COMMUNITY MANAGEMENT
OF RURAL WATER SUPPLY
Community Water *plus*

Understanding the resource implications of the 'plus' in community management of rural water supply systems in India: concepts and research methodology

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About Community Water Plus

Community management is the common model for rural water supply, but it has limitations, particularly when it comes to the ability to sustain services over the long-term. In an effort to identify what works and what doesn't when it comes to community management, the Community Water Plus project is investigating successful community-managed rural water supply programmes and approaches across India.

The project is funded by Australian Aid and is being 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 with overall project coordination provided by Cranfield University. It is also working closely with national and State government agencies as well as civil society partners.

This paper provides an outline of the conceptual framework for this research by providing a conceptual background to the current situation; outlining the research methodology to answer the research questions; and detailing the analytical tools that will be used to attain the results.

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Abbreviations and acronyms

CapEx	Capital Expenditure
CapManEx	Capital Maintenance Expenditure
CSP	Community service provider
CoC	Cost of capital
CBM	Community-Based Management
DRA	Demand-Responsive Approach
ESE	Enabling Support Entity
GP	*Gram Panchayat*
Lpcd	Litres per capita per day
NGO	Non-Governmental Organisation
NRDWP	National Rural Drinking Water Programme
O&M	Operation and Maintenance
OpEx	Operating and minor maintenance Expenditures
OpexDS	Operating Expenditure on Direct Support
OpexIDS	Operating Expenditure on Indirect Support
QIS	Qualitative Information Systems
SIASAR	*Sistema de Información de Agua y Saneamiento Rural* (Rural Water and Sanitation Information System)
SISAR	*Sistema Integrado de Saneamento Rural* (Integrated Rural Sanitation System)
VLOM	Village-Level Operation and Maintenance
WASMO	Water and Sanitation Management Organisation

Executive summary

While community management has successfully contributed to increased access to rural water supply, there is a limit to what this model has achieved in terms of the sustainability of these services. It is acknowledged that communities have a pivotal role in their own service provision but continued support from government and other entities remain critical. The way and extent of this continued support is yet to be determined and better insight is required to calculate the exact modalities and the costs of providing support.

Because of its long history of community management, coupled with water-sector reforms of the 1990s and 2000s, India provides a rich set of experiences regarding community management of rural water supply, including a variety of support mechanisms.

The Community Water Plus is a research project that aims to gain insight into the modalities and costs of service provision by studying a sample of the most successful community-managed rural water programmes. The research will scrutinise the resource implications of the 'plus' factor across a range of conditions and technologies in the sample programmes. It will emerge with answers to what type, extent and style of supporting organisations are prevalent in the rural water supply chain. It will look at what combination of factors and organisations most positively influence water services delivery to ensure sustainability.

This paper provides an outline of the conceptual framework for this research by defining and providing a conceptual background to the current situation; outlining the research methodology to answer the research questions; and detailing the analytical tools that will be used to attain the results.

From experience and reviewing the current literature, the research considers a number of concepts and insights.

Firstly, sustainable services delivery requires a combination of a meaningful level of community engagement and community management and on-going government support. The extent and quality of community participation and engagement can be assessed against a ladder representing different levels in the community, ranging from labour contributions and decision-making pertaining to minor issues, to full responsibility and decision-making on all key aspects of the services after finalisation of implementation.

Secondly, whereas community participation is crucial to success, it is important to keep a healthy balance between the levels of this participation and the level and degree of outside support – often from local government. If the levels of outside support are consistently too high, community participation may be at risk. It is thus critical that community management is professionalised through balanced, on-going support so that they can retain meaningful engagement throughout all the supply stages. The level, needs and possibilities for outside support differ according to the socio-economic status of the communities as well as the types of technology used. Different support demands are made in villages with rudimentary technology in comparison to villages with reticulated systems.

Thirdly, the success of community management is gauged through a range of measures, including the service level, meaning the effectiveness of supply; the equity in supply; its sustainability; and the degree to which recurrent costs are covered. In this instance the socio-economic situation prevailing in the community; the level of outside support; the professionalisation of the community management and the technology applied all play a role in determining success.

Finally, it is evident that on-going support comes at a cost: it simply costs more to organise intense community empowerment processes and to carry out regular support activities with communities. Thus, where the spending on support is low, the level of success in community management is often low as well.

This paper elaborates on the methodology to apply this conceptual framework in twenty community-managed rural water supply programmes across India, and particularly to those assessed as successful; where the spread of the sample villages covered different contexts in the country (including states from the various sub-regions); where different types of technology was used; their institutional support; and how the villages performed in their respective roles.

The research outlined in this paper will delve deeper and investigate at what cost the support was provided and their level of success measured against the findings. To validate that indeed these support programmes were successful, the performance of the community service providers that they supported and the services that the households eventually received, will be appraised. This is all put into the context in which the programme operates and the development trajectory the programme followed. In this way, more concrete evidence of what a successful support programme looks like and what it costs, will become clear. Thereby, the research will contribute to better insights into the 'plus' that community management so badly needs to perform more sustainably.

1 Introduction

1.1 Background

Community management has long been the dominant management model for rural water supplies in many low-and middle-income countries and it is widely believed to have been instrumental in the relative success in increasing access to rural water services in recent decades (Schouten and Moriarty, 2003; Harvey and Reed, 2006; Lockwood and Smits, 2011). However, problems in the sustainability and scalability of the model are leading many to conclude that we have reached the limits of an approach that is too reliant on voluntarism and informality (Moriarty, et al., 2013). A consensus is now emerging that communities need continued support from government and other entities in their on-going service delivery tasks (Harvey and Reed, 2006; RWSN, 2010; Lockwood and Smits, 2011; Moriarty, et al., 2013). Yet, this critical support represents uncertain ground for many governments and donors, with a lack of clarity on the form and cost of effective support functions.

India, a country at the forefront of efforts to expand access to rural water services, has a long history of community management. Following the scaling up of the model during the sector reforms of the 1990s and 2000s, the country is now home to a variety of community management programmes across the states. However, success remains uneven, with some notable success stories, but with continued evidence of failure (James, 2004, 2011). In India and elsewhere in the world, there remains a crucial need to understand what mechanisms for support have worked, and to develop realistically costed policies and strategies for scaling-up and strengthening support to community managed rural water supplies.

1.2 Objectives and research questions

Community Water Plus ^{Plus} (community management of rural water supply systems) is a research project which aims at gaining further insights into the type and amount of support (the 'plus') that have been needed for community management to be successful, as well as into the resources implications of the 'plus', across a range of technologies and conditions in India. Specifically, the project will focus on the following main research question:

What type, extent and style of supporting organisations are apparent in sustainable community managed water service delivery relative to varying technical modes of supply?

The main research question is further broken down into the following specific questions:

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

Our hypothesis is that sustainable services delivery requires a combination of community engagement and community management with the necessary government support (potentially including a level of out-sourcing to the private sector). The second part of our hypothesis is that through the on-going support community management can professionalise. Finally, we consider that the needs and possibilities for professionalisation and support differ widely and depend on socio-economic factors and the type of technology used.

In order to test these hypotheses, the research investigates twenty cases of community-managed rural water supply that have been claimed to be successful across India. These cases will be selected to cover a range of geographical and socio-economic conditions as well as types of technologies. For each of the cases, the extent and type of support will be captured and a validation will be carried out on whether indeed it has been a case of successful community management.

1.3 About this document

This is the first working paper of the project and as such serves to articulate our hypothesis and assumptions, and to clarify those to the project's stakeholders. The paper is a resource for others and serves to invite comment and debate on this subject. We hope it will be the first of a number of working papers and we will share updates as the project develops.

In addition, it serves to explain the methodology followed and provide an introduction to the instruments to carry out the study to the research team as well as to the stakeholders involved in each of the twenty cases.

It is split into two sections: SECTION A provides the conceptual background, whereas SECTION B provides the methodology. In SECTION A, we provide a discussion on the key concepts, coming to proposed definitions to be used in the project. In SECTION B, we present a general overview of the methodology, outlining the phases in the project and detailing what needs to be assessed as part of the research. It also includes the main analytical tools. The detailed data collection tools, including interview guides, survey forms and checklists, and protocols for their processing, have not been included in this report, but will be made available separately on the project website.

SECTION A

2 Conceptual framework

This section reviews the concepts that underpin our hypotheses: that sustainable services delivery requires a combination of community engagement and community management with government support; that there is need to professionalise community management through support; and, that the needs and possibilities for support differ according to socio-economic factors and the types of technology used.

We do so by first defining rural water supplies as a service, rather than as the development of infrastructure, and thereby introduce the different phases in the service delivery cycle. This is followed by a review of the concepts around community engagement, building on the literature of community participation, and how these apply to rural water supplies. This results in the identification of a continuum of forms of community management. It ends with a review of the means to assess the degree of success in rural water supply, looking into concepts such as its effectiveness, equity and sustainability. The chapter ends with a review of the resource implications for community-based rural water supplies.

2.1 Rural water supplies as a service

This research starts from the recognition that rural water supply needs to be seen as an on-going service rather than a system to be developed (Fonseca, et al., 2010; Lockwood and Smits, 2011; Moriarty, et al., 2013). A water service consists of access to a flow of water with certain characteristics (such as quantity, quality and continuity), as will be elaborated in section 2.3. For such a service to be supplied, one has to consider the physical infrastructure (the system) as well as an entity to manage that system and, in addition, other entities to monitor and support that system. In our research we focus on systems with a significant element of community involvement and engagement, which can include direct management responsibilities.

Water services delivery can be characterised by various phases over time (see Figure 1). It starts with a capital-intensive phase in which the physical systems are built, i.e. the development of the initial or 'new' construction of the physical system, also called the capital investment or implementation phase. This phase itself follows a project cycle, with a series of consecutive activities including assessment, feasibility, design, implementation and monitoring. Its activities include both physical construction as well as accompanying activities such as community mobilisation, training and the establishment of the service provider.

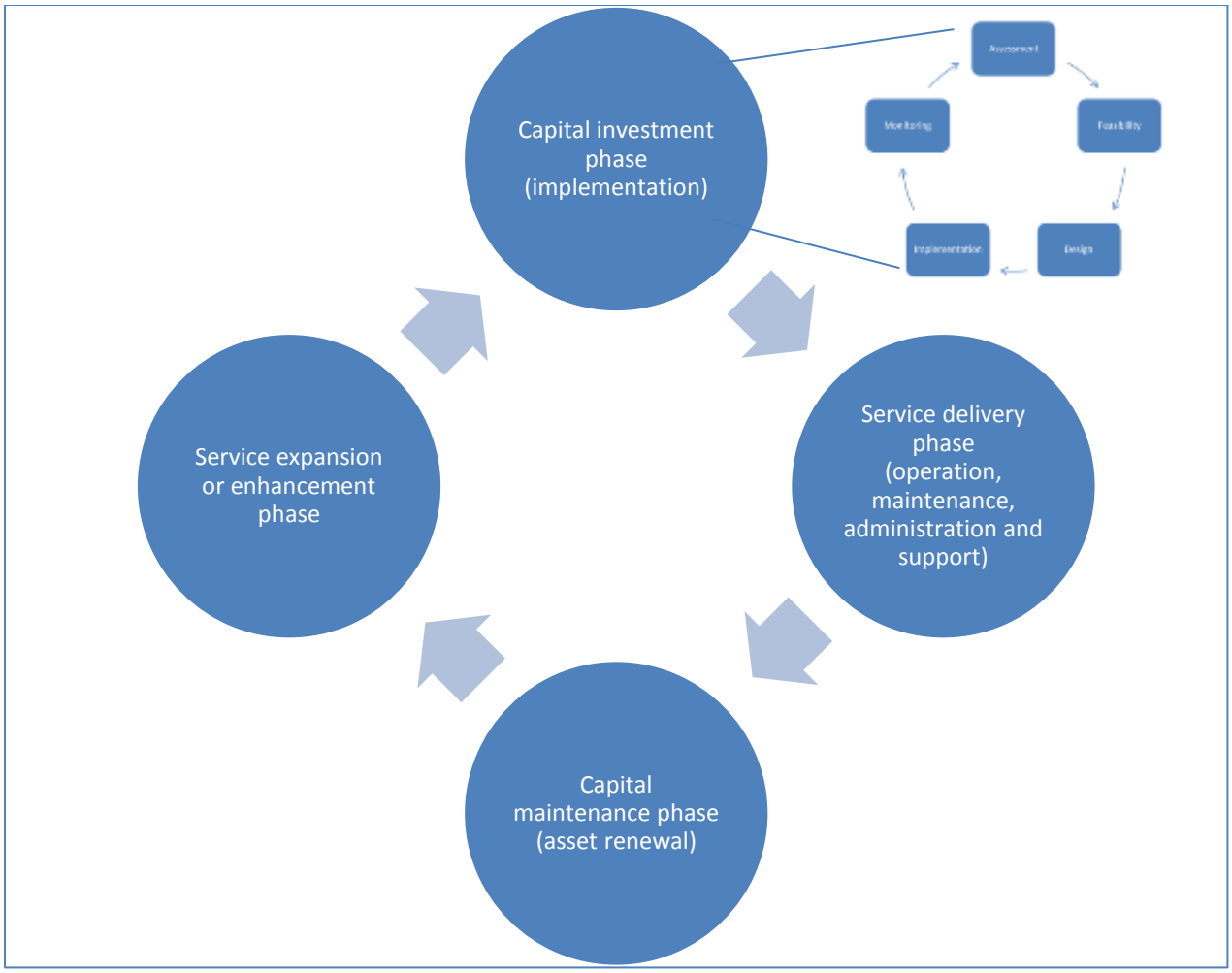
This capital-intensive phase is followed by the recurrent cost-supported service delivery phase, in which consumers receive the desired water supply, enabled by appropriate operation and minor maintenance which in turn has to be supported by a suitable level of administration. Support to this administration is also a likely part of this phase.

Depending on the technology used initially, the next phase, occurring some or many years later, is described as the capital maintenance phase where major replacements and renewal of physical assets take place. This phase is often not very discretely defined, as such activities happen in on-going steps as physical assets reach the end of their working lives, typically throughout the extended service period.

The process continues when the need for a significant upgrade of the service is required to expand or enhance the service, e.g. delivering additional boreholes as a village expands geographically or

the numbers of consumers develop through population growth or enhancement by moving from a borehole with handpump to a borehole with motorised pump and small distribution system.

Figure 1: Phases in the service delivery process



based on Lockwood and Smits,2011.

As the degree of community engagement may differ significantly from one phase to another, this research assesses how this may have changed over time from one phase to another, and identify at which phases community engagement is most critical.

2.2 Community engagement in rural water supply services

This section reviews the notions around community engagement in rural water supply services, whereby a largely historical perspective is taken towards how these notions evolved. It takes as a starting point the International Decade for Drinking Water and Sanitation, in which concepts of community participation and community management were first applied in a systematic manner in the rural drinking water supply sector. It discusses how these two concepts – community participation and community management – are related, but different. It ends by further describing the development of the concept in the 1990s, particularly supported by the emergence of the Demand-Responsive Approach (DRA). After that, we take a step outside the sector and review the theoretical foundations of community participation more generally, identifying degrees of participation and partnership. We conclude by describing the current state of the art in thinking on community management, as one of the service delivery models, amongst many in the sector, which also recognises the need for support of community management.

