by a policy mandate, through the MoU between Himmotthan and the Uttarakhand government. Both organisations apply systematic working methods with corresponding tools, as defined by the project cycle described above. The one element where they could improve is in the systematic monitoring of the performance of the phased-out villages. Monitoring is well developed for the implementation phase, through regular reporting by HIHT to Himmotthan and supervision by an external agency. But after the project cycle is ended, there is no longer systematic information tracked on the performance of the systems they supported. Through the recently started work of the community facilitator that focuses on the phased-out villages, there is scope to start with that. He employs a checklist with some of the key performance indicators, but this is not yet updated on a regular basis into a database or otherwise.

The other element that is not systematically tracked is client satisfaction. Though both Himmotthan Society and HIHT have a good implicit understanding of the high appreciation of VECs and users of the support provided, this is not tracked in a systematic manner. This has been done only during impact assessments, such as the one done in 2012 (Knowledge Link, 2012), which indeed confirmed high degrees of user satisfaction.

2.7 Institutional assessment of support entities

Whereas the previous section looked into how the support entities perform in their roles, here the results are presented of an overall institutional assessment that considers the strengths of the support entities – again limiting ourselves to Himmotthan Society and HIHT, in terms of: 1) organisational autonomy; 2) leadership; 3) community orientation; 4) organisational culture; 5) development and maintenance of staff; 6) technical capability; 7) management and administration; and 8) interactions with external institutions. Through a series of questions these areas were scored on a scale from 0 to 4 (see Figure 5).

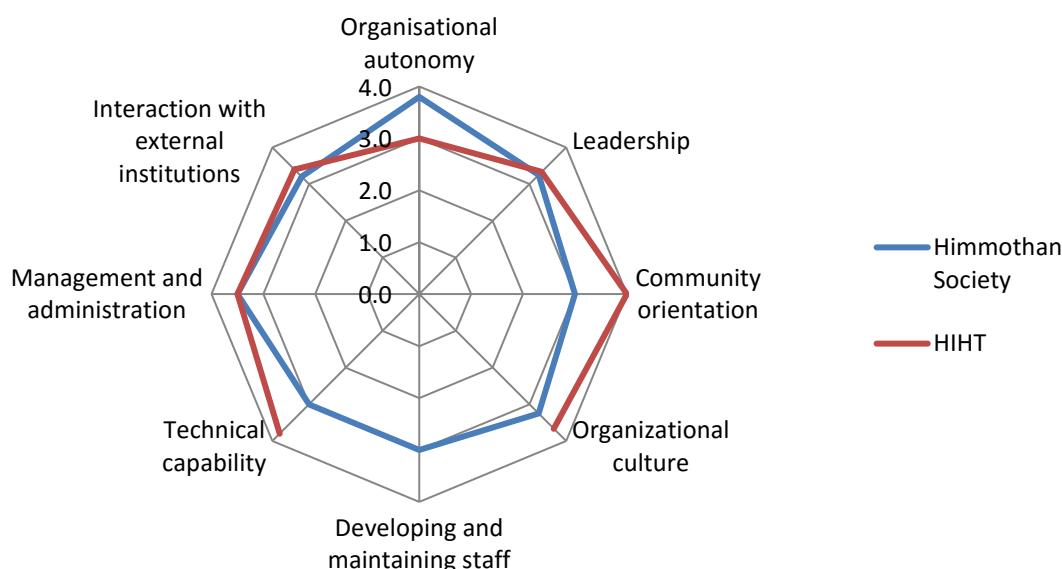


Figure 5: Institutional assessment scores¹

Both organisations score high (more than 3) or nearly all indicators, indicating that both organisations are highly professional organisations with strong internal institutional capacity and linkages with communities and external institutions. The differences between the two organisations are minimal – and mainly due to the different roles that both play in the set-up of the initiative. HIHT scores higher on community orientation – because it is HIHT that interacts directly with communities; it also scores higher on technical capability, because Himmothan Society is focusing mainly on programme management, outsourcing technical aspects mainly to HIHT and ENV DAS India. Himmothan on the other hand scores slightly higher on its organisational autonomy indicators, as it is in the funder position.

2.8 Assessment of type of partnering between HIHT and communities

To conclude this chapter, an assessment was made of the types of partnering that are found between Implementation Support Agencies and communities. This is done using an adapted model of six types of partnerships (Demirjian, 2002):

- Collaborative. The sharing of responsibility and authority through joint decision-making
- Contributory. Partners pool resources or leverage new funds for implementation and maintenance of service
- Operational. The sharing of working (division of labour) and co-ordinate operations
- Consultative. To systematically obtain and share relevant information to improve service design, delivery, evaluation or adjustment
- Transactional. This refers to the exchange of funds for services or products
- Bureaucratic. This is the partnering to fulfil regulatory or normative expectations regarding the need for partners to work together

A partnership may have elements of all these six types, as they are not mutually excluding. Also, there is no hierarchy between these types, that one is ‘better’ than the other.

The extent to which each of the six types of partnering is present in the relation between the Implementation Support Agency (ISA) and communities is assessed on a scale from 0 (not present at all) to 4 (very present). This is differentiated for three phases in service delivery: 1) capital investment

¹ Insufficient data was obtained to come to a score for HIHT on developing and maintaining staff

phase – the original construction; 2) service delivery phase – operation, maintenance and administration; and 3) capital maintenance phase – for example where parts of the system were replaced after the damages caused by disasters. The service enhancement or expansion phase, whereby for example a network had expanded because of growth of the village has not happened in the area and villages that we visited. So, the type of partnership in that phase couldn't be assessed.

The assessment has only been done for HIHT as Implementation Support Agency, as that is the entity that interacts closely with communities. Himmotthan's role, by the set-up of the initiative, in that is limited – and therefore wasn't part of the assessment. The results are presented in Figure 6 below.

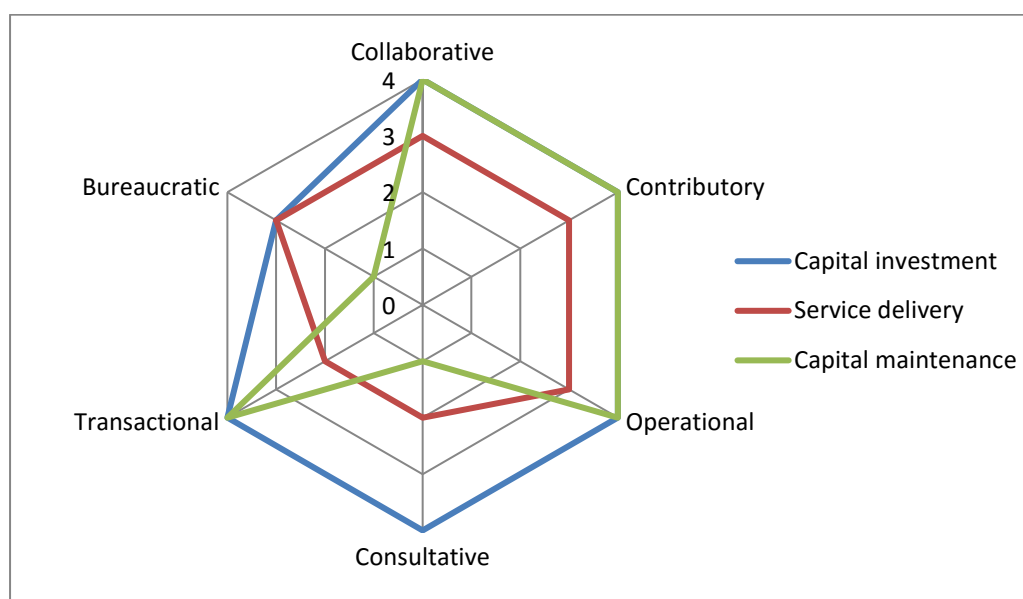


Figure 6: Type of partnering between HIHT and communities

As can be seen, the type of partnering differs a lot between the three phases. During capital investment, the type of partnering has strong elements of all types of partnerships: both HIHT and communities contribute to the works with labour and financial resources; there is joint decision-making on a range of issues, such as technology selection or site selection of taps, based on sharing of information. But there are also clear rules that regulate the partnership, with a number of non-negotiable conditions, such as the cash contribution of communities to the investment, or the need to establish a VEC.

During the service delivery phase, the scores on most aspects of partnering are much lower. This reflects the fact that the community, through its VEC, is largely solely responsible for operation, maintenance and administration. Still, ISA contributes to this and collaborates with the VECs on this, through on-demand advice and support as well as through the scheduled monitoring visits.

During the capital maintenance phase, finally, partnering is again stronger, with a mix of types of partnerships present. Both VECs and ISA come to joint decision-making and both contribute resources to this. However, this has so far happened only in response to emergencies. Then there were no bureaucratic rules in place to guide the decisions. Nor did asset renewal take place on the basis of detailed information in an asset management plan, but based on the emergency needs.

All in all, these data reflect a very high degree of partnering between communities and ISA-HIHT as Institutional Support Agency, the bases for which are laid during the capital investment phase. Because of the relation built up during this phase, the partnership continues during service delivery. Even though in theory the VECs should do most of this work on their own, ISA provides advisory and

other support for the VECs to be able to fulfil that role. When the need for asset renewal is there, the two partner again strongly – though a more proactive asset management is still lacking, and this is planned under integrated approach (other livelihoods programme to same villages).

3 Community service providers

Having seen the type and performance of the enabling support entities, this chapter assesses the performance of the community service providers. As indicated in the conceptual framework, the service provider assessment is above all a validation of whether the support that has been provided indeed leads to well-performance community service providers.

To do so, this chapter first provides the context of the villages where the validation took place, describing their location and socio-economic characteristics of the population. This is followed by a reconstruction of the history of water development in each village, based on the results of the focus group discussions with users and water committees. This is followed by the assessment of their respective service providers, using the descriptors and indicators and participation.

3.1 Context: location and socio-economic profile of the population

The community service providers assessed for this study are all located in Jaunpur block of the Tehri Garhwal district of Uttarakhand. This district is just located north of the State capital, Dehradun and forms the lower Himalayans. The first village of Tachila is located close to Dehradun, more in the foothills. The other three villages – Kinsu, KhedaTalla and *Kakru* – are all located close to each other in the same river valley. *Kakru*, the control village, is located right in the middle between the other two (see Figure 7). Though distances between them are short, the geographic conditions make accessibility low. Tachila, for example, is at least an hour uphill walk from the road. The three other villages are all along a dirt road, and around two hour's drive from the closest main town, Mussoorie.

