CRANFIELD UNIVERSITY

PAUL HUTCHINGS

SUPPORTING COMMUNITY MANAGEMENT: A SYNTHESIS OF SUCCESSFUL RURAL WATER SERVICES PROGRAMMES IN INDIA

SCHOOL OF WATER, ENERGY AND ENVIRONMNET

PhD
Academic Year: 2012 - 2016

Supervisors:
Dr Alison Parker and Dr Richard Franceys

Thesis Submission:
May 2016

ABSTRACT

For the past 30 years the dominant approach to managing rural water services in low and lower middle income countries has been the community management approach. Yet there is increasing evidence the model is not fit for purpose as too many services fail. The next generation ideas for community management emphasise the need for continuous on-going support to communities – an approach known as the community management plus approach. This thesis tests and develops this next generation community management plus paradigm. It analyses field data from twenty case studies of 'reportedly successful' community management programmes across seventeen states in India. Bringing together data from 2,355 household surveys, 272 interviews and 130 focus groups it provides a synthesis that assesses the type and level of support found in successful examples of community management. The evidence from these case studies demonstrates that communities receive significant recurrent subsidy covering between 7-48% of operational expenditure. This is in marked contrast to the conventional principles of community management whereby communities cover 100% of these costs. Analysis of organisation types also shows how community management has been shaped by the devolution of governance in rural India. Many community management programmes involve a structural overlap between the local self-government institution of the Gram Panchayat and water committees. The thesis argues this represents a shift to the 'institutionalised co-production' of rural water services, involving both the state and private citizens in public service delivery. Overall, the research shows that successful community management in India involves continuous on-going support as per the community management plus paradigm. However this has required the nesting of the model within the broader system of local self-government which blurs the lines between public and community management.

Keywords: Rural, Water, Services, Community, Management, India, Finance, Subsidy, Maintenance, Participation, Public, Political, Economy, Governance.

ACKNOWLEDGEMENTS

This thesis stands on the shoulders of many people. Undertaking it has been a privilege that has allowed me to travel and learn about this most fundamental of problems – how to deliver safe and sustainable water services.

In acknowledging the people that have made it possible there are too many to name in person. But, first, I shall thank my research collaborators from the Community Water Plus project. Particular thanks must go to Dr Snehalatha Mekala and Stef Smits who have been great collaborators and professional mentors. Special appreciation also goes to - Shaili Jasthi, Dr Rema Saraswathy, Mr Vaidyanathan, Prof Prakash Dash, Matthias Javorszky and Ben Harris –in various ways you have all helped me along the way.

Staying with Community Water Plus, I am indebted to those many hundreds of people from 17 different states across India who welcomed me and my colleagues into their villages. They patiently answered our questions and invariably provided us with *garam chai*! This research would simply not have been possible without you and I hope it does justice to the time you dedicated to it.

From Cranfield, a massive 'thank you' to my supervisory team. Dr Alison Parker has been with me throughout this endeavour – providing critical insight and a helping hand when I've most needed it. Professor Paul Jeffrey provided his authoritative take on my initial ideas and then was able to relinquish responsibility – but has remained a source of insight and comment.

Lastly, from Cranfield, I feel extremely grateful to have worked so closely with Dr Richard Franceys who has been my brilliant and dedicated supervisor and line-manager. It has been an absolute pleasure – I now wish Richard all the best for retirement!

Finally, a big thank you to my friends and family who have kept me sane and happy over the years! Especially Katie who has supported me throughout. Thank you.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ADRAS	Australian Development Research Awards Scheme
AUD	Australian Dollar
CapEx	Capital Expenditure
CapManEx	Capital Maintenance Expenditure
CSP	Community Service Provider
ESE	Enabling Support Environment
IQR	Inter Quartile Range
JMP	Joint Monitoring Programme
LPCD	Litres Per Capita Per Day
LSG	Local Self-Government
MDG	Millennium Development Goal
MVS	Multi Village Scheme
NGO	Non-Governmental Organisation
NRDWP	National Rural Water Drinking Programme
OpEx	Operation and minor maintenance Expenditure
OpEx Enabling Support	Operation expenditure and minor maintenance Enabling Support
PPP	Purchasing Power Parity
PRI	Panchayat Raj Institutions
RWSN	Rural Water Supply Network
SDG	Sustainable Development Goal
SLEC	Scheme Level Executive Committee
SRWSA	State Rural Water Supply Agency
SVS	Single Village Scheme
SWAp	Sector Wide Approach
UN	United Nations
UNICEF	United Nations Children's Emergency Fund
USD	United States of America Dollar
VWSC	Village Water and Sanitation Committee
WASH	Water, Sanitation and Hygiene
WASMO	Water and Sanitation Management Organisation

WHO	World Health Organisation

1 INTRODUCTION

This chapter explains the research background, purpose and context. It also outlines the thesis structure.

1.1 Research background

The expansion of safe water services to an ever larger proportion of the global population has been a cause for celebration in recent years. In 2012 the WHO and UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation announced the achievement of Millennium Development Goal (MDG) target 7c three years ahead of schedule (WHO and UNICEF, 2012). This meant that from 1990 to 2012 the world had halved the proportion of the global population without access to an improved drinking water source[1], expanding access to 2.6 billion more people (WHO and UNICEF, 2013). Now, as the world enters the Sustainable Development Goal (SDG) era, the global water sector is faced with an aspiration to deliver universal access to every person on the planet by 2030 (United Nations, 2015). In 2015 there were still 663 million people around the world who lacked basic access - eight out of ten of whom live in rural areas (WHO and UNICEF, 2015).

More fundamentally, however, the lack of sustainability in rural water service provision threatens progress (Fisher et al., 2015; Mandara et al., 2013; Schweitzer and Mihelcic, 2012; Stalker Prokopy and Thorsten, 2009). Research shows that over 30% of rural water supply infrastructure in Sub-Saharan Africa (Adank et al., 2012; Sutton, 2005) and India (Government of India, 2009a;

[1] An improved drinking-water source is used as the basic measure of access in the monitoring programmes for the MDGs and SDGs. It is “defined as one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with faecal matter” (WHO and UNICEF, 2013). This definition will be discussed in more detail in Chapter Two.

Reddy et al., 2010) are either below the designed-functionality or in a non-functioning state. This situation threatens the progress made under the MDGs and, if it is not addressed, makes achieving the universal aspiration of the SDGs all but impossible.

Within the context of this sustainability problem the thesis focuses on the future of the most common management model for rural water services – the community management approach (Broek and Brown, 2015; Harvey and Reed, 2006; Moriarty, Butterworth, Franceys, et al., 2013; Schouten and Moriarty, 2003). As outlined in this researcher's Hutchings et al. (2015) paper, community management can be defined loosely as an approach whereby:

"the basic principles were that communities should be involved in the development of water supply systems, then take ownership of them, and have overall responsibility for operation and maintenance (Harvey and Reed, 2006; Moriarty, Butterworth, Franceys, et al., 2013)*".*

The historical and ideological reasons behind the widespread application of this management model will be discussed in the following chapters. However, for now, it is important to understand that community management has been the favoured approach to managing rural water services in low and lower middle income countries since at least the 1980s playing an important role in the expansion of water services to hundreds of millions of people (Harvey and Reed, 2006; Lockwood and Smits, 2011; McCommon et al., 1990; Paul, 1987; Schouten and Moriarty, 2003).

Yet in light of the challenges outlined above there is a growing consensus that the approach needs to be reformed (Baumann, 2006; Broek and Brown, 2015). Moriarty et al. (2013, p.329) succinctly clarify a generally held belief that community management is "*at the beginning of the end…not principally because community management has failed, but because it is reaching the limits of what can be realistically achieved in an approach based on informality and voluntarism."* Simply put, community management has conventionally been an approach in which governments or other agencies can concentrate on developing infrastructure and not worry about operating or maintaining it. This can be considered an appropriate and efficient model when the challenge is expanding access to water services but one of the primary challenges the

sector now faces is to ensure the sustainable operation and maintenance of water services (Hutton and Varughese, 2016; Lockwood and Smits, 2011; Moriarty, Butterworth, Franceys, et al., 2013).

In response to this situation there have been calls to make governments (and other supporting agencies) take greater responsibility for providing continuous, on-going support to communities beyond the conventional focus on infrastructure creation (Kleemeier, 2000; Lockwood, 2002, 2004). As will be discussed this on-going support can take different forms and numerous terms have been used to describe it: 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). Collectively, they have become known by the term "community management plus", a phrase coined by Baumann (2006) with the 'plus' signifying the on-going support that is required to ensure community management is sustainable. Yet whilst the turn to community management plus has become a widely accepted shift there remains a lack of a robust guidance on how best to structure and finance such support services (Smits et al., 2011). Beyond this, it is also contended there remains a lack of robust interrogation of the core claims that such support actually ensures better service outcome.

1.2 Research purpose

This research therefore positions community management plus as a potential new paradigm for rural water services that needs further interrogation. In the classic work on the structure of scientific revolutions, Kuhn (1970, p. 175) defined a paradigm in two ways:

"On the one hand, it stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community. On the other, it denotes one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science"

In this view, paradigms are owned and created by a community of practitioners and most professionals spend their lives working within a certain paradigm using model solutions to respond to model problems (Kuhn et al., 1970, p. 175) Building on this definition the research positions the conventional approach to community management as representing a consensus of beliefs, values and techniques that were applied to the 'problem' of providing rural water services in low and lower middle income countries by development professionals and public servants (Harvey and Reed, 2006). However, in recent years, there is now a new consensus among many of these practitioners that rural communities cannot independently manage rural water services and therefore need continuous on-going support from government (or other agencies) to deliver such services (Baumann, 2006; Hutchings et al., 2015; Hutchings, Franceys, et al., 2016; Kleemeier, 2000; Lockwood, 2002; Moriarty, Butterworth, Franceys, et al., 2013; RWSN, 2009). The shift to community management plus therefore represents a potential new consensus around the world about what a model solution for rural water services should look like.

Synthesising evidence from India, a large and diverse country in which community management has played a significant role in national rural water policy since the late 1990s (Government of India, 2003, 2013a; James, 2004, 2011), this thesis seeks to investigate the assumptions that underpin this new 'community management plus paradigm'. Building on the typologies of research from Bryman (2012) and Denscombe (2010), the research exhibits descriptive qualities as it seeks to answer questions about the forms of successful community management in India but also moves to an evaluation approach to interrogate whether the principles of community management plus do deliver the benefits they are supposed to, as per the paradigmatic understanding. The specific research questions the study responds to are:

1. What are the type and characteristics of organisational arrangements found in successful community management programmes in India?
2. What are the indicative financial costs of supporting successful community management programmes in India?

3. To what extent do the findings from questions 1 and 2 support the justification for the community management plus paradigm as a dominant management model for rural water services in India and other relevant contexts?

The thesis is intentionally designed to be empirically-driven in answering such questions with its contribution to knowledge being about describing and testing the 'common-sense' assumptions that underpin the community management plus paradigm. In order to conduct such a study it has been necessary to operate at a resolution that allows the synthesis of knowledge across different analytical levels and case studies to be conducted in a systematic and robust manner. This has meant adopting different theoretical bodies of knowledge into the study. As explained in the literature review and methodology chapter, this is an appropriate approach as it reflects the diverse theoretical justifications for community management, that range from communitarian ideals about local determination to neoliberal scepticism of the state (Broek and Brown, 2015).

1.3 Research context – the Community Water Plus project

This research was conducted as part of the Community Water Plus research project which was funded by the Department of Foreign Affairs and Trade of the Australian Government through the Australian Development Research Awards Scheme (ADRAS). The Australian Government funded the project to a value of just over AUD$1 million with the objective to understand how effective support services for community management can be designed and funded. Focusing the study in India meant that the research could learn from a country whereby significant progress had been made in expanding rural water services in recent decades (WHO and UNICEF, 2013) but which was large enough to provide a rich diversity of different states with varying socio-economic and geographical challenges.

The project ran from March 2013 to March 2016 with Cranfield University as the lead-partner. Five other organisations were collaborating partners including four research institutions in India: Administrative Staff College of India, Centre for Excellence for Change, Malaviya National Institute of Technology and Xavier

Institute for Social Service and the IRC, a WASH 'think-and-do-tank' based in the Netherlands. The primary aim of the project was clarified as:

"Community Water Plus…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?" (Smits et al., 2015, p. 17)

The project followed a multi-case study research design which aimed to provide twenty rich examples of successful community management which would form the evidence base from which to conduct a cross-case analysis and synthesis to answer the main research question. This author was responsible for conducting this cross-case analysis and synthesis which forms the core empirical backbone to this thesis. The researcher's contribution as the led-researcher on this task involved co-authoring the overall project methodology (Smits et al., 2015), developing the fieldwork protocols (see: Appendix B), collating and harmonising the cross-case data, and conducting the overall analysis and synthesis of findings.

Beyond this the author was also the main author on two published literature reviews that provide further background to this study (Hutchings et al., 2015; Hutchings, Franceys, et al., 2016). He also led the fieldwork for one of the case studies (Hutchings, 2015) and made supporting field visits to six other case studies (Harris et al., 2016a; Javorszky et al., 2016; Ramamohan Roa and Raviprakash, 2016a, 2016b; Saraswathy, 2015, 2016a). The role of the collaborating partners has been focused on delivering the other nineteen individual case study reports. The thesis is therefore indebted to their hard work and contribution which provided a rich and unique dataset from which to build this thesis. In total across the 20 cases the project conducted 2,355 household surveys, 272 interviews and 130 focus groups. The challenge of bringing

together such a rich set of data is discussed in more detail in the methodology chapter and the fruits of that labour are presented in this thesis.

1.4 Thesis structure

Structuring a thesis that draws on such a large number of different case studies was a challenge. Various formats were considered including whether to have a detailed write-up and analysis of each case study within the main body of the thesis. Yet in the end it was considered more appropriate to concentrate on the synthesised data and arguments with a summary of each case study available via Appendix C. Based on this approach the following thesis structure was adopted:

- Chapter One 'Introduction' – is this chapter which introduces the thesis
- Chapter Two 'Rural water services and community management: concepts, history and theory' - presents the review of the 'global' community management literature. It initially focuses on providing a basic overview of concepts for studying rural water services. It then focuses on the community management literature to assess the history of the model and contemporary trends in its application linked to community management plus. It also provides an overview of relevant theoretical perspectives on community management and public service delivery that will be developed through the thesis.
- Chapter Three 'Research context - rural water services in India' – concentrates the thesis on the Indian context showing that there are different levels of economic development, human development and rural water supply coverage across the Indian states. This is linked to a number of broader structural factors at the state level including political economy tendencies and geography, which make useful stratifications for grouping case studies. An overview of Indian governance and a review of community management in the Indian context are also given in this chapter.
- Chapter Four 'Methodology' – this chapter explains and justifies the research design and methods. It explains the multi-case study research

design and the fieldwork methods for individual case studies. It then provides an overview of the cross-case analysis and synthesis approach including a review of a number of indicators which are used to compare the case studies and build the overall arguments. The chapter also discusses issues such as data cleaning and harmonisation, data analysis, research ethics, reflections on collaborative research and reflections on the limitations of the methodological approach.

- Chapter Five 'Organisational types and characteristics for successful community managed rural water services' – presents the empirical findings from the research related to research question one. It assesses the types and characteristics of organisational arrangements for successful community management in India. A comparative analysis is conducted regarding the levels of success across different set-ups. Findings are reflected back against the ideas underpinning the community management paradigm developed in Chapter Two and the concept of "institutionalised co-production" (Joshi and Moore, 2004; Ostrom, 1996) is applied to describe the close relationship between government and communities in rural water service delivery.
- Chapter Six 'The cost of good community managed rural water services' – provides a quantitative analysis of the service levels received across the case studies to validate the level of success found. It then presents a financial analysis of the cost of providing those services levels to help answer research question two on the 'indicative financial costs' of supporting community management in India. The similarities and differences in the cost sharing arrangements between communities and enabling support entities are considered with a discussion about how these relate to the cost sharing principles of the community management paradigms.
- Chapter Seven: 'Discussion - the institutionalised co-production of rural water services in contemporary India' – further develops the theoretical contribution of the thesis in terms of "institutionalised co-production" (Joshi and Moore, 2004; Ostrom, 1996) and considers its implications for

the community management and community management plus paradigms. It argues that what has been studied in India represents a distinct Indian-paradigm of community management that is shaped by the extent of decentralisation in the country and considers in more detail how and why this is the case

- Chapter Eight 'Conclusions' – develops the conclusions from the research to clarify the research's contribution, implications, limitations and consider future research.

Beyond the chapters in the main body of the thesis the Appendices provide supplementary material to the thesis. To maintain an appropriate length it was decided to include what is considered to be the most relevant information directly in this document and then provide links to publically available documents for the full supplementary information. Appendix A contains details on and links to two published literature reviews (Hutchings et al., 2015; Hutchings, Franceys, et al., 2016) which were first-authored by the researcher and which provide an even broader overview of the evidence base that the thesis draws on. Appendix B provides access to the fieldwork protocols developed by this researcher and used by various research teams to deliver the individual case studies. It also provides an overview of the household survey and the ethics approval form for the research. Appendix C provides access to the summarised overview of each of the twenty difference case studies which were drafted by this author as part of the analysis of the different case study reports. Finally, Appendix D provides further information on the data storage policy and management including links to the key databases the research analyses.

1.5 Chapter summary and contribution to thesis

This chapter has introduced the thesis by setting out the background to the research which responds to the myriad calls for the reform of community management into what has been conceptualised as the community management plus paradigm. The purpose of the research has been defined as the need to test the veracity of the key assumptions underpinning this new

paradigm and provide clearer guidance to sector stakeholders on how to structure and finance on-going support to community management. The context of the research forming part of the broader Community Water Plus project was also explained. This helped clarify the overall contribution of this author which was to deliver the cross-case analysis and synthesis of evidence from that project. Finally, the structure of the thesis was outlined.

2 RURAL WATER SERVICES AND COMMUNITY MANAGEMENT: CONCEPTS, HISTORY AND THEORY

This chapter serves two purposes. It first provides a basic overview of concepts related to rural water services which the thesis draws on. It then reviews the literature on the community management of rural water services to provide a historical overview of its emergence and the theories which underpin it. With an effort to sketch the shift from the community management approach to the community management plus paradigm, there is also a review of the evidence on what constitutes effective support services for community management. The chapter provides a general overview of these issues that brings together both academic and practice-based grey literature discussing global trends and evidence with a more focused overview of the Indian sector provided in the following chapter. The material presented augments a series of papers that the author has published on these subjects (Hutchings et al., 2015; Hutchings, Franceys, et al., 2016; Smits et al., 2015). In each instance, any elements from these papers which are directly drawn on in this literature review were originally undertaken by this author. If the author did not undertake the work directly this is clearly referenced in the text or not presented in the thesis.

2.1 Basic concepts in rural water services

In order to develop the appropriate understanding of community management, it is first useful to clarify a number of basic concepts from the literature which will be used throughout the thesis. This includes clarifying what is meant by a ‘rural water service’, which is explained in the context of a ‘service delivery cycle’ (Lockwood and Smits, 2011). Such an understanding is linked to the ‘life-cycle costs approach’ that helps categorise the different financial costs of delivering rural water services (Burr and Fonseca, 2013; Fonseca et al., 2011). This leads into a discussion about the difference between ‘access’ and ‘service levels’ as a means of measuring the level of performance associated with rural water services. The section then clarifies what the thesis considers to be ‘rural’ and also how it defines ‘community’. This helps provide a basic agreed conceptual framework from which to interrogate the literature and conduct the research.

2.1.1 Service delivery cycle and life-cycle costs

There are different ways to think about water supply. The most tangible aspect is often the material infrastructure that conveys water to people – 'the system'. Yet this thesis adopts the concept of a rural water service, which is a socio-technical configuration of technology, management entities and support services that enable the continued delivery of water to people (Fonseca et al., 2011; Lockwood and Smits, 2011; Moriarty, Butterworth, Franceys, et al., 2013). Such thinking reflects a broader shift to reject a static and narrow focus on systems and to think about services – an approach that has been labelled as the Service Delivery Approach (Lockwood and Smits, 2011; Moriarty, Butterworth, Franceys, et al., 2013). Broek and Brown (2015) have raised concerns that the use of the term 'services' represents a commodification of water, which challenges its status as a public good and a human right. Yet the adoption of the service discourse is considered appropriate because it makes explicit the way services undergo a cycle of phases that have different demands on the socio-technical configuration of technology, management entities and support services. It also aligns with the most widely used system of categorising financial costs for rural water supply – known as the "life-cycle costs approach" (Burr and Fonseca, 2013; Fonseca et al., 2011). This approach will be explained alongside the different phases of the service delivery cycle and then this issue of financing rural water services is returned to in more detail in Section 2.2.2 of this chapter.

As outlined in Figure 2-1, the service delivery cycle starts with a capital intensive phase in which physical water systems are built and management systems developed. This is labelled as the 'Implementation Phase'. This stage is often the most capital intensive, with a standard approach being where governments or other agencies build new infrastructure and support the development of institutions that will take on the on-going management of the infrastructure (RWSN, 2009). During this implementation phase the financial investment required to build the infrastructure will be referred to as 'Capital Expenditure (CapEx) on hardware' whilst the financial investment needed to support the development of the management entity, such as training community

members to be members of a water committee, will be referred to as ‘CapEx on software’. In both cases CapEx is a ‘lumpy’ one-off investment rather than a recurrent cost (Fonseca et al., 2011).

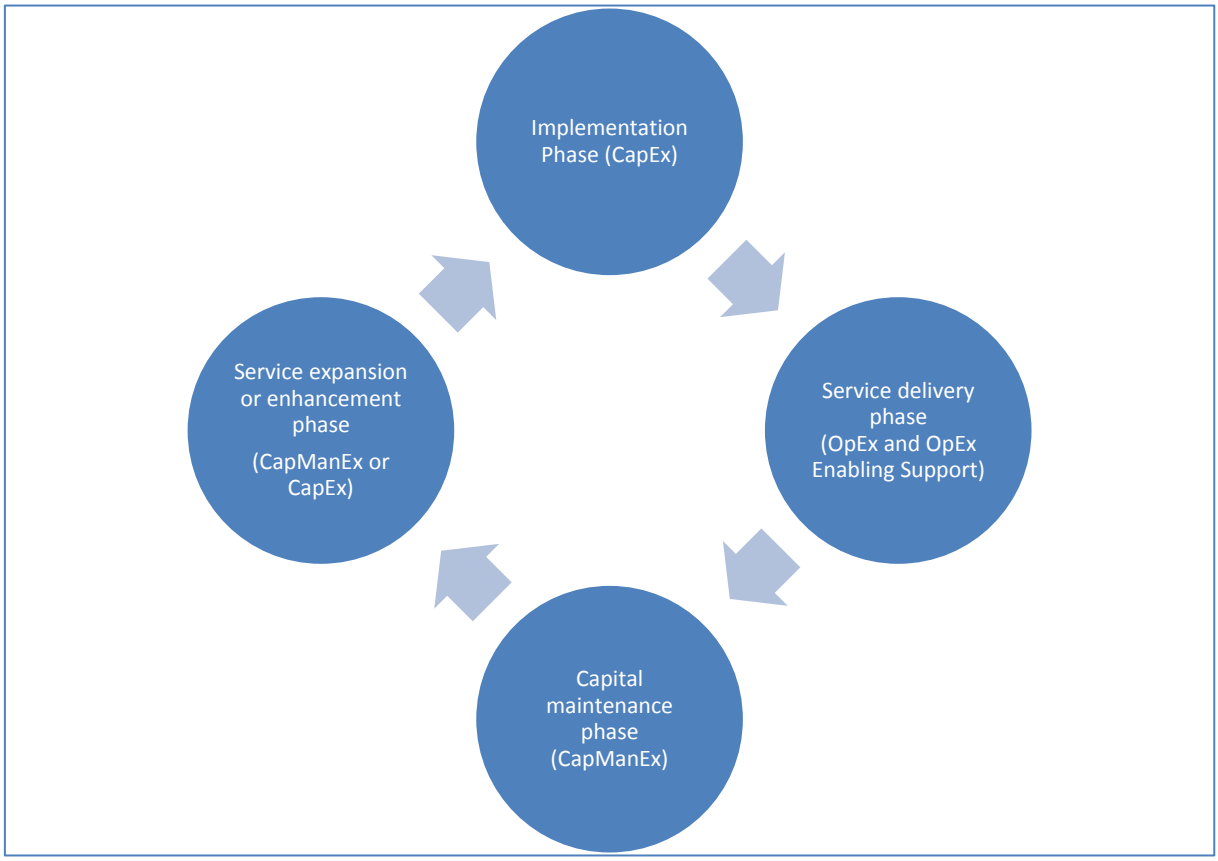

Figure 2-1 Phases in the service delivery cycle with associated cost categories in brackets (adapted from Smits et al. 2015)

Implementation is followed by what is labelled as the ‘service delivery phase’, in which the targeted population receives the desired water supply. The physical water system has to be operated and maintained by a service provider, including suitable administrative activities and, ideally, on-going support by support agencies (Lockwood and Smits, 2011). In this stage, the financial investment required is an on-going recurrent cost, rather than a lumpy one-off investment (Fonseca et al., 2011). Two recurrent cost categories are used to describe this investment including ‘Operating and Minor Maintenance Expenditure’ which covers routine maintenance and items such as labour, fuel, chemicals, materials and regular purchases of bulk water. These are usually the

costs directly incurred by the service provider. In this thesis, the other cost category is termed ‘OpEx Enabling Support’ which includes the investment in the support activities conducted beyond the core service provision tasks, such as monitoring service provider performance and on-going capacity building of service providers.