2.2.1 Laying the foundations: from community participation to community management

The involvement of communities in rural water supplies has its roots in the International Decade for Drinking Water and Sanitation in the 1980s to rapidly increase access to rural water supplies. Earlier approaches had favoured 'public works' or 'public health engineering', in which central government departments constructed new water supply systems in rural areas, and then tried to manage these centrally. But more often than not these systems were neglected after they were built. This approach was seen to be relatively inefficient and ineffective. In response, the 1980s gave rise to the concept of community participation – initially referring to the engagement of communities in the development of the water systems, as described in this extract from McCommon, et al., (1990): *"... funding has been declining and many completed systems are in disrepair or have been abandoned. This state of affairs has led many experts to question whether the emphasis on centrally-managed schemes needs to be re-evaluated and a new approach taken to the provision of rural water supply as a public service. Community management has been proposed as one possible alternative strategy in view of the increasing evidence that systems are more sustainable when designed, established and operated by the community".*

However, the initial result of community participation in implementation of water systems did not yield immediate positive results, because communities were given little space to participate in key decisions, let alone take full control of the water systems. McCommon, et al., (1990) state: "*The situation did not improve markedly even when some community-based participation was encouraged, largely because community participation has been narrowly defined as the mobilization of self-help labor or the organisation of local groups to ratify decisions made by outside project planners. Externally-imposed solutions do little to build capacity, increase empowerment, or create support structures that represent the interests of users willing to maintain these rural water supply and sanitation systems on a long-term basis. Community management, as distinguished from community participation, is taken to mean that the beneficiaries of rural water services have responsibility, authority, and control over the development of such services."*

In essence, McCommon, et al., (1990) identified two shifts in the conceptualisation of community engagement:

- The quality of community participation: from labour contributions and decision-making on minor issues: to full responsibility and decision-making on all key aspects of the services; and
- The phases in the service delivery cycle in which communities would participate: from community participation in the initial development of the infrastructure only, to also their participation in the subsequent service delivery and operation and maintenance of the systems.

The latter shift came from the thinking to place responsibility for operation and maintenance (O&M) onto the community, that being the first level of scale at which such activities could be undertaken. One of the first manifestations in which this thinking on community participation and community management was systematised was the VLOM approach (Village Level Operation and Maintenance). Under VLOM, communities were made fully responsible for the operation and maintenance of the water systems. This approach built also on what had earlier been called 'appropriate technology', and centred on basic technologies and systems that had been purposefully designed to require minimal external inputs, but primarily referred to handpumps. In practice VLOM proved to be insufficient to address the problem of sustainability as many communities were ill-prepared to take on the management responsibilities, even of the most low-cost technologies. Moreover, these – largely donor-driven – VLOM programmes favoured working directly with communities and grassroots organisations only, thereby by-passing government structures. This in turn meant that after these programmes ended, communities were left alone to manage their systems.

By the end of the 1990s the discourse developed further and put emphasis on the combination of a Demand-Responsive Approach (DRA) as well as community management. Three central elements of this combined approach were:

- A requirement that communities express a demand for services and external agencies try and respond to this. This demand was expected to be manifested through user contributions to capital costs, as that – so the argument went – this would lead to a sense of ownership and hence commitment to ensuring on-going operations and use. Real ownership, in legal terms, of assets however remained vaguely defined, if at all.
- Full cost recovery, understood to refer to user tariffs covering all operation and minor maintenance costs – which of course were only a subset of the full costs.
- Stronger and more meaningful participatory approaches. In order to achieve the previous two points, many organisations (particularly NGOs) gradually improved the quality of participation in their projects, giving a stronger voice to communities in expressing their demand and decision-making in, for example, technology selection, tariff setting, establishing the management model and preparing them better for their role in eventually managing the service. A range of participatory methodologies and tools were developed and specified for rural water supplies (Lammerink and De Jong, 1999; Dayal, et al., 2000, Deverill, et al., 2002, Bolt and Fonseca, 2001), becoming often part of the standard intervention model of these organisations. For India, the main guidelines that define the way in which communities participate are the ones set by the Ministry of Drinking Water and Sanitation (MDWS, 2013).

Particularly, the latter element of the more meaningful participatory approaches evolved markedly in the 1990s, largely under the influence of broader developments in thinking on community participation in general. This is explained in the next section.

2.2.2 Community management

The theoretical foundations for community management of rural water supplies lie in the broader work on community participation in (rural) development. This started from the observation that many development projects were not leading to the expected results, often because the intended user groups were not making use of certain interventions, or that these interventions had all kinds of unintended negative impacts. One of the main identified reasons for this mismatch was that many of the development projects were implemented in a top-down manner. The terminology itself implies that communities participate in another entity's programme and therefore do not have direct ownership and responsibility.

McCommon, et al., (1990) explain that "*the concept of Community Development originated (in the 1950s) in the community development movement of the late colonial era in parts of Africa and Asia. To the colonial administrations, community development was a means of improving local welfare, training people in local administration, and extending government control through local self-help activities. Community development fell out of favour in the late 1960s and early 1970s, primarily because of the widespread disenchantment with the top-down bureaucratic approach to development and its failure to redistribute benefits. During this era, community development came to be associated with coerced labor, although it was often called voluntary*."

As the concept of community participation evolved, more emphasis was placed on the decision-making power of communities over development programmes. For example, Paul (1987) reports the World Bank definition of community participation: "*an active process whereby beneficiaries influence the direction and execution of development projects rather than merely receive a share of project benefits*".

Appealing as such a definition of community participation may be, as a term and approach, it has been used and abused by agencies, often using the term as window-dressing for approaches in

which communities actually had very little voice. McCommon, et al., (1990) list the following possible objectives of community participation in the context of development programmes:

a) *"sharing project costs (beneficiaries contribute money or labor);*
b) *increasing project efficiency (beneficiaries assist in project planning and implementation);*
c) *increasing project effectiveness (beneficiaries have a say in project design and implementation);*
d) *building beneficiary capacity (beneficiaries share in management tasks or operational responsibilities); and*
e) *increasing community empowerment (beneficiaries share power and increase their political awareness and influence over developmental outcomes)"*

As can be seen, community participation can be understood to refer to anything from contributing money or labour to a programme to sharing in decision-making and management tasks.

The seminal work by researchers like Robert Chambers (1983) helped develop an alternative development model and methodologies which emphasised that community participation should be about providing a real voice and decision-making power to communities, so they could choose the interventions they most needed. To explain this point further, different scholars developed continuums, or ladders, of community participation, based on the original work by Arnstein (1969) in the context of social development work in the United States and further elaborated subsequently (see Table 1).

Table 1: Ladders of community participation

Degree of citizen power	Citizen control	Supporting independent community initiatives	Self-governing	Bargaining	Empower
	Delegated power				
	Partnership	Acting together	Facilitator		Partner
Degree of tokenism	Placation	Deciding together	Stakeholder		Involve
	Consultation	Consultation		Consultative	Consult
	Informing	Information	Source of local knowledge		Inform
Non-participation	Therapy (education)				Influence
	Manipulation		Activist	Authoritative	
Key References	Arnstein, 1968	Wilcox, 1994	'Images of NGOs Vanderwal, 1999	'Images of Governmental organisations' Vanderwal, 1999	Robinson, 2003

The challenge as Robinson and Nolan-ITU (2002) explain is that moving 'up' the community engagement ladder towards 'empowerment' requires 'increased capacity for information processing and learning, problem solving and resolving conflict.' The challenge to this is the obvious, often overlooked, realisation that poor communities are not only poor economically but also tend to be poor in terms of social and institutional capital. For example, they may lack democratic structures for decision-making and local elites may capture a disproportional amount of benefits from water projects. Social and institutional capitals are some of the qualities that poor rural communities also need significant support to develop. As a result their likely rate of 'demand-responsive development' will therefore (almost) always be slower than external agencies would like, particularly when they have budgetary and implementation targets to achieve. That means that there is often a tension

between the quality of interventions and the scalability of approaches. More meaningful participatory processes – of the interactive type – are needed to increase the probability of sustainability of service delivery. Such processes take more time, money and require well-skilled staff to facilitate them. These conditions are often not available at scale.

The demand-responsive approach emphasises the importance of communities contributing in cash or in kind to the costs of the initial infrastructure development as an important way of expressing demand and to create a sense of ownership of the water system. Marks and Davis (2012) show that such contribution indeed contribute to the sense of ownership but there is a threshold effect in that, as that contribution needs to be significantly high to create such a sense. In reality, it often has taken a long time for communities to mobilise such contributions and where they are made, they are often minimal (Jones, 2013), and even these minimal contributions are often waived – or reduced to token contributions – for the sake of speeding up infrastructure development.

In this research, we use these ladders to assess the extent and quality of community involvement, differentiating that for the various phases in the service delivery cycle.

2.2.3 Organisational partnering and relationships

The concept of partnering shares characteristics with the terminology of participation but is organisationally focused – as opposed to the discussion above which talks about people, households and communities. Partnering refers to an 'agreed-upon arrangement between two or more parties to work collaboratively toward shared objectives – an arrangement in which there is (i) sharing of work, responsibility and accountability; (ii) joint investment of resources; (iii) shared risk-taking, and (iv) mutual benefit' (Demirjian, 2002, p. 3). In rural water supply, partnering can help facilitate the transfer of physical (financial) capital (i.e. funds) *and* human capital (i.e. knowledge and skills) as the longer-term relationships between organisations provide fertile ground for learning (Demirjian, 2002).

The concept of partnering, therefore, provides an approach for considering the organisational relationship between community organisations, service providers and external entities. As shown in Table 2, different types of partnerships exist which can provide a framework for analysis. These types of partnering should not be considered rigid or exclusive but rather cumulative with an organisational relationship potentially exhibiting characteristics across the typologies. For the purpose of this research, two additional partnering types are added to the original model. These are bureaucratic and transactional partnering which are analogous to tokenism in the participation ladder. These types of partnerships may not strictly be considered partnering as defined above, but rather simple inter-organisational relationships that are likely to play a role in the rural water sector.

In this research, this classification will be used to assess the type of partnerships between community organisations and the external agencies with whom they may interact during the different phases of the service delivery cycle.

Table 2: Organisational partnering typology

Type of partnering	What is being shared?	Purpose	Extent of transfer of ownership and risk
Collaborative	Responsibility, authority	**Collaborative decision-making:** To share responsibility and engage in joint decision-making with regard to service design, delivery, evaluation or adjustment.	Responsibility, ownership and risk are shared between partners.
Contributory	Funds, resources	**Support-sharing**: To pool resources or leverage new funds for implementation and maintenance of service delivery.	Senior partner retains control, but operational partner contributes resources (which may be at risk) and may propose or agree to objectives.
Operational	Work, operations	**Work-sharing:** To share work (i.e., 'division of labour') and co-ordinate operations.	Senior partner retains control; operational partners can influence decision making through their practical involvement.
Consultative	Advice, information	**Advisory**: To systematically obtain and share relevant information to improve service design, delivery, evaluation or adjustment.	Senior partner retains control, ownership and risk but is open to input from operational partner.
Transactional	Payment, Services	**Contractual**: exchange of funds for services or products.	Senior partner commissions operational partner to undertake specific tasks.
Bureaucratic	Compliance, obligation	**Legitimacy:** To fulfil regulatory or normative expectations regarding the need for partners to work together.	Senior partner retains total control over responsibility, ownership and risk, whilst junior partner seeks to maximise output from partner.

Expanded from original by Demirjian, 2002.

2.2.4 Models of community management of rural water supplies

Applying these general insights to rural water supply, one can identify three broad groups of community-engaged approaches[1] to ensuring the fulfilment of the human rights to water, as illustrated in Figure 2:

- Direct provision with community involvement, in which a public body (in the case of India typically a Gram Panchayat (GP) as the lowest level of elected local government) carries out most of the service provision responsibilities, and may engage communities in several minor operational tasks, crucially in oversight functions.
- Community management with direct support. Under this approach, community-based organisations carry out the main responsibilities for service provision, and do so largely through voluntary arrangements. For certain tasks, it may get support from public bodies (who in turn may outsource this to a private sector organisation).
- Professionalised community-based management[2]. In this instance, the community-based organisation seeks the 'plus' by bringing on board professional capacity within the organisation

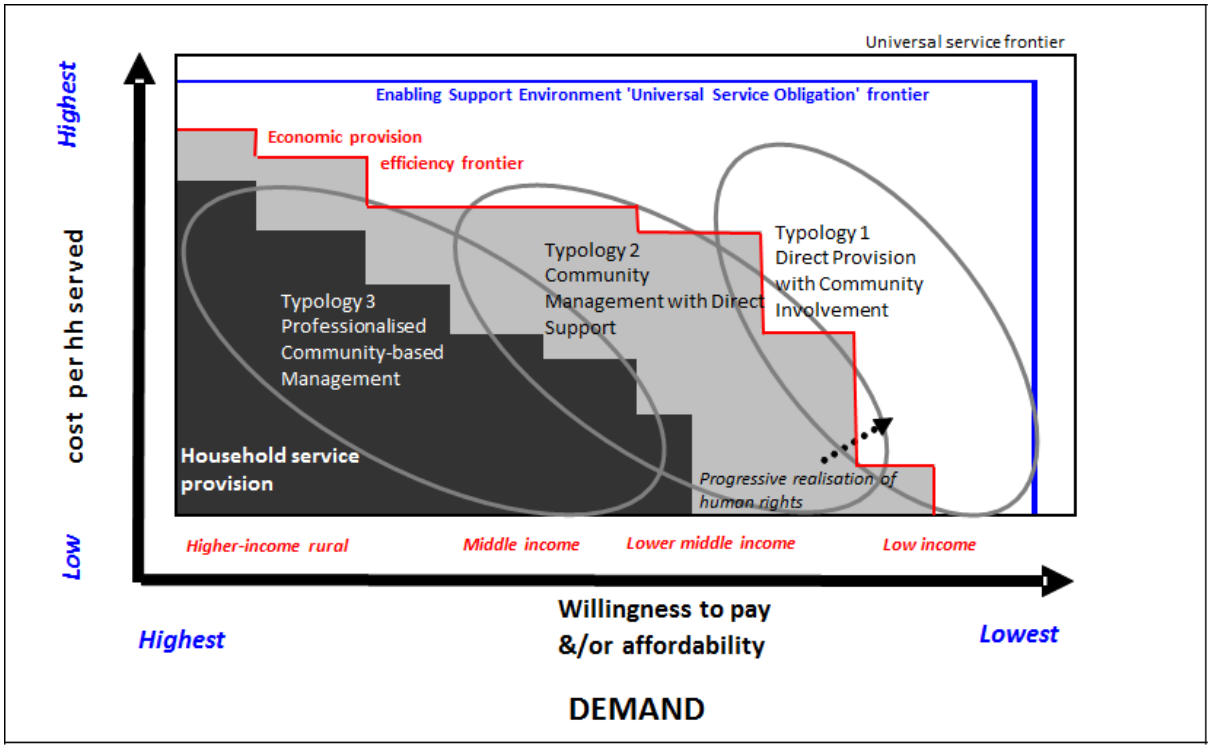
[1] There is also the approach of self-supply whereby rural households develop and use traditional water supply technologies, such as open dug wells (Sutton, 2004; Sutton, 2009). They may get support from external organisations to gradually improve these technologies or management (Sutton, 2011; Butterworth, et al., 2013). We do not consider it in this study, as it does not constitute a form of community management, but of management by the household.