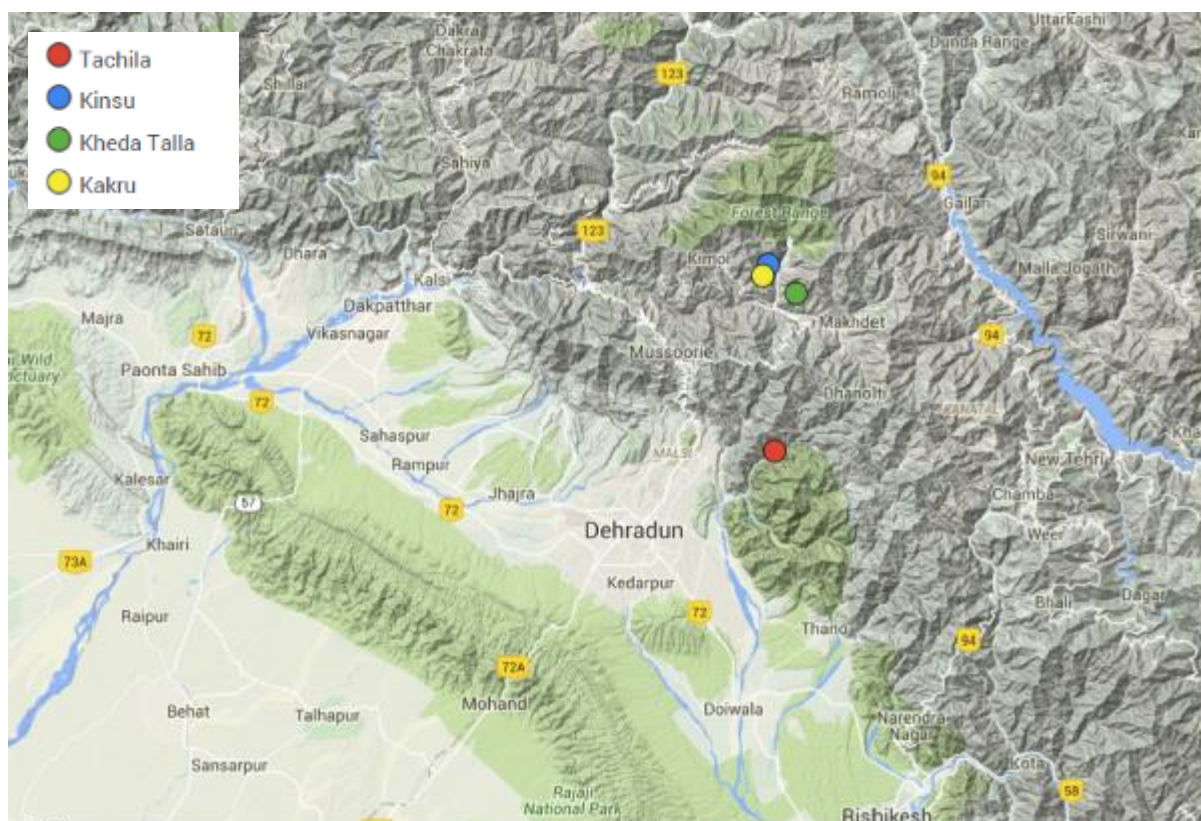


Figure 7: Location of the four villages in the Himalayans north of Dehradun

All villages are small (see Table 2), and very concentrated almost one solid block of houses built together. Though all also have a few houses located further away from the core of the village. It is notable that none of the villages has had any net population growth since the systems were

established several years ago. One of the villages, Tachila, even saw its population go down from 28 to 21 households. Migration of men, and sometimes the entire household, for jobs is one the key reasons for this.

Terraces with paddies and vegetables dominate the landscape. Agriculture constitutes the main source of livelihoods for 75% of the respondents, even up to 100% in *Kakru* (see Table 2). This is complemented in a few cases with off farm income.



Photo 2: View over the village of Tachila, from its water tank

With such small-scale farming, it is not surprising that these are generally poor villages. Half of respondents were illiterate. All respondents received ration cards, about half receiving white ones (below poverty line), and most of the remainder pink ones (for the poorest of the poor). Average annual family income across the villages was almost 37,000 INR, whilst income in the control village of *Kakru* appeared to be the poorest with a self-reported average family income of not even INR 20,000. *Kakru* is also the only village whose entire population is classified as Scheduled Caste. The other villages had a mix of backward and scheduled castes.

Table 2: Summary demographic data of the villages

Name of village	Current number of households	Respondents whose main income is from agriculture	Average total annual self-reported family income (INR)
Tachila	21	95%	33,514
Kinsu	45	57%	44,187
KhedaTalla	43	60%	43,213
<i>Kakru</i>	20	100%	19,750
Total	129	74%	36,840

3.2 History of water supply in the four villages

Through the focus group discussions with VEC members and women, the history of water development in each of the villages was reconstructed. Details about each village are provided below, but several commonalities – and differences - in the history of water supply stand out – that confirm also the way the project cycle is done, as explained in the previous chapter.

- Even though only one village (Tachila) didn't have any water supply system at all, none received a good supply. Kinsu, KhedaTalla, *Kakru* had been connected to government-built regional water supply systems – with one central tap stand in each village. These were very old – the ones in Kinsu and *Kakru* dating from 1960. But these systems were no longer providing any supply. Only occasionally would water come to these taps. So, in fact, villagers of all four villages had to walk long distances to mountain sources to fetch water. In that sense, the control village of *Kakru*, represents still a situation that is comparable to what the other villages had before.
- In all three cases, it had been the villagers themselves who took the initiative to approach HIHTor Himmotthan and apply for a new water supply system. Also in all cases, they knew about the Himmotthan water and sanitation initiative, because of work of Himmotthan in neighbouring villages. Also the people in *Kakru* – the control village – knew about HIHT, but because they were

not well organised internally, they never managed to come together and present an application to HIHT.

- The role of the Gram Panchayats, however, differed from one village to another. In Kinsu and KhedaTalla, the application to ISA-HIHT was sent by the Pradhan of the Gram Panchayat. In the case of Tachila, a village committee sent the application – but ISA had to verify the request later on with the Pradhan. In the control village of *Kakru*, the community has been requesting a water system, and the Pradhan has responded to that by applying for support from the government's Swajal programme, but that application is still under consideration.
- In the three intervention villages, the focus group confirmed the project cycle, consisting of the prefeasibility assessment, the detailed planning – including participation of the community in aspects like technology and site selection – and the eventual implementation, including training of the VEC and definition of the tariffs.
- Since then, the VECs that were formed at the project implementation have been doing the operation, maintenance and administration of the systems.
- All three villages have had major damages to their systems during the 2013 floods, and all successfully claimed some of the costs of the damages from the insurance. But the repairs were also partially financed by ISA.

3.2.1 Tachila

This village had never had any water supply prior to the Himmotthan intervention. Women walked long distances to fetch water from a mountain source. In 2003, in a nearby village, a new water supply system was being built by the Government's Swajal programme. Members from Tachila applied to the Swajal programme for a system as well. However, Swajal couldn't attend the need at that moment, Swajal referred Tachila to Himmotthan. A representation from Tachila even went to the Himmotthan office to present the application. After the submission of the application, ISA did a detailed assessment to verify indeed the need was there and that there was a sufficiently large source of water available to meet these needs. It also verified the request with the Pradhan who duly approved. After that, the detailed planning and implementation followed. The system was completed in 2004. The village now has a gravity-fed system, with an intake from a source some 5 kilometres away, a roughing filter and

village reservoir and a small distribution system with several tap stands. The VEC was duly formed during the project planning phase as well, and has been functional since then.



Photo 3: Communal washing place in Tachila, constructed by the Gram Panchayat

The relationship between the VEC and the Gram Panchayat has gradually become more intensive. In 2008, the Gram Panchayat constructed a washing and laundry tank at one of the central tap stands in the village. And in 2012, the VEC became officially a sub-committee of the Gram Panchayat.

The intake structure was washed away during the 2013 floods. The VEC met with village members and they decided to contact HIHT as Implementation Support Agency (ISA). They then came to assess the damages and define the repair needs. These were eventually shared between the insurance company, ISA and the VEC.

3.2.2 Kinsu

This village consists of two hamlets: Kinsu and Dugadda – the latter being lower down on the mountain flank, and the former being higher up. Kinsu received some water from a government-constructed system through one communal water point. But over time, this point received less and less water, and became beyond repair. In Dugadda, there had never been any water supply system, and people had

to fetch water straight from the river. In 2006, ISA was constructing a new water system in a nearby village. Having seen the type of work, one of the village members contacted ISA. Following which ISA did a feasibility assessment verifying needs and source availability. Once that was confirmed to be adequate, a formal application was submitted to ISA-HIHT via the Gram Panchayat. The remainder of the project cycle was then largely similar to the one described above. One particular point though referred to how to deal with the water needs of both hamlets that make up Kinsu. It appeared technically not feasible to have both covered by one single system. Two separate gravity-fed systems were constructed, drawing from two different sources. Still, it was decided to have one single VEC doing the operation, maintenance and administration of both the systems – but by having different liaison persons in each of the two villages.

Kinsu's water system was affected by floods both in 2010 and 2013, washing away the intake structure and parts of the main line. In both years, the costs of the damages were shared between the savings from the VEC, the insurance company and ISA.

3.2.3 KhedaTalla

Just like Kinsu, KhedaTalla also consists of two hamlets. KhedaTalla is the main hamlet on the upper side of a mountain flank. Lower down in the valley is the hamlet of Sirwa. And its history of water development is also similar to the one from Kinsu. Prior to the Himmotthan intervention, people had to fetch water at a stand point in the neighbouring village of *Kakru*, but which was very unreliable (see next section). There was also one water point at the school, as part of an old government-built water system. In Sirwa, being located down in the valley, people fetched from the river. Whilst ISA was working on the water system in a nearby village, some village members stopped their care along the road side, and requested them to also have a look at the situation in KhedaTalla. After that talk, the Pradhan also sent in a formal request to ISA. The process that followed was similar to the one described for the other villages, starting with the feasibility assessment. That initially showed that the development of systems for the two communities would turn out very expensive because of the geographic conditions. Thanks to the insistence and leadership by some of the village members, eventually the pre-feasibility was approved. After that, the detailed planning followed with technology selection and the eventual implementation and establishment of the VEC in 2006.



Photo 4: Thanks to the leadership by Sushila Devi, chairperson of the Sirwa VEC and vice-chair of the Gram Panchayat, the village successfully applied for a Himmotthan water supply system

Just as in Kinsu, two separate systems had to be constructed for the two hamlets, because of the topography. Like in Kinsu, one VEC was formed to support the implementation of the scheme. But it was split into two during the Operation and Maintenance phase, one for each of the systems. The two VECs meet regularly, and try and coordinate as much as possible.