The service delivery phase is usually clearly defined within many rural water supply programmes but it is the next stage, known as the ‘Capital Maintenance Phase’, in which problems often occur (Bakalian and Wakeman, 2009; Fogelberg, 2013; Harvey and Reed, 2006). This capital maintenance stage usually comes a number of years after the implementation phase although an issue here is that it is hard to discretely define (Lockwood and Smits, 2011). Essentially, it occurs when physical assets or institutional systems reach the end of working lives and need to be replaced or renewed to ensure continued service delivery. When such a situation occurs there is a need to invest in Capital Maintenance Expenditure (CapManEx) which covers maintenance beyond the routine investments incurred during the service delivery stage. Again, CapManEx can be in the form of hardware or software investments reflecting the fact that both technology and management systems can degrade. The final stage in the service delivery cycle is labelled the ‘Service Expansion and Enhancement Phase’ and recognises that services should be reviewed as fit for purpose and appropriately adjusted. The phase occurs, hopefully some years after initial implementation, when a significant upgrade of the physical or institutional system is required, either to expand it as both populations and need grow, or to enhance it to improve the level of service delivered. The cost categories associated with each stage are further clarified in Table 2-1 below. Together, this service delivery cycle and associated cost categories represent a way to conceptualise a lasting rural water service. It is considered especially important in this research context because it provides a framework for comparing how types of support services and organisational arrangements vary at different stages of the cycle.

Table 2-1 - Definitions of life-cycle cost categories (Adapted from Fonesca, 2011 and Smits et al. 2015)

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.
Operation expenditure enabling support (OpEx Enabling Support)[2]	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. It could also include elements of 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. However, these are usually hard to define.
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.

2.1.2 Service levels and access

This section is about how to think about successful performance in the context of rural water services. It is an important topic as a core claim of the research methodology is that the study is synthesising evidence from successful examples of community managed rural water services and hence the research

[2] This category has been adapted from the Expenditure on direct support (OpexpDS) and Expenditure on indirect support (OpexpIDS) in the life-cycle costing approach. This is because during the WASHCost research there was extremely limited data available on OpexpIDS and therefore it becomes useful to consolidate it together into an overall OpEx Enabling Support category.

needs to validate the level of success studied. The dominant measure of success in the global water sector is the demarcation between “improved drinking water sources” and “unimproved drinking water sources” used to assess progress towards the MDGs and now the SDGs (Clasen, 2012). At the core of the JMP is a classification that certain types of drinking water sources are more prone to contamination by faecal matter by the nature of their design than others – for example, an unprotected open well is considered unimproved whilst a borehole-fed piped system is considered improved (WHO and UNICEF, 2013). This indicator is based on a probabilistic understanding of the level of service a population receives from certain types of water source (Hutchings, Parker, et al., 2016)[3]. Yet it has been shown to significantly over estimate the number of people around the world with safe and sustainable water supply (Clasen, 2012). Based on analysis of over 10,000 household surveys across India and three African countries, one piece of research assessing the service levels from improved water sources, concluded: “even where communities appear in national or international databases as having access to an improved water source and therefore as “covered”, most people who live there do not receive a minimum basic level of service” (Burr and Fonseca, 2013, p. 1).

This quote juxtaposes the measure of access with the concept of a service level. At a basic level, a service level refers to the characteristics of the actual flow of water users receive from a water service (Burr and Fonseca, 2013). In most situations the definition for such characteristics is set by the governing authority of a country or region – in the context of India this is set out in the National Rural Drinking Water Programme guidelines (Government of India, 2013a). This represents the normative service level of a country and service providers are mandated to provide services that reach these characteristics.

[3] For a discussion about the dangers of technologically determinism in rural water supply please see the (Hutchings, Parker, et al., 2016) paper which was authored by this researcher.

The specific elements of a service level usually relate to the quantity, quality, accessibility, continuity and reliability of water services. To measure the level of success in the case studies this research therefore adopts the service level approach and specifically the Service Level Ladder developed by Snehalatha et al. (2011) for assessing service levels in India. The service levels displayed in Table 2-2 relate to Government of India norms, which in turn are set to reflect evidence on what factors impact whether services delivery safe and acceptable services to targeted populations (Government of India, 2013a). The score of basic in Table 1 for each parameter equates with the normative service level prescribed by the Government of India, whilst the other stages in the ladder are designed to provide greater granularity and understanding about the level of service populations receive. How the measurement of these factors will be incorporated into the study is discussed in Chapter Four but for now the concept of a service level has been explained as the ultimate measure of whether a rural water service can be considered successful.

Table 2-2 Service ladder for India (Adapted from: Snehalatha et al., 2011; as presented in Smits et al. 2015)

Service level	Quantity (lpcd)	Accessibility (cumulative time spent per day by the family on fetching water)	Water quality: perception	Continuity (hours/ day)[4]	Reliability: piped supplies	Reliability: handpumps
High	> 80 lpcd	0-10 minutes per day	Good	> 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	< 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			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.

2.1.3 Community service providers and enabling support entities

This researcher is aware that there are different models for delivering rural water services that can involve varying constellations of actors. Lockwood and Smits (2011) have produced a visual overview of different service delivery models, as presented in Figure 2. What this figure suggests is that there is a hierarchy in the professionalisation of service delivery models that range from self-supply – whereby households invest in and manage water services independently of any support (Sutton, 2008) – to what could be described as an

[4] For piped water supply only.

urban-utility model – whereby a fully professionalised organisation manages services in a financially sustainable manner based largely on user fees. This study recognises this diversity but is focused exclusively on community management as it is the dominant and most common management approach in low and lower middle income countries for rural areas (Broek and Brown, 2015). As the figure indicates, the research recognises that management models can overlap and that hybrid systems can develop. It is these conceptually blurred areas of overlap, particularly between direct local government providers and community management that this research will consider in more detail later in the thesis.

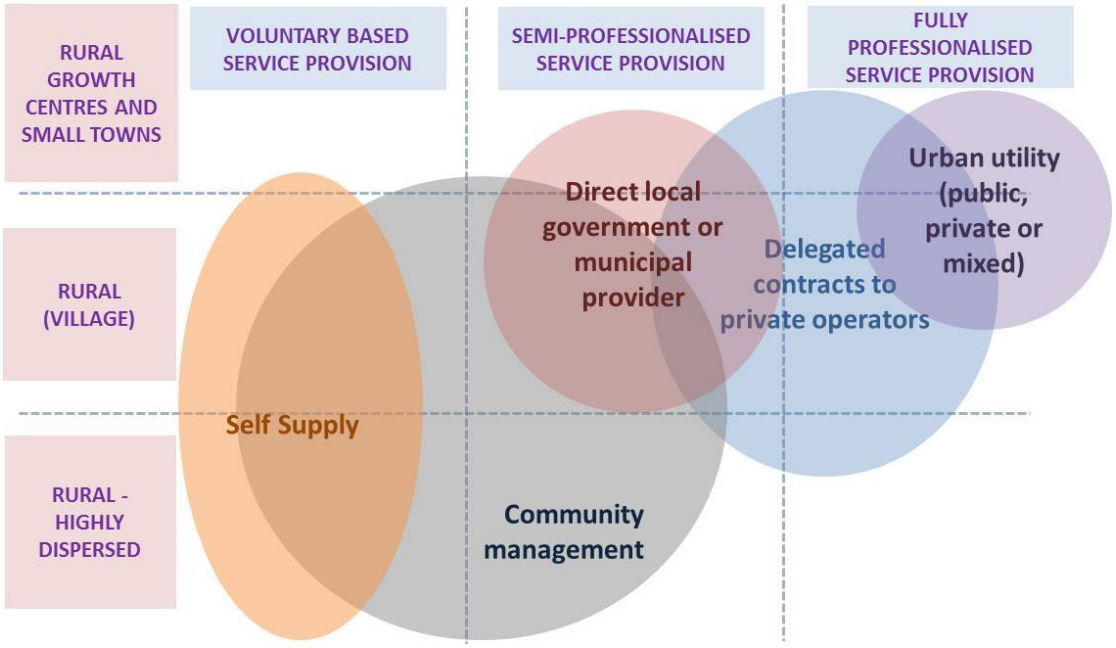

Figure 2-2 - Service Delivery Models (adapted from: Lockwood and Smits, 2011)

For now it is useful to clarify a distinction between two layers of organisations that operate within the community management model. This includes the service provider level, which is the organisation(s) *"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" (Hutchings et al. 2016, p.27). Within an urban utility context the entity undertaking such tasks could be called an operator but as this research is focused on community management, the service provider will be referred to as the 'community service provider'. Under the Government of India (2013a) National Rural Drinking Water Programme (NRDWP) it is mandated that the community service provider should be a community committee know as a Village Water and Sanitation Committee, which will be discussed in more detail in the following chapter.

It is now widely argued that the community service provider should be recurrently supported and monitored by a range of other organisations (Bakalian and Wakeman, 2009; Baumann, 2006; Kleemeier, 2000; Lockwood and Smits, 2011; Lockwood, 2002, 2004; Smits et al., 2013). These organisations will be known as the 'enabling support environment' that can provide support to and monitor the performance of the community service provider. The purpose of the enabling support environment will be explained in greater detail later in this chapter but it is succinctly summarised in the joint-authored Smits et al. (2015, pp. 22–23) paper as: *"The main objective of such support is to help communities in addressing issues they cannot reasonably solve on their own and gradually improve their performance in their service provider functions."* Although there is a strong consensus that this type of support is important to ensure sustainable and successful community management, there remains a lack of understanding about how to best structure and finance such support (Mcintyre et al., 2014; Smits et al., 2011). This research is designed to fill such a knowledge gap which will be investigated further in the reminder of this literature review. However, for now, the concept of community management involving two layers of community service providers and enabling support environments is an importance conceptual building block of the research.

2.1.4 Rurality and communities

This research focuses on the community management of *rural* water services but in practice the difference between an urban and rural area is not an easy thing to define. The UN Statistics division has no agreed upon definition of what is rural as it varies from country to country but cites a number of factors conventionally associated with defining it, including the population size of a settlement, population density and the proportion of households employed in certain sectors, for example,. agriculture (United Nations, 2016). In an age of substantial population growth and urbanisation around the world, defining an area as 'rural' is arguably becoming even more difficult (Danert and Flowers, 2012). It is easy to conceive of a scale of rurality ranging from very small hamlets with tens of households to concentrated rural growth-areas that can have many thousands of households, especially on the borders of urban areas (Danert and Flowers, 2012). This research does not attempt to navigate the debate about rurality in great detail but is aware of the contested nature of the definition. It simply accepts the definition of rural that is adopted by Ministry of Statistics and Programme Implementation of the Government of India, which defines rural areas as all areas that do not meet the following criteria of an urban area:

The urban area of the country was defined in 1971 census as follow: (a) all places with a municipality, Corporation or Cantonment and places notified as town area (b) all other places which satisfied the following criteria: (i) a minimum population of 5000, (ii) at least 75 percent of the male working population are non-agriculturists, and (iii) a density of population of at least 1000 per sq. mile (390 per sq. km.)…The rural sector covers areas other than the urban areas. (Government of India, 2001, pp. 5–6)

Based on this definition a core aspect of rurality in India is the governance system. As indicated in the quote, urban areas tend to have municipality, corporation or cantonment governance systems. Yet the system of governance for rural areas is through the 'Panchayat Raj Institutions' (PRI) (Banerjee, 2013; Government of India, 2015a). This is a three tiered system of local self-government with elected officials at the village, block (a sub-district administrative unit) and district levels. The PRI system will be discussed in greater detail in the following chapter.

For now it is useful to clarify that the lowest governance unit of the PRI is known as the Gram Panchayat and in 2013 there were 238,617 different Gram Panchayats that were made up of almost 600,000 villages (Government of India, 2013b). The approximate 3 to 1 disparity between the number of Gram Panchayats and villages show there is a distinction in scales. Yet, due to the way the National Rural Drinking Water Programme (Government of India, 2013a) and past policies (Government of India, 2003) have scaled community management in correspondence to the local self-government system, the Gram Panchayat is the most common unit described as a village in most states for rural water services. The research therefore adopts the existence of a Gram Panchayat as both representative of a rural area and also as the standard definition of a village (unless otherwise clarified).

It is recognised that there is a conceptual distinction between the terms village and community, with an extensive socio-theoretical literature that discusses the concept of 'community'. (for example, for a seminal paper from the pyschological literature see: McMillan and Chavis, 1986). Here, the intention is not to review that broad literature but rather to focus on how community is defined within the context of rural water services. One definition quoted from a practitioner handbook is:

"A group of people bounded by geographical links, such as a village, settlement or district, politics or natural boundaries but also includes those brought together by lifestyle, culture, religion, hobby and interest."

(Wasonga et al. 2010, p. 167 as quoted in Broek and Brown, 2015, p.52)

In the context of rural water services the term community is invariably used as merely another word for a geographically bounded group of people, normally a habitation or village. This is because of the materiality of the water infrastructure which will provide services within a given area. As explained, in India the boundaries of this geographical unit are defined by the administrative boundaries of the Gram Panchayat. In this sense, this thesis will use community to indicate the people living within a geographically defined area which is conventionally at the scale of a Gram Panchayat.

2.1.5 Summary of basic concepts for rural water services

This section has provided an overview of how the thesis understands a series of basic concepts related to the research problem. It has explained that rural water supply is conceptualised as a service that undergoes a continuous cycle of change, rather than as a static system. Under the community management model a community service is the organisation that delivers this service but is supported by an enabling support environment. Although the concept of access is important in assessing performance in rural water services it is only a crude measure and therefore this thesis adopts the concept of service levels as more granulated measures of success in service delivery. Finally, the section has clarified that rural areas in India can be defined by the governance system in place and that communities are considered geographically bounded groups of people living together who can be supplied water together, usually living within the unit of the Gram Panchayat.

2.2 Community management for rural water services

Building on the previously described understanding of rural water services, this section now interrogates the literature on the community management of rural water services. It places an emphasis on what is loosely described as as the global literature on community management noting that a more specific review of the Indian context is provided in the following chapter. It begins with a review of the history of community management, its problems with financial sustainability and the types of support found in community management plus. It then moves to more theoretical territory to consider how community management links to ideas about collective action and public service delivery.

2.2.1 A brief history of community management for rural water services

In order to understand the community management approach, it is useful to trace its emergence to becoming the dominant service delivery option for rural water services. Around much of the low and lower middle income world in the period from roughly the 1950s to the 1980s the norm was for a “top-down state-

led paradigm for water provision" (Broek and Brown, 2015, p. 116; McCommon et al., 1990; Paul, 1987). Initiatives such as the *Accelerated Rural Water Supply Programme (1972)* from India reflected this approach with government directly funding Public Health Engineering Departments to construct infrastructure in a supply-driven model (James, 2004). These types of public agencies proved effective at constructing infrastructure but these were failing *"nearly as quickly as they were being built"* leading to concerns particularly among donors who were supporting the sector that money was being wasted (Churchill, 1987). Sauders and Warford (1976, p. 198) summarised one of the central problems: *"The major problem associated with providing water supplies in rural areas of lower income countries relates to the operation and maintenance of systems."* In this sense, the problems associated with the supply-driven paradigm reflect the ones that sector faces today – the on-going management of services was the critical failure point.

More broadly, the 1970s was a period in which there was growing scepticism about state planning to solve rural people's problems (Scott, 1998). The decade saw the emergence of the "appropriate technology" paradigm *(Schumacher, 1973)* for rural development which advocated shifting beyond complicated and expensive infrastructure to focus on low-cost solutions that could be managed more effectively by local people (Black, 1998). Within the water sector, such thinking was adopted internationally in the 1977 Mar Del Plata UN Conference on Water and was propagated throughout the 1980s *UN International Decade for Drinking Water and Sanitation* (McCommon et al., 1990). At the core of policy shift was the principle to provide more appropriate technology but also to shift the responsibility for operation and maintenance *to* rural communities and away from the cumbersome state (Schouten and Moriarty, 2003).

Such an idea was attractive in part because it paradoxically responded to the two dominant ideological positions that influenced the international development community during this period (Blaikie, 2006; Broek and Brown, 2015; Harvey and Reed, 2006; Moriarty, Butterworth, Franceys, et al., 2013). This included what Broek and Brown (2015, p. 51) describe as left-wing "grassroots post-

Marxist developmentalists" and right-wing market-orientated neoliberals. Both groups were in favour of promoting local control and rolling back the state, although they justified this from different perspectives (Chowns, 2014). With the political left keen to avoid what they perceived to be the corrupt state and market; and, the political right seeking to reduce the size of the state by promoting a stronger community role (Blaikie, 2006; Harvey and Reed, 2006).

Such ideological justifications were only part of the story, however. The notion that water supply infrastructure could be constructed and then handed over to communities also appealed to the structural set-up of the development industry (Harvey and Reed, 2006). Short project cycles were favoured by NGOs and donors who could undertake implementation and then pass responsibility to communities with little or no on-going support (Lockwood, 2002, 2004). Community management can therefore also be described as a strategy through which international donors and NGOs could bypass what they deemed to be inefficient (domestic) government agencies in low-income and lower middle-income states and work directly with rural communities (Harvey and Reed, 2006).

The exact configuration of community management varied over time and setting. In Sub-Saharan Africa, where handpumps are particularly common, the community management model often became equated with the acronym of Village Level Operation and Maintenance (VLOM) (Colin, 1999). These relatively low-maintenance technologies would be installed sometimes in remote villages and communities would be trained to undertake maintenance work when required. However, sustainability problems remained as key assumptions that the VLOM model relied on, such as the private sector being an effective route for accessing spare parts, often did not materialise (Hankin, 2011).

In many settings, however, the community management paradigm became aligned with the neoliberal call for demand-driven public service provision (Broek and Brown, 2015). In this form it became known as the demand-responsive approach (DRA) to community management which is considered the

declared approach of many governments, donors and NGOs today (Marks and Davis, 2012; Moriarty, Butterworth, Franceys, et al., 2013; Whittington et al., 2009). The DRA follows the principle that water services should be delivered where demand exists and equates this with a willingness-to-contribute to the implementation costs and cover the operation and minor maintenance costs through tariffs during the service delivery phase (Schouten and Moriarty, 2003). It has been described as the 'declared' approach because in practice rural communities rarely cover the full recurrent costs of water services (Burr and Fonseca, 2013). This means there remains a significant problem with the financial sustainability of community management (and rural water services, more generally), which will be the focus of the next section.

2.2.2 Financial sustainability and community management

Water services, like all public services, cost money. The UN-Water Global Analysis and Assessment of Sanitation and Drinking Water report makes clear that there are three sustainable sources of finance for water services in low and lower middle income countries. These are known as the 3Ts (tariffs, taxes and transfers): *"(a) the monies paid by the users of the services ("tariffs"), (b) the monies provided by domestic taxpayers through governments ("taxes"), and (c) the monies provided by foreign countries ("transfers") (UN Water and WHO, 2014).* Getting the right mix of these 3Ts is of "strategic importance" in terms of delivering sustainable services (OECD, 2009) yet it remains one of the biggest challenges (Burr and Fonseca, 2013; Hutton and Varughese, 2016; Hutton, 2013; Hutton et al., 2007). At the global level it is estimated that capital financing of $114 billion per annum would be required to achieve the SDG for water supply (universal coverage of safely managed water supply), which is three times the current investment levels (Hutton and Varughese, 2016).

However, the greater challenge relates to the growing operation and maintenance costs[5] (Baumann, 2006; Briscoe and Malik, 2005), with these becoming a larger annual cost than capital investment during the fifteen year period between 2015 and 2030 (Hutton and Varughese, 2016). They are set to rise from around $18 billion to $128.8 billion over that period (Hutton and Varughese, 2016) (this is a combined estimate for water and sanitation services as the data is not available at the granularity of just water supply but this illustrates the magnitude of increase).

In this context, a basic tenet of the DRA to community management is that user tariffs should cover the operation and maintenance costs of rural water supplies and users should contribute 10% of the capital costs (Joshi, 2003). Taxes or transfers should then cover the remaining 90% of the capital costs with the belief that as countries get wealthier (like India has been getting in recent decades) a greater proportion of capital costs will be covered by domestic tax (Franceys and Cavill, 2011). Yet research has shown that user tariffs rarely cover even basic OpEx costs and even more rarely cover the full recurrent costs including CapManEx (Burr and Fonseca, 2013; Moriarty, Butterworth, Franceys, et al., 2013; Ratna et al., 2010). In a review of the costs of rural water services for UNICEF, it was concluded:

"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...There is no evidence in the literature to suggest that these costs can be funded through user charges." (Franceys and Cavill, 2011)

The available evidence suggests that users cannot cover operation and maintenance costs at the magnitudes required and with these costs due to

[5] Adopting here the terminology used in the latest Water and Sanitation Program Technical Paper (Hutton and Varughese, 2016) that does not distinguish between OpEx, OpEx Enabling Support and CapManEx but rather combines into a broader category labelled Operation and Maintenance.

substantially increase over the coming years this is likely to become an ever growing problem (Burr and Fonseca, 2013).

The described situation points to a fundamental flaw in the logic of the DRA to community management – that rural people in low and lower middle income contexts will consistently have the 'willingness-to-pay' for water services at a sustainable level. The rationality of focusing on willingness-to-pay – as a proxy for the concept of 'demand' – can be summarised as: *"If people are willing to pay for the full costs of a particular service, then it is clear indication that the service is valued (and therefore most likely to be used and maintained) and that it will be possible to sustain and even replicate the project"* (Whittington et al., 1990, p. 294).

However, willingness to pay is variable between and within communities and is often not at the required level (Marks and Davis, 2012). There is evidence that there is a threshold effect in terms of effective demand with service levels having to be sufficiently high for users to pay (Fonseca, 2014; Koehler et al., 2015). Moreover, there is recent evidence that communities have a lower willingness to pay for community managed services than service delivery option (Hope, 2015). Even if there is some evidence that rural water service users are willing to pay a tariff at some level, the most fundamental problem is that it rarely covers the actual operation and maintenance costs of supply leading to sustainability problems in the service delivery cycle (Franceys and Cavill, 2011; Franceys et al., 2016; Marks and Davis, 2012).