[2] Not elaborated on is stage 4 where rural water supply is delegated to a conventional utility.

itself. It may, for example, hire paid-for operators or administrators. There will typically also be a shift to the adoption of good management practices, common in utility management. Crucially, communities retain an important engagement through supervision over the work of the service provider.

- We also recognise a level where rural communities have sufficient resources and closeness to urban clusters to delegate water supply to a conventional utility or, in the Indian case, the GP is able to secure sufficient resources, through tariffs or other funds, to provide direct provision service with little or no actual community management. However, we still contend that community management retains its attractiveness because it has the potential to bring much greater effectiveness and equity, and perhaps efficiency, to programmes.

Figure 2: Application of 'plus' approaches in relation to demand and costs of water supplies



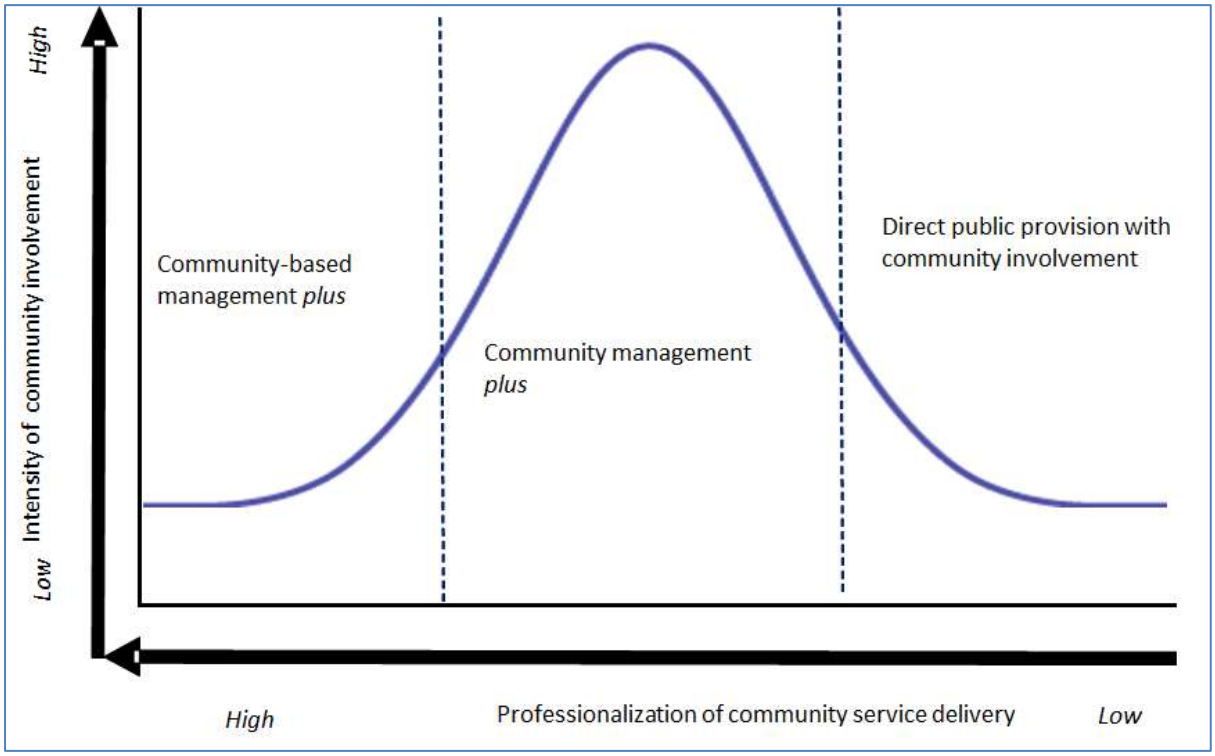
Adapted from Franceys and Gerlach (2008) after Stein, et al., (2007).

Figure 2 recognises the spectrum of likely costs of supplying households with water relative to their ability and willingness to pay, segmenting the different consumer groups by income and costs of supply. Higher-income level households begin to expect improved services, reflected in the change from 'carrying distance service' to 'household service' provision. Higher-income households also expect to have less involvement in that service provision. With these two different main service levels the figure also recognises an 'economic provision efficiency frontier' whereby it is possible to deliver differentiated services supported by appropriate resource contributions (tariffs and/or volunteer involvement) at an efficient level. However, the universal service obligation, a forerunner concept to the human right to water approach, suggests that for the very poor, and even higher-income groups in high supply cost areas, there will be a need for the state to take responsibility for 'uneconomic' direct provision, involving communities to every extent possible to deliver ongoing effectiveness and equity but recognising that communities will be unable to take the lead in remote, very poor, hydro-geologically-challenged, low population density areas. The distinction between the 'universal service obligation' frontier and 'universal service' recognises that there will always be a percentage, increasingly small it is hoped, who are beyond the reach of formal water services.

Figure 2 also shows that we believe that these different approaches are closely related to factors such as average income levels and the cost of service delivery. Communities with higher incomes are likely to contribute principally through tariffs, with these funds used to professionalise the service with paid for staff, and through involvement at committee/board or consumer involvement level. Those communities dominated by people with low incomes and fragile livelihoods are likely to have little additional capacity to contribute to managing the water system, so will have a form of direct provision with ideally some community involvement over key decisions but not necessarily involvement with operation and maintenance. In the middle, communities are more likely to provide volunteers to take on key duties related to operation, maintenance and administration whilst providing modest cost contribution via user charges. We recognise that within communities, groups of households may have different preferences for management; some better-off households may prefer to delegate the management of their water supplies to a professionalised utility, whereas there may be poorer households who are willing to volunteer their time to fulfil the management tasks.

This working hypothesis is further elaborated on in Figure 3 which indicates that in the model of community management with direct support, the intensity of community engagement is highest, as the community does the bulk of the executive tasks. In the other two forms of direct provision and professionalised community management, the communities have mainly an oversight and decision-making role, though not an executive one.

Figure 3: Anticipated level of community participation for different forms of community management



Source: based on Franceys, 2007

The research is undecided about whether any of these broad models is better than another. In fact, often the choice for one model or the other is not mae explicitly, based on these considerations. Rather, they are the results of preferences at the time services are developed. And the models evolve over time. So what starts as a form of community management with support may evolve over time into professionalised community management, or into direct public provision.

Another factor which may affect the level of community participation is the type of technology. A handpump could well be managed in a voluntary manner – but applying basic good business practices – with occasional calling down of support for major repairs or so on. But as systems become more complex (e.g. piped systems with household connections), more professionalised management and operation, with several paid-for staff and more substantial support is needed. These systems firstly require much more time to operate and maintain, as they will typically involve a much larger number of activities to carry out (switching on pumps, filling reservoirs, checking for leakages) and a bigger administration. They will also require more specialised staff and a division of labour, with dedicated pump operators, administrators or plumbers.

In the sections below, we elaborate on each of the three models and the typically conditions in which they occur in more detail.

Direct provision of water supply with community involvement

Communities with limited socio-economic capacity are most likely to require direct provision with community involvement. In other cases the requirement for high-level water supply technology, such as reverse osmosis treatment plants in areas affected by poor source water quality (e.g. presence of fluoride or arsenic), can mean the technical demands of managing the system are so high that direct provision is the most appropriate approach even for communities with medium to high level capacity.

Direct provision with involvement is a model of service delivery whereby an external provider manages the water system, including the major tasks such as operations, maintenance and administration, as well as overseeing the initial infrastructure development and investment cycle. The external provider is also likely to retain ownership of the infrastructure assets. This external provider may the district level office of the Public Health Engineering Department or affiliated government body. Although not common-place, it can also be a NGO or subsidised social enterprise. This body then carries out activities directly or outsources them to other local partners, such as contracting work to small private operators to carry out borehole drilling. The external provider is also expected to provide appropriate capacity development activities, such as training, for any tasks expected by the community.

Community involvement is organised through a community-based organisation (CBO), typically an elected water committee that is actively encouraged and supported by the external provider. At the initial stages of development of the water system, a voluntary committee will be formed to take decisions on technology choice, user charges and the code-of-conduct for water supply in the community. On an on-going basis, the water committee will be expected to perform limited day-to-day duties such as keeping water points clean and undertaking preventative maintenance. They will also be responsible for calling down the external provider for major O&M activities, as well as user charge collection and management. Community contribution via user charges is expected, although it is unlikely to meet the entire life-cycle costs of the system and significant external subsidy will still be required. In this case, the degree of community participation is low on the scales we have seen before, as the community has limited decision-making power.

In rural India, it is common that the GP – the lowest level of government – acts as the service provider. Whether such form of service provision is a form of community management or not, is debatable. To some, it is a form of public management, akin to cases where a municipality provides services. Others contend that the GP is the democratically-elected representation of the community and if it provides services, it is a form of community management. In many instances, Village Water and Sanitation Committees are sub-committees of the GP. We consider that management by GP is a form of direct public provision, but recognise that there may be different degrees of community

involvement in those. The study is interested in examples where the GP engages the community in the management of the water supply, either through tariffs or in some form of management role. However, in cases where there is no role for the community, then these cases are not considered in the study as they are not considered a form of community management.

Community management with direct support

Rural communities in the middle part of the curve presented in Figure 3 are most likely to be served by a form of community management with direct support. This is particularly common with systems at the lower end of the technical spectrum, such as borehole handpump schemes, where more of the management aspects of the system are within the capability of community institutions.

In its essence, this model relies on a CBO, typically an elected water committee fulfilling the functions of a **community service provider**[3]**,** i.e. carrying out all the day-to-day tasks of operation, maintenance and administration of the water system. Typically these tasks include:

- Operation: operating the engine of a pump, managing a treatment or disinfection facility;
- Maintenance: small preventive maintenance, like greasing of mechanical parts, cleaning of reservoirs, repairing leakages in the network and broken-down pumps and other corrective maintenance; and
- Administration: billing, tariff collection, book-keeping, reporting, governance.

The CBO may also sub-contract some of these tasks to an individual (plumber, handpump mechanic or technician) or to a local company.

Whereas studies show that communities can and do fulfil many of the provider functions (Schouten and Moriarty, 2002; Harvey and Reed, 2006; Bakalian and Wakeman, 2009), many communities struggle with sustaining their water supplies, with some succeeding and others failing, giving rise to the notion of 'islands of success' (Davis and Iyer, 2002). This has not so much lead to the conclusion that community management does not work, but rather that it has limitations and that on its own is not sufficient. From the early 2000s, recognition grew that rural communities require some form of on-going external oversight and support in service delivery (Lockwood, 2002; Moriarty and Schouten, 2003), and that indeed such support must be seen as integral to community-based management (Lockwood and Smits, 2011). For us, this kind of oversight and support is part of the 'plus' in community management 'plus'.

Professionalised community-based management

Service delivery support is also a way of contributing to the move towards the third type of community management: professionalised community-based management. This type is characterised by a move away from an approach based purely on volunteerism, towards a more professional, competent and effective management of rural water services working to agreed standards, and with greater transparency and accountability (Lockwood and LeGouais, 2011; Moriarty et al., 2013). This is the second 'plus' of the community management 'plus' approach. Professionalisation may take three major forms:

- The adoption of good business practices, such as billing, book keeping and auditing, systematic carrying out O&M tasks, managing customer relations, etc. One of the examples of this is the *Programa de Cultura Empresarial* (business culture programme), ran by the Government of

[3] Instead of the term 'community service provider', the term 'operator' can be used, reflecting the terminology of the urban water sector.

Colombia which sought to professionalise the community-based service providers, retaining their non-for-profit status, but promoting good business practices and hiring of paid-for staff (Tamayo and García, 2006).
- The contracting of paid-for staff, such as plumbers or an administrator to carry out the different functions as a dedicated task. In larger and more complex systems, such as multi-village schemes serving rural growth centres, CBOs may fully contract out all these operational functions.
- Calling down professional support. This refers to cases where the CBO proactively seeks and obtains support from a professional support agent. It requires professionalism of the CBO to recognise its limitations and the willingness to contract specialised support.

Professionalised community-based management may eventually evolve into a more conventional utility model, whereby none of the service provider tasks is carried out by a CBO, but all are done by a professional utility. The community should still be engaged, however, in certain oversight and customer involvement functions – a model more common in urban areas. Also, the difference with the previous type of community-management with direct support is a gradual one. Support organisations may gradually take on more and more service provider tasks, and push a CBO to operate more professionally.

2.2.5 Enabling support environment

Key to all three models is the presence of what is called - in the Indian context - an enabling support environment. The enabling support entities (ESE) fulfil what Lockwood and Smits (2011) call service authority functions, such as planning, coordination, regulation, monitoring and oversight, and direct support functions, such as technical assistance. All these functions can be fulfilled by a single ESE, but often they are spread over different organisations.

The rationale for separating the authority functions from the provider functions comes from the idea to separate the executive (service provider) role from the oversight role. Even though variations on this ideal exist, the ESE is also typically the legal owner of assets even when asset were fully developed by a community itself through a self-supply approach. In the Indian context, we understand the formal ownership of assets to lie with the government, through the GPs. As such, the ESE may also be able to formally delegate the executive role to a designated provider, for example in the form of contract, concession or otherwise. And indeed in some cases, a CBO has been given the formal mandate to be a service provider; but in many others, CBOs operate only *de facto* as provider, lacking the formal mandate or delegation from the respective authorities. They only have a 'sense of being a service provider' but do not have the formal function of a 'service provider' (Lockwood and Smits, 2011). In some cases, the authority also assumes some of the service provision tasks, for example carrying out repairs over and above a certain magnitude. That in itself is not a bad situation, as long as it is clear who is responsible for what. Unfortunately, in many cases the responsibilities for certain functions are not defined at all, or left ambiguous.

For the more direct support functions, different authors use different terminology: institutional support mechanisms (Lockwood, 2002), follow-up support (Lockwood, et al., 2003), post-construction support (Bakalian and Wakeman, 2009), direct support (Smits, et al., 2011) and support to service providers (Smits, et al., 2013). For this study we use 'service delivery support' – referring to support throughout the service delivery cycle from project implementation through ongoing service delivery to renewal and expansion. 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. Smits, et al., (2011) identify the following typical support activities (based on Whittington, et al., 2009; Lockwood and Smits, 2010; and Fonseca, et al., 2011):

- Monitoring, including water quality testing and auditing;
- Technical advice in aspects of operation and maintenance, administration and organisational development;
- Conflict resolution and moderating between different groups in the community;
- Support in identifying capital maintenance needs and resource mobilisation for such works. Monetary or material support is normally not considered part of the support functions. It may entail identifying possible funding sources and development of funding proposals;
- (Re)training and refresher courses for service providers; and
- Provision of information materials, such as manuals, guidelines and other information material.

In many instances, the entity that provides the support is the service authority. However, the service authority may also delegate this role, as seen in the overview of different modalities, defined by Smits, et al., 2011:

- Delegation by local government to a specialised entity, such as a private company, as in South Africa (Gibson, 2010) or an urban utility, as in Colombia (Smits, et al., 2013).
- Sometimes a national (or state) government body fulfils the support agent function. Examples include the *Programa de Cultura Empresarial* (business culture programme) in Colombia (Tamayo and García, 2006)). The WASMO (Water and Sanitation Management Organisation) in Gujarat is an example of this model, it being a state-level agency providing support (James, 2011). National government may also delegate this function to specialised entities, such as urban utilities in Chile (Fuentealba, 2011), or devolve it to provincial offices, as for example in Namibia (Gibson and Matengu, 2011) and various circuit rider programmes in Central America (Lockwood, 2002);
- Associations of community-based service providers who contract technical assistance from a specialised agency or individuals on behalf of their members, or provide mutual assistance among them (Glas and Lambrecht, 2010);
- Mixed models combine elements of two or more of the arrangements mentioned above, typically a combination of an association of community-based provider with (local) government involvement, such as SISAR (Integrated System for Rural Sanitation) in Brazil (Meleg, 2011).