3.2.4 Kakru

This control village is located in between Kinsu and KhedaTalla. And as mentioned before, it served even as the source of water for KhedaTalla before. *Kakru* got its first water supply system in 1960. This consisted of a communal tank, provided for by the block office. The Gram Panchayat was formally responsible for its maintenance. In 1980, another water intervention took place in the village. In that year, the block connected the village to a regional water supply scheme, and installed some 4 tap stands. The block was also responsible for the maintenance of this scheme, at least officially. But, in practice, the maintenance was haphazard. If the system would break down, the village wouldn't know whom to contact. After many years of irregular supply, it has almost gone completely defunct since some 5 years, when a flood washed away a piece of the main line. Only one of the tap stands has a trickle of water during the rainy season. Therefore, villagers have to go to a spring sources a 2 hours return trip away to fetch water.

In response to this situation, the Pradhan has sent an application to the Swajal programme. There has been some correspondence since then with the Swajal office, indicating that these are considering the application, this is now already 3 years ago. The previous Pradhan, however, appears not to have been giving much follow-up to this request.

Neither has the community itself taken any other initiatives to contact any Implementation Support Agency for support. The latter is possibly also due to the fact that it is a village that has had serious social problems, related to alcoholism. Many of the households are female-headed, as men have died in accidents and sickness due to the abuse. The remaining women have struggled hard to make ends meet, let alone to take community initiatives to improve the water situation.



Photo 5: Women from Kakru at the focus group discussion

3.3 Community service provider descriptors and performance indicators

The Table 3 below summarises the main descriptors of the VECs of the three intervention villages (further details are in Appendix 5). As there is no VEC or other type of community organisation present in *Kakru*, it couldn't be assessed.

Table 3: Summary descriptors of the community service providers

Descriptor	Results
1. Type of organisation	Formal water committee
2. Members of governing body	11-12
3.1 Coverage of water supply system	93-100
3.2 Coverage with household connections	0
4.1 Tariff structure (Rs/household/month)	10-20
4.2 Contribution to capital costs (Rs/household)	8620

The table shows that all villages have a formal water committee, i.e. a VEC duly established and formally recognised as sub-committee of the Gram Panchayat. All have their 11-12 members. These include a chairperson, treasurer and a secretary, alongside regular members. In addition, 1 or 2 members may be appointed as village maintenance workers, i.e. the ones responsible for doing the

actual operation and maintenance tasks. Only in one of the villages, Kinsu, is the person doing this work receiving a remuneration for this work. But for some of the major maintenance, such as cleaning intake structures or the roughing filters, community members are also asked to provide their own labour. Twice a year, groups of village members go up to the intake structures and filters to do this heavy labour.

The villages are covered for 100% with water supply. In one of the villages, not all households are connected to the main system – some of the houses that are outside the core of the village have a rainwater harvesting tank – so 93% of the households is covered by the main supply system in that case, and the remaining 7% by rainwater harvesting. None of the villages have household connections.

The tariffs are all very low, ranging from INR 10-20/household/month. The connection cost is the initial contribution to the capital investment that villagers have been making. This has been a significant amount of around INR 8,620 /household, including the contribution to sanitation. Further details on the costs of supply will be elaborated in chapter 5.

In addition, to these descriptors, an assessment was made of their performance indicators as part of the assessment protocol (see details in Appendix 5), as summarised in Table 4. As there was no VEC or other type of community service provider in *Kakru*, no score could be provided for that control village.



Photo 6: Mr Singh, chair of the Kinsu VEC also undertakes some of the maintenance work such as replacing broken taps

Table 4: Summary performance indicators of the community service providers

Indicator	Results
<i>Governance</i>	
1.1 Percentage of legal requirements for establishment of service provider complied with	100%. All have their bank pass book, some are constituted as sub-committee of the Gram Panchayat.
1.2 Presence of statutes	None have formal statutes, though all have a general description of roles and responsibilities of VEC members.
1.3 Selection of the Board of the service provider	A set procedure of VEC composition has been laid down. Main features are 7-12 members with 30% women and 20% SC-ST representation with participation of all habitations in the village. However, the procedure for regular elections of these members is not defined. Users and VEC have a general understanding of how it would work. This procedure was followed during the original election when the VEC was formed. No further elections have taken place since then.
1.4 Information sharing and accountability mechanisms	The VECs provide accountability during an annual assembly with users.
1.5 Percentage of women in the governing body of the CSP	Guidelines prescribe 30% are women. In the assessed villages we found 25-36%, or 3 to 4 women as part of an 11-12 person VEC
1.6 Percentage of members of the water committee who have received formal training	All members have been trained during the project implementation phase
<i>Finance</i>	
2.1 Financial balance of last year's revenue and expenditure	INR 1970-3800

2.2 Cash reserves	The VECs actively manages a cash reserve both through petty tax box and bank account. They replenish that depending on the financial balance of the year, but don't have a clear target for the amounts to be saved.
2.3 Book keeping	The VEC track their income and expenditure through basic book keeping systems. In Tachila this was all in order with clear annual account statements. Both in Kinsu and KhedaTalla, inconsistencies were observed.
2.4 Non-payment rate	0%
<i>Technical performance</i>	
3.1 Technical folder	All VECs have a copy of the Operation and Maintenance manual but VECs weren't able to show copies of their technical design
3.2 Registry of operational information	All VECs have complete registries of financial and technical data.
3.3 Response time to get a repair done	On average within 24 hours
3.4 Water metering	Doesn't apply as there are no household connections
3.5 Waters security measures	Catchment protection works were part of the original project implementation. But this is not a recurrent activity of the VECs.
3.6 Water quality management	A water quality management plan has been developed, indicating how the filters work and need to be maintained, as well as how chlorination needs to be done. But particularly chlorination seems not to be done consistently.

As can be seen in this table, in terms of governance, the water committees operate in a largely formal manner. They meet the minimum requirements for being a society (11 members and having a bank account). However, they don't have any statutes and the renewal of the VEC isn't happening regularly. In none of the villages have there been any elections since they were established. Accountability to users is done at the most basic level, through annual meetings, presenting the results. In terms of gender, around a quarter to a third of the members are women, reflecting the requirement that 30% of committee members are women. In some instances, they hold key positions, but most of the posts of chair and treasurer are held by men. But beyond the ones who are member of the VECs, other women in the villages were little updated on issues related to water supply. The Focus Group Discussions with women revealed a highly appreciative perception of the water supplies, but little awareness among women on how these were managed, operated and maintained. The discussions with men showed a much higher understanding among them of what was happening with the water supplies.

All mechanisms are in place for good financial management, all VECs having their income and expenditure registry and issuing receipts for payment of water tariffs. However, the actual book keeping is at times inconsistent. Both in Kinsu and KhedaTalla, it was observed that at times for several months in a row, data on expenditure is missing. The total amounts spent on chlorination also don't coincide with what is in the books. As all the expenses are so small, probably the treasurers often forget to capture it in the account books. This is not a big problem for the operation and maintenance, as the tariffs are sufficiently large to cover the operation and maintenance expenditure (as will be elaborated in chapter 6) – but for future capital maintenance, this may become an issue.

The technical performance is reasonable. Water committees keep records of financial and technical aspects. Measures to improve water security measures and water quality have been put in place. But in their execution, problems are encountered, particularly around chlorination. The regulators of the chlorinators are fragile and get damaged easily. Repairing these requires getting spare parts from a town like Mussoorie. As this is far away, it often takes a longer time for the repairs to happen. VEC members may get spares only when they go to Mussoorie on other business.

In conclusion, the VECs are functional and fulfilling their roles reasonably well, though with deficiencies observed in aspects of book keeping and chlorination. This is achieved largely through voluntary labour of the VECs, as effectively only in one village did the maintenance worker receive a remuneration.

3.4 Participation assessment

The previous sections have indicated how VECs manage the water systems on behalf of the community. This section assesses the extent to which communities participate in the decision-making around this. This is done by applying a ladder of different forms of participation to the various phases in the life-cycle of a service. Appendix 6 presents the detailed categorization of the type of participation found for the three intervention villages. The control village couldn't be assessed, as there are no (recently developed) water systems there. There were no differences between the three villages, so the synthesis in Table 5 applies to all. Only in Tachila has a small service enhancement taken place in the form of the construction of a communal washing and laundry place.

Table 5: Summary of the participation assessment

Stage of delivery cycle	Results
Capital Investment (implementation)	2 – Interaction participation. The community in partnership with the VEC and ISA engaged in a joint-analysis of implementation options before developing a plan
Service delivery	1 – Self-mobilisation. The community takes responsibility for administration, management and operation and maintenance, directly.
Asset renewal	2 – Interaction participation. The community in partnership with the VEC sought support and engaged with ISA to come to joint-decision making regarding asset renewal
Service enhancement or expansion	2 – Interaction participation. The community in partnership with the VEC approached the GP, and came to joint-decision making regarding construction of a communal washing and laundry place

This table shows that the capital investment phase can be characterise as interaction participation. The community has taken the initiative to approach ISA to request a water system. The details of the plan are a result of the interaction between the community and ISA. They assessed technology options and possible water sources, and communities had an important say in that, based on information. But there were also preconditions and non-negotiables in that, such as the financial contribution to be made and the setting up of VECs.

The form of participation in the service delivery phase is characterised largely as one of self-mobilization. The VEC has organised some of the basics of the operation, maintenance and administration such as the book keeping and minor operation. But the community also jointly undertakes major maintenance, such as the cleaning of filters and intake structures by contributing labour. However, in the focus group discussions with the VECs, the ongoing support by ISA was mentioned as being very important. As Mr. Singh, the chairperson of the Kinsu VEC said: *“Managing a water system is like having to take care of a pair shoes: it needs polishing every once in a while and then you can walk on them for a longer time. At times, we as VEC get lethargic, and forget about our tasks of book keeping or chlorination. But the visits of ISA are like the shoe polish. They help us refresh our memories and remind us of our tasks.”*



Photo 7: Visits by ISA to refresh the capacities of VECs are highly appreciated, particularly in aspects such as book keeping

Capital maintenance or asset renewal again takes place through a form of interaction participation. After the damaging floods, the VECs have approached external entities, particularly ISA but also the Gram Panchayats for support. Jointly, they have assessed the damages and repair needs. ISA has been very instrumental in claiming funds from the insurances.

All in all, this means that these communities score very high on the participation ladder, achieving high degrees of community empowerment. This is reflected both in their strong say in the way the systems were developed and their action to get repairs done after the floods, and their capacity to mobilize community labour towards maintenance works. This is probably also facilitated by the fact that these are all very small communities, that otherwise receive very outside support, and which have a strong tradition of community action.