With this identified ambiguity in the financial sustainability of community managed rural water services, this section now briefly considers the available evidence on the costs of rural water services. A global research project supported by the Bill and Melinda Gates Foundation called the "WASHCost project (2008-2013)" provides the most comprehensive dataset on these issues (Cross, 2013). It also uses the cost categories adopted in this thesis so enables direct comparison with the empirical findings reported later. The research involved fieldwork in four countries – India (Andhra Pradesh state only), Ghana, Burkina Faso and Mozambique (Mcintyre et al., 2014) – and provides an

estimated cost of services at the per person level (converted to 2014 costs for comparison with the data from this study using World Bank inflation rate for mid-2014 USD (World Bank, 2016a)). The costs provided were based on the data from schemes where the majority of people received accepted service levels but as explained above this represents only a minority of water systems they investigated with the "vast majority" not delivering acceptable service levels. They also adopted a lower service level benchmark for quantity than will be used in this research (20 litres per capita per day (lpcd) versus Government of India norms of 40 lpcd). Despite these differences the data presented is considered to be the most relevant international benchmarks to compare findings from this research to.

Table 2-3 - Estimate of costs for rural water services (adjusted to 2014 prices from Burr and Fonseca, 2013)

Cost category	Technology	LIQR[6]	UIQR
CapEx (per person)	Borehole - handpump	$21	$62
CapEx (per person)	Small piped schemes up to 5,000 people	$31	$132
CapEx (per person)	Intermediate and large piped 5000+	$21	$153
Recurrent costs (per person per year)	Borehole - handpump	$4	$7
Recurrent costs (per person per year)	Piped schemes	$4	$16

Table 2-3 above shows the inter-quartile range of the cost of services by different technical-modes of supply (Mcintyre et al., 2014). Whilst as would be expected costs vary depending on the technical-mode of supply, the most relevant finding is the range of costs reported in each category which suggests there is a low degree of standardisation in the cost of rural water services. Overall the recurrent costs are estimated to be 1-8% of the initial capital outlay with the costs higher for piped water supply schemes than handpumps. The WASHCost project provided greater granularity on the recurrent costs of

[6] Due to the variability of the data from the WASHCost study the data was presented as benchmarks based on the lower and upper interquartile ranges.

services, which is presented in Table 2-4. In the context of the community management plus emphasis on the enabling support environment for rural water services, this gives the range of costs for the OpEx Enabling Support category between $1 and $3 per person per year.

Table 2-4 - Estimate of recurrent costs for rural water services (adjusted to 2014 prices from Burr and Fonseca, 2013)

Recurrent Costs	Handpump		Piped schemes	
	LIQR	UIQR	LIQR	UIQR
OpEx	$0.5	$1.1	$0.5	$5.3
CapManEx	$1.6	$2.1	$1.6	$7.4
OpEx Enabling Supportr	$1.1	$3.2	$1.1	$3.2
Total Recurrent	$3.2	$6.3	$3.2	$15.8

Focusing on the India-specific data as presented in Burr (2015) from a dataset of 5,000 household surveys in Andhra Pradesh, we can see the ranges are on average lower than the international context, as shown in Table 2-5. This reflects the lower operating costs that are often associated with the Indian water sector compared to Sub-Saharan Africa countries (Mcintyre et al., 2014). Lower operating costs are largely due to comparatively lower labour costs and more developed supply chains, among other factors. Such differences should be accounted for to some extent by the Purchasing Power Parity (PPP) conversion into US dollars that was used within the WASHCost project (and will be used in this research) but notwithstanding this conversation India still retains a comparatively lower operating cost (Burr and Fonseca, 2013). Overall, the India-specific benchmarks for piped water supply range from around $20 to $80 per person, with the total recurrent costs reported between $0.2 to $2.5 per person (Burr, 2015). The research found data on recurrent costs hard to come by in India especially for CapManEx (Burr and Fonseca, 2013).

Table 2-5 - Costs of rural water services in Andhra Pradesh, India (Burr, 2015)

Service delivery model	*CapEx*		*OpEx*		*CapManEx*	
	LIQR	*HIQR*	*LIQR*	*HIQR*	*LIQR*	*HIQR*
Handpump	$16	$46	$0.0	$0.0	$0.0	$0.0
Single-village scheme (mechanised borehole)	$23	$49	$0.2	$0.3	$0.0	$1.2
Single-village scheme (household connections)	$38	$66	$0.5	$1.5	$0.0	$1.0
Multi-village scheme	$26	$53	$0.4	$1.8	$0.0	$0.6
Mixed piped supply	$38	$81	$0.7	$2.2	$0.0	$0.5

This section has reviewed the literature on financing rural water services showing that getting the financing rights remains a major challenge to achieving the SDGs. The particular cost sharing arrangements for the DRA for community management were explained that include user tariffs covering 100% of operation and maintenance costs. The evidence suggests that this is rarely met and is a likely cause of low levels of sustainability. A series of benchmarks were given that are considered to reflect useful guidelines for the level of financing required to deliver sustainable services.

2.2.3 Next generation trends in community management – toward the "plus"

Beyond the problems with financial sustainability, the community management approach can be placed as a subset of a broader movement that can be summarised as the 'participatory turn' in development thinking (Chambers, 1983, 2008). This concept of participation has been the subject of a vast and often highly critical literature (Brown and Ashman, 1996; Cleaver, 1999; Cornwall and Brock, 2005; Hickey and Mohan, 2005; Mansuri and Rao, 2004). It is a contested term which has been criticised as a meaningless "development buzzword" (Cornwall and Brock, 2005) that too often becomes materialised as a "managerial exercise" (Cleaver, 1999). Yet the concept of participation, however it is defined (an issue tackled below), is part of the justification for community management (Harvey and Reed, 2006) especially in the early literature (McCommon et al., 1990; Paul, 1987).

Some research has shown that a high level of community participation is associated with successful rural water services (Paul, 1987; Prokopy, 2005). However, it has also been shown that the ability to participate is uneven across communities and a focus on participation often leads to patronage (i.e. a reinforcement of the existing, often unequal, power relations found in rural communities) (Chowns, 2014; Isham et al., 2002). More generally, the prevailing levels of unsustainability in services in places such as Sub-Saharan Africa where participation has been a policy focus has led to an increasing scepticism about the relationship between highly participatory rural water services and the long-term sustainability of services (Broek and Brown, 2015; Jones, 2011; Marks and Davis, 2012).

This thesis positions participation as a still untested assumption that underpins the initial community management paradigm and therefore will seek to measure it within the research. For this purpose, the research tracks the definition of participation back to its popularisation within the community development movement in the United States of America in the 1960s. Sherry Arnstein defines it as a "categorical term for citizen power" and proposed a ladder that reflects the different degrees of participation that citizens can have in a planning and development process (Arnstein, 1969). Similar ladders have been developed for measuring participation in development projects (Bolt and Fonseca, 2001; Dayal et al., 2000; Deverill et al., 2002; Lammerink and de Jong, 1999). In the next methodology chapter, such a ladder is adapted to help measure the degree of decision-making power that community institutions have in different stages of the service delivery cycle. For now, it is important to note that the "participatory turn" has fundamentally shaped ideas around appropriate development in rural areas although it is an increasingly questioned condition for success, especially in the more recent literature.

Instead, in the contemporary practice-orientated literature, there is growing focus on the perceived importance of professionalising service delivery (Le Gouais and Webster, 2011; Lockwood and Smits, 2011). Professionalisation is about moving the community management model from one that relies on

community members volunteering time and using ad hoc management techniques, to a model whereby properly qualified, paid-for-staff complete the operation and maintenance tasks, but decision-making power remains within an appropriate community institution (Lockwood and Smits, 2011). The professionalisation of rural water services has been associated with a shift to the private sector away from community management (Le Gouais and Webster, 2011). This thesis rejects that as being necessarily true and instead hypotheses that professionalisation can happen within the community management model based on a number of potential forms:

- *"The adoption of good business practices, such as billing, book keeping and auditing, systematic carrying out operation and maintenance 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 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 Gracia, 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." (Smits et al.* (2015, pp. 22–23)

The emphasis on professionalisation rather than participation in community service delivery is considered to reflect a shift in thinking towards a community management plus approach. The research will therefore attempt to test whether the shift to professionalisation is reflected in the Indian landscape.

The call for professionalisation is also considered to be part of the same movement that advocates a shift towards more structured support services to communities throughout the service delivery cycle (Bakalian and Wakeman, 2009; Baumann, 2006; Kleemeier, 2000; Lockwood and Smits, 2011; Lockwood, 2002, 2004). This often practice-orientated literature suggests the major challenge in contemporary community management is about how to institutionalise this more bipartite sense of responsibility between communities and support agencies. This section now presents the evidence collected as part of a systematic review into the success factors found in successful community

managed rural water services programmes around the world (Hutchings et al., 2015- the full paper is provided via Appendix A). The study compiled case studies largely from the grey literature from 1980 to 2010 scanning over 2,544 potential cases of community management in low and lower middle income countries. This led to a sample of 174 case studies that was refined down to 72 of the most successful case studies of community managed rural water supplies for further interrogation to understand the basis for success in community management.

Focusing on the types of external support provided across the cases, as shown in Figure 2, the review showed that direct financial and/or material support is found in over 90% of successful community management programmes. Other common forms of support were capacity building of management and capacity building of technical skills. The study showed that there was not much standardisation in the support services with many case studies not documenting such support despite being reported as successful cases of community managed rural water services.

This demonstrates that there have been many cases of successful community management that do not follow the community management plus model which are still successful. The systematic review also highlighted the importance of what can be described as ‘internal community plus’ factors which were characteristics of communities where successful cases were found. These highlighted characteristics that were classified as collective initiative, strong leadership and institutional transparency at the community service provider level (Hutchings et al., 2015). This raises an important point that although much focus in the contemporary community management literature has been the discussion of external support, the characteristics and contexts of communities are still likely to have a significant impact on success in service delivery.

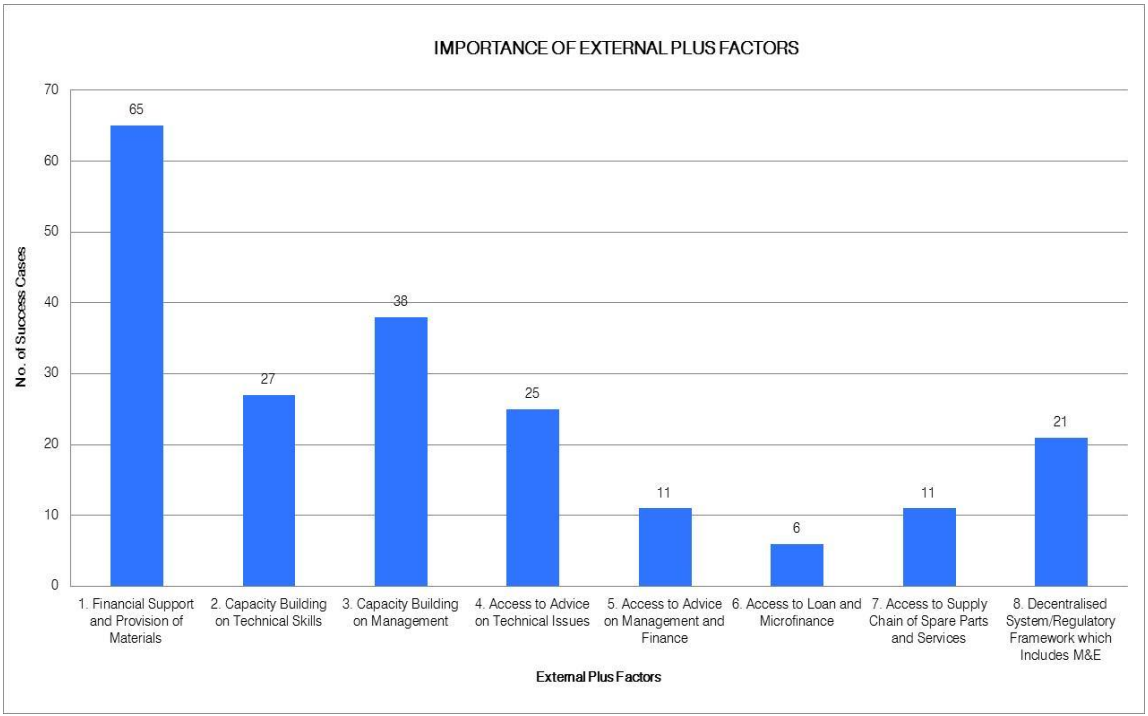

Figure 2-3 - External support functions provided in the most successful cases of community management (Hutchings et al. 2015)

This section has explained a number of contemporary trends in the community management literature. It has highlighted the link with the 'participatory turn' in development which is increasingly called into question, then focused on the perceived importance of professionalisation and support to community service delivery. Such factors are considered to reflect some general hypotheses that need further investigation, as clarified at the end of this chapter.

2.2.4 Theorising contemporary trends in community management

This section attempts to shift this chapter to more theoretical territory in an attempt to introduce some new concepts to the community management literature that are considered useful for theorising the contemporary trends above. It begins, however, by explaining the conventional links that are often made with the literature on the community-based management of natural resources (CBMNR). There is a considerable body of work that can be described under CBMNR that uses different labels such as community-based resource management (Armitage, 2005; Blaikie, 2006; Leach et al., 1999) and

common-pool resource management (Blaikie, 2006; Dynamics and Berkes, 2006).

At the core of these works is the management of “the commons” which can be described in the terminology of economics as common-pool resources that are non-excludable and rivalrous (Agrawal and Gupta, 2005). This means that people cannot be excluded from using them but each individual can potentially damage the overall value of the resource – they usually refer to resources such as forests or animal grazing grounds. The basic problem the literature engages with can be characterised as the “collective action problem” – for example, it investigates whether communities can avoid free-riding by individuals within their group (Olson, 2002; Ostrom, 1990, 2010). Hope (2015) argues this literature has been key to challenging the notion that community management is an effective and apolitical strategy for managing natural resources and by extension has fed into the broader critique of community managed rural water services.

The most famous perspective to emerge from this body of literature is Elinor Ostrom’s work “*Governing the Commons: The Evolution of Institutions for Collective Action”* that has developed a positivist model of institutional analysis (Ostrom, 1990, p. 25). Through this and subsequent work Ostrom developed eight design principles that typified successful collection management systems (Cox and Arnold, 2010; Ostrom, 1990). The principles were to have clear boundaries between users and non-users, adapt rules to local conditions, enable participation in decision making from users, monitor and sanction users and non-users who deviate from the rules, have a constitution and link local governance within a broad nest of institutions (Ostrom, 1990). A more recent review of 91 case studies of collective action problems, concluded that that the efficacy of the eight generalisations continue to be empirically supported (Cox and Arnold, 2010). The work can be considered a cornerstone of the CBMNR literature and has since been developed, tested or critiqued in a considerable number of works (Agrawal and Yadama, 1997; Cleaver, 2012; Cox and Arnold, 2010; Dynamics and Berkes, 2006).

This type of thinking has been linked with the management of rural water services in other studies (Chowns, 2014; Jones, 2015) in part, it is contended, because they provide theoretical and methodological approaches for understanding the functioning of community institutions. This thesis positions this approach as being more appropriate for studying early ideas about the community management approach. In the context of studying the on-going support of external organisations beyond the immediate community, it is argued that it is more useful to consider community management as an *organisational arrangement* for delivering public services rather than a collective action problem. As such it is argued that there is value in bringing in the literature on (unorthodox) public service delivery (Bovaird et al., 2015; Cepiku and Giordano, 2014; Joshi and Moore, 2004)

From this perspective the community management of rural water services could be said to share more parallels with the New Public Management movement that sought to reduce the role of the state and improve performance outcomes in public service delivery (Hood, 1995; Leftwich, 1993; De Vries and Nemec, 2013). Whether the participatory ideals that partly underpin community management make it distinct from the New Public Management movement (that is often associated with neoliberalism and privatisation (Hood, 1995)) is open to debate. However, the shift to community management is considered to be at least part of the broader shift away from standardisation in public service delivery that occurred from the 1980s onwards in many parts of the world (De Vries and Nemec, 2013).

Reviewing the 'standard' public service delivery options in developing countries, Joshi and Moore (2004, p. 144) propose the following basic options:

"Self-provisioning through collective action, independently of external agencies…Direct social provision through private associations. In almost every part of the world there is a long tradition of providing basic services through private associations, notably religious organisations…Direct market provision, on a commercial basis…Direct social provision through state agencies...Indirect state provision, through sub-contracting of delivery responsibility to other agencies."

Yet they note how researchers are increasingly raising concerns about the deficiencies of these distinct typologies in the context of the increasing

"permeability of the public-private divide (Bovaird et al., 2015; Cepiku and Giordano, 2014; Joshi and Moore, 2004, p. 33). In response, Joshi and Moore (2004) emphasise the increasing importance of inter-organisational partnerships in service delivery.

Developing these ideas they expand the concept of "co-production" – originally defined by Ostrom (1996, p. 1073) to simply emphasise that service provision often involves more than one organisation – to develop the concept of "institutionalised co-production", which they define as:

"Institutionalised co-production is the provision of public services (broadly defined, to include regulation) through regular, long-term relationships between state agencies and organised groups of citizens, where both make substantial resource contributions" (p.40)

They develop this definition by specifying four characteristics they consider to be associated with it: 1) institutionalised co-production should not be temporary; 2) it does not necessarily need to rely on formal contractual arrangements (although it can do); 3) it reflects a blurring of boundaries between public and private; and, 4) they *"do not particularly associate institutionalised co-production with what Hood (1998)(1998) categorises as the egalitarian (participatory, communitarian) approach to dealing with public management issues"* (Joshi and Moore, 2004, p. 40). This final point is thought to mean this conceptualisation has not been widely applied to the community management of rural water services, which has conventionally been associated with participation and collective action. Yet in the context of the calls to professionalise and continually support community service providers as specified through the community management plus paradigm, the concept of institutionalised co-production is considered to become more relevant.

Co-production has previously been connected with the interface between formal and informal aspects of water service delivery in urban areas (Ahlers et al., 2014). Whilst it has also been argued in a Sub-Saharan African context (Olivier de Sardan, 2011), that many forms of public services are delivered through the co-production of formal and informal processes such as maternal health services relying on public hospitals and community midwifes. This research has not attempted to interrogate the informal aspects of co-production in rural water

services, which it is contended are still likely to play a role in rural water services in India. This is partly because the resolution and scope of the synthesis was not considered conducive to studying such informality, as explained in the methodology.

However, the concept of institutionalised co-production is considered to capture particularly well the organisational arrangements proposed by the National Rural Drinking Water Programme (NRDWP) (Government of India, 2013a) guidelines. The guidelines specify although a VWSC is mandated to provide water services this committee should be a registered sub-committee of the local self-government institution of the Gram Panchayat. Due to the prescribed overlap of members between the VWSC and the Gram Panchayat there is ambiguity as to whether the VWSC should be considered a public or (private) community organisation, as per a basic Weberian distinction of organisational types. It is therefore useful to introduce this concept of institutional co-production in this research as it will be a term that helps categorise and theorise the organisational forms identified.

2.3 Chapter summary and contribution

This chapter has reviewed the literature and introduced a number of key concepts for understanding rural water services. It has also set out the emergence of the demand-responsive approach to community management and a number of contemporary trends in thinking related to community management. These trends are considered to form the basis for a series of ‘paradigmatic claims’ that will be investigated in this research to help verify the validity of the ideas underpinning the community management plus approach and further develop the empirical and theoretical understanding of the model. Table 2-6 displays the paradigmatic claims which are considered to be useful distinctions for this purpose. It is accepted that they are only emblematic of the broad trends in the literature and therefore obscure the level of complexity that each concept individually can be framed within. However, they are considered useful guides for developing appropriate indicators that can be used to structure a cross-case analysis and synthesis of findings from a multi-case study

research project. The task of doing this will be picked up again in Chapter Four but in the following chapter the focus of the thesis narrows to consider in more detail the context of the Indian rural water sector.

Table 2-6 – Paradigmatic claims in the community management of rural water services

Level of investigation	Conventional paradigmatic claims for community management	Next generation paradigmatic claims for community management plus
Research Question 1 - What are the type and characteristics of organisational arrangements found in successful community management programmes in India?	- Community participation in service delivery will deliver successful service outcomes (Prokopy, 2009)	- Professionalisation of community role in service delivery will delivery successful service outcomes (Lockwood and Smits, 2011) -
Research Question 2 - What are the indicative financial costs and cost sharing arrangements for successful community management programmes in India?	- Community contributes 10% of capital costs and then covers recurrent costs through tariffs (Joshi, 2003)	- Recurrent costs have to be subsidised by support agents to become sustainable – although the level of subsidy is not clear
Research Question 3 - To what extent do the findings from questions 1 and 2 support the justification for the community management plus paradigm as a dominant management model for rural water services in India and other relevant contexts?	- Paradigm framed through ideas about collective-action and participation	- Institutionalised co-production of public services to frame new generation of community management

3 RESEARCH CONTEXT –RURAL WATER SERVICES IN INDIA

India is home to over 1.2 billion people living across 29 states with diverse geographies, levels of economic wealth and levels of access to rural water services. It is also a country with a rich history of community managed rural water services that range from early experiments with NGOs as far back as the 1960s (James, 2004, 2011) to the formal adoption of community management with government programmes from the late 1990s (Government of India, 2003, 2013a). The logic of undertaking a study in India is that it provides an appropriate level of diversity in operating contexts allowing an assessment of community management in varied situations whilst retaining consistency in some key features that more easily enable a comparative analysis such as a unified federal governance system and single currency.

This chapter explains and analyses this research context. It starts by discussing the status of development and rural water services highlighting national trends and then assesses the difference between states in terms of access to rural water services. This includes a correlation analysis between access levels and a number of broader development indicators, such as GDP per capita and the Human Development Index. This is designed to illustrate the 'synergistic character' of water services that often follow broader levels of human and societal development which vary from state to state. To add an explanatory insight to this analysis a political economy framework for explaining differences between India states is introduced (Kohli, 2012). Following this an overview of the governance of rural water services is given that highlights the tension between a highly decentralised local self-government and the role of centralised State Rural Water Supply Agencies. The chapter ends with a review of community managed rural water services in India.

3.1 Status of development and rural water services in India

This section provides an overview of the status of development and rural water services in India. It does this because the research positions rural water

services as synergistic with broader process of human and societal development. Simply put this means societies that are poorer in terms of financial and human capital are also more likely to have poorer outcomes in terms of rural water services (Gerlach and Franceys, 2009; Hutchings et al., 2015). Theoretically, this thinking is considered to reflect the synergistic logic of the Human Development Index (HDI) (Gandhi et al., 2011; Sen, 2004; ul Haq, 2004). The HDI measures three composite dimensions related to health, education and standards of living to produce a consolidated indicator of human development as it has been shown that feedback loops exist between different tenets of human development. The logic is that these factors all act as both inputs and outputs of one another, in this wider process of development (Gandhi et al., 2011).

Within this research context evidence suggests that rural water services are considered synergistic with broader measures of human development (Gerlach and Franceys, 2009; Hutchings et al., 2015). The expansion of water services leads to improved health outcomes (Fewtrell et al., 2005) and contributes towards economic prosperity (Hutton et al., 2007) yet the ability to deliver these services is dependent on an underlying level of financial and human capital (Harvey and Reed, 2006; Lockwood and Smits, 2011; Lockwood, 2002), that is in turn dependent on the prevailing health and prosperity of communities (Bloom et al., 2004). For this reason, it is believed to be important to frame any analysis of rural water services within the broader context of a synergistic development process.

3.1.1 National status of development and rural water services

India is the world's 2nd most populous country and 7th biggest in land area. It is widely considered to be a future geopolitical superpower (Kugler, 2006) and at the time of writing it had one of the fastest growing economies of any major country (IMF, 2016). With a GDP per capita of $4,234 it ranks in the upper band of the World Bank's definition of a lower middle income country (World Bank, 2016b). Yet the paradox of modern day poverty is that the majority of the world's poor live in populous lower middle income countries rather than smaller

low-income countries (Sumner, 2012). India contains 35% of the global population living on less than $2 a day making it the country with the most poverty in absolute terms (Sumner, 2012).