In India the ESE function is vested in local government, the GPs, though some of the functions may be split and duplicated between GPs and other administrative levels, such as blocks and districts. For example, during the initial implementation stage finance, manpower and technical expertise is brought into the community by an external mandated government body – usually the local division of the Public Health Engineering Department. After the systems have been built, it is the GPs that take over the role for support and provide that on a continuous basis.

In the research, we classified the different types of community management and the necessary enabling support environment, to get an understanding of which models function best and where.

2.3 Goals of rural water supply

Having focused initially on aspects of community management and support for communities, it is helpful to consider the overall purpose of rural water supply services being the delivery of a service which is effective in terms of quantity, accessibility, quality and reliability and is equitable in that all rural households can access services irrespective of gender or social status. It is important that there is a bias towards the poorest who most benefit from good public health provision; that the service is sustainable and viable, in that there are adequate resources available to ensure its continuation; that is efficient in that the minimum resources are used to deliver the desire quality of outputs; and replicable in that approaches can work at scale across different localities, not being dependent upon particular situations or leaders.

2.3.1 Effectiveness - household service levels

A water supply service is effective, if water flows with certain agreed-upon characteristics. There is of course a difference in whether the water only trickles out or has a good pressure and flow, and whether the water meets quality standards or not. It is therefore important to define characteristics of the water service. The most commonly used ones are the quantity of water, its quality, the reliability and accessibility of supply. Taken together these make up a service level. For example, access to 50 lpcd reflects a higher level of service than access to 25 lpcd. Some would argue that the costs or the affordability of the supply should be considered as part of the service level as well. While undoubtedly important, this is fundamentally different, as it is a reflection of the financial (or management) costs to get to a certain service level. It would often cost more to have access to 50 lpcd than to 25 lpcd. Costs are therefore not part of the service level definition itself, but reflect what is needed to reach a certain service level.

A differentiation needs to be made between: 1) normative service level, i.e. the level of service to which users are entitled, as per official norms or standards, 2) the design service level, referring to the specifications of the service level as per the design parameters of a particular system and 3) actual service level, being the characteristics of the service that users actually receive. The latter two may be above or below the norm. In the WASHCost project, the following ladder was developed for India, based on the NRDWP (National Rural Drinking Water Programme) guidelines. An acceptable service is thus one in which at least the normative service level is provided over time, and even possibly improved.

Table 3: Service ladder for India, as used in the WASHCost project

Service level	Quantity	Accessibility	Quality	Reliability/dependability
High	> 80 lpcd	0-10 minutes per day to collect water	Water quality has been tested independently using a water quality test kit.	As below, but a system for handling breakdowns exists and it functions well.
Improved	60-80 lpcd	10-20 minutes	Users are aware that rural water supply and sanitation officials have certified that there are no water quality problems.	As basic level and a system for handling breakdowns exists, but is not functional.
Basic	40-60 lpcd	20-30 minutes	No complaints from users.	Network supply according to an agreed schedule and duration. Handpumps are dependable but no system for handling breakdowns exists.
Limited	20-40 lpcd	30-60 minutes	Water is used for drinking but users complain of bad smell, taste, colour or appearance.	Network supply has scheduled times, duration and delivery but supply is haphazard. Handpumps are not dependable because recharge rates are low.
No service	< 20 lpcd	> 60 minutes	Water is unfit for drinking by humans or animals.	Network supply is haphazard. Handpumps are not dependable because groundwater is exhausted.

Snehalatha, et al., 2011.

Whereas the service level is a useful manner of assessing whether water is flowing at the moment, it neither allows saying whether a service is likely to continue being provided in a sustainable manner, nor which factors are making the water flows.

In this research, we will assess what service levels are received by household consumers in order to describe the effectiveness of the services.

2.3.2 Equity

Typically, the service level received will differ from one household to another. Partially, this is due to the demand of the household: a bigger family needs more water than a smaller one. But some of the differences in service level come from the way the service was developed or is provided. Households at the edge of the village may not have household connections whereas ones in the core may have those, as household connections at the edge may have been deemed too expensive. Or households in more elevated parts of a village may receive water at a lower pressure than the ones in the valley. Often, the people with lower levels of service in a village are also the ones that are generally more vulnerable: the poorest, those living on the outskirts of a village, scheduled tribes and castes, etc. Equity in service delivery refers to the degree to which all households in a certain area have the potential to access the same service level. This may in fact mean that more effort goes into ensuring that the most vulnerable groups are indeed getting this service, e.g. by providing subsidies to user charges.

The degree of equity can be expressed through distributional statistics, such as the percentage of the population that receives a certain level of service, or by visualising that in a histogram. Another way of doing that is by pre-identifying the different groups in a village, e.g. by wealth quintiles, and assessing their service levels. The current research will assess such distributional statistics.

Equity also refers to the degree to which different groups in a community participate in decision-making. It is not uncommon that the most vulnerable groups have least influence over decision-making, e.g. because they simply do not have the time to attend community meetings, or because their voices are not heard. In the participation ladders seen in the previous section, the degree of equity will be assessed in a qualitative manner.

2.3.3 Viability or sustainability of services - performance of community service providers and authorities

There are numerous interpretations of the concept of viability or 'sustainability' for rural water supply. Many organisations define sustainability as the maintenance of the perceived benefit of investment projects (including convenience, time savings, livelihoods or health improvements) after the end of the active period of implementation. Building on the definition by Abrams, et al., (1998) who describes sustainability as: "*whether or not something continues to work over time*" (Abrams, et al., 1998), it could be defined as whether water continues to flow over time.

Whereas that is a simple definition, it is one that can only be assessed with the benefit of hindsight. Different frameworks have emerged to both assess whether water indeed has kept on flowing and to predict whether water is likely to keep on flowing in the future as well.

The first group of frameworks recognises that there are a number of dimensions that explain both the challenge and that take the broader perspective and explicitly identify a likelihood of good service and sustainability. They typically are composed of a series of factors that are believed to lead to effective, equitable services, categorising these dimensions into social, health, technical, economic, financial, institutional and environmental groups. These frameworks are used to design or monitor the suitability of their programmes (Franceys, 2001; Parr and Shaw, 1996).

The initial 'social' dimension explains the emphasis in this research on community management or involvement. The 'institutional' dimension reflects the organisational patterns that have to be delivered to enable communities to be involved. The 'financial' dimension reflects the need to research both the costs and the flow of funds to pay for those costs.

In their review of five recently-developed sustainability frameworks, Boulenouar, et al., (2013) found that many of the recent frameworks looked at parameters at community level, but also – to a lesser extent – into parameters at higher institutional levels, including districts and even national level. The mentioned groups of indicators are scored at these institutional levels, so as to come to an overall assessment of the likelihood of good rural water services. In a way, these tools take a snapshot of the degree to which the factors are in place and, based on that, identify a likelihood of service sustainability (see Table 4).

Table 4: Comparison of rural water sustainability frameworks

Organisation	Name of tool		Stated sustainability categories									Indicators	Sub-Indicator
		Reference	Social	Technical	Financial	Institutional	Environment	Management	Service Delivery	Sanitation/Hygiene	Knowledge/Capacity		
AGUASAN (network)	Sustainability Assessment Tool		X	X	X	X	X				X	22	110
Dutch WASH Alliance	Sustainability Monitoring Framework	DWA, 2013	X	X	X	X	X					45+	N/A
UNICEF	Sustainability Check	Godfrey, et al., 2013	X	X	X	X			X	X		26	59
USAID / Rotary International	Sustainability Index Tool	WASHPlus , 2013		X	X	X	X	X				14-23*	56-92*
Water and Sanitation for Africa	Tool for Planning, Predicting and Evaluating Sustainability	WSA, 2012; Ryan and Sulemani, 2013	X	X	X	X	X	X	X			23	92

*Note: the indicators and sub-indicators are dependent on the intervention type. The total number of indicators and sub-indicators cannot be determined without knowing the different intervention types in each programme.

based on Boulenouar et al., 2013.

One of the critiques on these frameworks is that these also often extrapolate from a snapshot in performance to sustainability, a likelihood which could be tenuous. As Boulenouar, et al., (2013) observe, good rural services depends on many inter-related factors and even though the frameworks they reviewed cover many of these, it is more appropriate to talk about performance in service delivery from a wider perspective than the ones reviewed in the previous section.

Another group of frameworks tries to complement service levels, by also taking a snapshot of how service providers and authorities are performing. The assumption is that if they perform well, the service is likely to be sustainable. Typically, these frameworks therefore assess how service delivery

performs against explicit sector norms or implicit best practices in the sector. These are typically geared towards use at sector level. Examples of this include the SIASAR monitoring system in various countries in Central America (SIASAR, 2013) and the set of service delivery indicators in Ghana (CWSA/IRC, 2011). Similar in their set-up as typical benchmark indicators for urban utilities, they 1) assess service levels (as defined in the previous section) and/or asset status, 2) performance of service providers against their official functions in administration, operation and maintenance, and 3) performance of service authorities against their official functions. Taken together, an overall score is obtained in terms of performance. The extrapolation of such a performance snapshot in relation to the likelihood of sustainability is tenuous, and therefore these frameworks cannot be used as predictors of sustainability. Moreover, these frameworks do not look at the broader contextual factors that may affect sustainability, such as the management of the water resources, or trends in the social and economic development of a community.

Apart from the service levels mentioned above, this research draws on these frameworks, by also assessing performance of community service providers and of the ESEs.

2.3.4 Financial sustainability

One of the premises behind community-based management was cost recovery, whereby user tariffs would cover the O&M costs of rural water supplies (ODI, 2003). However, that has remained largely elusive. In many instances, tariffs barely cover operation and minor maintenance costs, let alone the costs of asset replacement (Fonseca, et al., 2013), as no or too small reservations are made for depreciation in tariffs. This is not surprising, as in many urban utilities, tariffs rarely cover full depreciation, as for example shown in a recent tariff review of urban utilities in Latin America (Ducci and García Merino, 2013). The difference between income from too low tariffs and expenditure is either covered through general taxes, or indeed it often is not, leading to a gradual reduction in the level of service.

Franceys and Cavill (2011) in their study for UNICEF suggest that "*Analysis of the monitoring and evaluation literature suggests that subsidies (on-going, long-term) to recurrent costs of hardware (capital) maintenance are necessary in rural areas if improved services (already subsidised in implementation) are to remain serviceable. Subsidies to recurrent costs of software maintenance (ongoing hygiene or household water treatment promotion, support to community water committees etc.), in addition to implementation software, are necessary for all non-networked sanitation and hygiene approaches. There is no evidence in the literature to suggest that these costs can be funded through user charges*."

In addition, public funding often needs to go into the ongoing support to rural water supply. Smits, et al., 2011 found in a number of countries (e.g. Brazil, Chile, Namibia and South Africa) where support was considered effective, i.e. where adequate levels of service were provided, its costs were some US$ 1-3 per person per year. In many other countries in that same study, actual expenditure on support was well below this number and the effect of support was limited. But where it was effective, the funding for support came largely from general taxes, with a small user contribution.

With this in mind, the Community Water Plus project aims to assess the extent to which users cover the recurrent costs, and the extent to which subsidies are provided by the public sector to capital maintenance and support. Below we explain the cost categories used for that, and some findings from earlier work on costs in India, that we will build upon.

Cost categories for rural water services

The first step to understanding financial viability, irrespective of where the finance comes from, is to determine the costs. For this study, we will use the cost categories that follow the pattern of service development and delivery, as defined in Table 5. A variation on the life-cycle cost approach

developed by the WASHCost project will be adopted. The cost components include the construction and operational costs as well as the asset renewal, financing and indirect costs, such as IEC (Information, Education and Communication). The basic costing approach includes the components defined in the table below.

Table 5: Definitions of cost categories

Cost category	Description
Capital or 'one-off' Investment costs	
Capital expenditures – hardware and software (CapEx)	The capital invested in constructing fixed assets such as concrete structures, pumps and pipes. Investments in fixed assets are occasional and 'lumpy', and include the costs of initial construction and system extension, enhancement and augmentation (also called CapEx on hardware), as well as once-off work with stakeholders prior to construction or implementation, extension, enhancement and augmentation, such as costs of one-off capacity building (called CapEx on software).
Recurrent or annual costs	
Operating and minor maintenance expenditures (OpEx)	Expenditure on labour, fuel, chemicals, materials, regular purchases of any bulk water. Minor maintenance is routine maintenance needed to keep systems running at peak performance, but does not include major repairs.
Capital maintenance expenditure (CapManEx)	Expenditure on asset renewal, replacement and rehabilitation costs, based upon serviceability and risk criteria. CapManEx covers the work that goes beyond routine maintenance to repair and replace equipment in order to keep systems running. Accounting rules may guide or govern what is included under capital maintenance, and the extent to which broad equivalence is achieved between charges for depreciation and expenditure on capital maintenance.
Cost of capital (CoC)	The cost of capital is the cost of financing a programme or project, taking into account any loan repayments and, in economic terms, the cost of tying up capital. In the case of private sector investment the cost of capital will include an element distributed as dividends.
Expenditure on direct support (OpexpDS)	This includes expenditure on support activities direct to local level stakeholders, users or user groups, such as support to service providers and ensuring that local government staff have the capacities and resources to help communities when systems break down or to monitor performance.
Expenditure on indirect support costs (OpexpIDS)	This includes macro-level support, planning and policy making that contributes to the service environment, but is not particular to any programme or project. Indirect support costs include government macro-level planning and policy-making, developing and maintaining frameworks and institutional arrangements, and capacity-building for professionals and technicians.

Fonseca, et al., 2011.