4 Service levels

This chapter presents the next step in the validation of success found in this case study. It consists of assessing 1) the coverage, 2) functionality of the infrastructure, 3) the levels of service received by users both in the intervention and control village and equity in that, and 5) household satisfaction on supplies.

4.1 Coverage

As indicated in the previous chapter, the Himmotthan-supported gravity-fed systems cover 100% of the population in 2 out of the 3 villages. In one of the village, there is also 100% coverage, but through a mix of a main piped supply and rainwater harvesting tanks. In the control village, coverage is 0%, as the one tap stand only functions during the rainy season.

4.2 Functionality

In order to assess the functionality of the systems, an infrastructure snapshot was taken, assessing all the components that are there, whether they are functional, and how their age is in relation to the estimated life-span of that particular component. This was done for the 5 systems, as both Kinsu and KhedaTalla have two systems each, covering both the hamlets that made up these villages. The infrastructure snapshot revealed the following (Table 6). Visual presentation of the various components is in the photos below.

Table 6: Infrastructure snapshot

Infrastructure component	Description	Functionality	Age
Intake structures	River intakes or spring boxes	All functional	In all cases, these were renewed two years ago after the floods
Main lines	PVC pipes conveying from intake to filters and on to community reservoirs	All functional	8-10 years as they haven't been renewed since original construction, though repairs to it have been made.
Filters	Roughing filters either at the intake or close to community reservoirs. All with by-pass valves, overflows and gate chambers	All functional	8-10 years as they haven't been renewed since original construction
Chlorinators	Recipients for liquid chlorine, with floating device as regulator	Only one out of five functional	8-10 years
Community reservoirs	Concrete or masonry tanks, with their respective valves and gate chambers	All functional	8-10 years as they haven't been renewed since original construction
Distribution network	Pipe network from community reservoir to tap stands	All functional	8-10 years as it hasn't been renewed since original construction.
Tap stands	Stands with brass or plastic taps and simple drains. On average 1 tap stand for every 4-5 households	All functional	8-10 years, though the taps themselves have all undergone replacement

The snapshot shows that most parts of the system as originally constructed are still there and functional. As the systems are 8 (Kinsu and KhedaTalla) to 10 (Tachila) years old, there is no immediate need for replacement or extension, particularly as the villages haven't grown. Only intake structures and some parts of the main lines had to be replaced or repaired after the floods.

The one component that is non-functional in all but one system is the chlorinator. The floater that serves to regulate the flow seems to be a fragile component that was broken in 4 of the chlorinators. Some of the chlorinators clearly seem to have been out of function for a while. The fragility of chlorinators is a technical issue, known to Himmotthan and Implementation Support Agencies and they are looking into alternative chlorination devices.

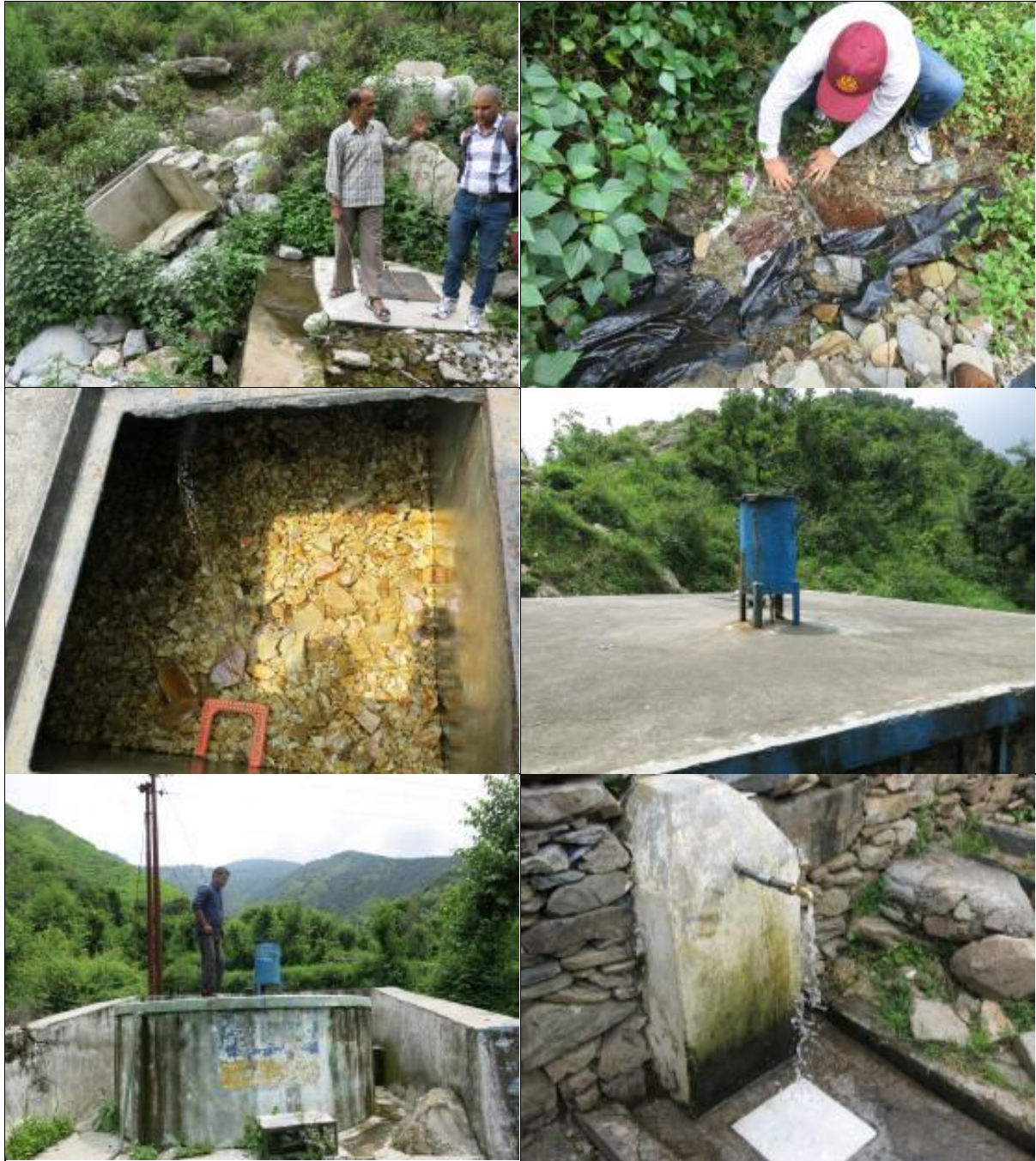


Photo 8: Infrastructure snapshots (from left to right, top to bottom): river intake structure (Kinsu), spring box (Sirwa), roughing filter (Tachila), chlorinator (Tachila), reservoir (KhedaTalla) and tap stand (KhedaTalla)

4.3 Service levels

The service level assessment consisted of a questionnaire asking users about the quantities used, their perception of water quality, time spent on fetching water and the continuity and reliability of supply. These were then compared to the standards used in this project, and based on the standards of the

Government of India. Appendix 8 provides the definition of each level of service for the various parameters (quantity, accessibility, quality, continuity and reliability), though the nomenclature for this study is slightly different from the ones used in the other cases studied as part of the Community Water Plus project, as Himmatnagar uses slightly different names for the various service levels.

4.3.1 Intervention villages

The first step in assessing service levels was to compare the reported service level parameters to the references as established in the research protocol. That revealed the aggregated results as presented in Table 7 (for results per village, see Appendix 7).

All schemes are designed according for 40 lpcd (for tap stands) and 70 lpcd (for household connection). In the three villages, only tap stands were found. So 100% of the users have access to a service level that is considered standard, i.e. meeting the standards defined by the Government of India.

However, the respondents report to use lower amounts than these design standards, based on the number of containers of water they fetch on a day. This results in the majority of users having consumption levels categorised as “basic” (20-40 lpcd) or even as “low” (less than 20 lpcd) – with minor differences between summer and non-summer. This is likely to be an underestimation because many of the water consuming tasks, such as laundry and dishes, are done at the tap stands. There are also differences between the villages. In KhedaTalla, median consumption was just below the ‘standard’ threshold at 37. When possible under-estimations are taken into account, KhedaTalla users effectively use a standard level of service. In Tachila and Kinsu the amounts used were reported to be much lower (13 and 18 lpcd respectively). These amounts compare also low to the impact assessment done by Knowledge Links (2012), where the mean consumption was estimated to be 59 lpcd. In conclusion, even though system design meets the standards, in two of the villages, users report to consume less.

Accessibility is measured in terms of the time spent on a single round trip as well as in terms of total amount spent per *day* fetching water, i.e. multiplying the time of a single round trip with the number of round trips made on a day. The median single round trip is only 10 minutes and hence majority of users report improved or high levels of service in terms of accessibility. The cumulative median time spending per household per day is 80 minutes in Tachila, and around 100 minutes in Kinsu and KhedaTalla – bringing down the accessibility to sub-standard for many households. This is explained by the fact that the distance between taps and houses is small as is the number of households sharing a tap (normally 4 to 5 houses per tap). This means that typically a family makes many short round trips. Whenever more water is needed, someone quickly fetches a bucket of water. The Knowledge Links (2012) impact assessment reports a mean time spending on fetching water of 20 minutes per day. It is unclear whether that is the cumulative time spending or the time spent on a single round trip – but probably the latter. All this means that even though accessibility appears low (because of the total cumulative time spent on a day), it actually is improved (because of the short single round trip). This point was also reflected in the focus group discussions where people expressed above all very high satisfaction that water supply was now close to the homesteads rather than a long walk away

Table 7: Percentages of households with different service levels from main supply in intervention villages (n = 81)

Service level	Design quantity	Quantity: reported use		Accessibility: reported time of single round trip	Accessibility: reported cumulative time spent		Quality perception		Continuity	Reliability
		Summer	Non-summer	Summer and non-summer	Summer	Non-summer	Summer	Non-summer	Summer and non-summer	Summer and non-summer
High	0	0	0	53	0	4	89	88	100	33
Improved	0	1	0	33	0	1			0	52
Standard	100	19	10	12	10	6	11	12	0	0
Basic	0	35	40	1	40	22	0	0	0	11
Low	0	46	51	0	51	67			0	0
No data	0	0	0	0	0	0	0	0	0	4

Table 8: Percentage of households with different levels of service in the control village of *Kakru* (n = 20)

Service level	Quantity		Accessibility reported single round trip		Accessibility: reported cumulative time spent		Water quality perception	
	Summer	Summer	Non-summer	Non-summer	Summer	Non-summer	Summer	Non-summer
High	0	0	0	0	0	0	25	15
Improved	0	0	0	0	0	0		
Standard	0	0	0	0	0	0	40	50
Basic	50	35	55	40	40	0	35	30
Low	50	63	45	60	60	100		
No data	0	0	0	0	0	0	0	5

The quality is perceived to be good by almost 90% of the respondents – the remainder indicating it to be acceptable. In the focus group discussions, people also expressed to base this perception on the fact that, as one woman said “the VEC puts the white medicine [chlorine] into the water”. This reflects a positive attitude towards chlorination.