Geographically, the country sits at the heart of South Asia with a geography that ranges from the sub-tropical south to the some of the world's highest mountains in the Himalaya regions of the north. In the west of the country there are expansive deserts whilst the eastern hilly region has some of the highest rainfall levels reported on earth (Chauhan, 2008). As such water sources are unevenly spread across the country and so droughts can plague one region as another suffers from flooding. At the national scale, there is increasing pressure on water resources which has seen annual per capita water availability dwindle from 5,177 m^3 in 1951 to 1,545 m^3 in 2011 (TERI, 2016), largely due to massive population growth over the period**.** The country is heavily reliant on groundwater for agriculture and drinking water but source degradation has become endemic with 60% of groundwater sources threatened by overexploitation (Briscoe and Malik, 2005). This has led the Government of India to prioritise shifting drinking water services to surface water sources in the latest policy guidelines (Government of India, 2013c).

In terms of rural water services, the country has an improved-water source coverage rate of 96% in rural areas showing that it is moving towards universal access (WHO and UNICEF, 2013). Analysis shows that this is above the international trend line for countries with a similar GDP per capita level (Smits, *forthcoming*). However, the Census of India (2011) also provides data by the population living with "piped-on-premises", also known as household or yard connections. This figure is at the much lower level of 31% (Census of India, 2011), which is below the international trend line when compared to countries with similar wealth (Smits, *forthcoming*).

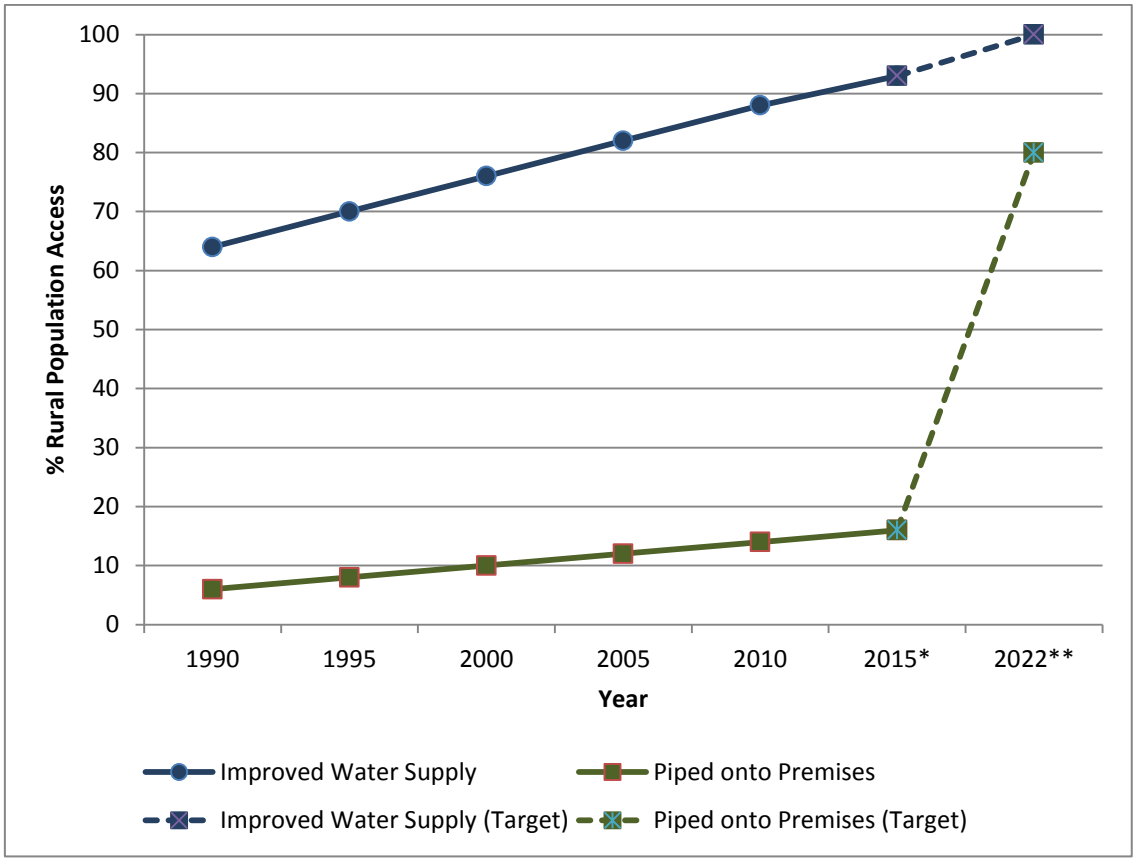

Figure 3-1 Rural Water Supply coverage rates (data taken from Census of India (2011a) and WHO and UNICEF (2015) – and targets from Government of India (Government of India, 2013a))

This is significant as the Government of India has recently set ambitious new policy targets to *"ensure at least 80% of rural households have piped water supply with a household tap connection"* by 2022 (Government of India, 2013a, p. 2). This means that it plans to expand access to such facilities to around 400 million people in less than a decade (Hutchings, Franceys, et al., 2016). As Figure 3-1 shows, this will involve an extremely ambitious jump in the level of access for a measure that has conventionally advanced in a very slow linear fashion. For this research it indicates the importance of producing guidance on the community management of piped water supply with household connections as particularly useful for the Indian policy context.

3.1.1 Analysis of development and rural water services by state

Data at the national level in India obscures some significant differences from state to state. In Bihar state just 3% of the rural population have access to a household connection whilst in the state of Sikkim this rises to over 80% (Census of India, 2011a). This section therefore presents the results from an analysis of state-wise secondary data. It focuses on two key dependent variables which are the improved water supply coverage rate and the household connection coverage rate, both as reported by the Census of India (2011a). These are then assessed by how they relate to other development variables which are outlined in Table 3-1 below. The analysis used data that was available at the state level in India either through the academic literature or published by reputable institutions such as the Government of India or international bodies, such as the UN. Table 3-1 below shows the data that was examined and justifies why it was selected whilst Table 3-2 shows the dataset. The data was initially compiled in MS Excel with the analysis being conducted in SPSS. As discussed in the methods chapter, the measure used here is the Kendall's tau test whilst statistical significance and effect size are assessed against the proposed ladders from Field (2013). The statistical output from the analysis is presented in Table 3-3 and explained below the tables.

Table 3-1 Macro-development measures as potential determinants for success in rural water supply

Measure	Description of measure	Justification for use	Source
GDP Per Capita (PPP)	GDP is the most widely used measure of economic activity given for a specific area over a designated time period, usually a year. The 'per capita' measure divides this by the population, whilst PPP makes this comparable across countries.	Although the use of GDP as a development indicator has been criticised for being economically deterministic (Costanza et al., 2014), it remains among the most widely used due to the high correlations between GDP and development outcomes such as health (Schell et al., 2007).	Gross Domestic Product per capita (2013-1014) (Reserve Bank of India, 2015) was converted at mid-2014 conversation rate USD PPP, as reported by World Bank (2016a).
Human Development Index	HDI is a composite indicator; it measures three composite dimensions of human development related to health, education and standards of living.	Based on the synergistic development process described above, it would be expected that the broad increase in health, education and standards of living would lead to positive "feedback loops" in the provision of public services such as rural water services.	The India Human Development Report 2011 Towards Social Inclusion (Gandhi et al., 2011)
Devolution Index (Rank)	Each year the Government of India assess the extent of devolution to the Panchayat Raj Bodies across India.	As discussed later in this chapter there are varying levels of decentralisation between India states. It may be that there is a link between decentralisation and the provision of rural water services and it is therefore interesting to see whether any association can be identified in this state-level analysis	Ranking of States on Devolution Index (Government of India, 2015a)
Below Poverty Line (Rural Population)	A consumption based poverty line is set for rural and urban areas by the Government of India based on a mixed reference period (MRP) measure of consumption data reported in the National Sample Survey (Government of India, 2009b).	It is anticipated high rural poverty rates are likely to be negatively associated with progress in terms of water supply due to the reduced capacity for cost recovery from users (among other issues).	Handbook of Statistics on Indian Economy (Reserve Bank of India, 2015)
Literacy Rate	Through the Census of India (2011b) the literacy rate is collected as the number of people living above the age of 7 that can both read and write in any language.	Literacy rates are an important component of the HDI yet they could be especially potentially important indicators for rural water services where there is a high degree of devolution of power to rural communities.	Census of India (Census of India, 2011b)
Gini coefficient	Gini co-efficient measures the income distribution of a country as the basis for assessing inequality among the population.	Economic inequity has been associated with poor development outcomes (Easterly, 2007) so it may be expected that a high Gini coefficient would be negatively associated with high coverage in rural water supply.	Data reported from 2004 dataset at the state-level: (Rajan et al., 2013)

Growth in Poverty Elasticity (Rural Population)	Growth in Poverty Elasticity is a measure of the extent to which increases in GDP lead to decreases in the proportional of people living below the poverty line.	The measure reflects the extent to which the economic process in any state is leading to equitable outcomes in terms of its impact on the poor. Therefore, in a similar fashion to Gini coefficients it may offer insight on whether equity in terms of economic development impacts coverage rates.	Using data for GDP and below the poverty line as above this was calculated for the 2005-2012 period for the rural population only.
Physiographic Zones	A simply binary variable has been created based on whether the state is has a largely mountainous physiographical zone or is classified as a different physiographic zone (plains, plateau and coast).	After an initial analysis run and reading of the case studies, it was recognised that the geographical setting could be a determining factor for rural water supply success. In particular, the difference between those states that are largely mountainous or highland against the rest appeared to be particularly strong with regards to improved access. Pre-analysis runs before the correlation were conducted that identified statistically significant differences between the median outcomes for improved water supply in mountain classified states against the rest of the sample but no statistical difference between the plains, plateau and coast categories. Hence, it was considered appropriate to consolidate those physiographic zones into one category for the purpose of the correlation. The pre-correlation analysis tests used were the Kruskal Wallis with post hoc Dunn's test for stepwise comparison, as used throughout the analysis in later stages of the thesis.	Allocation geography variable followed Physiographic Zones as adapted from India State of the Environment Report (2009) and Sheikh et al. (2011) into four major physiographic zones (mountains, plains, plateau and coast) and then consolidated into a mountains versus other binary category for correlation run.

Table 3-2 - State-wise rural water supply and development indicators dataset (sources and definitions as reported in table above)

State	Improved Water (Rural)	Household piped water supply (Rural)	GDP Per Capita (PPP)	Human Development Index	Devolution Index (Rank)	Below Poverty Line (Rural)	Literacy Rate	Gini	Growth in Poverty Elasticity	Physio-graphic Zones
All India	96%	31%	$4,243	0.467	n.d	26%	74%	32.3	-1.2	Other
Andhra Pradesh	97%	63%	$4,643	0.473	13	11%	92%	32.9	-6.1	Other
Arunachal Pradesh	80%	59%	$4,876	0.573	20	39%	67%	32	-1.7	Mountain
Assam	87%	7%	$2,525	0.444	16	34%	73%	23.8	-2.2	Mountain
Bihar	98%	3%	$1,780	0.367	17	34%	64%	22	-1.9	Other
Chhattisgarh	97%	9%	$3,340	0.358	9	45%	71%	27.5	-2.5	Other
Goa	94%	78%	$12,786	0.617	16	7%	87%	27.6	-1.2	Other
Gujarat	97%	56%	$6,094	0.527	10	22%	79%	30.1	-1.2	Other
Haryana	97%	64%	$7,611	0.552	11	12%	77%	25.3	-1.9	Other
Himachal Pradesh	96%	89%	$5,265	0.652	12	8%	84%	27.4	-2.7	Other
Jammu & Kashmir	78%	56%	$3,382	0.529	n.d	12%	69%	23.9	-1.2	Mountain
Jharkhand	96%	4%	$2,632	0.376	21	41%	68%	27.4	-2.1	Mountain
Karnataka	96%	56%	$5,108	0.519	2	25%	76%	30.8	-1.3	Other
Kerala	93%	25%	$5,922	0.79	1	9%	94%	30.1	-2.8	Other
Madhya Pradesh	98%	10%	$2,955	0.375	4	36%	71%	27.4	-2.2	Other
Maharashtra	98%	50%	$6,679	0.572	3	24%	83%	34.8	-1.7	Other
Manipur	46%	30%	$2,372	0.573	18	39%	80%	16	-2.9	Other
Meghalaya	65%	29%	$3,511	0.573	n.d	13%	75%	21.6	-3.7	Mountain
Mizoram	49%	41%	$4,342	0.573	n.d	35%	92%	23	-1.2	Mountain
Nagaland	79%	52%	$4,423	0.573	n.d	20%	80%	19.1	-2.1	Mountain
Odisha	94%	8%	$2,998	0.362	13	36%	73%	30.7	-3.4	Mountain
Punjab	97%	35%	$5,268	0.605	19	8%	77%	27.2	-7.5	Other
Rajasthan	87%	27%	$3,763	0.434	6	16%	67%	26.8	-1.0	Other
Sikkim	83%	83%	$10,068	0.573	8	10%	82%	24.8	-1.1	Other
Tamil Nadu	98%	79%	$6,427	0.57	5	16%	80%	33.1	-1.6	Mountain
Tripura	94%	25%	$3,976	0.573	10	17%	88%	32.6	-2.2	Other
Uttar Pradesh	99%	20%	$2,068	0.38	15	30%	70%	28.1	-1.9	Mountain

Uttarakhand	91%	64%	$5,916	0.49	14	12%	80%	29.8	-2.5	Other
West Bengal	98%	11%	$3,997	0.492	7	23%	77%	32.4	-4.3	Mountain

Table 3-3 Results of the bivariate analysis of development indicators against rural water supply coverage

#	Macro-development Indicator	Household piped water supply			Improved Water Supply			
		Kendall *tau*	Significance	Interpretation	Kendall *tau*	Significance	Interpretation	Shapiro-Wilk (Test for Normality)
1	Household piped water supply	1.000	n/a	n/a	-.023	.865	Not significant	.000
2	Improved Water Supply	-.023	.865	Not significant	1.000	n/a	n/a	.039
3	GDP Per Capita (PPP)	.622	.000	Large effect (positive), highly significant	.117	.385	Not significant	.012
4	Human Development Index	.395	.004	Medium effect (positive), highly significant	-.277	.049	Small effect (negative), significant	.097
5	Devolution Index (Rank)	-.013	.925	Not significant	-.095	.523	Not significant	.637
6	Below Poverty Line (Rural Population)	-.498	.000	Medium effect (negative), highly significant	-.031	.821	Not significant	.034
7	Literacy Rate	.364	.006	Medium effect (positive), highly significant	-.026	.850	Not significant	.806
8	Gini-coefficient	.117	.377	Not significant	.387	.004	Medium effect (positive), highly significant	.086
9	Growth in Poverty Elasticity (2005-2012, Rural below the poverty line, State GDP)	.193	.159	Not significant	-.078	.567	Not significant	.000
10	Physiographic Zones	.130	.401	Not significant	-.631	.000	Large effect (negative), highly significant	.000

The analysis showed that there is no significant correlation between states with improved water supply and those with high household piped water supply coverage, suggesting that there are different drivers for each of these factors. For household piped water supply, there are four states above 75% coverage, eight states between 50-75%, seven states from 25-50% and the rest below 25%. On this measure GDP per capita has a highly significant, strong effect suggesting it is only in states that have sufficient levels of wealth that the transition to household piped water supply is being achieved. The same relationship between wealth and improved water source is not found. There are two likely reasons why: 1) the lower level of capital and recurrent resource commitment and institutional capabilities that are required for basic improved services mean they are within reach of lower wealth levels; 2) due to the inherent human right and constitutional requirement for providing improved access, there is greater emphasis on transfers from the Federal Government, international donors and non-state actors like NGOs to support these types of services meaning domestic-state wealth becomes less important.

In comparison to piped water supply, there is limited variability in the improved water supply coverage rates with 21 out of the 29 states scoring between 90% and 100% coverage rates. However, out of the 8 states scoring below 90% seven of them come from the mountainous regions of Northeast India or the Himalayans (with the only exception Rajasthan that includes large areas of desert). This indicates that India is making progress towards universal access to improved water supply across all states, including the very poorest, apart from in areas where the mountainous geography becomes a key factor. This was confirmed by the highly significant association found between the physiographic variable and improved coverage as reported in Table 3 above. Although there could be different reasons for this, it is speculated that there could again be two overarching reasons: 1) mountainous physiographic settings tend to not be conducive to the basic improved water source (handpumps) but rather served by more complex and expensive gravity-fed piped systems making the level of investment for improved-access higher in these regions; 2) inaccessibility of some villages in mountainous physiographic settings further increases the

challenge of delivering basic services as compared, on average, to other physiographic setting.

It is accepted that this descriptive statistical analysis of trends only provides evidence of simple, binary correlations between a selective group of variables. In this sense it does not provide any evidence of causation, nor does it assess the compounding of one variable onto another, yet it is still considered to provide appropriate insights into the overarching pattern of rural water access across Indian states. It helps illustrate how India has largely achieved its goals around universal improved water supply coverage apart from in the mountainous states. Beyond these states, however, differences in performance in terms of household piped water supply can best be explained by the development status of the states. Whilst no single variable can predict success, GDP per capita (PPP) and the 'below the poverty' line measures are most strongly associated with household coverage rates. It is argued in the next section that these factors are reflected in the political economy of states.

3.2 The political economy of development across India states

This section builds on the analysis above to argue that a key driver of differential performance in terms of development and rural water service coverage can be summarised as the political economy of the state. Using a political economy lense has become a common approach in a series of recent studies into the community management of rural water services (Chowns, 2014; Harris et al., 2011; Jones, 2015). This reflects the general trend in the sector to expand analysis beyond infrastructure and service levels, to understand the context in which rural water services are provided (Lockwood and Smits, 2011). Overall, this research develops an approach that links the empirical analysis above with studies on the political economy of India, in particular Kohli's (2012) empirically-driven "State-Society Framework" on the differences between Indian states. In his work Kohli argues that Indian states can be allocated into three broad (political economy) categories that reflect the way in which "development

dynamics" emerge in each to drive development outcomes. He argues that the "varying patterns of politics and authority across Indian States, especially the underlying state and class/caste relations, are a key determinant of regional development dynamics" (Kohli, 2012, p. 14). The political economy categories are 'neo-patrimonial', 'social democratic' and 'developmental' and are considered to provide an empirically valid and analytically useful set of categories for analysing state-wise trends in India. Each is described below.

3.2.1 Neo-patrimonial states

In the 1980s the Indian demographer and economist, Ashisha Bose, coined the phrase "BIMARU" to describe the states of Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh. As this acronym sounded like the Hindi word for "sick" it became the popular shorthand in the press for underperforming states with poor governance records (Sharma, 2015). It later became expanded to "BIMAROU" to include the state of Odisha and, since its popularisation, the states of Chhattisgarh and Jharkhand have been carved out of Bihar and Madhya Pradesh, respectively. It is these BIMAROU states that are considered to have the greatest 'neo-patrimonial' tendencies in India (Kohli, 2012). The term has most commonly been used in the broader development literature to describe the political economy of post-colonial Sub-Saharan African states (Englebert, 2000; Kohli, 2012). The concept is rooted in an understanding of traditional political authority which is based on a leader's ability to distribute resources to supporters in return for political support (Kelsall, 2011). This can be described as clientelism but Max Weber used the term 'patrimonialism' (Weber, 1978). It has since been reapplied as 'neo-patrimonialism' to describe a situation where this type of 'personal' political relations 'overlaps' with formal, impersonal forms of governance (Kelsall, 2011).

Kohli (2012) argues that neo-patrimonialism has taken particular root in these states of India because politics (and business) have been dominated by the high, often land-owning, castes who secure broader political support through short-term patrimonial strategies. In such a context corruption and clientelism become widespread, retarding the development process. Such an analysis is

reinforced by looking at the developmental statuses of the BIMAROU states with them performing badly in many of the development measures presented in Table 2. Before proceeding it is important to acknowledge however that “the problems of India’s neo-patrimonial states need to be kept in perspective; India is no Congo or even a Zimbabwe” (Kohli, 2012, p. 154). Nationally, India is now ranking mid-way in the Corruption Perceptions Index (Transparency International, 2014) at 85 out of 175 countries. Yet it is still argued that neo-patrimonial characteristics are strong in the BIMAROU states of the country and that this political economy ‘model’ has shaped and is shaping developmental process, including in rural water services.

3.2.2 Social-democratic states

In the states that exhibit social-democratic principles, political and economic power is dispersed more equally throughout the society. This is reflected in the ability of these states to be comparatively more effective at reducing poverty and promoting human development, even though the absolute level of economic wealth may be lower than some other states (see Figure 3-2 below). The classic example is Kerala which is only the ninth richest as measured in GDP per capita yet has the highest HDI score and literacy rates. The ‘social-democratic’ mechanisms that underpin this come through the way in which almost all social classes and caste groups are effectively enfranchised within the democratic system (Kohli, 2012). As political elites generally have a broad-base of support in these states it encourages them to favour policies that promote equitable development outcomes – whilst the generally high literacy rates and engagement in politics means the population is able to hold them to account (Desai, 2006). Overall, this means there is well established sense of ‘public purpose’ within these states that is reflected in a redistributive approach to development (Kohli, 2012).

Whilst Kerala is the standout example of the social-democratic class, there are other examples, with Kohli (2012) arguing that all the South Indian states exhibit some social-democratic characteristics in that the political system is less likely to follow entrenched caste-based politics (as is the case in many Northern

states, especially those in the Hindi heartlands such as Bihar and Uttar Pradesh). There are a number of other states that perform well in terms of having low levels of poverty to GDP ratios. These include Punjab, Andhra Pradesh and Himachel Pradesh. Yet as argued by Kohli (2012) this type of analysis only moves towards an indicative classification as there are exceptions to the rules. For example, West Bengal is often considered a highly social-democratic state because lower classes and 'marginal' caste groups are well-represented in the political system. However, this has not translated well into strong development outcomes (Desai, 2006). This shows that the political economy classification should be treated as useful for explaining broad trends but that it is not a universally, all-encompassing explanation.

3.2.3 Developmental States

The final category of political economy classification of Indian states proposed by Kohli (2012) is the 'developmental' state. The use of the term developmental state first emerged to explain the remarkable rise of East Asian nations, such as Japan and South Korea, in the second half of the twentieth century. Johnson (1982) famously conceived the concept arguing that the key to Japan's post World War II economic success was that the government took an interventionist approach to supporting capitalist production, as compared to the neoliberal – '*laissez-faire'* – economic policies that were promoted by Western countries or the 'socialist' centrally planned approach of Soviet states. This close alliance between government and business is in some ways found right across India as the extent of government bureaucracy means that the business class often has close alliances with government officials. Yet in some states these alliances are more strongly reflected in a strategic consensus between business and government with a collective aim to promote economic growth as the driver of development (rather than elites focusing on redistributive policies or serving piecemeal political and personal interests) (Kohli, 2012).

Gujarat and Maharashtra are the archetypical cases where there is particularly close cooperation between the business and political elites. Although his personal preference is for a more social-democratic approach, Kohli

acknowledges that ultimately a developmental economy has led to significant public revenue generation through the tax system that in turn has enabled higher levels of investment in public infrastructure, especially the type of infrastructure that supports growth such as roads. Yet another key characteristic of these developmental states is that they enjoyed 'first mover' advantage in terms of economic growth as they represent the traditional heartlands of economic prosperity in India, so it is hard to assess whether these developmental policies could be translated to the poorer states that lack comparative advantage. Either way, the more top-down and elite-led approach to development is something that is thought to have significant implications for 'best-fit' thinking in terms of rural water services in developmental contexts.

3.2.4 Overview of the political economy of Indian states

In the section above three broad political economy models were described. However, it is perhaps more helpful to consider them as political economy 'tendencies' rather than standalone categories. In every state each of these tendencies exists to a greater or lesser extent so they should not be considered distinct or static categories. Political trends shift over time, especially in terms of the party politics of the states. Yet over time the broad pattern of political tendencies described above has persisted for long enough to lead to consistent associations with developmental outcomes (Kohli, 2012). This is considered to be particularly relevant for the 'extreme' cases such as neo-patrimonial Bihar, social democratic Kerala or developmental Maharashtra. The categories become more nuanced for states that do not exhibit very strong characteristics of a single category but more of a mixture of tendencies. Figure 3-2 is considered to provide a crude indicative approach for classifying states that ranks GDP per capita levels against the poverty rate giving an approximation of the balance of priorities between economic growth and redistributive policies (which highlights the 17 states from which case studies were taken in this study against the national average).