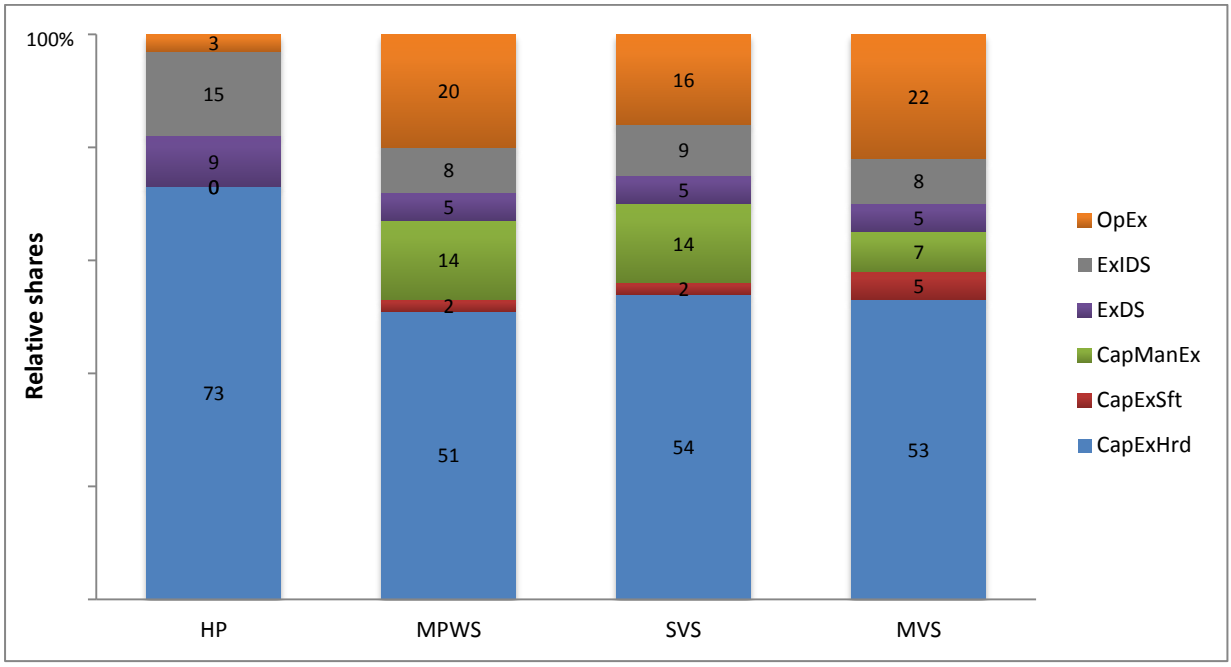
The purpose of this research is to investigate in detail the levels of operating expenditure on direct and indirect support required to deliver good water services through community management. We build upon the findings from the WASHCost project in India, which obtained much insight into these cost categories. However, the WASHCost research methodology was to determine the costs associated with different levels of services, attempting to determine a cost for each of the 'normative' service levels in Table 3, above. This proved to be extremely difficult to achieve and the results reported in Figure 4, necessarily reverted to costing technical approaches rather than service levels. Similarly, the costs determined by the research reflect an average cost of service provision by each technology that might not necessarily be effective, equitable, viable or efficient – that is they may not have been working properly. That valid research approach to investigating average schemes is being complemented in the Community Water Plus research by focusing on the ostensibly most successful rural water supply schemes with the most successful community involvement. This 'cherry-picking' of cases, not based on random sampling, is therefore hoping to determine what it has cost to be successful or sustainable.

WASHCost outline results in India

With respect to CapEx, it was found that this takes a lion's share of expenditure accounting to about 90% of the total investments and rest of the cost categories include only 10%. Figure 4 gives the details of cost sharing across the different technologies of the water supply systems. Conventionally in India, the sharing of these investments costs involves a broad 90%-10% split whereby government covers the majority of capital expenditure costs, with the community covering the remaining 10%.

The 10% contribution from communities is rarely achieved as intended. During capital expenditure it is common for private enterprises – often borehole drilling companies/contracts of system installation – to pay the 10% community contribution to secure the remaining 90% investment from the government.

Figure 4: Relative shares (%) of fixed and recurrent costs by technology for a normative life span



HP = Handpump; MPWS = Motorised Piped Water System; SVS = Single Village Scheme; MVS = Multi-Village Scheme

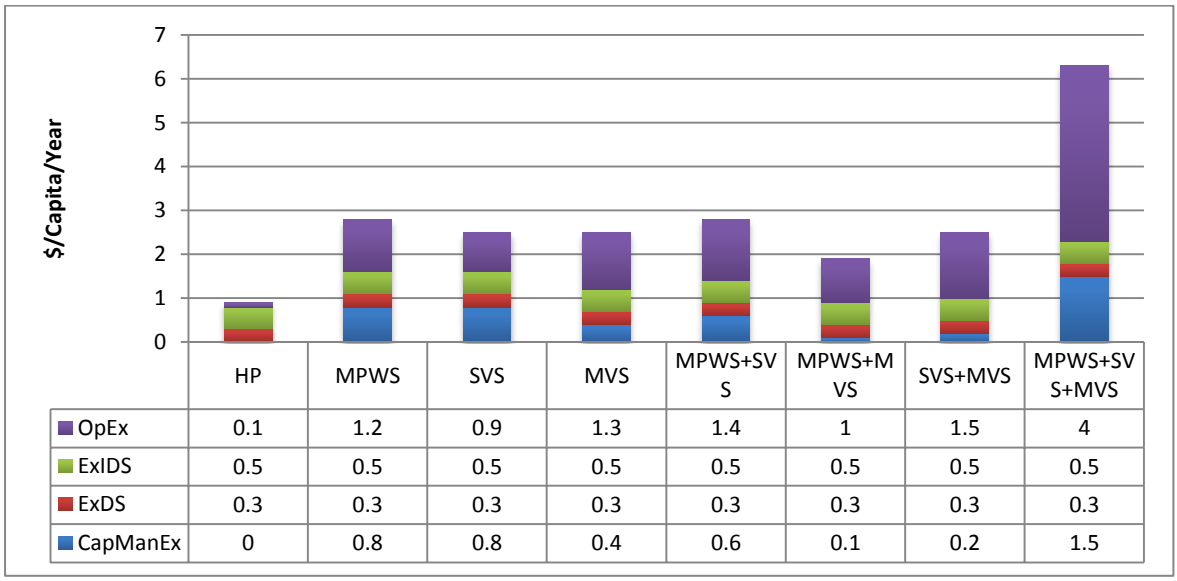
Ratna Reddy, et al., 2011.

With respect to the recurrent costs alone, these were distributed as shown in Figure 5. The OpEx figures are about US$ 0.8 per capita, whilst CapManEx is on average US$ 0.5 per capita, across all technologies. However, there are big differences in these costs between the types of technologies, with expenditure on handpumps being lowest and combinations of piped supplies being highest.

Direct support costs are incurred by the facilitating agencies, in for example, the work of the departments building the capacities of the communities and providing training to them. Sometimes there are also support organisations such as NGOs or training institutions involved in this process. Further, systematic monitoring is mandatory to ensure that the communities can lead this process in the long run. All these costs incurred by the departments and NGOs on providing support to the communities are not part of the estimation. These costs are met on an *ad hoc* basis and there are no specific allocations. In fact, there is very little or no data in this regard which makes it much more difficult to allocate the resources. Still, an estimate was made of about US$ 0.32 per capita, whilst it was also indicated that such spending was too little to have any effect. The expenditure on direct support was not differentiated per technology type.

Expenditure on indirect support costs refers to the costs incurred in macro planning and policy formulation. These costs are often neither in the records, nor is there guidance on how much to allocate for policy and planning. In WASHCost, ExpIDS was estimated to be about US$ 0.5 per capita but not disaggregated between water supply and sanitation. As part of this research, where available, these costs will be collected and estimated for driving the successful community participation.

Figure 5: Average expenditure on recurrent costs by technology type



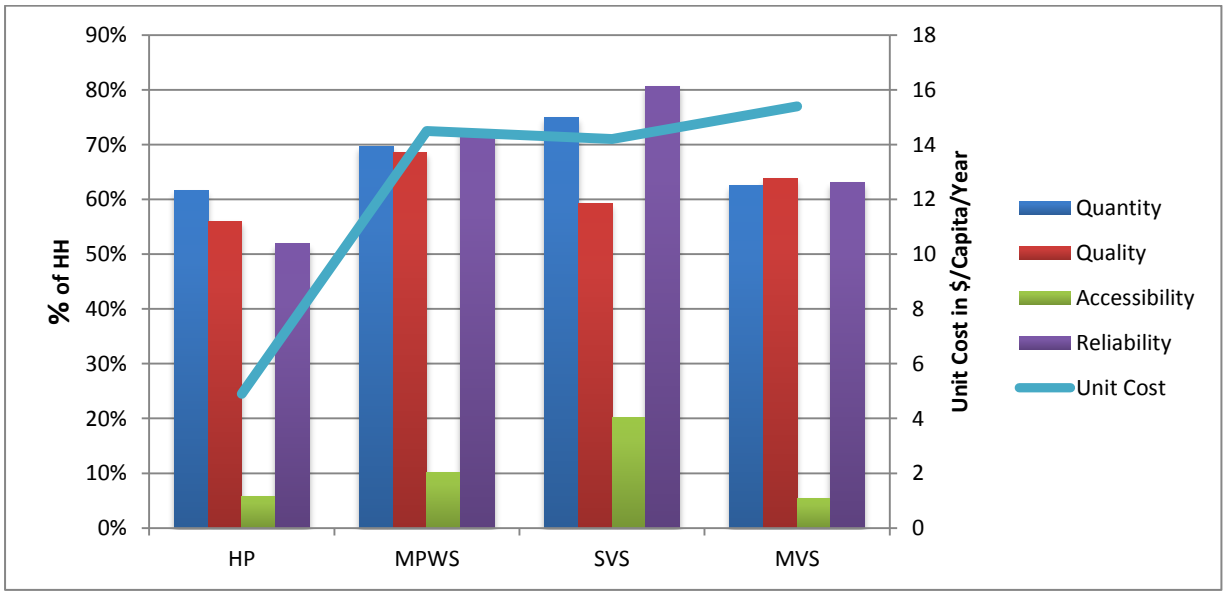
	HP	MPWS	SVS	MVS	MPWS+SVS	MPWS+MVS	SVS+MVS	MPWS+SVS+MVS
OpEx	0.1	1.2	0.9	1.3	1.4	1	1.5	4
ExIDS	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ExDS	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
CapManEx	0	0.8	0.8	0.4	0.6	0.1	0.2	1.5

Ratna Reddy, et al., 2011.

In theory, the bulk of these recurrent costs are expected to be covered through tariffs. However, user charges consistently fail to properly meet recurrent costs, usually failing to cover basic O&M, and almost always not providing capital for significant maintenance expenditure which is needed in the system renewal phase. It is the hypothesis that actual expenditure on recurrent costs is below what is needed, and that this might be the reason for the low service levels that are generally found.

This can be seen in Figure 6, where the percentage of households receiving a water supply that meets basic service level parameters are plotted against the unit costs. Though there is differential expenditure incurred on different types of technologies, the service delivery remains broadly the same. In fact, the handpumps are serving as critical back-up systems during summer and are able to provide similar service as the other technologies such as MVS, and SVS. It was found that the single village schemes are providing better service delivery as the communities are able to manage and repair the systems in a better way ensuring the continuous service delivery.

Figure 6: Service levels (basic and above) and unit costs across technologies



HP = Handpump; MPWS = Motorised Piped Water System; SVS = Single Village Scheme; MVS = Multi-Village Scheme

Ratna Reddy, et al., 2011.

Other resource implications

The research recognises that whereas funding is crucial for support, and hence for achieving the 'plus', money alone is not sufficient. There are other non-monetary resource implications, including:

- Staffing and human resources: This refers to the number of staff or persons involved in support and professionalisation, as well as to their skills and the quality of their work. Where monetary data is not readily available, e.g. where government salaries are considered as fixed costs, one can assess the number of person-months spent on support, the job profiles of the persons involved or the background of the staffing.
- Political capital: Various cases in India show that rural service delivery reforms has required political courage on behalf of visionary bureaucrats and politicians (James, 2011).

These will also be looked at in the scope of this study.

2.3.5 Efficiency

The degree of efficiency of water supply services refers to the costs incurred to reach a certain benefit, in this case a certain level of service, and could be expressed in terms of the number of Rupees spent in relation to the level of service. The efficiency is in part a useful way of comparing different service delivery models. It may be that for example the community management model with support costs less than professionalised community-based management. But, if the former leads to lower levels of services, it is not necessarily more efficient. However, there are limits to such comparisons, where these models are applied in different types of circumstances. A second use of the efficiency analyses is to compare degrees of efficiency within a certain service delivery model, but applied at different localities. Such a comparison is difficult if the socio-economic or physical circumstances are widely differing. Given this variety of circumstances, this study does not seek to find the most efficient community management approaches, though it will use some of the descriptive efficiency statistics as reference figures.

2.3.6 Replicability

Replicability refers to the possibility to apply a certain approach to community management at a large number of localities. In the past, highly participatory and empowering approaches have been developed to rural water supply, but those often required high levels of external input, for example, highly skilled facilitators who would spend lots of time working with communities. Such approaches were often not scalable, because the human and financial resources were not available. That is not only an issue of efficiency, but of sheer availability of the resources. Moreover, such approaches were often dependent on a relatively high degree of capacity within the recipient community, e.g. in the form of a few exceptional leaders or otherwise extraordinary circumstances. Or to turn it around, an approach is replicable, if it is reasonably efficient (i.e. does not require large amounts of resources to achieve a certain level of services) and if it works well in average conditions, with averagely skilled support entities and averagely performing recipient communities. For this study, we focus mainly on those community-management programmes that have already achieved a certain level of scale, to avoid selecting only those with the exceptional skills or leadership.

SECTION B – Research Methodology

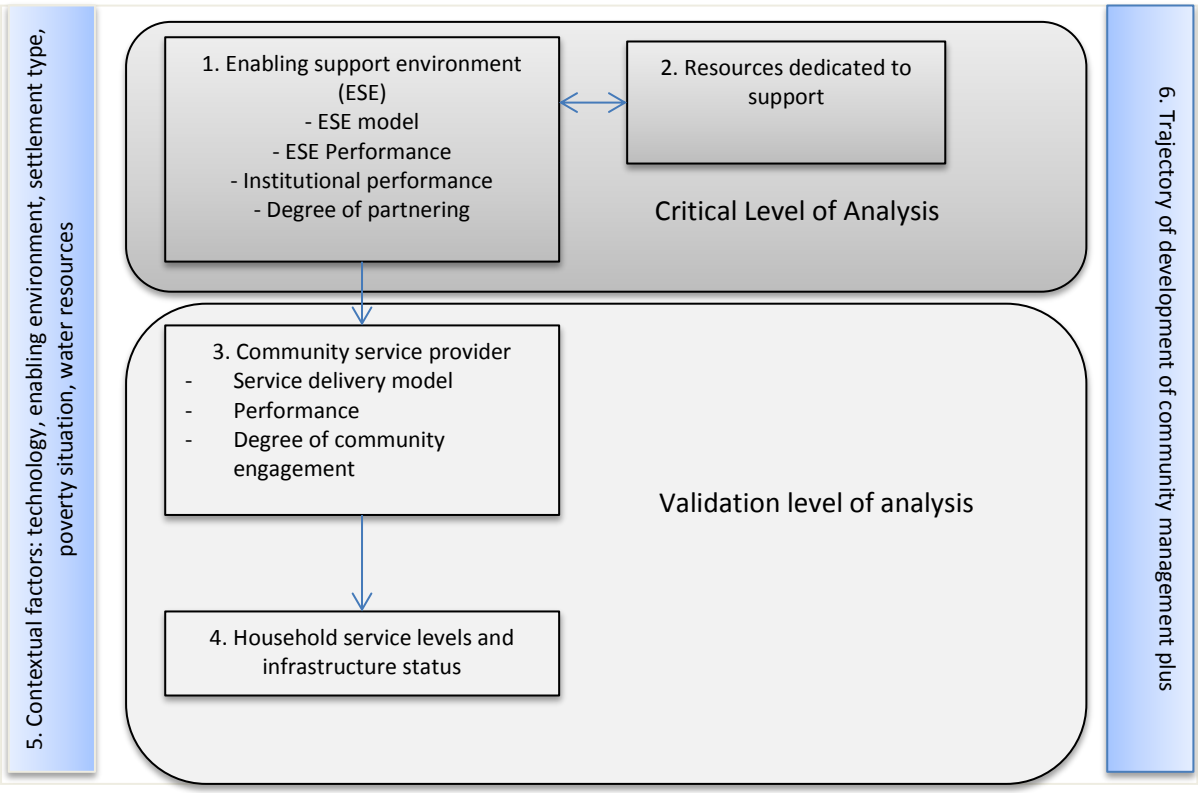
This section elaborates the research methodology. It does so by first providing an overview of all the research elements that are to be assessed. This is followed by a discussion of the units of analysis at which these assessments are done and how these units are to be sampled. After that, we present the tools and instruments we will use to do the analysis for each of the research elements, including relevant indicators sets and scoring tables. The data collection and processing tools are in the Annexes.