The continuity is high, all respondents indicating that water is available 24 hours per day. This is obviously due to the fact that these are gravity-fed systems that normally don’t have continuity problems.

Reliability is also rated as high (response time to break-downs less than 24 hours) or improved (response time to break-downs less than 48 hours).

4.3.2 Control village

These data also need to be compared to the service levels in the control village of *Kakru* (Table 8), noting that villagers in *Kakru* don’t really receive a service, in the sense that they fetch water from an open water source.

In *Kakru*, the respondents report using similar quantities as in the intervention villages. However, for *Kakru* inhabitants, these 20 lpcd is really all there is. In the intervention villages, as mentioned, the actual consumption is probably much higher, because of the use of water at tap stands.

For most respondents, accessibility is sub-standard or “no service”, even 100% in non-summer. This becomes even more apparent, when looking at the actual time spent. The median estimated time for a single round trip is estimated to be 70 minutes by *Kakru* villagers. With several round trips on a day, the cumulative time spending on fetching water is several hours.

The water quality from the spring sources is also perceived to be relatively low. Still the majority rates it as acceptable to good, but a third of interviewees consider it to be bad.

As these are open sources, continuity and reliability are indicators that do not apply.

4.3.3 Equity in service levels between and within villages

From the tables above, it is clear that the starkest difference in service levels is across villages, with KhedaTallausing slightly higher amounts than Tachila and Kinsu, and obviously much better than *Kakru*, which doesn’t have a service at all.

The tables of individual villages (Appendix 7) showed some spread of service levels within villages, in terms of quantities used, accessibility and reliability. An analysis was made of different socio-economic factors to assess a correlation between some of these and the service level parameters. That analysis didn’t show any clear tendencies that certain socio-economic groups had higher or lower levels of service.

In conclusion, the service level assessment leaves it difficult to make conclusive remarks around the water quantities consumed, particularly in comparison between the intervention and control villages, due to the fact that part of the consumption could not be recorded. Arguably, the biggest difference between the intervention villages and the control village lies in accessibility, indicating a difference of several hours in cumulative time spending on fetching water. This echoes the findings of the Knowledge Links (2012) impact assessment that a major impact of the Himmotthan water initiative has been in reducing drudgery. Furthermore, the data show that the service provided is high in terms of continuity and reliability and perceived water quality.

4.4 User satisfaction with the service received

Apart from the reflections on the service level obtained during the focus group discussion, as discussed above, the survey also tried to quantify the level of satisfaction with the service. Of the 81 respondents in the intervention villages, 1 reported to be not satisfied, 3 somewhat satisfied and all other 77 to be very satisfied. The four respondents indicating only to be somewhat satisfied or not being satisfied were all from KhedaTalla.

In the control village of *Kakru*, of the 20 respondents, 5 indicated still to be somewhat satisfied with the supply, but all other 15 to be not satisfied with the water situation.

In neither the intervention villages, nor the control village was there any difference in satisfaction between the summer and non-summer season.

5 Costs and financing of service delivery

This section reviews the costs incurred in each of the cost categories. In that, it presents both the costs related to the specific systems in Tachila, Kinsu and KhedaTalla, as well as the overall programme costs. It also indicates which of the organisations involved paid for which part of the costs.

5.1 Capital investment expenditure

For the three intervention villages, the detailed hardware investment costs were found, indicating both the contributions from the Himmotthan water supply initiative and the community. It also included a break-down per line item, including the water supply system itself, catchment protection works and sanitation. The Table 9 below presents these costs, all converted to 2014 INR, excluding the costs of sanitation and rainwater harvesting tanks, in order to be able to better compare it to other case studies. The costs of catchment protection works were included in the calculation as it is such an essential part of the supply for gravity-fed systems. The per person costs have been calculated on the basis of the population at the moment the investment was done, and not on the projected population. This is done because the expected levels of population growth haven't materialised.

Table 9: Capital expenditure on hardware in the three intervention villages

Village	Capital expenditure on hardware (2014 INR)			Capital expenditure on hardware (2014 INR/person)		
	Community contribution	Himmotthan water supply initiative	Total	Community contribution	Himmotthan water supply initiative	Total
Tachila	124,568	1,121,106	1,245,674	611	5,496	6,106
Kinsu	183,827	1,654,436	1,838,263	571	5,138	5,709
KhedaTalla	308,165	2,770,947	3,079,112	1,172	10,536	11,708
Total	616,559	5,546,489	6,163,048	781	7,030	7,811

These data show that indeed communities have been contributing the expected 10% contribution to the capital expenditure. For an average family of 6-7 persons, this would be on average around INR 5,000 (in 2014 prices), or around 83 US\$/family. The table also shows that the per person costs have differed widely from around INR 6,000 /person in Tachila and Kinsu to almost INR 12,000 /person in KhedaTalla.

These data, however, do not include the capital expenditure on software, such as the training of the VEC, nor any programme management costs. These were never recorded per village, but as overall costs for each phase. In order to get the most relevant reference data, we looked into the costs for the most recent phase (2011-2013). In that, we summed the actual hardware costs of the construction of the water systems and the catchment protection works, but excluding any costs of latrine construction. To that, were added the staff time, travel and administrative expenses of the NGO, both on the hardware (technical studies, construction supervision) and on the software (training, community mobilization and others), as well as the costs of the technical support agency (ENV DAS India). Only the staff time costs of Himmotthan itself were not included given that they don't have a direct technical role in this, as it is outsourced to the technical support agency. These costs were all converted to 2014 INR and divided by the 2,603 persons covered through 9 water supply systems (see Table 10).

Table 10: Overall capital investment costs per person for period 2011-2013 (2014 INR/person)

	Source of funding			Total
	Himmotthan	Community	NGO	
Hardware costs	6,369	678		7,047
Staff time, travel and administrative expenses of NGO related to the technical works	2,058		232	2,289
Technical support to planning and implementation	1,360			1,360

Total CapEx Hardware	9,787	678	232	10,696
Staff time, travel and administrative expenses of NGO in relation to community mobilization, training and other software activities	2,958	193	142	3,292
Technical support to software	1,360			1,360
Total CapEx Software	4,318	193	142	4,652
Grand total CapEx	14,104	871	373	15,348

These data show that the per person costs of the hardware development are very similar to the ones found in the three intervention villages, so just above INR 7,000 /person. Communities were also found to contribute around 10% to these costs.

On top of this amount, comes another INR 4,460 /person for all the staff time costs related to hardware development, i.e. the costs of doing the technical studies and engineering works as well as the technical support and construction supervision. Around two thirds of the hardware support is done by the NGO (HIHT) and one third by the technical support agency. The NGO also contributes a small part of its own staff time to this. This brings the total CapEx hardware to almost INR 11,000 /person (USD\$178/person or PPP USD\$610 per person, see Summary Cost Table below).

CapEx software amounts to some INR 4,653 /person, of which three quarters accounts for staff time, travel and related administrative costs of the NGO in activities like community mobilization, training and mentoring – and a quarter the costs of the technical agency. There are some minor contributions from the community and the NGO to these costs.

All in all, this leads to a total person expenditure of INR 15,350 /person (USD\$ 255/person, PPP USD\$875), of which 45% is the actual hardware, 24% the support to the hardware development and 30% the CapEx software and the support to that.

5.2 Operation and minor maintenance expenditure

Little insight has been obtained into the operation and minor maintenance expenditure. Though the expenditures of the different VECs were reviewed, as noted before, several inconsistencies were found. There would be several months without records of purchase of chlorine – not matching with the amounts of chlorine used. Also the premium paid to the insurance company could not be found back in the records. The values in Table 911 therefore need to be taken with some caution, as probably the total expenditure by the VECs has been higher than what is recorded. However, the recorded level of expenditure is well below the income from tariffs, indicating that even if actual expenditure on operation and maintenance is higher than what is listed below, it should still not be problematic.

Table 11: Recorded annual expenditure on operation and maintenance hardware in the three intervention villages

Village	Annual income in 2014 (INR)	Recorded annual expenditure on operation and minor maintenance in 2014 (INR)	Per person recorded expenditure on operation and minor maintenance (INR/person/year)
Tachila	2,520	550	3
Kinsu	10,800	6,825	21
KhedaTalla	10,320	3,060	12
Total			13

In addition, to the expenditure on operation and maintenance that is done via the VEC, users contribute also directly, in two ways:

- Groups of households who share a tap stand sometimes buy new taps on their own account when these are leaking or broken, and don't claim the costs back from the VEC. No records of these incidents are kept. Assuming one new tap that is purchased per tap stand per year, which is shared by 5 households, then the equivalent of some INR 5 /person/year needs to be added to OpEx costs.
- Community labour. Community members are expected to also contribute labour to some of the heavy maintenance work, such as cleaning out debris from the intake structure or the washing of filters. Using the wage for unskilled labour as paid by MG-NREGA (Mahatma Gandhi National Rural Employment Guarantee Act) of INR 162 /day as reference, and a total estimated of time spending of ten person-days per year for this type of maintenance, a total of INR 1,620 – equivalent to some INR 5-8 /person/year - needs to be added to the OpEx costs.

This brings the total of actual OpEx costs to around INR 18 /person/year, of which then half is paid for through the VEC, and the other half are direct contributions by users in cash (for purchase of taps) or in labour.

5.3 Capital maintenance expenditure

Though capital maintenance expenditure is often seen as a recurrent cost, in practice it occurs as bulky one-off expenses. So far, these have occurred in the form of repair of heavy damages to intake works after the floods in 2010 and 2013. Replacement of other major components due to regular wear and tear has not occurred yet.

The costs of the replacement of the infrastructure components that were damaged were paid for from several different sources:

- **VECs own contribution.** As could be seen in the previous section, the annual balance of the VECs is largely positive and the VECs had been saving some money in the years prior to the floods. This has been used to pay for part of the damages, but also in some cases, the VEC to make an additional collection of funds within the community to contribute to the capital maintenance works.
- **Insurance.** Given the frequency with which natural disasters like landslides and floods occur, Himmotthan decided that the water supply systems developed with its support should be insured against such events. Initially this was done by organising the VECs in a federation, and the federation getting a collective insurance policy for its associated members. But currently, the relation with the insurance company is moderated through the partner NGOs. So, HIHT holds the insurance policy with a company on behalf of the VECs. These policies only cover damages caused by natural disasters (so not damage as a result of normal wear and tear). Initially, only those components were insured that are most susceptible to damages, particularly intake structures and filters located close to the river banks. Now the full schemes are insured at the full construction costs.