Despite the ambiguity for some states, the categories are nonetheless considered useful as they can help answer some important questions, such as:

“How can one best explain some of these broad regional patterns [in development outcomes]? What might be the underlying mechanisms that retard development in some states and generate wealth and prosperity in others? Similar, why are some states more capable than others of reducing poverty?” (Kohli, 2012, p. 151). It is contended that such thinking also offers insight into important questions concerning this research such as: how can one best explain the differences in terms of performance in rural water services? Why are some states more capable of supporting community managed rural water services than others? And, perhaps most importantly, are there patterns of community management that are more likely to succeed in certain categories of states compared to others, and why is this? The conceptual categories will therefore be used when interpreting the findings from different states, especially for government supported programmes which are considered to be representative of the selected states and therefore reflect their political economy.

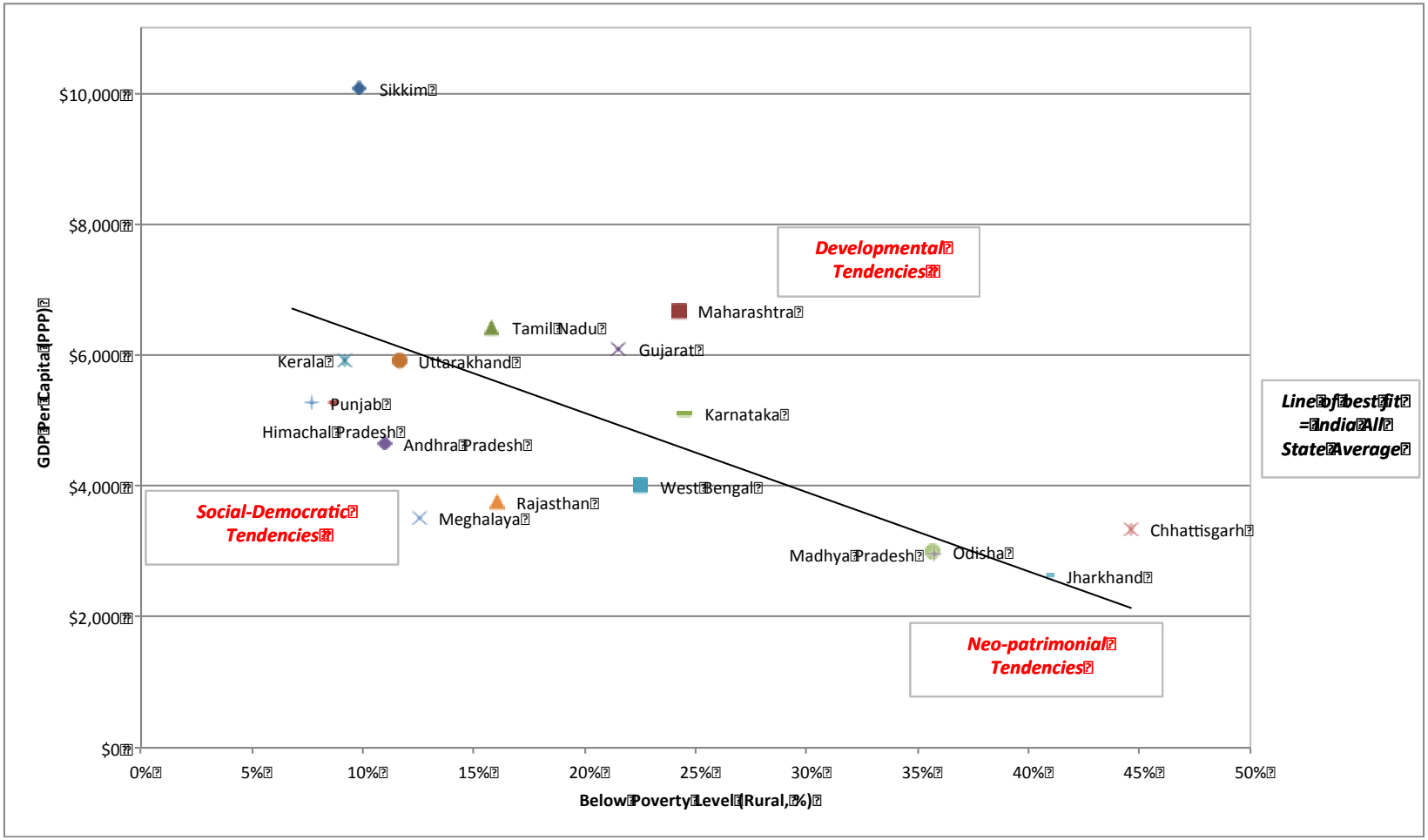

Figure 3-2 - State GDP per capita versus below poverty line as proxy for political economy tendencies (data as presented in Table 3-2)

3.3 Governance of rural water services

The difference between the political economy of Indian states is partly reflected in the federal structure of governance in India. This section explains this in relation to rural water services. It first focuses on the governance of village regions before scaling-out to consider the state and federal systems. Contemporary trends in India's governance system can be traced back historically to the concept of *Swaraj* or 'self-rule'. *Swaraj* has been associated with rejecting the foreign rule of British and other colonial powers (Parel, 2011) but also has a related meaning in its application to village-level governance summarised in Gandhi's famous statement: *"My idea of the village Swaraj is that it is a complete republic independent of its neighbours for its own vital wants"* (Mahatma Gandhi as quoted in Bhatt, 1982, p. 87).

This idea of autonomous village republics is reflected in the devolution agenda followed by the Government of India since the early 1990s (Johnson et al., 2005a). This has involved devolving statutory powers to the Panchayat Raj Institutions (PRI) – the three-tier system of local self-government that was introduced in the previous chapter. As explained, the lowest level of the PRI is known as the Gram Panchayat[7] which operates at (or close to) village scale and is elected by all adult residents of the village (known as the Gram Sabha).

Under this system, statutory responsibility is given to the Gram Panchayats for delivering public services including the provision of drinking water as well as 28 other areas such as street lighting (Government of India, 1993). For this purpose the Gram Panchayat usually sets up a number of sub-committees, such as a schooling and education committee. For rural water services it

[7] Although there is some variety in practice such as in the Tribal belts in the North Eastern States where the Sixth Schedule to the Constitution of India means that village administration can follow a different model involving the formation of a tribal council known as a Durbars (Constitution of India, 1950).

establishes a Village Water and Sanitation Committees (VWSCs), who will assist and advise the Gram Panchayat, often on a voluntary basis, on the provision of these services (Government of India, 2012). The key institutions at the village level are explained in Table 3-4.

Table 3-4 - Descriptions of local self-government institutions for rural water services at the village level (as presented in Hutchings, 2015)

Institution	Description
Gram Sabha	*includes every person of voting age within a village. Usually, the Gram Sabha meets to take key decisions during the implementation of a water scheme and it is responsible for approving the plans that the Gram Panchayat and VWSC have for water supply each year.*
Gram Panchayat	*is the lowest level of government in rural India. It is part of the Panchayat Raj system of local self-government which promotes self-rule within Indian villages. Each Gram Panchayat has a President known as the Sarpanch who is elected by the members of the Gram Sabha. Typically, he or she is supported by a Vice President and Clerk, whilst a number of elected Ward Members also sit within the main Gram Panchayat council. Together they are responsible for the provision of many public services within the village, including domestic water supply. The Gram Panchayat owns and manages (in partnership with the VWSC) the water supply with its tasks including: approving investment plans and getting financing; approving annual budgets and user fee charges after discussion in the Gram Sabha; approving contracts with operators; co-ordinating with the block and district Support Organizations; hiring trained mechanics, for regular preventive maintenance for handpumps, and trained operators for piped water supplies* (Government of India, 2012).
Village Water and Sanitation Committee (VWSC)	*is a standing committee of the Gram Panchayat of between 6 and 12 members that takes on the responsibility for the everyday operation, maintenance and administration of the water supply service. It is chaired by the President of the Gram Panchayat and includes some ward members – it should also include at least 50% women and representatives from all social classes and castes with the village. The existing members nominate new members onto the committee but any decision must take into account the predetermined quota system. Key tasks include: collecting household contributions and user fees; opening and managing a bank account; preparing annual budgets and recommendations for user fee charges; organising people to be vigilant about not wasting water and keeping water clean; ensuring professional support for handpump caretakers and piped water supply operators; ensuring access to spare parts for handpumps and trained mechanics for regular preventive maintenance; ensuring the operators handling piped water supply systems are provided with adequate training to gain the technical and financial skills needed to do the job* (Government of India, 2012).

The Gram Panchayat is considered to represent a form of local self-government rather than simply local government. The difference being that local self-government, which has its own elected officials and statutory powers over a

considerable range of functions, has greater autonomy, compared to local government which can be considered to have less autonomy and direct accountability to the local population (Datta, 2007; Rajesh and Thomas, 2012). The local self-government system had some historical precedent in pre-colonial and colonial times but its power had been eroded in much of the post-colonial period as the Government of India and state governments sought to drive a relatively centralised programme for rural development (Banerjee, 2013). This was until 1993 and the 73rd amendment to the Constitution of India reversed those decades of centralisation.

Recognising that decentralisation has become a global mega-trend attracting praise and criticism alike (Asthana, 2003; Rodríguez-Pose and Gill, 2003), it is useful to reflect on the maturity and character of devolution in India. Devolution is a strong form of decentralisation that involves the formal statutory transfer of powers to lower levels of government (James, 2011; Robinson, 2007). However, the transfer of these functions should also be accompanied by the appropriate transfer of funds to finance the activities and functionaries to undertake any necessary work.

Following 25 years of devolution there are concerns that the devolution of power to Panchayats has been hampered by a lack of devolution of funds and functionaries (Banerjee, 2013). Such concerns are not universal, with key differences between the states. Some states, such as social democratic Kerala, are renowned for advanced and genuine devolution to the Panchayat Raj Institutions (Heller et al., 2007), whereas other states retain a largely centralised character in public administration. Each year the Ministry of the Panchayati Raj publishes a devolution list that ranks states against one another depending on the devolution of functions, functionaries and funds which is presented as part of the dataset in Table 3-2 in section 3.1.2 of this chapter (Government of India, 2015a). It shows there is no pattern in terms of the level of devolution and the wealth of a state. This is one of the key challenges of conducting research across Indian states – although there is a federal government the set-up for governance within each state can vary considerably. Part of these differences

relates to how the system of local self-government functions alongside the centralised agencies of the state government, which are now explained below.

At the Federal level there is a Ministry of Drinking Water and Sanitation that sets policy, budgets and oversees the entire drinking water and sanitation sector (James, 2011). The administration of the country is then divided into 29 states, with nine of these having populations of over 50 million people. A cabinet of state ministers lead departments in the various domains of public administration, and would usually include a State Rural Water Supply Agency. These agencies set the budgets and overall plan for rural water supply in the state. They are meant to provide technical services to the Gram Panchayat but often retain decision making power over budgets and technical design (Banerjee, 2013). This is considered to be partly a hangover from the supply-driven era of expansion of rural water services prior to the 1990s.

Through research into the functioning of such agencies within the sanitation sector, Hueso and Bell (2013, p. 1013) described these organisations as representing the “technocratic governing machinery” of the Indian state. They argued they represent “a hierarchical and technocratic bureaucracy that is well suited to send down technical designs and subsidies for physical infrastructure projects” (Hueso and Bell, 2013, p. 1013). In this sense, the paradox in the governance of rural water services in India is the extremely advanced devolution of local self-government alongside centralised and often bureaucratic State Rural Water Supply Agencies. The balance between these decentralised and centralised agencies is specific to each state and shapes how rural water services are governed within them.

3.4 Community management of rural water services in India[8]

India has a long history of community management. Early experiments were conducted as far back as 1964, with the World Health Organisation and UNICEF Banki and Mohkampur projects in Uttar Pradesh running with some limited success until 1994 and 1976 respectively, and the sister Pharenda project reported as still ongoing at the time of the last citation (WSP, 2002). Tracing the genealogy of community management from these early initiatives to the present day, this section draws on James' (2004, 2011) synthesis reports to identify four broad categories of community management initiatives. These include *independent* cases where communities have simply taken complete charge of water services when government services have failed, *small scale NGO initiatives*, *larger scale donor-NGO schemes* support by bilateral and multilateral agencies, and then the post-Sector Reform *government-supported programmes* that emerged from 1999 onwards. The learnings from each category will be briefly discussed in order to demonstrate how community management has changed throughout this period.

With the provision of safe drinking water constitutionally mandated as the government's responsibility in India (Constitution of India, 1950) it is rare for communities to be completely autonomous in the management of drinking water (James, 2004). However, there are limited cases of reportedly independent piped schemes such as the case in Kolhapur (Maharashtra) that ran from 1979 until the 1990s (James, 2004). This occurred after the District Administration refused to take on a government-constructed piped water network, so taking their own initiative, community members from four villages came together to

[8] This section is an extract from the paper Hutchings et al. (2016). This section was completely undertaken by this author and reproduced here as part of the thesis, although to promote consistency in this thesis the rural water supply has been replaced with the term rural water services and some stylistic elements have been adapted.

form an unofficial committee that took responsibility for the piped network. Without any further support they managed the scheme for 20 years, even creating a big surplus in the committee's accounts (James, 2004). Whilst this case of unsupported community managed piped water supply is relatively rare, it does demonstrate that it is possible. Yet its eventual failure also highlights how "even a successful community management initiative requires a support structure to cope with external shocks and stresses" (James, 2004, p. 39).

As opposed to the paucity of completely independent cases, there have been many *small-scale NGO projects* that have been significant in developing the contemporary practices of community management in India. James (2004) illustrates a number of examples, including:

- the Utthan programme from Gujarat, started in 1981, which demonstrated the influential role of women as 'spearheads' of community water services campaigns;
- Self-Employed Women Association's experience, also in Gujarat from 1972, that illustrated the need for capacity building of women's groups if they are to be successful spearheads;
- the work of the Watershed Organisation Trust in Maharashtra and Karnataka from 1996 emphasising the importance of trust between support entities and service providers as a basis for successful community management;
- Gram Vikas, whose work began on water services in 1981 in Odisha, who pioneered an intensive participatory approach based on the equitable principles that including 'every household' is the key to sustainable outcomes.

These examples merely touch the surface of the numerous NGO programmes operating over the past decades yet they serve to demonstrate the importance of NGOs in the establishment of community management. But arriving at such outcomes involved time consuming "trial and error-based experimental" approaches that were often costly in terms of resource and which required specialist skill sets (James, 2004, p. 49). This makes this kind of approach

limited in its scalability – as such resources and skills sets are often not available, and cannot easily be employed in programmes that cover many thousands of villages.

Throughout the 1990s and the early 2000s, the (supposedly) demand-responsive approach to community management was introduced to the country through a number of bilateral and multilateral donor-NGO programmes (Black and Talbot, 2004). The demand-responsive approach was based on the principles that users should express their demand through what they are willing to pay, and based on that the appropriate level of technology is put in place (Isham et al., 2002). This was usually based on the notion that communities contribute 10% of capital costs and then cover operation and maintenance through tariffs. However, in India as elsewhere, the demand-responsive approach has been implemented only to a limited extent (Black and Talbot, 2004). Yet the concept of the demand-responsive approach has been extremely widespread in internationally supported programmes with examples including the KFW (German Development Bank) funded Aapni Yojna Project in Rajasthan (1994-2004), World Bank programmes in Maharashtra and Karnataka (1991-2000), and the World Bank Swajal Project in Uttar Pradesh (1990s). As opposed to the smaller-scale NGO approaches, these initiatives had budgets between $60-100 million and sought to serve a larger number of villages (500-1000), often making use of smaller NGOs as partners (James, 2004).

Professional approaches to community management were developed in this period, including building participatory methods into the design stage of programmes, scheduled training schemes with community members to build capacity, and tripartite agreements between Village Water and Sanitation Committees (VWSC), support organisations and overall programme managers. However, despite professional practice, government requirements in areas such as procurement prevented community management from flourishing beyond these programmes as community entities were unable to make use of allocated government funds or access government procurement processes (James, 2004, 2011).

A new form of government-supported community management emerged from 1999 onwards. In that year, the Government of India implemented Sector Reform Pilot Projects (SRPP) in 67 districts across 26 states and so began the process of integrating community management into its national policy. In many states, new institutions were formed, including District level Water and Sanitation Committees, which received funds directly from the Federal Government bypassing state level agencies. Whilst there was some success in the pilot programmes, there was also resistance to change from officials who were used to a supply driven model and inadequate support at state and district level "to provide backstopping and trouble-shooting" when initiatives failed (James, 2004, p. 39).

Despite these flaws, in 2002, the Government of India launched the *Swajaldhara* programme. The Swajaldhara programme advocates community management along the following principles: a demand-driven approach; village level capacity building for community management through VWSCs; integrated service delivery mechanisms that streamlined the functioning of the government agencies involved; demand-responsive approach based on cost-sharing by users (100% of operation and maintenance costs; 10% of capital costs); and, water conservation measures through rainwater harvesting and groundwater recharge measures (Government of India, 2003).

In practice it is questionable whether these claims were met even in successful schemes as the Swajaldhara claim of 100% operation and maintenance covered by the community does not reflect the many indirect (and hidden) subsidies in India that support rural drinking water services. There are also cases where the programme has been poorly implemented, such as the one highlighted by Srivastava (2012), where the Swajaldhara programme in one area merely became a sham with no community management but water services run by local elites for their own benefit. The sheer scale of the reform meant institutions at many levels did not have the capacity to implement the aspirational objectives and the Swajaldhara programme "had roughly the same impact on sustainability as the regular…supply-driven model followed in the

country since 1972-1973…largely because of the inadequate preparation and capacity building – especially among the engineers as well as the community and NGOs" (James, 2011, p. 54).

Notwithstanding the criticism, Swajaldhara was still significant as it legalised community management within the prevailing governance model, providing a formally recognised legal basis for communities to become service providers and thus removed barriers regarding their access to government funds and procurement procedures. Perhaps most significantly the Swajaldhara provided an impetus for a number of highly successful state-based programmes to flourish in the last decade including the Water and Sanitation Management Organisation (WASMO) in Gujarat, Jal Nirmal in Karnataka, Jalanidhi in Kerala and Jalswarajya in Maharashtra (James, 2011; Lockwood and Smits, 2011).

Following Swajaldhara India is now home to a rich diversity of community management experiences. However the latest policy programme from the Government of India has sought to further formalise the model within the broader system of local self-government. Launched in 2009, the National Rural Drinking Water Programme (NRDWP) the successor to Swajaldhara has consolidated the importance of the Gram Panchayat institution in rural water services with greater responsibility and funds devolved to this level. Under these guidelines a VWSC is still formed, however it operates as a sub-committee of the local self-government (Government of India, 2012). The close institutional relationship with the Gram Panchayat means the VWSC is far from autonomous. Experience from the field indicates that this has often led to dual systems developing whereby in certain villages the Gram Panchayat simply becomes the direct service provider whilst in other villages the VWSC are formed to enact community management with support from the panchayat institutions (Rout, 2014).

In many ways, the NRDWP promotes an institutional structure that is both robust and admirably malleable in that various institutional variations can emerge, even within the same programme. Yet this can also mean a lack of clarity over the exact nature of institutional arrangements, leading to questions

over who takes key roles such as service provision or service monitoring. Furthermore, the diversity of approaches to rural drinking water services is likely to grow further as the NRDWP came to the end of its 5 year cycle in 2014. The Government of India has also abandoned its Planning Commission replacing it with the NITI Aayog (National Institutions for Transforming India) which has less direct power over policy and, hence, in the long term this move is likely to mean more freedom for States governments to promote different models for rural drinking water services (Government of India, 2015b).

Together, this historic review shows that there are different types of community management in India and current policy trends are likely to lead to even greater diversity in practice. Yet the range of models and changes in the policy landscape now mean there are tensions – or at least conceptual uncertainties – with regards to the role of communities vis-à-vis the state. It is contended that this ambiguity is poorly reflected in the discourse of community management that tends to characterise it as one identifiable approach when in reality the label is used to describe many different institutional arrangements. Through better differentiation it is felt that the more appropriate forms of support can be tailored to specific forms of community management.

3.5 Chapter summary and contribution

This chapter has focused the thesis on the Indian context. It has explained that India is a vast and populous country that has varying levels of human development and access to rural water services. The diversity means the research can investigate community management across different contexts. To provide explanatory insights into why such differences can exist in a single country, this chapter has provided an overview of the political economy tendencies that can be found in India. It was argued these represent a useful contextual background when considering trends across case studies from different states. The governance system for rural water services was also explained with the tension between a highly decentralised mode of local self-government and the legacy of centralised State Rural Water Supply Agencies highlighted. Finally, an overview of different community management models

across India was explained. This identified four main types of community management programmes which were *independent* cases, *small scale NGO initiatives*, *larger scale donor-NGO schemes* and *government-supported programmes*. This illustrates that different types of enabling support environments are present in India and can be captured in the study.

4 METHODOLOGY

The thesis contribution is based on the analysis and synthesis of findings from twenty case studies of community managed rural water service programmes compiled as part of the Community Water Plus project. Critical to providing an appropriate basis for this work was the common research framework and methods that was used in each specific case study. This was jointly developed with collaborators (Smits et al., 2015) but then refined by this author into the Fieldwork Protocols, which are accessible via Appendix B, and further conceptually developed in this thesis. The protocols were piloted and refined by this researcher in the initial scoping study for the case study that this author led in Tamil Nadu (Hutchings, 2015).

The fieldwork and report writing for the other nineteen cases were conducted by collaborating researchers (references given in table later in this chapter). To ensure consistency across the cases a series of data collection tools were developed which then fed into cross-case databases that were analysed in this research. To promote consistency in the application of the fieldwork protocols on-going support was provided by this author to the field research teams both remotely and in the field. The researchers were exposed to and familiarised with the protocols during a series of project workshops in Delhi in September 2013, Chennai in February 2014 and Jaipur in November 2014.

Support from this researcher also included field visits to seven case studies to support data collection and extended working sessions in India at the institutional headquarters of each of the collaborating research partners to ensure harmonised data processing and analysis. This chapter outlines this process in more detail. It begins by explaining the overall research design.

4.1 Research process overview and candidate's contribution

As this thesis was conducted as part of the collaborative Community Water Plus project, this section makes clear the role of the candidate in the overall project. After providing an overview of contributions made by the author to different stages of the research it then focuses on his role in the design and implementation of the cross-case study analysis, which forms the primary contribution towards the thesis. Figure

4.1 provides a summary of the role of the candidate during different phases of the Community Water Plus research.