3 What to assess: elements of research

This research seeks to obtain insight into the type, extent, style and costs of supporting organisations that are required to ensure sustainable community managed water service delivery. It therefore, by definition, will focus on 'successful' cases of community management and support of rural water supplies, in order to be able to assess what support was provided and with what resource implications. Moreover, we are aware of the positive impact that studies of 'best performing' utilities have had on the urban water supply sector and we propose to find and study the better-performing community management 'plus' service providers, examples which will be of relevance to the sector as an addition to the research analysis.

We therefore focus our research on the resource implications at the ***enabling support entity level*** (recognising that there may not always be a clear distinction between the support and service delivery levels) and also recognising that we have to be sure that we are indeed investigating successful community managed service delivery. 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 the support agent in partnership with the service provider. In order to answer the research questions, the research will therefore assess the degrees of success of various elements, as summarised in Figure 7, recognising that the key validation of success is the service achieved by consumers.

Figure 7: Elements of the research



3.1 Critical level of analysis

1. **Enabling support environment.** To assess the degree of success in support, we look into the following elements:
   - We will first describe the ***enabling support environment model***, by defining which type of entity (or entities) fulfil these roles, and the relationships between them.
   - ***Performance of the enabling support environment***. This refers to the degree to which the support entities, as identified in the partnership continuum, are fulfilling their roles adequately, against a set of performance indicators, looking for example at the types of support they provide and the quality of that support.
   - ***Institutional performance***. This entails the internal institutional process such as leadership, organisational culture and community orientation that allow the external performance to happen.
   - ***Degree of partnering***. This is a description of the type of partnering between the enabling support entity and community service providers.

2. **Resources dedicated to support**. It is to be expected that the degree of success in enabling support and monitoring depends to a large extent on the resources dedicated to these functions. This refers both to the monetary costs (as per the cost categories) as well as non-monetary costs, such as the presence of skilled staff and political capital. We will quantify both financial and human resources and provide a qualitative description of other resources, such as political capital, that are spent on this.

3.2 Validation level of analysis

3. **Community service provider**. To assess the degree of success of the service provider, we will look into three elements:
   - ***Service delivery model.*** This refers to description of the entity that carries out day-to-day O&M and administration. This may be a water committee, a GP, a CBO or other entity. In this, we will also capture the degree to which the entity may have professionalised certain tasks, e.g. to a paid-for caretaker or mechanic, and its scope and scale of operations.
   - ***Performance***. This refers to the extent to which the service provider fulfils its roles in O&M and administration adequately, as defined by formal regulations or general good business practices.
   - ***Degree of community engagement in service provision***. We believe that community engagement in service provision is a good thing per se, as it empowers users to take appropriate levels of responsibility and oversight over their water services. We will assess the degree of community engagement, based on the ladders of participation.

4. **Household service levels and infrastructure status**. Whether a water service can be considered successful is eventually measured by the characteristics of the water supply that users eventually receive, i.e. the service level. In this, we will look at aggregate service levels, as well as their break-down between the constituting elements, such as water quantity, quality and accessibility. In addition, it will be disaggregated for different groups within a community, to assess equity in service levels. We will analyse how service levels have changed over time, to come to a full understanding of service sustainability. Finally, we will complement service level data, with data on the status of the infrastructure, as a snapshot of sustainability.

3.3 Supplementary level of analysis

5. **Contextual factors.** We recognise that what may be required to be successful in one case may not be adequate to be successful in another. For example, the management of a more complex multi-village scheme may require a higher degree of professionalisation and support than a simpler handpump system. Likewise, with similar inputs not the same degree of success may be achieved in different types of settlements: for example, with a relatively small amount of external support, success may be achieved in a relatively well-off settlement where people are willing to pay for water and where there are no water security risks. In a village with a large destitute population or one with serious water resources management issues, a similar small amount may not be sufficient to achieve success. Or maybe it will, if that community is well organised. In order to understand the type and extent of support that is needed to achieve successful service delivery, one needs to relate them to these kinds of contextual factors. In our research, we will assess these factors, including amongst others: type of technology employed, the socio-economic and poverty status of the community, the spatial dimensions of the type of settlement and the water resources situation.

6. **Trajectories.** Lastly, we recognise that the organisational partnerships between communities, service providers and support agents have a particular history and trajectory of development that is often not replicable to another situation. Still, insights into the various trajectories of development of these 'plus' partnerships may help identify common elements to take into account when promoting such partnerships elsewhere. Therefore, the final research element is the qualitative description of the trajectories of development of partnerships will be undertaken.

4 Units of analysis and their selection

This section explains that the research will take place at two key levels of analysis: 1) the programme or support model and 2) the community level. A third level, the household, is a level at which data is collected, but which is not a level of analysis in itself. In this chapter, we will provide the arguments for this, and discuss how sampling happens at each of the levels.

4.1 Units of analysis

The research seeks to analyse examples of community management 'plus' that are successful at scale. We realise that there are always individual communities that – with or without support – may achieve highly sustainable services. However, what interests us are examples where community management 'plus' has led to sustainable services at scale, i.e. where a significant number of communities are being successful as per the criteria identified above. The implication of the above is that our first unit of analysis is the area served by a particular ***programme and/or support model***. We distinguish the following three types:

- Government-supported programmes, where (typically state) government have developed a model for community management and support and are leading the implementation. WASMO in Gujarat is an example of this.
- External agency-supported programmes. Refers to areas, where (state) government together with external agencies, such as the World Bank, have developed a model for community management and support and implement this. Examples of this are the World Bank-supported programme in Maharashtra, Kerala and Karnataka (see James, 2011).
- NGO-supported programmes, where the NGO follows a certain intervention and service delivery model, in parallel to, or in support of government efforts. An example of this is the Everyone, Forever approach of Water For People in West Bengal (Smits and Baby, 2013)

It follows from the definition of these programmes or support models as main units of analysis, that the assessment of the degree of 'plus' through support, performance of support agents and resources dedicated to support takes place at this institutional level, as that is the level at which support and resourcing for that is organised. Also, the trajectory of partnership development will be assessed at that level.

However, the other assessments – i.e. the ones related to the service provider, degree of community engagement, service levels and contextual factors – need to take place at the second unit of analysis, the ***community level***, that being the level where data on service providers and service levels are generated, and where contextual factors are best captured. We recognise that villages are not always clearly defined. Within a village there may be sub-communities, or the boundaries between two villages may not be very clear. For purposes of this research, the definition of village as per the census is followed. A village may contain one or more water systems – particularly the combination of communal piped supplies with individual point sources is common. Taking the village as a unit of analysis, thus means assessing the aggregate level of service from these various systems, as well as the aggregate performance of all service providers in that village.

By definition, a service level refers to what users actually receive. Therefore, data on service levels will in part need to be collected from a third level: the ***household***. From there, the service level is constructed from the bottom up, i.e. data from households is aggregated to community level. A particular concern is equity in service delivery, amongst other how different groups within a community have access to a service and how they participate in the management of the service. This also requires compiling data from households, so as to see the variability in service levels and participation within a village. Again, this requires data collection at household level, so as to analyse variation and difference between households at village level. This means that the household is not a third unit of analysis, but a level of data collection.

4.2 Case selection and sampling

Reflecting the levels of analysis given above, the approach to sampling involves a two-tiered selection process. The first layer will be to select programmes from across India, with the second level identifying the villages to study within these programmes. Although not technically a unit of analysis, there will be a need to gather data at the household level for certain measures, so this stage is also briefly explained here.

4.2.1 Selecting programmes

In sampling the programmes for this study, we aim to select programmes that deliver best practice community management 'plus' across various social, technical and geographical spectrums. For this purpose we will follow a stratified purposive sampling approach (Patton, 2002). In contrast to probability sampling which is concerned with producing a sample that is representative of a large population, non-probability sampling involves a systematic process to identify a relatively small number of critical cases that are likely to produce a significant amount of information on a key topic, such as community management 'plus' (Teddlie and Yu, 2007).

Developing the initial sample frame

Following Ritchie and Lewis's (2003) guidance, the selection process involves developing an initial sample frame of many potential cases from which programmes will be finally selected. For this purpose, potential cases that appear to characterise successful community management were identified from academic and grey literature as well as through the sector knowledge of the consortium partners, the national and state governments and through our civil society network. In this way, we did not limit ourselves to the most successful ones nation-wide, as that yielded on repeated occasions a rather limited list from generally the most progressive and best-performing states. In order to move beyond the short list of oft-repeated success cases, which may be examples beyond the reach of some of the states that struggle most in community management, we also include examples of relative success, i.e. examples of programmes that perform above average in those states that are lagging behind in sector reforms or the backward states.

The initial scanning process found 161 'successful' case studies to investigate. Following database cleaning and the removal of duplicates or overlaps, 92 potential cases remained. These 92 cases represent 35,661 villages. This compares to an all India total of 597,483 villages (Census of India, 2011), noting that there is some uncertainty regarding the consistency of the terms 'villages' and 'habitations' used in various publications. From analysis of the data in the Census of India the average population size per village is 1,395. This initial scanning therefore suggests that approximately 49,750,000 out of the 833,463,448 rural population, or 6%, are receiving reportedly successful community managed rural water services. There are undoubtedly many more unreported successes.

Scanning and sample selection

From the 92, we considered that a sample of twenty cases would be sufficient to achieve a high level of external validity across different types of systems, ensuring that the research questions can be answered and generalisable theory developed (Yin, 2003).

To bring the sampling frame down to twenty, a first verification was done for all programmes on the long-list, by checking them against a series of criteria to assess whether they are really successful (see the check-list in Table 6). This check was done using existing literature and experience of contact persons within the research team and among a broader group of stakeholders. So in the literature and through (phone) interviews with contact persons, we verified whether there was any information available and whether that indicated any of the proxy indicators below was considered positive. In many cases, though, the level of information we required was not always available or only for some of the criteria; but it did give a first verification of the degree of success.

In addition, the long-list was further reduced by ensuring that a good spread was obtained of the different contexts in the country, so including states from the various sub-regions in India and different types of technology. Finally, some logistical criteria were applied, such as checking cases against availability of information and location of possible cases versus the geographical location of the research partners. Table 6 contains the criteria for the spread and logistical consideration in the scanning of the long-list.

Table 6: Check-list for scanning of programmes on the long-list

Criteria	Potential proxy measures under consideration
Verification checks	
1. Community engagement	Information on regular community meetings, attendance at meetings, inclusion of different groups in committee.
2. Service levels	Data availability on quantity, quality and reliability
3. Service provider model	Clear description of how service provision takes place, through water committee, Gram panchayat or other type of CBO.
4. Service provider performance	Legal status of the service providers; its organisational and internal governance, financial management and operation and maintenance.
5. ESE function	Type of ESE (NGO, GP, CBO, consultant) and information on the ESE fulfilling any of the following functions: regulation, monitoring, planning, subsidy provision and its performance in that.
6. ESE performance	Longitude of ESE's engagement with communities; scale of support provided and data on performance in roles such as monitoring, technical advice in O&M, conflict resolution and moderation, support in identifying capital maintenance needs, training and retraining of service provider, on-going information.
7. Sustainability	The number of years that services have been operational, degree of cost recovery
8. Local water resources management practices	Source sustainability, presence of local water management and conservation practices.
9. Scale	Degree to which a programme has been able to reach scale of at least more than 400 villages.
Criteria for ensuring adequate spread	
10. Technical spectrum	The total selection of cases should cover different types of technology: handpump, piped supply, single village, multi village, treatment.
11. Geographical coverage	Geographical spread of the cases across.
12. Type of programme	A balance between the three main types of support programmes: government-supported programmes, external agency-supported programmes and NGO-supported programmes.
Logistical criteria	
13. Research partner capacity	Location of the potential case in relation to the capacity of the research partner, including distance and language.
14. Availability of information	Availability of data and information in reports, through contact persons, websites, etc.

From this sampling frame an *indicative* sample of twenty cases was selected. An initial visit was done to the main ESEs and stakeholders around those programmes to do a more in-depth verification of the case against the criteria listed above both to confirm the probability of the degree of success and to confirm availability of information. After confirmation, the full in-depth analysis was done.

4.2.2 Selecting villages

For the selection of villages within each programme, we will follow a systematic purposive approach based on locating critical cases that reflect our understanding of community management 'plus' within the given programmes. This will include three best-practice villages and one control village per programme meaning that the entire sample will include four villages per case and 80 villages in total. Building on this multi-layered case study research design, the villages represent embedded units within the broader programmatic cases, with replication logic being used to select three literal

cases and one theoretical case (Yin, 2003). This sampling logic will provide a control to test research hypothesis against, and is analogous to the matching sampling technique which is used when random assignment of treatment and control groups is not possible in quantitative studies (Rubin, 1973).

The first step consists of selecting the literal cases or 'treatment' communities, i.e. the ones that are part of a particular programme and are known *a priori* to be successful as per purposive selection criteria. This group will consist of three villages for each of the twenty cases. Many programmes keep a record of those successful villages, e.g. ones that have won awards or have the best performance indicators, and this information is likely to prove useful in selecting appropriate cases. We will not select the best of the best villages, though, which may have had exceptional leadership or above average wealth levels. Rather we are more interested in 'average best practice', where programmes lead to success in villages that do not display these exceptional circumstances. Practically, this means that when having a list of twenty best-practice cases we should exclude the 'super-exceptional' top two or three, and take one lower down the list – within the top 60-80% of the high performers.

It is recognised that programmes differ significantly in size – some only cover the villages in one district or block; others are applied almost state-wide and cover thousands of villages. For programmes that are state-wide, for logistical reasons, a district will be selected and successful communities will be selected that are all in that district. In smaller programmes the population from which villages can be selected will be limited. However the initial programme selection process should ensure that only smaller programmes that have a high concentration of success will be selected. In such cases, the villages are still likely to comply with the purposive selection criteria despite not having a large sampling frame to select from.

A second step is to identify the theoretical cases or 'control' communities, those who are not part of that programme or model, but share a set of observed covariates (e.g., technology, social, demographic, geographic, and other community characteristics), with the literal cases. The control group will consist of one village for each programme.

In considering the control village for each case study, then there are two broad options: the first and preferred option is the selection of a village within or close-by to the primary district of fieldwork that is outside the case programme. Selecting this case will involve modifying the in-case purposive selection criteria in two ways:

1. fixing broad stratifying criteria that closely match with at least one of the literal cases (i.e. population size, water source quality, etc.); and
2. modifying the selection criteria to ensure the case does not contain the community management 'plus' support functions that are provided to the literal cases.

The sampling frame for this case will be developed in conjunction with local officials and programme officials with a shortlist of four to five possible villages that are likely to be in close proximity to the main programme and which will then be considered in light of the selection criteria. In following this process, a theoretical replication will be selected that will ensure in-case comparability between best practice community management 'plus' and conventional community management enhancing the overall validity of the research.