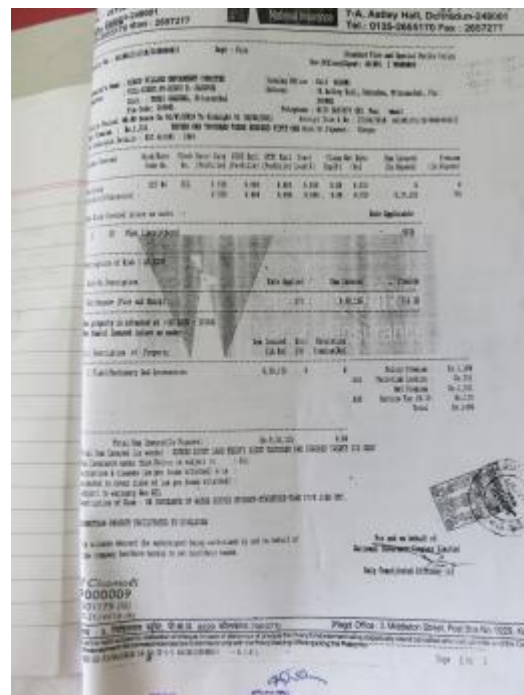


Photo 9: Copy of the insurance policy of the Kinsu water supply system

- **ISA.** The 2013 floods were particularly damaging and in that case, ISA decided to contribute with its own funds to replacement of affected infrastructure in the area, including the villages reviewed as part of this study.
- **Gram Panchayats.** When State-wide emergencies are declared, Gram Panchayats can also access contingency funds for replacement works. Of the three visited villages, this has happened only in KhedaTalla. During the interviews it appeared that this is common in neighbouring villages.

In order to calculate the expenditure on capital maintenance, the contribution from all these sources to the repair of the damages was calculated. This was then converted to 2014 INR (see Table 12). Note that these are indicative numbers, as the VECs didn't have detailed records of all the expenditures made for these replacement works, as much of it, didn't go via their accounts. Also, these amounts only relate to the hardware component of the capital maintenance works, so excludes all the project management and design work around it. The table also includes a column with the unit costs, i.e. the total divided by the number of years that the systems have been operational, and by the population. This by no means implies that the same amount of capital maintenance expenditure needs to happen annually – rather the opposite, it is likely to come in bulky payments and with irregularity. This needs to be seen solely as an equivalent cost.

Table 12: Expenditure on capital maintenance by different sources in the three intervention villages

	Total expenditure on capital maintenance over life-time of the system (2014) from different sources					Annualised per person expenditure (INR/person/ year)
	Community	HIHT	Insurance	Gram Panchayat	Total	
Tachila	-	35,000	-	-	35,000	19
Kinsu	46,360	163,000	112,640	-	322,000	143
KhedaTalla	-	50,000	235,400	36,600	322,000	175
Total	46,360	248,000	348,040	36,600	679,000	114

The table provides several insights. First of all, the level of damages is not similar in each of the village. Tachila had only relatively minor damages in one year (2013) whereas both Kinsu and KhedaTalla had damages twice in 2010 and 2013 adding all up. This is to some extent logical as the impact of heavy rains will differ highly from one location to another.

It also shows that there is no clear pattern in the way the costs are shared. The community only provided a major contribution in Kinsu and the Gram Panchayat only in KhedaTalla. The insurance was successfully claimed from in two villages – and the underlying data show that this happened both in 2010 and 2013. However, it is not clear to the interviewed villages how the insurance company came to the exact amounts to be paid out – so what is the residual risk for the community and what is really insured by the company. Still, the insurance company has covered more than half of the total damages.

The resulting annualised per person costs, therefore also differ a lot, from a very low INR 19 /person/year to a significant amount of INR 175 /person/year – with a weighted average of INR 114 /person/year. If we compare that amount to the average tariff of INR 20 /household/month – equivalent to INR 40 /person/year – it is clear that current tariffs are not sufficient to cover these costs solely from the community; hence, also the important contributions from the Implementation Support Agency and the insurance company.

5.4 Direct support costs

The final cost category is the direct support, or the ongoing support provided by the Project to the phased-out water committees. As this is a new type of support provided since only a year, good reference data are lacking. The estimated costs of this support are mainly the annual salary costs of the community facilitator (about INR 120,000/year) and travel costs (estimated at INR 84,000/year).

One community facilitator is responsible for around 16 villages, which has an equivalent population of more than 4,500 people. The costs per person would then be around INR 45 /person/year (0.75 US\$/person/year). This is a bit below of what is considered an adequate level of ongoing support to community management (Smits et al., 2011).

5.5 Summary of overall costs and sources of funding

Table 13 below provides a summary of the various costs, as well as the sources of funding. It shows that the annual recurrent costs (INR 222) are about 1.5% of the original investment costs (INR 15,350). This is a very low figure, and confirms a commonality around gravity-fed schemes: they are rather expensive to develop, but relatively cheap to maintain. This is due to the fact that gravity-fed systems don't require expensive energy for pumping and don't have the related high expenses of pump maintenance and replacement. Of course, some caveats need to be mentioned. The recurrent costs are probably an underestimation as the software costs related to capital maintenance are not included, and because the operation and minor maintenance are not recorded consistently.

Gravity-fed systems, however, do have the expenses of maintenance and replacement of intake works – which amount to about half of the total annual recurrent expenditure. If these costs would have to be covered fully by the community, it would not be possible with current tariffs – which are equivalent to around INR 40 /person/year.

Finally, what stands out is that the costs of direct support – INR 89 /person/year – are significantly higher than the operation and minor maintenance expenditure. However, we have also seen that this kind of support is very much needed and demanded by the VECs. So one can see this as a form of an outsourced support to operation, maintenance and administration – but paid for by the NGOs in this case. It would be of interest for Himmotthan and HIHT to track the performance of the phased-out VECs over time to assess the impact the presence of the direct support has on that, and whether this external investment pays off.

Table 13: Summary Cost Table (INR)

Uttarakhand Summary Cost Table - calculated as the average cost per person, that is averaging across the three 'successful' villages

Source of funds	Use of funds - implementation			Use of funds - annual recurrent					RECURRENT EXPENDITURE TOTAL
	CapEx hardware	CapEx software	CAPEX TOTAL	OpEx labour & materials	OpEx power	OpEx bulk water	OpEx enabling support	CapManEx	
Community/consumers	INR 678	INR 193	INR 871	INR 18	-	-	-	INR 66	INR 84
Local self-government	-	-	-	-	-	-	-	INR 6	INR 6
State government entity	-	-	-	-	-	-	-	-	-
State water supply agency	-	-	-	-	-	-	-	-	-
National Government	-	-	-	-	-	-	-	-	-
NGO national & international	INR 10,019	INR 4,460	INR 14,479	-	-	-	INR 89	INR 42	INR 131
International donor	-	-	-	-	-	-	-	-	-
TOTALS	INR 10,697	INR 4,653	INR 15,350	INR 18	-	-	INR 89	INR 114	INR 222
Median of 20 case studies			INR 3,231						INR 207
'Plus' %age	94%	96%	94%	0%	-	-	100%	42%	62%
Median of 20 case studies			95%						57%

Notes: NGO refers to the cost borne by HIHT and the Himmotthan Society

Table 14 Summary Cost Table (PPP USD\$)

Uttarakhand Summary Cost Table - calculated as the average cost per person, that is averaging across the three 'successful' villages

Source of funds	Use of funds - implementation			Use of funds - annual recurrent					
	CapEx hardware	CapEx software	CAPEX TOTAL	OpEx labour & materials	OpEx power	OpEx bulk water	OpEx enabling support	CapManEx	RECURRENT EXPENDITURE TOTAL
Community/consumers	\$ 38.65	\$ 11.00	\$ 49.65	\$ 1.03	-	-	-	\$ 3.79	\$ 4.82
Local self-government	-	-	-	-	-	-	-	\$ 0.35	\$ 0.35
State government entity	-	-	-	-	-	-	-	-	-
State water supply agency	-	-	-	-	-	-	-	-	-
National Government	-	-	-	-	-	-	-	-	-
NGO national & international	\$ 571.08	\$ 254.22	\$ 825.30	-	-	-	\$ 5.09	\$ 2.38	\$ 7.48
International donor	-	-	-	-	-	-	-	-	-
TOTALS	\$ 609.73	\$ 265.22	\$ 874.95	\$ 1.03	-	-	\$ 5.09	\$ 6.53	\$ 12.65
Median of 20 case studies			\$ 184.16						\$ 11.78
'Plus' %age	94%	96%	94%	0%	-	-	100%	42%	62%
Median of 20 case studies			95%						57%

Notes: NGO refers to the cost borne by HIHT and the Himmotthan Society

The INR Indian Rupee conversion to the USD United States Dollar has been undertaken at the mid 2014 exchange rate of INR60/USD\$ with a Purchasing Power Parity (PPP) multiplier of 3.42 applied in order to give the best interpretation of India costs in global terms (<http://data.worldbank.org/indicator/PA.NUS.PRVT.PP>).

Conclusions

The Sir Ratan Tata Trust (now – Tata Trusts) has been supporting the development of rural water supply systems in Uttarakhand since the early-2000s, initially through a programme, which has now become an independent organisation, the Himmotthan Society. Through its water supply and sanitation initiative, gravity-fed water supply systems are developed in small mountain villages of Uttarakhand. Arrangements for community management of these systems are set-up as part of the programme, and support to these is provided on an ongoing basis.

The Himmotthan Water Supply and Sanitation Initiative involves three groups of players:

- The central core is formed by civil society organisations, with different roles. Himmotthan Society itself funds the initiative and carries out programme management activities and provides all technical inputs. The actual implementation is done by local partner NGOs, such as HIHT. The local NGOs interact directly with the community-based organisations, particularly the VECs.
- Government. At State and district level, Himmotthan and HIHT coordinate their work with government, for example on who works in which parts of the state. Up till recently, the relation with Gram Panchayats was very limited. But now, VECs are established as sub-committees of the Gram Panchayats, and Gram Panchayats are more involved in paying for maintenance works.
- Private sector. An independent consulting agency provides technical and oversight support to the programme.

All in all, however, this set-up can be characterised as a case of NGO-supported community management, given the limited direct role of the public sector in this set-up.