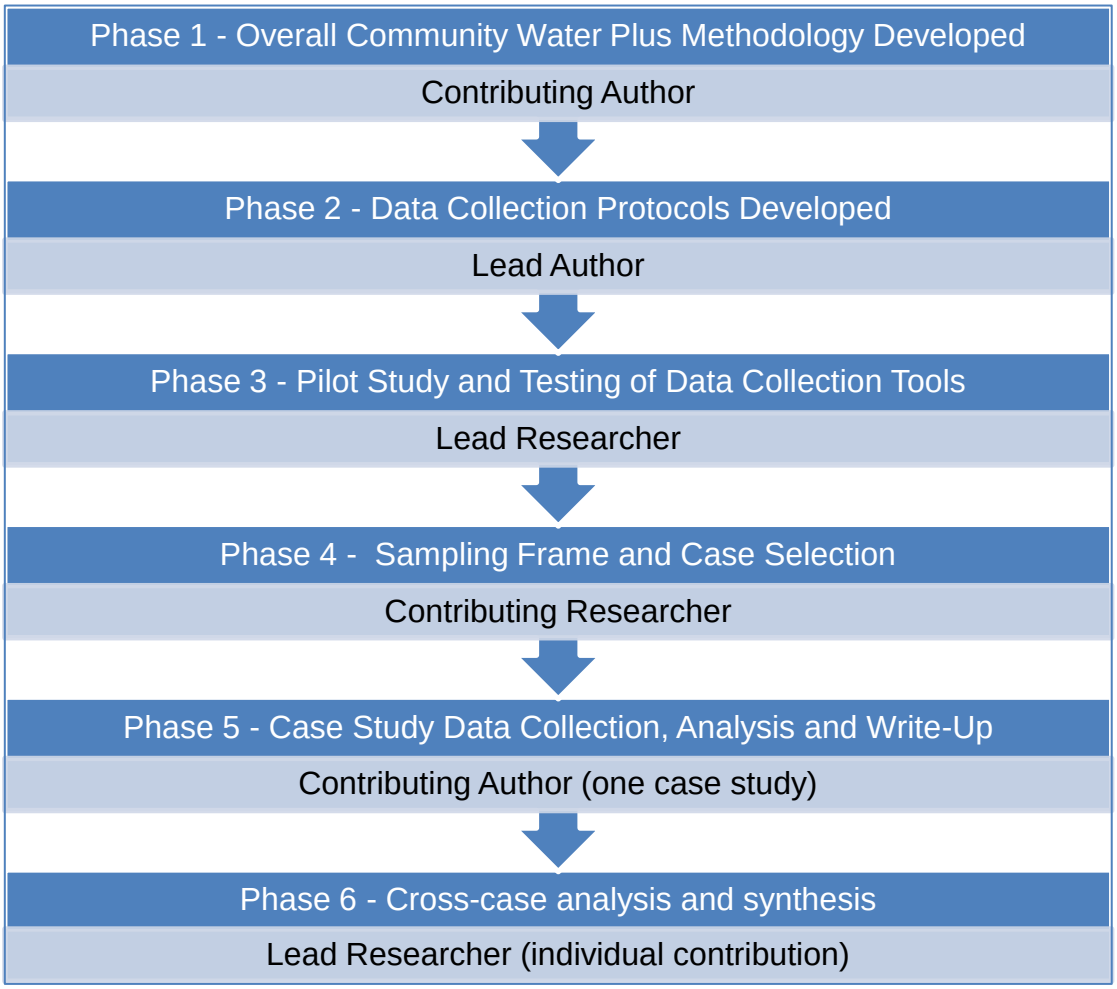

Figure 4-1 - Community Water Plus Research Process with Candidate's Contribution

In Phase 1, in which the overall project methodology was developed, the author's role was as a contributing author to the concept and methodology working paper (Smits et al., 2015). Specific contributions focused on "Section B – Research Methodology" in terms of: overall research design for the case selection and sampling sections; comparative frameworks for qualitative-quantitative data processing tools; approach for understanding contextual factors and history of case studies; and, overall editing of the remaining document (although final copy editing and print setting was also conducted separately by a specialist agency). Secondary contributions were also made to "Section A – Conceptual Framework" in terms of the literature review for the community participation, community management and organisational partnering and relationships sections.

Overall, the collaborative methodology set the trajectory of the Community Water Plus project and, by extension, this thesis through providing the foundation for the cross-case study analysis. This was in terms of the basic comparative frameworks that were used in this thesis to compare different case studies, as explained in Section 4.3.1. However, how these were operationalised into data collection and processing tools was part of Phase 2 of the Community Water Plus project, which was the responsibility of this author. This included designing the data collection methods, data processing tools and data analysis approach for individual case studies, with the associated protocols totalling over 90 pages as presented via Appendix B. Part of the associated activities in this stage involved conducting workshops and training sessions with research partners, as discussed in Section 4.10. In Phase 3 of the research, these data collection protocols were piloted, tested and refined by this author during a three-week pilot study in what would become the "Tamil Nadu – Public-Private Hybrid" (Hutchings, 2015) case study (which was also used to confirm that suitability of that case study for full inclusion within the research).

In Phase 4 of the research, this author contributed to the sampling and case selection processes by conducting a literature review of case studies from India to contribute to an overall sampling frame. Case selection was then directly actioned by in-country researchers in terms of the selection process that involved review of secondary evidence, speaking to local informants (i.e. civil servants) and pilot studies. This process was conducted by this author for the "Tamil Nadu – Public-Private Hybrid" case study only. In Phase 5 the data collection, analysis and write-up of each individual case study was conducted by research partners. This author completed this process for the Tamil Nadu – Public-Private Hybrid" and was also involved in data collection in six other case studies and provided guidance and checked the veracity of the data analysis on all twenty case studies.

Phase 6 of the Community Water Plus project on the cross-case study analysis was completed solely by this researcher and forms the core empirical contribution to this thesis. The overall research process is visualised separately in Figure 4.2. As explained above, the overall project methodology set the broad trajectory for the research. However, it did not specify how the synthesis should be conducted so Phase 6.1 involved developing, refining and clarifying the approach to the cross-case

study analysis. The approach brings together principles from the comparative ranking systems of the case survey method (Yin and Heald, 1975) with basic qualitative and quantitative analysis from multi-case study research projects (Yin, 2003). With this mix-methods design, the principle was to 'ring-fence' the qualitative and quantitative data separately during the analysis stage but then promote triangulation of those findings during the combined analysis and write-up phases.

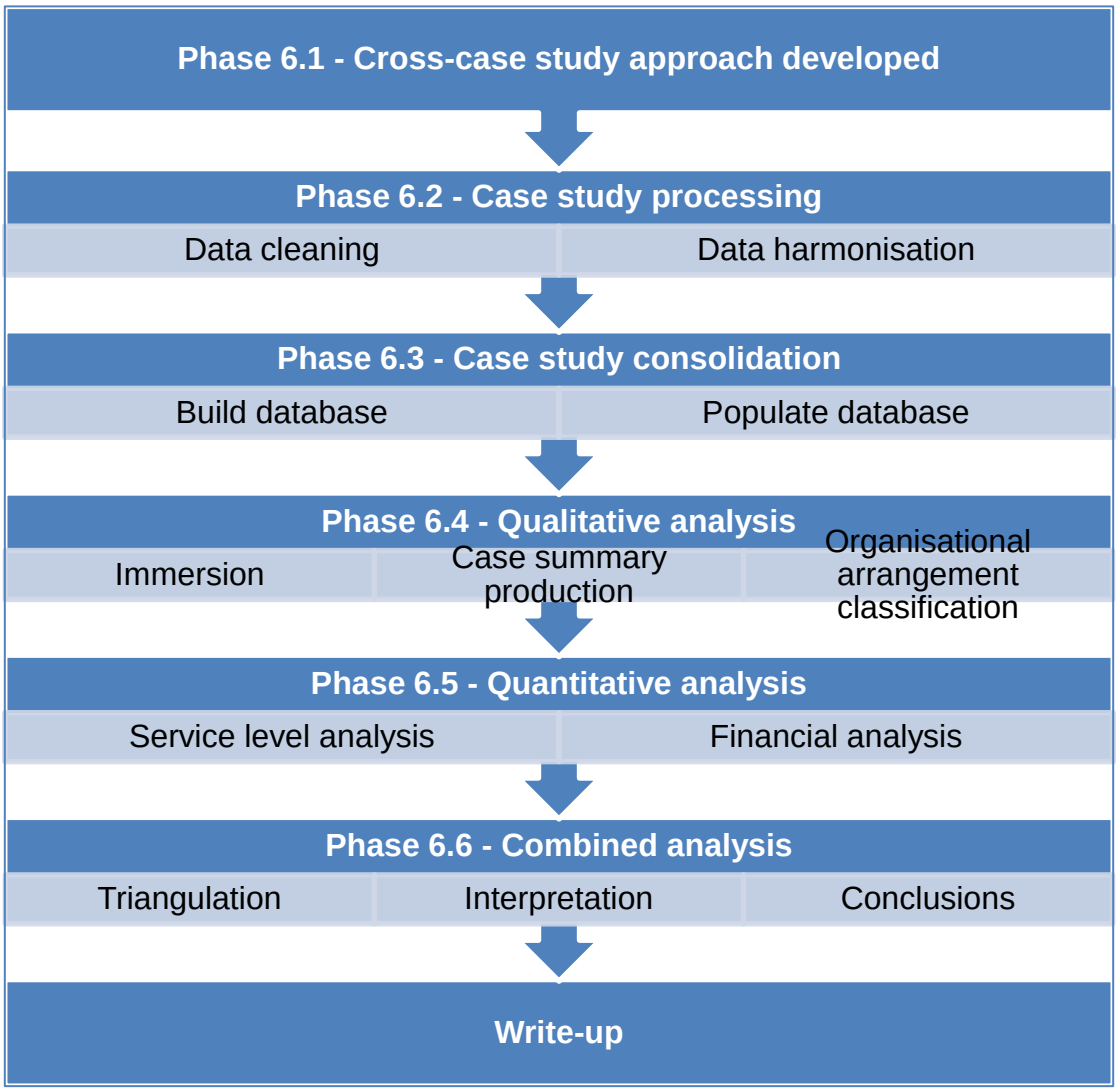

Figure 4-2 – Research processes for community

Phase 6.2 on case study processing and Phase 6.3 on case study consolidation are explained in Sections 4.3, 4.4, 4.5 of this chapter. However, in summary, they involved assessing whether individual case study report contained all the requested information as per the fieldwork protocols. This was in terms of the completeness of the information but also an assessment of its quality. Significant work was

undertaken verifying and harmonising data through discussion and consultation with the fieldwork partners. Four overview databases were built for the main analytical levels of the research – enabling support environments, community service providers, household service levels and financial costing. These were then populated with data from each of the twenty case studies which was then subject to quantitative analysis as discussed below and in Section 4.8. The qualitative data for this research were the case study reports themselves and, as the reports were peer-reviewed by a team of core researchers (including this author), the data cleaning process had already been completed for these documents.

Phase 6.4 on the qualitative analysis and Phase 6.5 on the quantitative analysis are explained in Section 4.7. In summary, the qualitative analysis followed an immersive approach in which the case study reports were read and then summarised in terms of key features of that case study. This 'recursive abstraction' approach (Stebbins, 2001) to data analysis was considered appropriate as compared to the more common thematic coding approach for qualitative analysis, as the case studies were already arranged thematically by the prescribed structural set-up of the case study. It follows the principles advocated by Ritchie et al. (2013) in large-scale qualitative policy research in which the process of summarizing case study features promotes learnings and research insights about key trends and patterns. A process of classification was also applied to the organisational arrangements found in each case study at the enabling support environment and community service provider level. This involved developing typologies that covered the organisational forms described in the reports and then allocating the case studies within these groups. The results of that classification process are presented in Chapter Five. The quantitative analysis sought to provide a descriptive statistical overview of key trends and patterns across the case studies in terms of the service levels reported via the household surveys and the financial costs reported in the case study reports. Basic descriptive analysis was also applied to the qualitative-quantitative data from the scoring tables related to participation, partnering and other institutional elements. The precise tests used are presented in Table 4.9 later in this chapter.

In Phase 6.6 on the combined analysis, the emphasis was on data *triangulation* between the different analysis streams – a key strength of a mix-methods approach (Teddlie and Yu, 2007). For example, this means assessing whether the

qualitatively-defined organisational typologies had different quantitatively-assessed characteristics, such as financial cost sharing arrangements or service level outcomes. It also involves checking the empirical and theoretical-logical coherence of the findings from each form of analysis and using this to inform any interpretation of the findings. The interpretation of the findings and the conclusions drawn from the study have been shaped by the literature review chapters and, in particular, the comparison of the two sets of paradigmatic claims associated with community management and community management plus. In the main discussion of findings, presented in Chapter Seven, the author has sought to further develop institutionalised co-production (Joshi and Moore, 2004) as a key concept for explaining and interpreting the results. In summary, this section has described the author's significant contribution to the broader Community Water Plus project through all phases of the research. It has then focused on the author's primary and individual contribution to the design and implementation of the cross-case study analysis. Further details on the different stages of the methodology are presented throughout the remainder of this chapter.

4.2 Case framework, selection and sampling

The Community Water Plus research was organised around a framework of elements that reflect the core components of a successful community management rural water services programme, as explained in Chapter Two and visually outlined in Figure 4-3. The primary unit of analysis and therefore the determining component for case selection was the 'enabling support environment' in the form of a particular programme supporting community managed rural water services. This reflects the importance the research places on understanding how to design and finance effective supporting organisations for community management plus. The programmes were purposively selected based on what is described by Flyvbjerg (2006) as "most likely cases" of community management plus in India with the principle that they can be used to verify or falsify the hypotheses associated with the model outlined in Chapter Two.

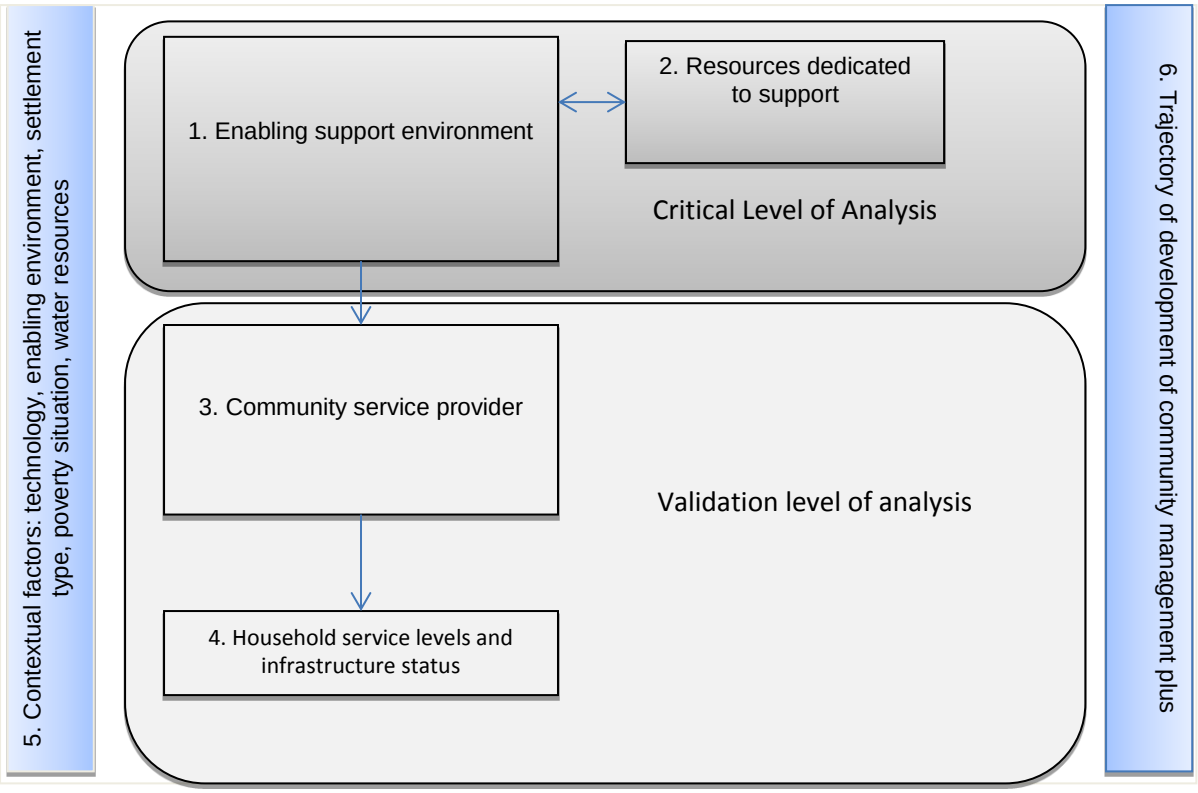

Figure 4-3 - Community Water Plus Research Elements Framework (Smits et al., 2015)

The case selection process led to the selection of twenty case studies that are placed on the map of India in Figure 4-4 and named in Table 4-1 below. The selection was made from an all India sampling frame of 92 cases that was developed from the literature and feedback from government and other sector stakeholders working in the Indian sector. The case studies were then selected through consultation with local officials and pilot visits were made by individual research teams to verify that they would make an appropriate case study. An initial condition of selection was that the cases should have been operational for at least five years. In the end, the average age of case study was seven years but there were five that had been operational less the five years.

In selecting the cases a key stratification was to cover different GDP per capita measures at the state level with 17 different states being covered. These ranged from the poorest state in the study, Jharkhand having a 2014 GDP per capita of $2,632, to the richest state Sikkim, at over $10,000 GDP per capita. These are comparable to levels found in Chad and Albania (World Bank, 2016a), respectively, showing the study covers a range of wealth from a poor Sub-Saharan Africa context to a middle-income Eastern European country. Selecting by state also ensured the

study had a good geographical coverage of different regions in India, as shown in Figure 4-2 below.

Figure 4-4 - Location of Community Water Plus case studies across India

Beyond wealth, two other selection stratifications were to cover different types of support programmes, from government support programmes to small-scale NGOs programmes. The full range of different support systems is the subject for discussion in the following chapter so will not be explained here. The stratification for the technical design of the system was designed to cover different forms of piped supply and also non-piped supply. In considering how to design the technical stratification criteria there was a consideration of adopting the WASHCost categories (Mcintyre et al., 2014) yet these were not widely recognised in India so it became easier to adopt the Indian terminology for different types of water supply set-ups. These were:

- Borehole Handpump – a borehole with handpump attached.
- Single-Village Scheme (Tubewell) – reticulated water supply serving the population of a village through piped water supply either to household connections or public stand posts (or both). The source for the system is a local borehole.
- Single-Village Scheme (Surface) - reticulated water supply serving the population of a village through piped water supply either to household connections or public standposts (or both). The source for the system is a surface water source usually a river in the plains
- Single-Village Scheme (Gravity-fed) – reticulated water supply serving the population of a village through piped water supply either to household connections or public standposts (or both). The source for the system is spring or similar in a hilly or mountainous area.
- Single-Village Scheme (Mixed) – reticulated water supply serving the population of a village through piped water supply either to household connections or public standposts (or both). The source for the system comes from a mixture of borehole, surface and/or gravity-fed sources.
- Multi-village Scheme - reticulated water supply serving the population of multiple villages through piped water supply either to household connections or public standposts (or both). The source for the system can come from either borehole, surface or gravity-fed sources.
- Water Kiosk – a type of point source in which users pay to access water from a vending point in the village as they use it. The source for the system can vary but usually a Reverse Osmosis plant or equivalent treats the water before vending.

A problem in specifying the technical design of a water system in India is that often multiple systems can overlap and these can even be managed by different entities (Reddy and Batchelor, 2012). This research focused on the technical system that was implemented and/or maintained under the enabling support environment being studied. As shown in Table 4-1 below, the study covers different forms of piped supply adequately but is weak on other forms of supply, such as handpumps and water kiosks, with only one case study each focusing on these, respectively.

Table 4-1 - List of Community Water Plus case studies

#	State[9]	Case Name and reference	Tech Type	Household Connection (% from survey)	Years of Operations	State GDP Per Capita	State GDP per person relative to All India	Physio-geographic Zone[10]
1	Jharkhand	Drinking Water and Sanitation Department (Ranchi West Division), Ranchi West District, Jharkhand (Javorszky et al., 2015)	Single-Village Scheme (Tubewell)	48%	4	$ 2,632	*62%*	Plateau
2	Madhya Pradesh	VASUDHA and PHED support in Dhar district, Madhya Pradesh (Ramamohan Roa and Raviprakash, 2016a)	Single-Village Scheme (Tubewell)	100%	2	$ 2,955	*70%*	Plateau
3	Odisha	Gram Vikas model in Ganjam, Bargarh and Jharsuguda districts, Odisha (Javorszky et al., 2016)	Single-Village Scheme (Tubewell)	95%	3	$ 2,998	*71%*	Coast
4	Chhattisgarh	Chhattisgarh Public Health Engineering Department, Rajnandgaon district (Javorszky et al., 2015)	Single-Village Scheme (Tubewell)	54%	14	$ 3,340	*79%*	Plateau
5	Meghalaya	The Dorbars and gravity based Piped Water Supply in Meghalaya (Saraswathy, 2016b)	Single-Village Scheme (Gravity-fed)	31%	9	$3,511	*83%*	Mountains
6	Rajasthan	Swajaldhara programme in Jaipur district, Rajasthan (Harris et al., 2016b)	Single-Village Scheme (Tubewell)	91%	6	$ 3,763	*89%*	Plains
7	West Bengal	Community-managed handpumps in Patharpratima, West Bengal (Smits and Mekala, 2015)	Tubewell Handpump	0%	6	$3,997	*94%*	Plains
8	Telangana	Decentralised drinking water service delivery –	Water Kiosk	39%	5	$4,643	*109%*	Coast

[9] The state name given will be used as shorthand name in text and future figures and tables

[10] Physiographic Zones as adapted from India State of the Environment Report (2009) and Sheikh et al. (2011)

		community managed water purification units in Telangana (Chary Vedala et al., 2016a)						
9	Karnataka	Jal Nirmal and beyond: supporting the community management of rural water supply in Belagavi district, Karnataka (World Bank) (Ramamohan Roa and Raviprakash, 2016b)	Single-Village Scheme (Surface)	65%	6	$5,108	*120%*	Plateau
10	Himachal Pradesh	Community Water Classic: the success of community managed water supplies in Himachal Pradesh with limited on-going support (Harris, Brighu, & Poonia, 2016)	Single-Village Scheme (Gravity-fed)	92%	6	$5,265	*124%*	Mountains
11	Punjab	24x7 water supply in Punjab: international funding for local action (World Bank) (Harris et al., 2016a)	Single-Village Scheme (Tubewell)	100%	3	$5,268	*124%*	Plains
12	Uttarakhand	Support to community-managed rural water supplies in the Uttarakhand Himalayas - the Himmotthan Water Supply and Sanitation initiative (Smits, Shiva, & Kapur, 2016)	Single-Village Scheme (Gravity-fed)	0%	8	$5,916	*139%*	Mountains
13	Kerala I – World Bank	Jalanidhi programme in Nenmeni Panchayath, Wayanad District, Kerala (World Bank) (Saraswathy, 2016a)	Multi-village Scheme	100%	9	$5,922	*140%*	Coast
14	Kerala II – Local self-government	Community-managed rural water supply in Malappuram district, Kerala (Chary Vedala et al., 2016b)	Single-Village Scheme (Surface)	100%	9	$5,922	*140%*	Coast
15	Gujarat – WASMO Gandhinagar	WASMO in Gandhinagar District (Chary Vedala et al., 2015a)	Single-Village Scheme (Mixed)	100%	11	$6,094	*144%*	Plains
16	Gujarat – WASMO Kutch	WASMO in the desert Kutch region (Chary Vedala et al., 2015a)	Single-Village Scheme (Mixed)	99%	6	$6,094	*144%*	Plains
17	Tamil Nadu – Local self-government	TWAD Board and the Panchayat Raj Institutions in Erode district (Saraswathy, 2015)	Single-Village Scheme (Mixed)	93%	10	$6,427	*151%*	Coast
18	Tamil Nadu – Public-Private Hybrid	TWAD Board and the Hogenakkal Water Supply and Fluorosis Mitigation Project in Morappur district (Hutchings, 2015)	Multi-village Scheme	94%	3	$6,427	*151%*	Coast
19	Maharashtra	Maharashtra Jeevan Pradhikaran (MJP) and the Shahnoor Dam project (Chary Vedala et al.,	Multi-village Scheme	100%	14	$6,679	*157%*	Coast

		2016c)						
20	Sikkim	Decentralised local self-government and gravity based Piped Water Supply in Sikkim (Saraswathy, 2016a)	Single-Village Scheme (Gravity-fed)	0%	5	$10,068	*237%*	Mountains

Within each case study there was an embedded case study design (Yin, 2003) in which a number of community service providers which are supported by the enabling support environment were studied. The intended design was for four such community service providers to be covered across three ‘programme villages’ and one ‘control village’ coming from outside the programme, although, as discussed in the methodological limitations section of this chapter, there is some variation on this arrangement across the cases. The design principle follows what is called literal and theoretical replication logic in case study research (Yin, 2003). The selection of the literal replications means having more than one case unit that exhibits the phenomena under study (i.e. the enabling support environment) increasing external validity whilst the theoretical replication is then having a case unit without that phenomena that improves the internal validity of the study. This design can be considered analogous to the concept of ‘treatment’ and ‘control’ in quantitative research design (Yin, 2003).