However, when this is not practically possible as the study programme is so large, then the second option for the selection of the control village is the selection of a poorer performing village within or close-by to the primary study district that is still within the overall case programme. In this case, an

effort will be made to identify a village that has not received as much support from the Enabling Support Environment to properly test the hypothesis.

4.2.3 Sampling households within communities

As mentioned above, the household does not constitute a level of analysis, but the level at which some data will need to be collected, particularly on service levels, costs and expenditure and participation in community management. In particular, household surveys will be conducted.

Overall, across all case studies, 80 villages will be part of the study and in each of these villages 30 surveys will be conducted. This sample size has been selected to be reflective of the resources available to each research partner, whilst still obtaining a reasonably representative sample. A systematic approach to sampling will be taken to select the 30 responding households in each village. This means that the researchers need to ascertain the total number of households in each village then calculate an appropriate sampling interval for that community. For example, if the village consists of 300 households, this is divided by the intended number of surveys, which is 30. This would result in a sampling interval of six, meaning that every sixth household must be surveyed in this village. Enumerators will cover the entire geographical spread of the village and will be aware that many habitations are multi-sited, often with marginalised people living beyond the main area of the village.

5 How to analyse: indicators and tools for each research element

This section describes for each of the elements of research, how they will be analysed, focusing mainly on the tools to be used for that. The details of how the data will be collected and processed to come to this analysis are described in the respective protocols.

5.1 Critical level research

We will assess various areas of the enabling support entity level:
1. the description of the enabling support entities;
2. their performance;
3. an institutional and partnership assessment; and
4. the resource implications.

The study will combine both quantitative and qualitative data collection tools, particularly key informant interviews, secondary data and records review and resource costing.

5.1.1 Description of enabling support entities

This refers to the description of the entity or entities responsible for the enabling support functions. This will be done in the form of a short characterisation of the responsible body. Typical support authorities would be:

- State level government bodies;
- Any regulatory or monitoring bodies;
- GMs, or other decentralised government bodies (where they are not acting as service providers); and
- NGOs

Private entrepreneurs, such as area mechanics, or specialised companies can be described as ‘support agents’ who are employed by either the community service provider or directly by the service support entity. In many instances, the support functions may be divided over several bodies. In that case, all these will be listed, alongside their specific functions, such as monitoring, technical assistance, regulation, oversight, etc.

For each of the enabling support entities that has been identified, a number of quantitative descriptors will be captured, as suggested in Table 7, that above all describe the scope and scale of the work of the entity.

Table 7: Descriptors of the Enabling Support Entity

Descriptor	Definition
1. Characterisation of the ESE	
1.1 Type of organisation	☐ PRI body ☐ Other public body ☐ NGO ☐ Community organisation ☐ Private sector ☐ Other, specify
1.2 Modality of support provision	☐ On-request basis, whereby communities request support. ☐ Supply-driven, whereby the support authority visits the community on a scheduled basis. ☐ Mixed model, whereby communities request support when needed, but where the support entity also provides support on a scheduled basis.
2. Organisational capacity	
2.1 Personnel of the ESE, assigned to rural water and sanitation	Number of staff members (in Full Time Employee equivalents (FTE)) dedicated to water / population of the areas of jurisdiction of the authority and / number of service providers to be supported in the areas of jurisdiction of the authority.
2.2 Annual operational expenditure	Total operational expenditure (transport, communication, etc.) made by the support services authority related to water and sanitation / rural population and / number of service providers to be supported.
2.3 Logistical capacity of the support agent	Number of cars: Number of computers: Number of motorcycles:

In addition to capturing these characteristics of the ESE, the research will also elaborate the internal organisation of the authorities and their formal relationship with the service providers they support. This will be elaborated in a short narrative description of the ESE model, alongside an organogram and Venn diagramme indicating the responsibilities of the ESE vis-à-vis other organisations.

5.1.2 Performance of enabling support entities

This refers to the degree to which the enabling support entities are fulfilling their roles adequately, against a set of performance indicators. Similarly, as for the service providers, a set of indicators have been developed to describe and assess the performance of the support organisations, using similar types of indicators as in Nickson and Franceys, (2003) for urban utilities and the ones by Smits, et al., (2013) to assess performance of support agents in Colombia (see Table 8).

Table 8: **Performance indicators for the enabling support environment entity/entities**

Indicator	Definition
1. Degree of professionalisation in the ESE	
1.1 Formality of the mandate for support	Existence of a formal mandate for support to service providers, based on ordinal score.
1.2 Working methods	Standard tools and instruments for support being applied in a structured manner, based on ordinal score.
1.3 Information management	Existence and use of structured mechanisms for tracking information on performance of the service providers attended by the service support and monitoring authority. Based on ordinal score
1.4 Communication between service support authority and service providers	Existence of structured mechanisms for communication with the service providers, based on ordinal score.
2. Performance of the ESE	
2.1 Variety of support services being provided	Number of types of support services being on offer.
2.2 Response time	Average time that passes between a request for support and the support being provided.
2.3 Effectiveness	Number of the service providers that received support in the last year / total number of service providers to be attended.
2.4 Efficiency	Number of systems attended in the last year / number of staff of the support agent.
2.5 Unit costs	Operational annual expenditure / number of systems supported.
2.6 Frequency of support	Number of support visits / number of service providers supported.
3. Client satisfaction	
3.1 Client satisfaction	Number of service providers indicating satisfaction with the support received / number of service providers supported, based on ordinal score.

Note that some of the indicators are quantitative ones, such as the number of service providers supported in the last year. Other indicators are more qualitative in nature, such as the formality or mandate that the ESE has to provide support. In those cases, the Qualitative Information Systems (QIS) method is used to come to an ordinal score. QIS works by quantifying qualitative indicators with the help of progressive scales, called 'ladders'. Each step on the ladder has a short description, called a mini-scenario, which describes the situation that signifies a particular score. The scenario that best describes the situation is selected and the corresponding core obtained (Postma, et al., 2004; da Silva Wells, et al., 2013). The researcher will need to give also the explanation for the scoring, including reference to evidence from interviews. An example of the scoring table for indicator 1.1 on the formality of the mandate for support is given in Table 9.

Table 9: Scoring table for indicator 1.1: formality of mandate for support

Description		Score	Explanation of scoring
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, but this is not supported by a policy mandate.	☐	75	
The ESE has a formal policy mandate for support, but it only has an implicit understanding of what that mandate entails in terms of objectives to be achieved.	☐	50	
The ESE has an implicit understanding of its objectives, but lacks a formal policy mandate.	☐	25	
The ESE operates without a clear vision or objectives and without a policy mandate.	☐	0	

The information to score these indicators will be obtained from key informant interviews with staff from the ESEs and secondary information such as records. Data will be triangulated through interviews with the service providers that these ESEs support.

5.1.3 Institutional Assessment and partnering

The research recognises institutional performance and capability as central to successful community management. However, it is also recognised that beneath the official organograms and tangible performance indicators can be unseen factors contributing to organisational performance. For example, networks of patronage which others may not enjoy.

Therefore, to explore these issues in more detail, the participatory stakeholder Net-Mapping Tool (Schiffer, et al., 2007) will be used to assess how different people and groups influence water supply. This method will be used via focus groups, with service providers and community members, to construct a birds-eye map of support networks for the local water supply system. This data will help understand the reality of power relations that impact the support to the water schemes. Building on Arnstein's (1969, p. 1) understanding that 'citizen participation is a categorical term for citizen power', the data collected here also provides the foundations for validating and digging deeper into the categorisation of schemes along the community participation ladder.

The results of this Net-Mapping Tool will be combined with the results of key informant interview with the ESE and the community service providers into two qualitative assessments:
1) the institutional assessment; and
2) the partnering typology.

Institutional assessment

The indicators in the previous section refer to how the ESEs are performing in their tasks, as it is portrayed externally. This is influenced by the internal institutional set-up and processes of the ESEs. In order to better understand the performance of the ESE in these internal institutional processes, we will score these through our own adaptation of the WASH 37 institutional assessment tool (Cullivan, et al., 1988), which was originally designed to help in the understanding of water utility performance. The tool assesses the institutional performance in seven key performance categories:

1. Leadership
2. Management & Administration
3. Community Orientation
4. Technical Capability
5. Developing & Maintaining Staff
6. Organisational Culture
7. Interactions with Key External Institutions

For each of these seven performance areas, a number of statements are provided that can be scored. This results in a score per performance area and thereby gives insight into the internal institutional processes of the ESE.

Partnering

The relationship between the ESE and the service provider will be assessed using the typology of partnerships, building on the one presented in Table 2, differentiating them for the different phases in the service delivery cycle. It presents a number of statements that reflect the partnering typology continuum for the phases in the service delivery cycle. The research team will score the degree to which each statement reflects the situation found in the interviews. The scores are added up towards a total score for each type of partnering and for eac stage of the service delivery cycle. These types of partnering are not considered exclusive but rather cumulative with an organisational relationship potentially exhibiting characteristics across the typologies.

Table 10: Organisational partnering typology for relation between ESE and community service provider (CSP) during different phases of service delivery cycle

Phase in service delivery cycle / Type of partnering	Capital investment phase	Service delivery phase	Capital maintenance phase	Service enhancement or expansion phase
Collaborative	ESE and CSP share responsibility for decisions regarding hardware (e.g. infrastructure) and software (e.g. capacity building) development during implementation.	ESE and CSP share responsibility for decisions regarding administration, management and operation and maintenance.	ESE and CSP share responsibility for decision making regarding asset renewal.	ESE and CSP share responsibility for decisions regarding service enhancement or expansion.
Contributory	ESE and CSP pool financial resources to meet the costs of capital investment in hardware and software provision during implementation.	ESE and CSP pool financial resources to cover costs of administration, management, and operation and maintenance.	ESE and CSP save and pool financial resources to meet the costs of asset renewal.	ESE and CSP save and pool financial resources to meet the costs of service enhancement or expansion.
Operational	ESE and CSP work together contributing labour and/or resources to deliver hardware and software provision during implementation.	ESE and CSP work together contributing labour and/or resources to support administration, management, operation and maintenance.	ESE and service provider contribute labour and/or resources for asset renewal.	ESE and CSP contribute labour and/or resources for service enhancement or expansion.
Consultative	ESE and CSP communicate regularly during implementation with structured opportunities for feedback and dialogue.	The ESE and CSP have a systematic and transparent system for sharing information regarding administration, management, and operation and maintenance.	ESE and CSP systematically share information regarding service levels and technology status enabling proper planning for asset renewal.	Information regarding service levels, technology status and population is systematically shared, enabling proper planning for service enhancement or expansion.
Transactional	ESE and CSP initially negotiate an implementation plan that is then delivered by the ESE.	The ESE and CSP fulfil different elements of the administration, management, and operation and maintenance functions as per negotiated arrangements.	Asset renewal is dependent on negotiations between ESE and CSP following a request from the CSP.	Service enhancement or expansion is dependent on negotiations between ESE and CSP following a request from the CSP.
Bureaucratic	ESE provides CSP with a standardised model of hardware and software provision during implementation.	Bureaucratic standards dictate the system for administration, management, and operation and maintenance.	Asset renewal is dependent on generic programme timelines (i.e. every X years).	Planned asset replacement, expansion or renewal is dependent on generic programme timelines (e.g. every X years and/or with every X% of population increase.)

Developed from: Demirjian, 2002.

5.1.4 Resource costs of service support and monitoring functions

For this study, we will not carry out a full cost analysis of the water service, but limited ourselves to the following cost categories:

CapEx software. Capital expenditure on software refers to the once-off work with stakeholders prior to or during construction or implementation, extension, enhancement and augmentation, such as costs of one-off capacity building. It will include the costs of salaries of the staff that carried out this work with stakeholders, as well as their travel costs. In addition, it may include the costs of information materials and stationery used in this work. The unit of analysis for these costs is the village that was intervened (or the control villages). However, the data are most likely to be obtained from the entities that carried out this work.

OpExpDS. By our agreed definition, Operating Expenditure Direct Support (OpExpDS) refers to the operating expenditure on support activities direct to local level stakeholders, users or user groups, such as support to service providers and ensuring that local government staff have the capacities and resources to help communities when systems break down or to monitor performance. This will therefore include the costs of salaries of staff of the service support authorities as well as their travel costs. Moreover, it will include the costs of information materials and stationery used in this work, as well as any other office costs, like computers, office rent, etc. The information on this will need to be collected at the level of the service support authorities. To come to the proper unit costs, the total expenditure on direct support will need to be divided by the population attended by them.

Part of the service provision **OpEx** which is being carried by the support entities. The part of the service provider OpEx which we need at this level, includes all expenditure on labour, fuel, chemicals, materials which are being provided or funded by the support entity. Where support entities support extends to regular purchases of any bulk water, as well as routine maintenance needed to keep systems running at peak performance, not passing on those costs to the service providers, this also needs to be recorded. However, for this research we are mainly interested in the costs of professionalisation. This would basically be the costs of all labour funded by the service support entity, such as remunerations for scheme attendants, pump mechanics, administrators, guards and other staff of the service provider, as well as any travel expenses incurred on that. Also any office costs the service provider will incur should be included in this, for example their expenses on stationery, computers, billing software, or officer rent – if any – should be included. For this research, we will try and obtain all OpEx costs, but disaggregate between the items that make up these costs, to get insight into the costs of professionalisation. These data are to be obtained from the service providers themselves for each of the villages in the study, as they are the ones who would most likely track these costs.

In order to support data collection, sheets will be prepared with the most common line items (such as salaries, travel, stationery, office costs, etc.), that can be filled out during visits to the service providers and support service authorities. Ideally, this information will be taken from annual financial/budgeting accounts from the support entities where available. If not available then it will be necessary to estimate these costs through key informant interviews. These will capture the units (like for example the number of person-days spent on support, or trips made) and the unit costs so as to calculate totals later. By doing so, we can also obtain further insight into some of the non-monetary resources that are spent on support, such as the type of staff. But to get the full insight into these resources, the quantitative data collection will be complemented by semi-structured interviews for a more qualitative insight into the resource dedication.

5.2 Validation level research

The research will assess three broad areas of the service provider:

1. the type of service delivery model;

2. their performance; and
3. the degree of engagement of communities.

In addition, it will assess the services themselves, in terms of 1) the status of the infrastructure and 2) the service levels that households receive and the degree of equity in that.

5.2.1 Type of service delivery model

This refers to the description of the entity responsible for day-to-day O&M and administration. This will be done in the form of a short characterisation of the responsible body. Typical service providers would be:

- Formal water committee: a community body that has been set-up with the sole responsibility of providing water services and not engaged in other activities within the community. It has been recognised by the relevant authorities as being responsible for this task.
- Informal water committee: a community body that has been set-up with the sole responsibility of providing water services and not engaged in other activities within the community. It does not have any formal recognition by authorities of having this responsibility.
- Other community organisation: a community body that undertakes water-related tasks, alongside other community-development activities.
- Gram Panchayat: the GP is the service provider in those cases where it undertakes all operation, maintenance and administration tasks.

In addition to capturing the main responsible entity, the research will also elaborate the internal organisation of that main body, differentiating between the corporate oversight function (typically the committee or community board) and operational staff. Examples would include cases where a water committee hires a paid-for mechanic for repairs or if it hires an administrator for billing and book-keeping. This will elaborated in a short narrative description of the service delivery model, alongside an organogram.

Finally, for comparison purposes, we will capture a number of descriptors to identify the scale of operation of the community service provider, as presented in Table 11.