The water supply and sanitation initiative is implemented following a project cycle consisting of four phases: pre-planning (including feasibility), planning, implementation and support to operation and maintenance. During these phases, communities participate in decision-making on aspects such as technology selection – though given the terrain, gravity-fed piped schemes are the most commonly selected technology. But there are also non-negotiable aspects to the programme, such as the payment of a 10% cash contribution by communities to the hardware costs. Furthermore, the programme is characterised by taking an integrated approach, including also full sanitation of the villages and catchment protection activities. After the hardware implementation is complete, the initiative accompanies communities for about a year in their operation and maintenance activities, to ensure that they start in the right manner. Recently, a de facto fifth phase is added to this project cycle, and that is the ongoing support to “phased-out” villages.

The study assessed the performance, institutional capacity and partnering approach of the two key support entities, Himmotthan Society and one of the Implementation Support Agencies (ISA) (in this case HIHT). It concluded that these are both very strong professional organisations. Given the scope of work, ISA is a strongly community-oriented organisation which employs a mix of partnering approaches in its engagement with communities, particularly during the project implementation phase. During the service delivery phase, the degree of partnering is much less, as operation and maintenance is largely the responsibility of the communities. But during capital maintenance works, many elements of the different partnership styles are taken up again.

The research sought to validate the performance of the VECs as service providers. It found that the VECs that are established to carry out the operation, maintenance and administration works, do these tasks largely adequately. Some deficiencies and inconsistencies were found in aspects of book keeping and chlorination. The support provided to phased-out villages would be an important way of addressing these deficiencies – and it is one for which there is a strong demand from communities.

Also in some governance aspects, performance could be improved, e.g. in having clearer statutes and rules around elections of VEC members. The VECs depend also to a relatively large extent on voluntary contributions from users. For example, households who share a tap stand often purchase new taps when these break. And major maintenance works – like cleaning of intake structures and filters – is done by unpaid community labour. All in all, we categorise this as a model of community management with some support.

A particular area in which support is provided to the VECs is in capital maintenance. The floods and landslides, which occur with regularity in this mountainous area, damage main works like intake structure. Communities have insurances against damages to the head-works, caused by such events. These cover part of the damages, but ISA has at the 2013 disaster also directly financed some of these repairs, with contributions from communities and Gram Panchayats.

The research validated that the infrastructure was functioning well and in good condition. All damages incurred during the 2013 floods have been repaired. None of the systems is coming to the end of its life-span, also because population growth has been nil (or even negative) in these villages. The validation showed that the design service levels are meeting the standards. However, many users take rather less water from their tap stands, than the 40 lpcd for which the systems have been designed. There may be a sub-estimation in this, as many users carry out some of the activities (doing the dishes and laundry) at the tap stands or at communal tanks. Other service level parameters, like quality, continuity and reliability do meet the standards. The systems do represent a huge improvement compared to the situation before – which could be witnessed in the nearby control village without any supply, and a low satisfaction with the water situation.

The per person investment costs in hardware are about INR 7,000 /person, on top of which come costs for technical assistance and software, resulting in a total of about INR 15,000 /person. Costs are affected by the fact that the villages are very small (average 30 households), and poorly accessible in these mountain areas (one had to be reached over a one-hour by foot from the main road. Direct operation and minor maintenance, on the other hand, is very low at INR 18 /person per year. This covers the costs of chlorination and small repairs and in one village the costs of a paid maintenance worker. Villagers take turns in doing maintenance works, like cleaning intake structures of the roughing filters and these in-labour contributions are included in the cost calculation as well. Current tariff levels are adequate to cover these costs. Capital maintenance so far has only taken place after the mentioned floods. The annualised costs of this are around INR 114 /person/year. Out of this amount, almost half could be claimed back from the insurance. The remainder was brought together by the communities themselves, the Gram Panchayat, and HIHT. The external support to capital maintenance is crucial as current tariff levels are far from sufficient to covers these costs. Finally, in terms of costs, there are the costs of support to phased-out villages of around INR 89 /person/year, which are paid for the Project through a corpus fund provided to the Implementation Support Agency.

The study concludes that through strong and quality-oriented support during project implementation, necessary capacity is built for community management of these gravity-fed schemes. Communities do manage their systems effectively – though also inconsistencies and deficiencies are observed. The recently started systematic support to phased-out villages is a key mechanism to address these deficiencies, as it allows for targeted problem solving and refreshing capacity of the VECs, and for which there exists a strong community demand. The other aspect in which the communities do need and get outside support is the replacement of works after damages caused by floods. It is through this combination of strong community management, and outside support, that these systems have been functioning and providing a service for almost 10 years.

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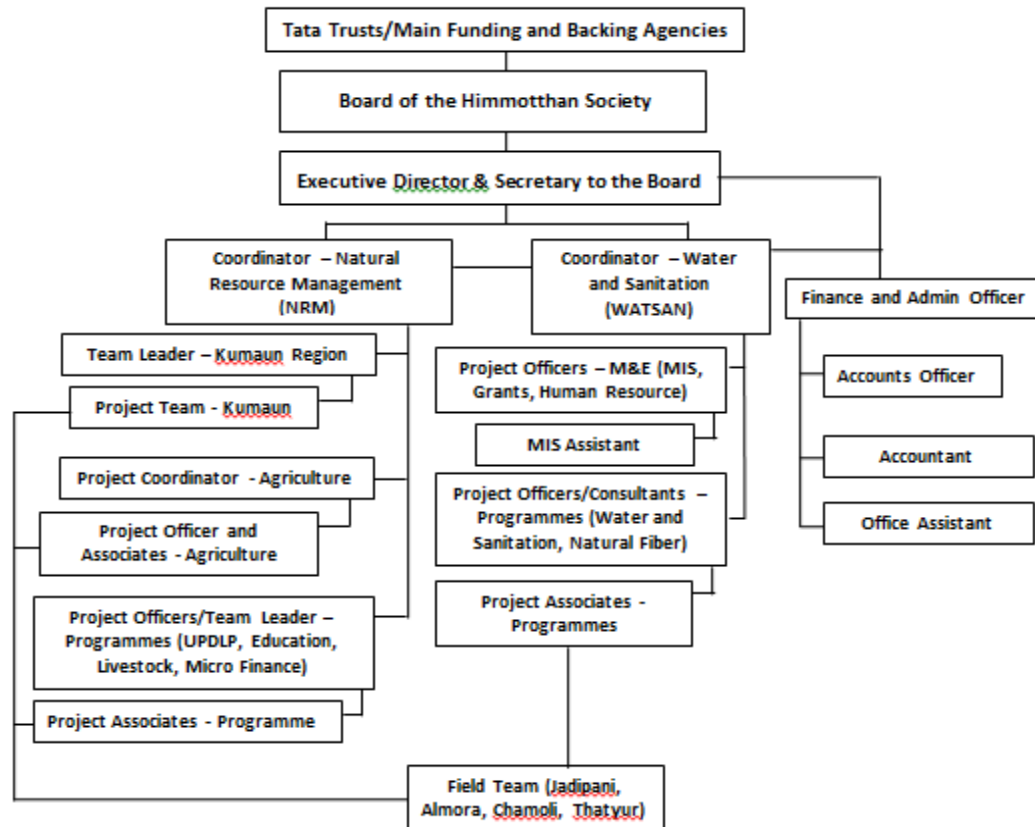
Appendix 1: Activity and responsibility matrix

Entities / Actors	Tasks / Activities																		
	Allocation of finance / Budgetary approval	Monitoring service levels & water quality	Project planning	Infrastructure design & implementation	Social intervention design and implementation	Operation and minor maintenance	Ongoing software support to community	Water resources management measures	Capital Maintenance and renewal	Major repair	Approval of user charges	User charge collection	Management of community involvement	Community capacity development & Training	Dispute resolution	Paying of water charges	Institutional & human resources development	Auditing	Evaluation/performance assessment
State Government			INV																
District government			INV																
Gram Panchayat			INV						INV + PAY	INV + PAY			INV						
Himmotthan and HIHT	RES	INV	RES + PAY	RES + PAY	RES + PAY	INT	INV	INV + PAY	INV + PAY	INV + PAY	INT	INT	RES + PAY	RES + PAY		INT			RES + PAY
Insurance company									PAY	PAY									
ENV DAS India			INV	INV															RES
VEC	INV + PAY		INV + PAY	INV + PAY	INV	RES + PAY	INV	RES + PAY	RES + PAY	RES + PAY	RES	RES	RES	INV	RES	INV			INV
Operator or mechanic						RES		RES	RES	RES		INV							
Households			INV	INV	INV	INV + PAY		INV + PAY	INV + PAY	INV + PAY	RES	INV	INV	INV	INV	RES + PAY			

Legend: RES = responsible; INV = involved; INT = interested; PAY = paying.

Appendix 2: Organogram of Himmotthan Society

Organogram Himmotthan Society



Organogram of the water and sanitation unit within the Himmotthan Society

Appendix 3: Support activity matrices

Support activities undertaken by Himmotthan Society

Type of activity	Is this activity undertaken?	Way of providing support	Name of intermediary	Modality of support	Are tools or methods used consistently
Monitoring and control (auditing)	Yes	Directly to service provider and via intermediary	ENV DAS India	On request	Yes, always
Water quality testing	Yes	Via an intermediary	ENV DAS India	On request	Yes, always
Water resources management	Yes	Directly to service provider and via intermediary	ENV DAS India	On request	Yes, always
Technical assistance	Yes	Via an intermediary	ENV DAS India	On request and supply based	Yes, always
Conflict Management	Yes	Via an intermediary	NGO partners of Himmotthan	N/A	Sometimes
Support in identifying investments needs	Yes	Via an intermediary	ENV DAS India	On request	Yes, always
(Re)training of service provider	Yes	No data		No data	No
Information and communication activities	Yes	Via an intermediary		On request and supply based	Yes, always
Fund mobilization	No				

Support activities undertaken by HIHT

Type of activity	Is this activity undertaken?	Way of providing support	Name of intermediary	Modality of support	Are tools or methods used consistently
Monitoring and control (auditing)	Yes	Directly to service provider		Supply based	Yes, always
Water quality testing	Yes	Via an intermediary	ENV DAS India	On request	Yes, always
Water resources management	Yes	Directly to service provider and via intermediary	ENV DAS India	On request and supply based	
Technical assistance	Yes	Directly to service provider and via intermediary	ENV DAS India	On request and supply based	Yes, always
Conflict Management	Yes	Directly to service provider		On request	No data
Support in identifying investments needs	Yes	Directly to service provider and via intermediary	ENV DAS India	On request	Yes, always
(Re)training of service provider	No data	No data		No data	No data
Information and communication activities	Yes	Directly to service provider		On request and supply based	Yes
Fund mobilization					