Based on the selection of the Community Service Providers there was intended to be 80 villages (60 programme and 20 control) as part of the study and so there was a need to collect data from households in the programme and control villages so to validate the service levels people received. For this purpose a predefined sample size of 30 households was selected for each village which was shaped by the resources available to the project and the desire to achieve a reasonably representative sample (which will be discussed below). Random interval sampling was followed based on standard practice for such household survey research in developing countries (Deaton, 1997). Each of the case selection and sampling processes is summarised in Table 4-2.

Table 4-2 - Case Selection and Sampling Strategies

Analytical Level	Case Selection / Sampling Approach	Sampling Frame	System of selection	Units Selected
Enabling Support Environment	Stratified Purposive Case Selection (Patton, 2002)	Initial scan of the literature gave a sampling frame of 162 reportedly successful community management programmes that was refined to 92 (as shown in Appendix X)	Non-probability purposive approach based on literature scan and consultation with sector experts. Programmes selected to stratify type of support programme (i.e. public sector, NGO), geographical and socio-economic conditions at the state level.	20 programmes selected
Community Service Provider	Embedded case study design based on literal and theoretical replication logic (Yin, 2003)	All villages supported by programme selected at the Enabling Support Environment level	Consultation with programme officials about identifying three high performing villages and one village outside programme. This approach is designed to enable research hypotheses to be tested against and is analogous to the concept of a "control" case in quantitative research design (Yin, 2003)	3 programme villages and 1 control village per case study. In total circa 60 programme villages and 20 control villages.
Households	Quasi-random interval sampling	All households in the programme and control villages	A predefined sample size of 30 households per village was selected due to the resources available to research partners. Household were selected by random interval sampling in which the enumerators used the size of the village and sample size of 30 to calculate an interval based the sampling on (i.e. population of 90 households divided by sample of 30 means sampling interval (k) of 3)[11]. A household was selected in a quasi-random manner from the village and then every k household was surveyed as the research completed a walking transect of the entire village.	30 households per village meaning 90 surveys from programme villages and 30 from control villages per case study. In total circa 2400 households surveyed.

[11] Total Population of households (N) ÷ Sample size (n = 30)=Sampling Interval (k)

4.3 Embedding comparative data processing tools in the case studies

The research can be described as a multi-case study research project yet the number of case studies is higher than is conventionally associated with this method (Yin, 2003). As such, comparative analysis following the in-depth qualitative coding approaches of conventional case study research (Flyvbjerg, 2006) would have been problematic. Instead the research adopted principles from the case survey method (Larsson, 1993; Yin and Heald, 1975) that seeks to standardise the qualitative information from various case studies into comparable quantified-qualitative data. As will be discussed later in this chapter the researcher acknowledges that this approach can be problematic for promoting an exclusion and inclusion bias by directing analysis in particular directions and for simplifying complex concepts (Yin and Heald, 1975). However, to promote the desired comparability it was decided this was an appropriate approach and, therefore, a number of data processing tools were developed to embed within each case study to provide a framework for comparative analysis. These related to the key hypotheses outlined at the end of Chapter Two. They include measures related to 'professionalisation', 'participation', 'partnering' and 'institutional performance'. Each will be briefly explained here but the data processing tools are outlined in more detail in the fieldwork protocols available via Appendix B. The data collection methods will be explained after the tools.

4.3.1 Qualitative-quantitative data processing tools

To measure the professionalisation of the enabling support environment and the community service provider, the research adopted an approach called Qualitative Information Systems (Postma et al., 2004; da Silva Wells et al., 2013). These were developed as a means for standardising evaluation in water, sanitation and hygiene programmes. The researchers were provided with a series of questions to ask in key informant interview and focus groups, and then in the analysis of the data collected, they are asked to incorporate a quantitative logic in their assessment of the findings. In essence, they were asked to complete a ranking ladder, similar to a Likert scale. For an illustrative example, in Table 4-3, the researcher is asked to rank the formality of the mandate for enabling support entity's support activities on a five-point scale

from 0 to 100. There were seven such tools related to professionalisation at the enabling support environment and community service provider levels which were then consolidated using the standard mean to give an overall ranking of professionalisation. To promote consistency in scoring, the researchers have to provide an explanation for the scoring which was used to harmonise the scoring process across the cases by this author.

Table 4-3: Scoring table for indicator 1.1: formality of mandate for support (as provided via Appendix B in protocols)

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	

Participation and partnering were integrated into data processing tools based on laddered frameworks. For participation, recognising the resolution at which this can be meaningfully captured in a standardised way, the tool was designed to assess the extent to which communities had decision-making power at key stages of the service delivery cycle. Similarly, with the research interested in the co-production of the enabling support environment and community service provider organisations, the researchers were asked to assess the type of partnering that best described the relationship between these levels. Both these frameworks are given in Tables 4-4 and 4-5. As with the other data processing tools, researchers provided narrative explanation of their selections in the database that enable this researcher to harmonise the interpretation across the cases.

Table 4-4: Ladder of participation (based on Pretty (1994), adapted from Adnan, et al., (1992), in key issues in rural water supplies, first presented in Smits et al. (2015)).

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.

Table 4-5 Organisational partnering typology for relation between ESE and community service provider (CSP) during different phases of service delivery cycle (adapted from Demirjian (2002) and first presented in Smits et al. (2015))

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.)

The final qualitative-quantitative data processing tool was for the enabling support environment. It related to desire to deepen the characterisation of successful enabling support entities by assessing the relative strengths and weaknesses of them using an institutional assessment (Cullivan et al., 1988). Such a tool was originally developed by USAID to assess the performance of urban utilities but it was considered potentially useful to adapt to this new context. The tool focuses on eight areas that are accompanied by a series of statements which researchers then consider whether they agree or disagree with. The areas are: Autonomy; Leadership; Management & Administration; Community Orientation; Technical Capability; Developing & Maintaining Staff; Organisational Culture; Interactions with Key External Institutions. The ranking in each category were then used to compare the characteristics of the different support organisations covered in the study.

4.3.2 Quantitative data processing tools

The synthesis framework also involved developing two quantitative data processing tools. The first relates to how the research assesses the level of success between case studies, which is through the service levels delivered. The calculation of the service levels is based on using household survey data to calculate the service level benchmarks presented in the previous chapter that contains five different parameters: quantity, accessibility, quality, reliability and continuity. Amin et al. (2015) proposed a composite service level indicator that brings these different parameters together into one measurement unit. As they discussed, there are numerous approaches for producing a composite indicator of water service level, including nominal logic (Burr and Fonseca, 2013), the basic arithmetic mean and various forms of statistical weighting. To avoid over compensability between the different parameters (i.e. high reliability making up for low quantity), the approach taken draws on a mixture of nominal threshold logic and the geometric mean. This approach means that if any service level is either sub-standard or no service then the composite indicator cannot exceed this reflecting a nominal logic. However, above this, the geometric mean is employed as it *"limits the impact of compensability and eclipsing (where the composite indicator is insensitive to a single variable)"* (Amin et al., 2015, p. 14). This approach is used as the main benchmarking measure of service levels when comparing case studies.

The final element of the synthesis framework relates to standardising the assessment of financial costs. Researchers were asked to collate the data related to the various elements of the 'life-cycle cost approach' described in Chapter Two. The focus was on financial costs only rather than economic costs so to promote proximity to the actual data rather than have individual researchers attempt to calculate items such as the opportunity-cost of voluntary labour. The costs were asked to be produced as follows:

- CapEx – per person, in 2014 Indian Rupees
- Recurrent Costs (OpEx, OpEx Enabling Support, CapManEx) – per person, per year in 2014 India Rupees

The 'per person' scale provided a base for comparison. For historical costs, researchers were given an inflation calculation tool to calculate the inflation of hardware costs by the Indian Construction Price Index (Counstruction Industry Development Council (India), 2016) and software costs by the Consumer Price Index (Reserve Bank of India, 2015). This distinction was developed during the research as it was deemed an appropriate balance because of the high levels of inflation in the consumer price index in recent years in India not yet being reflected in the inflation of the unit costs of infrastructure, as per the advice of government officials in India. For this synthesis costs were presented using the mid 2014 exchange rate of INR60 to USD$1 along with the 3.42 Purchasing Power Parity adjustment (World Bank, 2016a).

4.4 Data collection methods

The data collection methods for fieldwork are outlined in detail via Appendix B which also explains in detail how they relate to the data processing tools outlined above and so this section is presented in an abridged format. The following methods were used at each analytical level:

- Enabling Support Environment – key informant interviews and secondary records (i.e. accounts, reports).
- Community Service Providers – key informant interviews, focus groups and and secondary records (i.e. accounts, reports).
- Household level – household surveys.

On average in each case study 14 key informant interviews, seven focus groups and 118 household surveys were conducted by the field research teams, as shown in Table 4-6. The data collected was processed by the researchers through the tools above to feed into four databases covering the enabling support environment, community service provider, household service levels and financial costs. As well as these databases, twenty reports were drafted that contained a rich description and analysis of the case studies.

Table 4-6 - Primary datasets from across the case studies

#	Case Studies	Enabling Support Environment		Community Service Provider		Household	
		Key informant interviews	Focus Groups	Key informant interviews	Focus Groups	Focus group / unstructured interview	Survey
1	**Jharkhand**	8		8	4	4	120
2	**Madhya Pradesh**	4	2	11	4	4	120
3	**Orissa**	4		5	8		120
4	**Chhattisgarh**	5		8	6		120
5	**Meghalaya**	8		8	4	4	120
6	**Rajasthan**	5		4			120
7	**West Bengal**	4	2	2	2	4	120
8	**Telangana**	8	2	6	6		68
9	**Karnataka**	8		8	4	4	120
10	**Himachal Pradesh**	6		6	4		89
11	**Punjab**	8			4	4	120
12	**Uttarakhand**	5		3	2	3	98
13	**Kerala I - World Bank**	4		4	3		120
14	**Kerala II**	10	1	4	4	4	120
15	**Gujarat I**	8	2	12	4	4	120
16	**Gujarat II**	8	2	12	4	4	120
17	**Tamil Nadu I**	3		8	3		120
18	**Tamil Nadu II**	10	1	16	1	0	180
19	**Maharashtra**	8	1	2	4		120
20	**Sikkim**	10		11	3	4	120
Total		***124***	***13***	***127***	***62***	***43***	***2355***

4.5 Data cleaning, consolidation and harmonisation

With so much data to deal with, a key process in the synthesis was data cleaning, consolidation and harmonisation. Spreadsheets were designed in MS Excel for the enabling support environment, community service provider, household service levels and finance data to process the fieldwork data. The field-researchers were asked to fill these databases, which were designed to be convergent with the fieldwork protocols with features built into to promote data consistency such as formatting cells to receive only certain types of data. The spreadsheets were then submitted to this researcher by the field-research teams for checking and sign-off. The following criteria were considered in this process:

- Completeness: A systematic assessment was undertaken to ensure all sections of each case study database was completed. In cases where there was missing data then requests will be made to the research team to populate the databases. In any case where a significant amount of data remained missing then the case was excluded from that part of the analysis.
- Creditability: An informed reading of the data was made to make an assessment of creditability. Key questions include:
    I. What was the original source of the data? Is this explicitly mentioned and can this be traced to a credible source (i.e. interview with relevant stakeholder)?
    II. What was the 'rawest' level of data available? How has this data been manipulated/interpreted?
    III. Was the data feasible? (i.e. are unit costs within the magnitudes expected?)
    IV. Formatting: consistent formatting was checked as coding was used to export the data from the case level into synthesis databases and therefore the formatting had to be precise

In cases where queries arose, then clarification requests were sent to the research team and worked through in partnership to move to agreed resolution. It was also recognised that different priorities needed to be applied to each database during cleaning such as assessing interpretative logic for the qualitative-quantitative indicators or checking consistency in use of drop-down menus for the household survey data.

Once the data had been cleaned it was consolidated into cross-case databases for each analytical level in both MS Excel and Statistical Package for Social Science (SPSS) software. Visual Basic Application (VBA) coding was used to accelerate the consolidation process. As the analysis progressed the four databases were

consolidated into a master database containing key data from each analytical level across all the cases.

When working with the data there were times when queries with the data were spotted that were not initially picked up during cleaning – this particularly related to the inconsistent use of qualitative-quantitative frameworks and tools. It was therefore deemed appropriate to undergo a data harmonisation process whereby this researcher set-up calls with each research team to understand how they had interpreted the data processing tools, which led to the reallocation of scores in some situations. The financial data underwent a similar thorough harmonisation process led by the Community Water Plus principle investigator and PhD supervisor with support from MSc students. This involved cleaning, consolidating and harmonising financial data at the individual case level but no cross-case analysis which was the sole work of this author.

4.6 Clarifying the resolution of analysis

With so much potential data the resolution and granularity at which the analysis was conducted was a key question for this study. Part of the challenge was simply dealing with such large volumes of data whilst attempting to retain an appropriate balance between abstracted quantitative analysis and the context rich essence of the case study method. This resolution was experimented with during the write-up. The researcher re-analysed and harmonised each individual case study report. The initial plan was to apply ‘framework analysis’ to the reports (Ritchie and Lewis, 2003; Ritchie et al., 2013) that seeks to code and summarise multiple qualitative transcripts or case studies into an overall framework to be analysed by case or theme. Ultimately, this approach was not followed as its robust application was not deemed feasible in the time frame of having the reports (with an average case study having approximately 50 pages and some not submitted late into the thesis process).

However, the framework approach did highlight the importance of “data summarisation” as a vehicle for analysis when working with such large amounts of text (Ritchie and Lewis, 2003). An immersive approach to report analysis was therefore conducted that led to the production of twenty summaries of the reports highlighting key themes and conclusions. This approach followed the principles of

recursive abstraction in which the process of the researcher summarising large-qualitative datasets into summaries helps highlight key trends and patterns (Stebbins, 2001). It was debated whether to include these within the main body of the thesis but this approach was rejected as presenting too much case-specific detail to enable a meaningful synthesis of findings, so they were instead presented via Appendix B. However, this process was crucial to the overall synthesis process as it enabled an appropriate understanding of the context of each case study to be developed by this researcher (alongside the fieldwork undertaken directly in seven case studies).

Similar questions of appropriate resolution were considered when working with the cross-case databases. With the enabling support environment being the primary unit of analysis this was the default level to which data was summarised and compared in the comparative analysis presented in the following chapters, unless otherwise stated. Yet an important issue was that whilst complete and reliable data was found on the enabling support environment for the programme villages in every case study, there was very little data at this level for the control villages. It was therefore not possible to compare between programme and control villages any of the data that was reliant on input from this level. For example, it was not possible to reliably understand the cost reported in the control villages as these were likely to only be partial costs, not including those documented at the enabling support environment level. Yet when it came to household surveys that data was collected at the village level only and had been consistently conducted both in the programme and control villages in all the case studies. Hence, it was possible to compare the control village to the programme villages for this dataset. This meant the programme-control design enabled the verification of comparative success in terms of service levels but not a full analysis of other elements of the research between programme and control.

In conducting the financial synthesis another decision was taken regarding the resolution at which the synthesis was conducted. The financial data was provided at a granularity regarding which type of support entity was covering external costs. Yet the types of organisations providing finance varied from case-to-case and the research problem regarding costs related primarily to trying to document the level of financial support beyond communities needed to deliver sustainable services. The

cost data was therefore analysed in a simply binary form that compared community costs to all support costs.

4.7 Acknowledging the representativeness issue

The purposive selection of the case studies was not intended to develop some form of representative sample of community management in India. However, due to the use of the household survey to assess service levels, it is important to discuss the issues of representativeness in this element of the study. A limitation of the research is that based on standard tests the sampling strategy for household surveying cannot be considered statistically representative at the single village level, as measured by commonly agreed standards for calculating sample sizes, i.e. 5% confidence interval at a 95% confidence level when faced with a 50/50 variability in response (Field, 2013). The average habitation size from this research is around 300 households and so based on those worse-case conditions described in the previous sentence the confidence interval for the sample is 17% which gives a larger margin of error than the standard level of 5%.

When a sample is not statistically representative it is best to focus on presenting data with basic descriptive statistics (Black, 2012) whilst in his classic work on the analysis of household surveys Deaton (1997, p. 133) argues that:

"The use of survey data…is often straightforward, requiring little statistical technique beyond the calculation of measures of central tendency and dispersion."

This approach is therefore followed when focusing on case level data with basic frequency and central tendency measures (i.e. means, inter-quartile range and standard deviation) given to describe service levels.

However, due to the marginal returns between sample sizes and very large populations, the findings from the overall sample of household data can be treated with higher confidence. As explained, the case selection process followed a purposive approach so is not representative of community management across India, as it was designed to cherry pick high performance. However, based on the results from the initial scanning of the Community Water Plus project it can be said that:

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. (Smits et al. 2015)

Based on the assumption that the 1,766 household surveys from the programme villages (out of a total of 2355 from the whole study) are representative of the nearly 50 million people reported as being served by reportedly successful community managed rural water services, then the confidence interval comes down to 2.33% at the 95% confidence level. This means the analysis of this data at the whole sample level can be treated with much greater confidence than analysis at the single village level.

4.8 Data analysis

Data analysis involved two main threads. The first was the immersive case study analysis, which was explained above in Sections 4.1 and 4.6. That led to the production of the twenty case study summaries. This section does not explain that approach again but rather how the databases were analysed containing the data from the qualitative-quantitative processing tools, household surveys and financial elements. A largely descriptive statistical approach was followed with analysis conducted in SPSS. This was appropriate due to the 'fuzzy' nature of qualitative-quantitative data and also the representative issues discussed above. The principle was to structure and present the data in a format where trends and patterns can be analysed and triangulated with the qualitative narratives from the case studies. The differences between the datasets from each analytical level mean that they need to be treated in different ways.

Table 4-8 provides an overview of the analysis approaches with emphasis on presented basic frequencies and central tendency measures alongside measures of dispersion. Where appropriate, these basic descriptive statistics will be accompanied by non-parametric statistical testing of the differences between groups and bivariate correlations. For this purpose the Mann-Whitney U-test or Kruskal Wallis test will be

used to compare medians between groups, while Kendall's tau will be used to measure the association between two variables (Field, 2013; Sirkin, 2006). These have been selected as they are flexible tests that can be applied to data which is either continuous or ordinal and not normally distributed (Field, 2013). Following the advice of Black (2012) when the Kruskal Wallis indicates a significant difference between sub-groups, a post hoc Dunn-Bonferroni pairwise test will be used to further assess which groups are different to one-another. Kendall's tau also has the advantage that it tends to be more conservative than other tests for correlation so in this sense it will provide more statistically robust results when effects are found. Table 4-7 provides a guide to assess the size of effect in correlation analysis which will be used to interpret the results.

Table 4-7 - Assessing effect from Kendall's Tau tests (Field, 2013)

Correlation Coefficient Interpretation Guide	Interpretation
<0.1	Negligible effect
0.1-0.3	Small effect
0.3-0.5	Medium effect
>0.5	Large effect

Table 4-8 - Data analysis approach summary

Category	Enabling Support Environment & Community Service Provider	Service Level Analysis	Financial Costs	Overview Analysis
Data Source	20 – databases consolidated into overview database	2239 Household Surveys	20 – databases consolidated into overview database	Overview database
Critical Data Type	Qualitative-quantitative (ordinal or categorical)	Ordinal (composite service level indicator)	Continuous	Continuous v Ordinal (treated as continuous)
Basic frequency	Count and Percent	Count and Percent	Count and Percent	Count and Percent
Central Tendency	Mode or Median	Median	Mean	Mean
Dispersion	Range and inter-quartile range	Standard Deviation & Inter-quartile range	Standard Deviation & Inter-quartile range	Standard Deviation
Shape of distribution	N/A	Visualisation & Skewness and Kurtosis	Visualisation & Skewness and Kurtosis	Standard Deviation & Inter-quartile range
Statistical Tests for Comparing Average of Groups within one Variable	N/A	Mann Whitney U-test or Kruskal Wallis test	Mann Whitney U-test or Kruskal Wallis test (with post hoc Dunn-Bonferroni pairwise testing)	Mann Whitney U-test or Kruskal Wallis test (with post hoc Dunn-Bonferroni pairwise testing)
Statistical Tests for Association between two variables	N/A	Kendall's tau	Kendall's tau	Kendall's tau
Level of significance	N/A	<0.05 Significant and <0.01 Very Significant	<0.05 Significant and <0.01 Very Significant	<0.05 Significant and <0.01 Very Significant

4.9 Research ethics

Research ethics are especially important in development research due to the uneven power relations that often exist between researchers and participants (Laws et al., 2003). As part of this thesis, this especially applied to the seven months the researcher was conducting fieldwork in India either directly or in support of collaborating research partners. To guide conduct during this time, the researcher followed the useful 'applied guide to ethics' from Laws et al. (2003) that specifies the following principles: avoiding harm to respondents; avoiding undue intrusion into people's lives; communicating information clearly and obtaining informed consent for participation; explaining and enforcing the rights to confidentially and anonymity; trying to provide fair return for any assistance offered in the field; giving appropriate acknowledgement to respondents' in publications (but not contradicting the right to confidentiality). Such principles were followed and, procedurally, the research underwent ethical review by the Cranfield University Research Ethics Committee which approved the research in January 2013. The form, provided in Appendix B, provides more details on the ethical procedures followed.

However, perhaps of particular relevance to this study is the emphasis from Laws et al. (2003, p. 175) that researchers also have a responsibility to colleagues when conducting research. For example, they argue: *"Northern researchers should take account of the interests and needs of Southern colleagues, considering the disparity in resources available to them."* As a researcher and individual I sought to act with integrity during the research and work sensitively with collaborating partners. As suggested in the quote, this often materialised in everyday ways such as being conscious of the contrasting purchasing power of myself and (some) in-country researchers, for example, suggesting to eat in local *dhabas* that have cheap (and very good!) food rather than expensive hotel restaurants. As will be discussed in the following section I am completely indebted to my Indian colleagues for providing the data that this thesis is based upon and hope it does justice to their hard work.

4.10 Reflections on collaborative research

When conducting the complex business of collaborative development research it is important to reflect on challenges and limitations (Laws et al., 2003). This research was made possible by being embedded in the Department for Foreign Affairs and Trade, Government of Australia, supported Community Water Plus research project. Being part of this project has provided access to data that would have been impossible to collect as an individual PhD researcher. This was made possible by the close collaboration with research partners from the Administrative College of India (Hyderabad), Centre for Excellence in Change (Chennai), Malaviya National Institute of Technology (Jaipur), Xavier Institute for Social Service (Ranchi), the IRC (The Hague).as well as colleagues from Cranfield University. The research was dependent on these collaborating research partners to deliver the individual case study reports and associated databases. To support this, numerous steps were taken including:

- Pre-fieldwork: providing extensive, prescriptive fieldwork guides and holding a series of researcher meetings to expose and train researchers to follow the guides;
- Supporting-fieldwork: making supporting visits to accompany researchers undertaking fieldwork to support the delivery of case studies (this was personally undertaken to support two research teams);
- Post-fieldwork: visiting each research partner to support the harmonisation of data processing and analysis across the cases; providing designed databases and case study report formats for the collaborating research teams to use; peer-reviewing outputs and working with research collaborators to harmonise analyse across the cases.

These steps have been extremely important in ensuring the delivery of the research. However, there have still been challenges with regards to the dependency on research partners. These can be divided into two main areas. The first is with regard to the timeframe for delivery of outputs. The planned timeframe for fieldwork was from January 2014 to January 2015 with reports

and databases due to be delivered by the end of March 2015. However, it was not until the end of December 2015 that the final databases were submitted and the final reports were submitted in March 2016, which had knock-on effects in terms of the cross-case analysis and synthesis.