Table 11: Descriptors of the community service provider

Descriptor	Definition
1. Characterisation of the CSP	
1.1 Type of organisation	☐ Formal water committee ☐ Informal water committee ☐ Other community-based organisations ☐ Gram Panchayat ☐ Other, specify
2. Organisational capacity	
2.1 Staffing of governing body of CSP	Number of persons on governing body of CSP (typically including chairperson, secretary, treasurer, other members).
2.2 Staffing of the CSP	Number of employed staff members (in Full Time Employee equivalents (FTE) of the CSP (typically including operators, administrators, plumbers, etc.).
3. Scale of operation of the CSP	
3.1 Coverage	Population supplied with water by the CSP / Size of population in service area.
3.2 Coverage with household connections	Number of households with household connections / households served by the CSP.
3.2 Coverage with household connections among vulnerable groups	Number of SC/ST [and other vulnerable group] households with household connections / SC/St [and other vulnerable group] households served by the CSP.
4. Financial descriptor	
4.1 Tariff structure	Average tariff of user charge that is levied for the water service, and the units in which these are expressed (Rs/m3, Rs/bucket, Rs/household/month). Where relevant indicate whether there are more advanced forms of differentiation such as progressive block tariffs.
4.2 Connection costs	Average one-off user contribution to get a household connection to the water supply system.
4.3 Total capital expenditure	Total expenditure on capital investments, i.e. on extension of the service or its enhancement done during the last year, from all sources: CSP's own investments as well as those done by government or other entities.

5.2.2 Community Service Provider Performance

To assess the performance of the service providers, we will use a set of indicators that describe how service providers are fulfilling their functions. These derive from formal legal and regulatory requirements, where they exist; where they do not, we will derive them from our long experience with such indicators in urban utilities, as well as recent experiences with indicators for rural service providers in for example Ghana (Adank, et al., 2012) and Colombia (Smits, et al., 2013). In Table 12 is the proposed set of indicators that captures the performance of the service providers in three crucial areas:

- Organisational performance, referring to the legal status of the organisation and compliance with internal organisational procedure;
- Administration and financial performance, including key financial indicators and the compliance with adequate financial management procedure; and
- Technical performance, referring to the degree to which operation and maintenance tasks are carried out.

Table 12: Proposed indicators to assess performance of the service provider

Indicator	Definition
Governance	
1.1 Formal establishment of service provider	The number of legal requirements related to the formal establishment of the service provider that are complied with.
1.2 Statutes	Presence of statutes that define the organisational structure, roles, responsibilities and rights and obligations of the provider and users.
1.3 Selection of the Board of the service provider	(S)Election process follows the procedures and legal requirements. Based on ordinal score.
1.4 Information sharing and accountability mechanisms	Number of mechanisms that the CSP employs to inform users and provide accountability to the about the service delivery. Based on ordinal score.
1.5 Gender balance in the governing body of the CSP	Number of women in the governing body of the CSP / total number of members of the governing body
1.6 Capacity of the personnel and board of the provider	Number of members of the personnel and governing body of the CSP that have received formal training for their function / Number of personnel and governing body members.
Finance	
2.1 Financial balance of recurrent revenue and expenditure	Total annual revenues from user charges and government subventions of the last year minus total annual expenditure on recurrent and minor maintenance; occasional major maintenance of the last year.
2.2 Cash reserves	Management of cash reserves – petty cash box in community; any banked reserves. Based on ordinal score.
2.3 Book keeping	Existence of up to date (and audited) accounting books. Based on ordinal score.
2.4 Non-payment rate	Number of users who owe more than three months of water fees/number of users.
Technical performance	
3.1 Technical folder	Existence and use of folder with maps, designs, manuals and operational guidelines. Based on ordinal score.
3.2 Registry of operational information	Existence of up to date operational registers. Based on ordinal score.
3.3 Response time	Average time to repair break-downs.
3.4 Water metering	Presence of water meters and their use to charge consumers and track non-revenue water. Based on ordinal score.
3.5 Waters security measures	Execution of one or more physical or administrative measures to ensure water security. Based on ordinal score.
3.6 Water quality management	Presence and execution of water quality management plan. Based on ordinal score.

As for the ESE, these indicators are a combination of quantitative ones and ordinal scores, using the QIS methodology.

In order to come to the scoring of the indicators, primary data collection will be undertaken in each of the communities. This includes key informant interviews with the governing body and personnel of the community service provider. Where available, they will be asked to provide written copies of some of the supporting materials (e.g. a copy of statutes or of the most recent water quality tests). Data will also be validated in a focus group discussion with community members.

5.2.3 Degree of community engagement in service provision

To assess the degree of community participation in rural water supplies, we developed a ladder with a series of descriptions and key words for each level of participation, similar to the one developed by Pretty (1994) adapted from Adnan, et al.'s, (1992) participation ladder for irrigation. Rural water supply projects often contain a range of issues to consider, such as the type technology, level of tariffs, formation of a water committee, etc., on which there are different degrees of participation. For example, a technology may be predefined by an intervening agency and the community is only informed about it; but they may be given a real voice in defining the type of management model and the election of its members. Moreover, the degree of participation may change between different phases in the service delivery cycle. Table 13 describes the levels of participation for typical key decision areas in different phases of the rural water supply life cycle.

Table 13: Ladder of participation

Phase in service delivery cycle / Type of community involvement	Capital investment phase	Service delivery phase	Capital maintenance phase	Service enhancement or expansion phase
1. Self-mobilisation	The community practices self-supply and seeks to improve this, or have developed an implementation plan and seek external support.	The community take responsibility for administration, management and operation and maintenance, either directly or by outsourcing these functions to external entities.	The community practices self supply and invests in asset renewal, or identifies need and seeks external support for asset renewal.	The community practices self supply and invests in service enhancement or expansion, or identifies need and seeks external support for service enhancement or expansion.
2. Interaction participation	The community in partnership with the service provider and/or support entities engage in a joint-analysis of implementation options before developing a plan.	The community in partnership with the service provider and/or support entities engage in joint-decision making regarding appropriate arrangements for administration, management and operation and maintenance.	The community in partnership with the service provider and/or support engage in joint-decision making regarding asset renewal.	The community in partnership with the service provider and/or support engage in joint-decision making regarding service enhancement or expansion.
3. Functional participation	The community is provided with a detailed implementation plan that they discuss and they have a chance to amend limited elements.	The community is provided with administration, management and operation and maintenance arrangements that they discuss and they have a chance to amend limited elements.	The community is provided with an asset renewal plan that they discuss and they have a chance to amend limited elements.	The community is provided with a service enhancement or expansion plan that they discuss and they have a chance to amend limited elements.
4. Participation by consultation	Community members are asked whether they want a predefined implementation scheme but have no formal decision making power to demand alternatives.	The community discusses administration, management and operation and maintenance functions but have no formal decision making power to demand alternatives.	Community members are asked about asset renewal but have no formal decision making power to demand alternatives.	Community members are asked about service enhancement or expansion but have no formal decision making power to demand alternatives.
5. Passive participation	Community members are informed that project implementation is going ahead as per an externally designed plan.	Community members are informed how administration, management and operation and maintenance will operate without opportunity for changes.	Community Service Provider informs community members about asset renewal as per an externally designed plan.	Community Service Provider informs community members about service enhancement or expansion as per an externally designed plan.

based on Pretty (1994), adapted from Adnan, et al., (1992), in key issues in rural water supplies.

This table will be filled out based on the focus group discussions with community service providers and users. For each of the phases in the service life-cycle the description that fits best will be selected and the corresponding score obtained. The results of this will be aggregated to an overall average score.

5.2.4 Infrastructure assessment

The infrastructure assessment tool will help give an indication of any sustainability problems for the future, e.g. a pump that is ten years old has a high chance of breaking down. The infrastructure status snapshot (Table 14) is the tool to be used for that, filled out during an inspection in the field. Each of the components is visited and observed. Through observation and testing, it will be checked whether it is functioning. The results will be discussed together with the representative of the community service provider so to obtain further insight into why certain components may be functioning well or not.

Table 14: Infrastructure status snapshot tool

System component	Presence (yes/no)	Functioning (yes/no)	Age in relation to design life-span[4]	Physical condition (good, reasonable, poor)	Remarks
Intake structure					
Borehole					
Handpump					
Motorised pump					
Diesel generator					
Electricity panel					
Treatment plant					
Main line					
Reservoir					
Pressure-break tanks					
Chlorinator					
Distribution network					
Tap stands					
….To be expanded when necessary					

Using the data collected through the Infrastructure Snapshot, an overall score will be given to the status of the infrastructure. A difference should be made between piped water supply systems, which are typically composed of a number of infrastructure components, and handpumps, which are not. For the latter, it is more useful to look at the overall status of all handpumps in a village.

[4] Design life span data to be obtained from technical guidelines from the Ministry of Drinking Water and Sanitation, or from state level government, if states apply different standards.

Table 15: Infrastructure status snapshot scoring (piped water supply)

		Score	Explanation of scoring
All components that are present function and are in good physical condition. None of the components have reached over 80% of their design life span.	☐	100	
All components that are present function and are in good physical condition. However, 1 or more are over 80% of their design life span.	☐	75	
Out of all components that are present, 1 is not functioning or is not in good physical condition.	☐	50	
Out of all components, 2 are not functioning or are not in good physical condition.	☐	25	
3 or more components are not functioning or are not in good physical condition.	☐	0	

Table 16: Infrastructure status snapshot scoring (handpumps)

		Score	Explanation of scoring
All of the handpumps in the village function and are in good physical condition. None of the handpumps have reached over 80% of their design life span.	☐	100	
All of the handpumps in the village function and are in good physical condition. However, one or more of the handpumps have reached over 80% of their design life span.	☐	75	
Out of all handpumps that are present, not more than 20% are not functioning, or not in good physical condition, or have reached over 80% of their life span.	☐	50	
Out of all handpump, not more than than 40% are not functioning, or not in good physical condition, or have reached over 80% of their life span	☐	25	
More than 40% ore of the handpumps are not functioning, have reached over 80% of their life span or are in poor condition	☐	0	

5.2.5 Household service levels

In order to assess overall service levels, the service ladder, as presented in Table 17 will be used. For the communities in the sample, the overall service level will be defined, as well as the score on each of the sub-indicators. The analysis will provide us with a combined score on whether the water services are effective, i.e. whether they provide the level of service to which users are entitled.

In order to come to these aggregate scores, households – that are to be selected through the sampling method elaborated in 4.2.3 – will be surveyed. At household level, data on quantity used, accessibility, water quality perception, continuity and reliability (differentiated for piped supplies and handpumps) will be obtained. These will be complemented by water quality testing data for the while village.

Once the service levels are obtained for each of the parameters, these are consolidated into one table for the household by putting a mark in the corresponding service level. In this way, a score per parameter is obtained. The next step is for the household to assess in how many of the parameters at least a basic service level has been achieved. As the basic service level indicates the norm, any parameter below that, indicates a certain degree of sub-standard service delivery. That score is defined as the ratio between the number of parameters for which at least a basic level was obtained and the number of total parameters for that household.

Table 17: Service level assessment tool

Service level	Quantity (lpcd)	Accessibility (cumulative time spent per day by the family on fetching water)	Water quality: perception	Water quality: testing	Continuity (hours/day)[5]	Reliability: piped supplies	Reliability: handpumps
High	> 80 lpcd	0-10 minutes per day	Good	All tested samples are within permissible levels.	> 3	Supply above the agreed schedule and duration, and response time does not exceed 24 hours.	Response time is less than 24 hours and handpumps are down for not more than 12 days per year.
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.	Response time is less than 48 hours and handpumps are down for not more than 12 days per year.
Basic	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.	Response time is less than 48 hours and handpumps are not broken down for more than 15 days per year.
Sub-standard	20-40 lpcd	30-60 minutes per day	Bad	Tested samples are tested positive for one parameter.	< 1	Supply has scheduled times, duration and delivery but this is not always met, or response time exceeds 48 hours.	Response time is more than 48 hours or handpumps are broken down for more than 15 days per year.
No service	< 20 lpcd	> 60 minutes per day		Samples are tested positive and the contamination levels are very high.		Supply has scheduled times, duration and delivery but this is hardly ever met, or response time more than two weeks.	Response time it more than two weeks or handpumps are broken down for more than 30 days per years.

[5] For piped water supply only.

Using the aggregates results from the service analysis, we can then assess the equity of service across the community. The first way is by taking an average of the overall service levels scores obtained. These can also be expressed through other distributional statistics (medians or quartiles) or visualised in a histogram that provides the distribution of service levels within the community. This can also be broken down further for each parameter by aggregating each households' service level into the 'High' to 'No Service' categories for quantity, quality, accessibility and reliability as indicated in the previous section, as percentages of the total number of respondents that receive different levels of service as shown in the example in Table 18. During the analysis, if service levels are very unequal, the research team should identify which sections of the community receive high service levels and which low service levels.

Table 18: Percentage of households receiving a certain level of service for the different parameters for (handpumps)

	Parameter			
	Quantity	Accessibility	Quality: perception	Reliability
Water service level	(% of respondents)			
High	5	1	1	9
Intermediate	13	11	5	
Basic	54	48	9	6
Sub-standard	28	11	33	51
No service	1	15	52	21

Based on a WASHCost example.

5.3 Supplementary level of analysis

5.3.1 Contextual factors

The information on the context in which certain enabling support environments developed and thrived is largely qualitative in nature. Through key informant interviews we have the opportunity to access the information on the underlying contextual factors that may be influencing the success of these models. As such, these semi-structured interviews are designed to probe wider issues, such as the history of schemes, levels of community cohesion and local skill sets. Together, the qualitative methods will help provide a rich description of support activities and help discover how major bottlenecks were navigated in these best practice cases. This will be complemented by data obtained from secondary data and the focus group discussions, we will capture that information and it will be analysed primarily in a narrative manner.

In addition to this 'thick' analysis of the context, a number of descriptive contextual factors will be collected at village level. These will enable the cases to be compared across key characteristics. To do so, the following table will be used, for which data will be obtained from census data and other secondary sources of information.

Table 19: List of contextual factors to be collected

Factor	Definition
Identifier	Name and location of the village (block, district).
Type of technology	The type(s) and number of water technologies found in the village, from a standard list.
Poverty status	Percentages of the population according to wealth status (below and above poverty line), as per census data.
Vulnerable groups	Percentage of the village population classified as SC/ST as per census data.
Type of settlement	Choose from: small town, concentrated rural settlement, dispersed rural settlement.
Population size	Number of persons in the habitation(s) that make up the village as per census data.

5.3.2 Identification of categories and trajectories for success

The project will address the research question on identifying particular trajectories of professionalising and categories of institutional support at the programme and wider enabling environment levels during the inter-case analysis stage.

Both quantitative and qualitative data will be relevant in this process, with attention given to categorising organisational types and structures, levels of finance and financing mechanism, technical support services, monitoring functions and so on in each of the schemes, and then considering generalisable trends across the different case studies.

Whilst emergent themes will be explored during this process, a key task will be to test the hypotheses behind the models of community management of rural water supplies that are presented visually in Figure 2 and Figure 3. For example, this will mean assessing whether community wealth is related to the type of service delivery model as suggested in Figure 2, and whether the degree of participation in community management follows the distribution across different typologies, as suggested in Figure 3.

The inter-case synthesis will also test the hypothesis that collaborative and higher level partnership types are associated with successful community management 'plus' by making using of the partnership ladder presented above.

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