Appendix4: Performance score for the two enabling support entities

Indicator	Himmothan Society	HIHT
1. Degree of professionalization		
1.1 Existence of a formal mandate for support to service providers (QIS score)	100 - The ESE has a clearly articulated vision, mission and/or objectives for its support function, which is also supported by a policy mandate	100 - The ESE has a clearly articulated vision, mission and/or objectives for its support function, which is also supported by a policy mandate
1.2 Number of standard tools and instruments for support applied in a structured manner (QIS score)	100 - The ESE has tools and methods for all of the areas of support it provides and applies those in a systematic manner	75- The ESE has tools and methods for all of the areas of support it provides but doesn't apply those systematically
1.3 Existence and use of structured mechanisms for tracking information on performance of the service providers (QIS score)	50 - The ESE has one or more tools to track the performance of the service providers it supports and uses that occasionally for planning and monitoring	25- The ESE only keeps track of the service providers it supports in an informal and ad hoc manner
1.4 Existence of structured mechanisms for communication with the service providers (QIS score)	75 - The ESE has a number of communication channels, but of which only some are easily accessible and well-used.	100 - The ESE has a number of communication channels that are well used for contact with the service providers it supports.
2. Performance of the ESE		
2.1 Number of types of support provided	6	7
2.2 Average time between a request for support and the support being provided	Not applicable	24 hours
2.3 Percentage of all service providers in area that received support last year	Not applicable	Not applicable
2.4 Number of systems attended in the last year per staff member	11	0.9
2.5 Unit costs	Further elaborated in chapter 6	Further elaborated in chapter 6
2.6 Frequency of support visits per system per year	2	5
3. Client satisfaction		
3.1 Service providers indicating satisfaction with the support received (QIS score)	25- The ESE only has an implicit understanding of how satisfied its clients are with the support	25- The ESE only has an implicit understanding of how satisfied its clients are with the support

Appendix 5: Community service provider descriptors and performance indicators

Community service provider descriptors

Descriptor	Tachila	Kinsu	KhedaTalla
1. Type of organisation	Formal water committee	Formal water committee	Formal water committee
2. Members of governing body	12	11	12
3.1 Coverage	100	93 through piped supply and 7 through rainwater; total 100	100
3.2 Coverage with household connections	0	0	0
4.1 Tariff structure (Rs/household/month)	10	20	20
4.2 Contribution to capital costs (Rs/household)	7424	8914	9470

Community service provider (CSP) performance indicators

Indicator	Tachila	Kinsu	KhedaTalla
<i>Governance</i>			
1.1 Percentage of legal requirements for establishment of service provider complied with	100%	100%	100%
1.2 Presence of statutes	No	No	No
1.3 Selection of the Board of the service provider (QIS score)	50 - There is no formal document describing how elections should take place, but users and CSP have a general understanding of how it would work. This informal procedure was followed during the last elections.	50 - There is no formal document describing how elections should take place, but users and CSP have a general understanding of how it would work. This informal procedure was followed during the last elections.	50 - There is no formal document describing how elections should take place, but users and CSP have a general understanding of how it would work. This informal procedure was followed during the last elections.
1.4 Information sharing and accountability mechanisms (QIS score)	50 - The CSP has at least one mechanism through which users are informed and accountability is provided. This is used regularly.	50 - The CSP has at least one mechanism through which users are informed and accountability is provided. This is used regularly	50 - The CSP has at least one mechanism through which users are informed and accountability is provided. This is used regularly
1.5 Percentage of women in the governing body of the CSP	25%	36%	25%
1.6 Percentage of members of the governing body of the CSP who have received formal training for their function	100%	100%	100%
<i>Finance</i>			
2.1 Financial balance of last year's revenue and expenditure	INR 1970	INR 3800	INR 1980
2.2 Cash reserves (QIS score)	75 - The CSP actively manages a cash reserve both through petty tax box and bank account but replenishes it on an irregular basis.	75 - The CSP actively manages a cash reserve both through petty tax box and bank account but replenishes it on an irregular basis	75 - The CSP actively manages a cash reserve both through petty tax box and bank account but replenishes it on an irregular basis
2.3 Book keeping (QIS score)	75 - The CSP tracks its income and expenditure systematically and produces an annual	25 - The CSP registers its income and expenditure in a haphazard and irregular way.	25 - The CSP registers its income and expenditure in a haphazard and irregular way.

	account. However, no auditing of these takes place.		
2.4 Non-payment rate: percentage of users who own more than three months of water fees	0%	0%	0%
<i>Technical performance</i>			
3.1 Technical folder (QIS score)	The CSP has a folder with at least the map or design of the system or the operational manual and guidelines	The CSP has a folder with at least the map or design of the system or the operational manual and guidelines	The CSP has a folder with at least the map or design of the system or the operational manual and guidelines
3.2 Registry of operational information (QIS score)	100 - The CSP has more than two of the five types of records and all are up to date	25 - The CSP has only one of the five types of records	25 -The CSP has only one of the five types of records
3.3 Response time (hours to get a repair done)	18	27	28
3.4 Water metering	N/A	N/a	N/a
3.5 Waters security measures (QIS score)	50 - At least one water security measure is being taken, though not as part of a comprehensive water security plan	50 - At least one water security measure is being taken, though not as part of a comprehensive water security plan	50 - At least one water security measure is being taken, though not as part of a comprehensive water security plan
3.6 Water quality management (QIS score)	50 - A water quality management plan has been developed and is followed most of the time but not always.	50 - A water quality management plan has been developed and is followed most of the time but not always.	50 - A water quality management plan has been developed and is followed most of the time but not always.

Appendix 6: Participation score

Stage of delivery cycle	Tachila	Kinsu	KhedaTalla
Capital Investment (implementation)	2 – Interaction participation. The community in partnership with the VEC and HIHT engaged in a joint-analysis of implementation options before developing a plan	2 – Interaction participation. The community in partnership with the VEC and HIHT engaged in a joint-analysis of implementation options before developing a plan	2 – Interaction participation. The community in partnership with the VEC and HIHT engaged in a joint-analysis of implementation options before developing a plan
Service delivery	1 – Self-mobilisation. The community takes responsibility for administration, management and operation and maintenance, directly.	1 – Self-mobilisation. The community takes responsibility for administration, management and operation and maintenance, directly.	1 – Self-mobilisation. The community takes responsibility for administration, management and operation and maintenance, directly.
Asset Renewal	2 – Interaction participation. The community in partnership with the VEC sought support and engaged with HIHT to come to joint-decision making regarding asset renewal	2 – Interaction participation. The community in partnership with the VEC sought support and engaged with HIHT to come to joint-decision making regarding asset renewal	2 – Interaction participation. The community in partnership with the VEC sought support and engaged with HIHT to come to joint-decision making regarding asset renewal
Service enhancement or expansion	2 – Interaction participation. The community in partnership with the VEC approached the GP, and came to joint-decision making regarding construction of a communal washing and laundry place	No data, as this hasn't taken place	No data, as this hasn't taken place

Appendix 7: Service levels found in the villages

Percentage of households with different levels of service in Tachila (n= 21)

Service level	Design quantity	Quantity: reported use		Accessibility reported single round trip		Accessibility: reported cumulative time spent		Water quality perception	Continuity	Reliability
		Summer	Non-summer	Summer	Non-summer	Summer	Non-summer	Summer and non-summer	Summer and non-summer	Summer and non-summer
High	0	0	0	43	38	0	0	100	100	38
Improved	0	0	0	38	38	0	0		0	38
Standard	100	5	0	14	19	0	5	0	0	0
Basic	0	14	24	5	5	24	33	0	0	24
Low	0	81	74	0	0	76	62			0

Percentage of households with different levels of service in Kinsu(n=30)

Service level	Design quantity	Quantity: reported user		Accessibility reported single round trip		Accessibility: reported cumulative time spent		Water quality perception		Continuity	Reliability
		Summer	Non-summer	Summer	Non-summer	Summer	Non-summer	Summer	Non-summer	Summer and non-summer	Summer and non-summer
High	0	0	0	43	47	0	10	83	80	100	40
Improved	0	0	0	43	43	0	0			0	50
Standard	100	0	0	13	10	0	7	17	20	0	0
Basic	0	37	27	0	0	27	13	0	0	0	7
Low	0	63	73	0	0	73	70				0

Percentage of households with different levels of service in KhedaTalla (n=30)

Service level	Design quantity	Quantity: reported use		Accessibility reported single round trip		Accessibility: reported cumulative time spent		Water quality perception	Continuity	Reliability
		Summer	Non-summer	Summer	Non-summer	Summer	Non-summer	Summer and non-summer	Summer and non-summer	Summer and non-summer
High	0	0	0	70	67	0	0	87	100	23
Improved	0	3	0	20	27	0	3		0	63
Standard	100	47	27	10	7	27	7	12	0	0
Basic	0	47	63	0	0	63	23	0	0	7
Low	0	3	10	0	0	10	67			0
No data		0	0	0	0	0	0	0	0	7

Percentage of households with different levels of service in *Kakru* (n=20)

Service level	Quantity		Accessibility reported single round trip		Accessibility: reported cumulative time spent		Water quality perception	
	Summer	Non-summer	Summer	Non-summer	Summer	Non-summer	Summer	Non-summer
High	0	0	0	0	0	0	25	15
Improved	0	0	0	0	0	0	0	0
Standard	0	0	0	0	0	0	40	50
Basic	50	40	35	55	40	0	35	30
Low	50	60	63	45	60	100	0	0
No data	0	0	0	0	0	0	0	5

Appendix 8: Reference values for service levels

Definitions of service levels across all cases

Service level	Quantity (lpcd)	Accessibility (cumulative time spent per day by the family on fetching water)	Water quality perception	Continuity (hours/day)	Reliability
High	> 80 lpcd	0-10 minutes per day	Good	> 3	Supply above the agreed schedule and duration, and response time doesn't exceed 24 hours.
Improved	60-80 lpcd	10-20 minutes per day		2-3	Supply above the agreed schedule and duration, and response time doesn't exceed 48 hours.
Standard (basic in other community water plus cases)	40-60 lpcd	20-30 minutes per day	Acceptable	1-2	Supply according to an agreed schedule and duration and response time doesn't exceed 48 hours
Basic (sub- standard in other community water plus cases)	20-40 lpcd	30-60 minutes per day	Bad	< 1	Supply has scheduled times, duration and delivery but this is not always met, or response time exceeds 48 hours
Low (no service in other community water plus cases)	< 20 lpcd	> 60 minutes per day			Supply has scheduled times, duration and delivery but this is hardly ever met, or response time more than 2 weeks