Another issue was that due to changes in staff or recruitment of consultant researchers, some of the field researchers had not attended the pre-fieldwork researcher meetings. This was partly mitigated by accompanying any new researchers during their first session of fieldwork so to ensure that they were using and understood the fieldwork guides. Notwithstanding these challenges the collaborative nature of the research working closely with numerous research teams is considered to have greatly enriched my understanding of the research problem. As part of the research I have made nine visits to India spending over seven months in the country (having previously spent eight months in South Asia before the PhD). Over this time – much time spent discussing issues with collaborating researchers – I have learnt a great deal about the reality of Indian society and rural water services, which shapes my approach to this research. In this sense, despite the sometimes frustration of my dependency on research collaborators, the collaborator nature of the research is considered to have greatly benefited the overall thesis.

4.11 Limitations of the methodology

The scale of the Community Water Plus project has enabled an impressive dataset to be produced, yet the ambitions in research design have also presented significant challenges in terms of this thesis. With a need to bring together data from twenty case studies it was deemed appropriate to standardise and codify information into the qualitative-quantitative indicators yet it is acknowledged this can lead to an overly reductionist logic. This presents the danger of what is described as exclusion and inclusion bias in the case survey method (Yin and Heald, 1975; Yin, 2003) as it forces the field-researchers to interpret the findings through the provided tools and conceptual frameworks provided. This is a danger this researcher is aware of but considers

to be an appropriate trade-off for providing the uniform comparison framework. There were efforts to mitigate it through the accompaniment of the full case study report which should have provided the research teams with the chance to go beyond the core indicators used in the study. The follow up harmonisation sessions between the author and the field-researchers also provided an opportunity to explain important factors within a specific case study beyond the reductionist tools.

Partly in an attempt to gain greater insight into the potentially less tangible aspects of the case studies this researcher had originally designed into the research protocols a method called the Net-Map Tool Box (Schiffer and Hauck, 2010). This is a participatory facilitation technique and research method designed to be used by the field-research teams to evaluate the informal institutional arrangements for rural water services. Yet researchers found it difficult to apply and it was eventually dropped from the study. On reflection it was unrealistic to expect researchers without training in participatory methods to use this technique.

More fundamentally, the research bridges what could be described as the conventional divisions between 'small-n' qualitative and 'large-n' quantitative studies (Bryman, 2012). For this reason it is described as a '*med-n'* research study that brings together design-principles, methods and analysis techniques that have traditionally been associated with what some consider to be the separate meta-paradigms of quantitative-orientated positivist and qualitative-orientated interpretivist research (Morgan, 2014). This researcher perceives social reality as having ontological depth that goes broadly from the more material to the more socially constructed (Blaikie, 2007). As such, he believes there is value in applying positivist methods to studying ontologically shallow elements of social reality such as accepted social structures and concepts (i.e. organisational types) whilst interpretivists methods allow investigation of greater ontologically depth into more intangible aspects (i.e. informal mechanics of institutional change). Such a view is rooted in pragmatist (Dewey, 1989; Rorty, 1996) and critical realist perspectives (Bhaskar, 1998; Sayer, 2000).

Connecting this thinking, a core limitation with this type of synthesis research is therefore that it becomes extremely hard to robustly capture those aspects which are considered to have greater ontological depth in a way that facilitates this type of systematic comparative analysis. This research has attempted to do this to some extent but it is accepted that in the abstraction to comparative indicators much contextual detail is often lost. It is still contended that the study offers a valid approach for studying such matter and it is hoped that the balance of resolutions between the abstract quantitative and context-rich case study actually provides novel insights that improve understanding regarding community management in India and elsewhere.

4.12 Chapter summary and contribution to thesis

This chapter has explained how the research was undertaken. It set out and justified the case framework and selection process for the twenty case studies. The synthesis approach based on a series of data processing tools was explained, with these designed to measure key aspects related to the community management paradigms described in Chapter Two. The data collection methods were outlined whilst a discussion was given about the appropriate level of resolution at which the synthesis could meaningfully be conducted. The largely descriptive statistical analysis approaches of the indicators, which will be triangulated with the analysis of the case study reports, were clarified. The chapter also described the ethical considerations underpinning the research and the challenges and rewards of working in a collaborative research project. Finally, the limitations in terms of reductionism associated with the qualitative-quantitative data processing tools were considered. Following this chapter the thesis will progress to present the synthesis of findings from across the different case studies. It will focus on answering the research questions in turn moving from the focus on organisational arrangements in the following chapter and then onto the financial costs of services in the subsequent chapter.

5 ORGANISATIONS TYPES AND CHARACTERISTICS FOR SUCCESSFUL COMMUNITY MANAGEMENT IN INDIA

A key emphasis in this thesis is that there is a need to better understand how to structure support services to successfully enable the community management of rural water services (Baumann, 2006; Lockwood and Smits, 2011; Lockwood, 2002, 2004). This chapter is designed to answer that question by considering the *type* and *characteristics* of organisational arrangements from across the twenty case studies. Based on the basic conceptual framework for rural water services, the chapter reviews the findings at the enabling support environment and community service provider levels. It does this through presenting a series of typologies of organisations at each level before considering the characteristics that can be associated with each typology.

This chapter does present a limited amount of service level and financial data to compare levels of performance across the typologies but the full analysis of that quantitative data is the subject of the following chapter. The analysis presented here is therefore inclusive of every case study from the Community Water Plus project regardless of the performance documented in terms of service levels. As explained earlier in the thesis a write-up of each specific case study is not given in the main body but is provided via links in Appendix C. However, overleaf, Table 5-1 that contains the organisational *typologies* and *characteristics* found in each case study. A similar a table will be presented at the start of the next chapter to provide a reference point for the reader alongside the summaries in the appendix.

Table 5-1 – Summary of finding on organisational arrangements across the case studies

Case	State	Organisational Typologies		Organisational Characteristics (Summary indicators)			
		Enabling Support Environment Type (ESE)	Community Service Provider (CSP)	Professionalisation		Partnering Typology	Participation in Service Delivery
				ESE	CSP		
1	Jharkhand	Centralised State Rural Water Supply Agency	Representative VWSC	55	67	Transactional	4. Interactive Participation
2	Madhya Pradesh	Hybrid (NGO)	Unregistered society	95	67	Transactional	4. Interactive Participation
3	Odisha	External Agency	Registered Society	75	61	Operational	4. Interactive Participation
4	Chhattisgarh	Centralised State Rural Water Supply Agency	Representative VWSC	50	39	Transactional	3. Functional Participation
5	Meghalaya	Centralised State Rural Water Supply Agency	Representative VWSC	50	33	Transactional	4. Interactive Participation
6	Rajasthan	Centralised State Rural Water Supply Agency	Autonomous VWSC	50	33	Collaborative	3. Functional Participation
7	West Bengal	Hybrid (NGO)	Unregistered society	30	33	Operational	4. Interactive Participation
8	Telangana	External Agency	Registered Society	90	75	Operational	4. Interactive Participation
9	Karnataka	Hybrid (Donor)	Representative VWSC	100	89	Transactional	4. Interactive Participation

10	Himachal Pradesh	Hybrid (Donor)	Unregistered society	60	44	Collaborative	4. Interactive Participation
11	Punjab	Hybrid (Donor)	Registered Society	75	78	Collaborative	5. Self-mobilisation
12	Uttarakhand	External Agency	Registered Society	65	56	Operational	4. Interactive Participation
13	Kerala I – World Bank	Hybrid (Donor)	Registered Society	70	100	Transactional	5. Self-mobilisation
14	Kerala II – Local self-government	Decentralised Local Self-Government	Registered Society	100	64	Operational	4. Interactive Participation
15	Gujarat – WASMO Gandhinagar	Centralised State Rural Water Supply Agency	Registered Society	90	69	Operational	4. Interactive Participation
16	Gujarat – WASMO Kutch	Centralised State Rural Water Supply Agency	Registered Society	90	75	Operational	4. Interactive Participation
17	Tamil Nadu – Local self-government	Decentralised Local Self-Government	Representative VWSC	45	81	Collaborative	5. Self-mobilisation
18	Tamil Nadu – Public-Private Hybrid	Hybrid (Private)	Representative VWSC	75	69	Transactional	1. Passive participation
19	Maharashtra	Centralised State Rural Water Supply Agency	Representative VWSC	55	33	Transactional	1. Passive participation
20	Sikkim	Decentralised Local Self-Government	Representative VWSC	80	83	Operational	4. Interactive Participation

5.1 Types of enabling support environments

This section presents the analysis of the enabling support environment across the case studies. This led to the classification of four typologies of arrangements that are considered useful for distinguishing between different types of support systems. There are two forms of government support systems that are labelled as centralised 'State Rural Water Supply Agencies' (SRWSA) and decentralised 'Local Self-Government' (LSG) support which partly reflect the different ways decentralisation has played out across India states. Another typology is called the 'Hybrid Support Approach' that involved public partnerships between government agencies and external agencies, such as donors, NGOs or the private sector. The fourth category is labelled as 'External Agency Support' which involves cases whereby NGOs or similar organisations (i.e. social enterprises) take on the role of an enabling support environment beyond the government system. Within these categories there are some sub-types of support systems whilst the distinction between one typology and the other is often not completely distinct. For example, the government support systems can sometimes outsource minor functions to non-government entities such as NGOs. However, as will be shown these four typologies are considered conceptually distinct approaches that provide a useful set of categories to compare the cases by. Table 5-2 below provides a table of how the case studies have been allocated but each typology is explained in detail in the sections below.

Table 5-2 - Overview of case studies by type of enabling support environment

Centralised State Rural Water Supply Agency	*Decentralised Local Self-Government*	Hybrid (Public-Donor/NGO/ Private Partnership)	External Agency *Typology*
1. Jharkhand	*13.* Kerala II	*2.* Madhya Pradesh	*3.* Orissa
4. Chhattisgarh	*17.* Tamil Nadu I	*7* West Bengal	8. Telangana
5. Meghalaya	*20.* Sikkim	*9.* Karnataka	12. Uttarakhand
6 Rajasthan		*11.* Punjab	
15. Gujarat - Gandhinagar		*14.* Kerala I	
16. Gujarat - Kutch		*10.* Himachal Pradesh	
19. Maharashtra		*18.* Tamil Nadu II	

5.1.1 Centralised and decentralised government support

This section focuses on the two government-supported enabling support environment typologies that include eleven of the case studies. It first focuses on the centralised SRWSAs which it will be argued have an institutional set-up that has its legacy in the supply-driven approach that the Government of India took prior to the Sector Reform Projects of the late 1990s (James, 2011). During that period the primary concern of government agencies was concentrating on expanding access to rural water services and this approach involved investing power in a centralised agency that had the primary function of infrastructure asset creation (James, 2004). The body that undertook such work was conventionally called a Public Health Engineering Department or 'Water Board' although a variety of names were used. In the centralised SRWSA case studies, this hardware-focused agency continues to be the primary provider of support to community management. This is both in the implementation stage of infrastructure asset creation but also in the on-going support during the service delivery phase, as shown in Figure 1 below. The centralisation of responsibility for CapEx is a common approach across an international context but the centralisation of on-going OpEx support is less common (Lockwood and Smits, 2011). Yet in India the centralised SRWSA model is the most common government model reported on in this study although there are subtle differences between the seven case studies exhibiting this support.

They can be divided into two broad groups which include the 'standard' SRWSA found generally in the poorer states and what is described as a 'Reformed SRWSA' that is shown in the two Gujarat case studies. The 'standard' SRWSAs reflect the hallmarks of what has been described, in the context of Indian sanitation policy, as the "technocratic governing machinery" of the Indian state which is "a hierarchical and technocratic bureaucracy that is well suited to send down technical designs and subsidies for physical infrastructure projects" (Hueso and Bell, 2013, p. 1013). As shown in Figure 5-1 and exhibited in the case studies from Jharkhand (Javorszky et al., 2015), Chhattisgarh (Javorszky et al., 2015) and Rajasthan (Harris et al., 2016b), the SRWSA develop

infrastructure and then provide support during this implementation period. For example, in Chhattisgarh, immediately following implementation the SRWSA operate the service for a transitional period of three to six months during which members of the community can shadow the agency's staff and learn how to operate the water supply (Javorszky et al., 2015). On-going support involves periodic monitoring of water quality and functionality alongside sustained subsidy from the state to the VWSCs but the support remains largely focused on hardware and technical matters. The Rajsathan SRWSA case study follows the principles of the Swajaldhara policy (Government of India, 2003) whilst Jharkhand and Chhattisgarh reflect the NRWDP policy (Government of India, 2013a) which has led to some subtle differences with regards to the village-level institutional arrangements for the community service providers which will be explained later in the chapter. However, the enabling support environments follow the same structure.

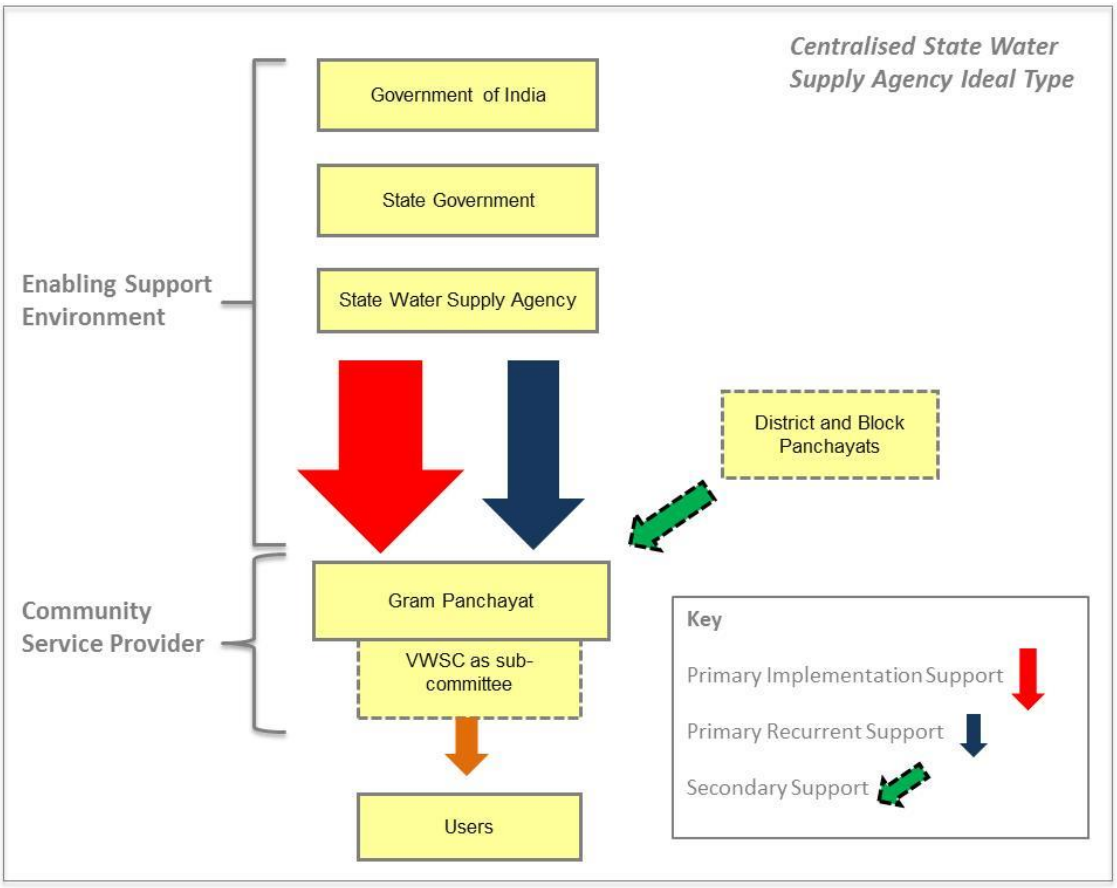

Figure 5-1 - Institutional Map of Centralised State Water Supply Agency Enabling Support Environment

The Maharashtra case study exhibits traits of an outlier case as it follows a 'hierarchical and technocratic' approach but is one of the richest states. This is partly shaped by the 'developmental' political economy of that state (Kohli, 2012) but it can also be explained by the much more sophisticated technology that is being managed. As opposed to the single village scheme (SVS borehole) systems in the cases already discussed, in Maharashtra the case study focuses on a multi village scheme (MVS) for 156 villages and two small towns. Here, the SRWSA take on the role of direct service provider and the role of the community is to establish a VWSC for promoting compliance among the community for regular tariff payment. In this sense, the case study reflects hybrid forms of service delivery that includes characteristics of community management and standard utility-type approaches.

The other centralised government support is called the ‘Reformed SRWSA’ that come from the two Gujarati case studies but these are both focused on the same enabling support environment, called the Water and Sanitation Management Organisation (WASMO). WASMO was born out of a process of sector change in the early 2000s to exist alongside the Gujarati Water Supply and Sanitation Board with a mandate to support the community management of rural water services across the state (Chary Vedala et al., 2015a, 2015b). This led to the development of a state-level organisation that retained a centralised character operating alongside a conventional SRWSA but which integrated both technical support units with ‘Social Development Units’ that focused on providing specialist information, education and communication (IEC) services to communities to support community management (Chary Vedala et al., 2015a, 2015b). This celebrated programme (Anekal et al., 2016; Das, 2014; James, 2011) provides an example of how a centralised SRWSA can support a highly participatory model of community management when compared to the other SRWSA cases. The Government of India has attempted to adopt this design principle in the NRDWP through the promotion of Water Supply and Sanitation Organisations at the state level (Government of India, 2013a) but this research found little evidence that such organisations functioned in a meaningful way in any other SRWSA case study.

The three case studies from Sikkim (Saraswathy, 2016b), Tamil Nadu Erode (Saraswathy, 2015) and Kerala Kodur (Chary Vedala et al., 2016b), on the other hand, are all considered to be forms of a decentralised LSG enabling support environments. Before describing these, it is important to clarify that the in the centralised SRWSA cases (and all other case studies) the LSG of the Gram Panchayat is prevalent and can play a role either in service provision or support. However, in these three cases the broader Panchayat Raj Institutions are the main support bodies during the service delivery phase and for this reason they are deemed to reflect a decentralised, rather than centralised, form of support system. This is reflected in Figure 5-2 below that shows although a SRWSA still leads the support during implementation through asset creation

and other tasks, the primary form of on-going support is channelled through the LSG system. This is considered to reflect the maturity of the 73rd constitutional amendment toward devolution within the rural water supply sector within these states.

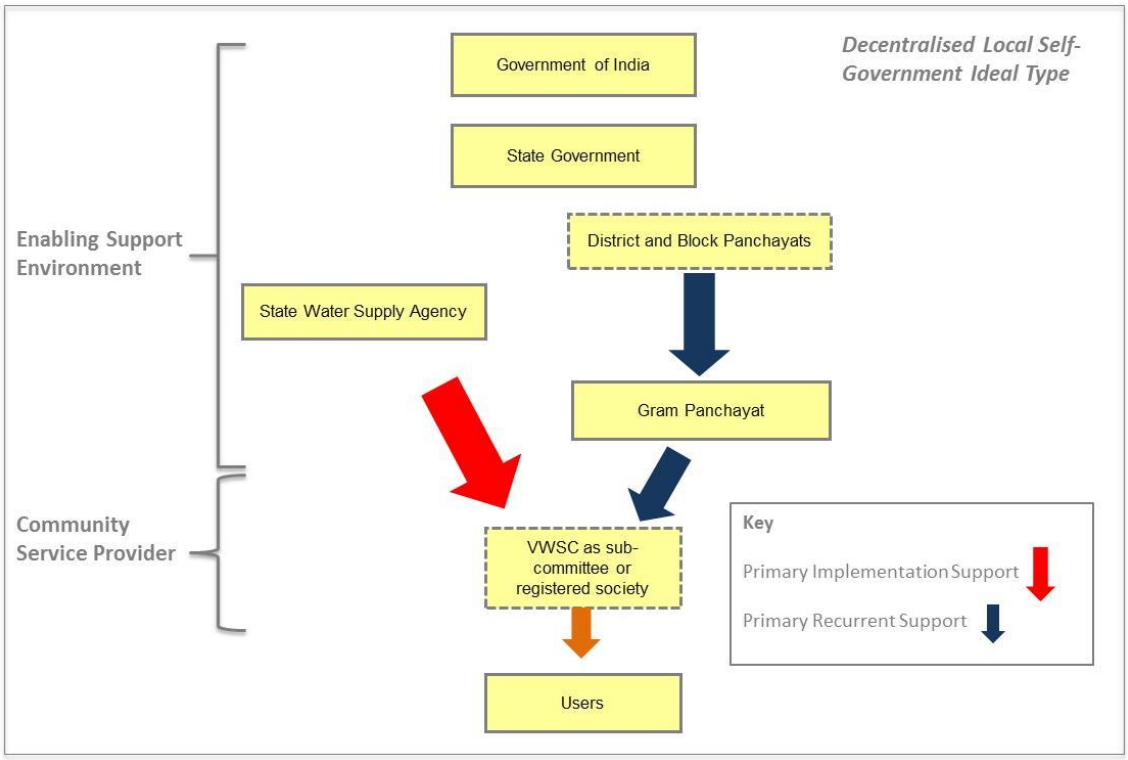

Figure 5-2 - Institutional map of decentralised local-self government

Kerala is the standout example of a state that has implemented this devolution agenda (Desai, 2006) and this is reflected in its ranking as the most devolved state as per the Government of India Devolution Index (Government of India, 2015c). The maturity and success of devolution in Kerala is considered to be linked to a number of advantages the state has over others in terms of decentralisation. Primarily, this includes a well-educated and politically engaged population (Kohli, 2012) but the structure of local administration also means the average Gram Panchayat in Kerala is approximately 50,000 people against a national average of 5,000. This unit of administration means that the 'village-level' LSG units have greater economies of scale and capacity to undertake development works. In the case study from Mallappuram district, the Gram

Panchayat has a population of 45,000 people and it is this agency that operates as an enabling support environment to a series of beneficiary groups at the habitation level who formed Registered Societies to become community service providers. Implementation is still undertaken by a SRWSA, in the form of the Kerala Water Authority, but all on-going support is structured through the Gram Panchayat and broader LSG system.

The other two decentralised LSG approaches have an extremely strong role for Gram Panchayats within the service provision tasks and so provide support directly to these institutions from the apparatus of the LSG system. In Tamil Nadu, which ranks sixth on the devolution index, this means that although the SRWSA – known as the Tamil Nadu Water and Drainage Board (TWAD Board) – takes on implementation work, the community service provider receives on-going support primarily through the Block Development Officer of the Department of the Panchayat Raj and Rural Development (Hutchings, 2015; Saraswathy, 2015). Similarly, in Sikkim, which comes fourth on the devolution index, the Rural Management and Development Department focus on implementation whilst on-going service delivery and support are provided through the Panchayat Raj structures with the state institution for rural development delivering accredited training to Gram Panchayats to support community management of rural water services with some ongoing technical support to water quality management (Saraswathy, 2016b). Together, these decentralised case studies represent government programmes that have moved away from having a centralised SRWSA as the main on-going support agency toward a model where that function has become integrated in local government systems, a set-up that is more common in other low and lower middle income countries (Lockwood and Smits, 2011)

5.1.2 Hybrid and external support

Beyond the ‘pure’ government programmes, there are seven case studies with hybrid enabling support environments and three with external agency enabling support environments. The hybrid case studies include partnerships between

SRWSAs and other non-governmental organisations. In the case of West Bengal (Smits and Mekala, 2015) and Madhya Pradesh (Ramamohan Roa and Raviprakash, 2016a) this includes civil society NGOs who can be described as a ‘complementary partner’ helping to provide services in problematical areas where the standard government model has failed to deliver services. In Tamil Nadu Morappur, the hybrid model, also includes a public-private partnership with the private sector delivering and operating a MVS for villages alongside the decentralised LSG model described in the other Tamil Nadu case study (Hutchings, 2015). The final hybrid sub-model is public-donor partnerships with three World Bank supported programmes in Kerala Nenmeni (Saraswathy, 2016a), Punjab (Harris et al., 2016a) and Karnataka (Ramamohan Roa and Raviprakash, 2016b) and one bilateral donor supported pilot programme in Himachal Pradesh (Harris et al., 2016c). The configuration of the enabling support environments for each sub-type is further outlined via Appendix B but for now this section focuses on describing the public-donor partnerships to outline the set-up of the hybrid model.

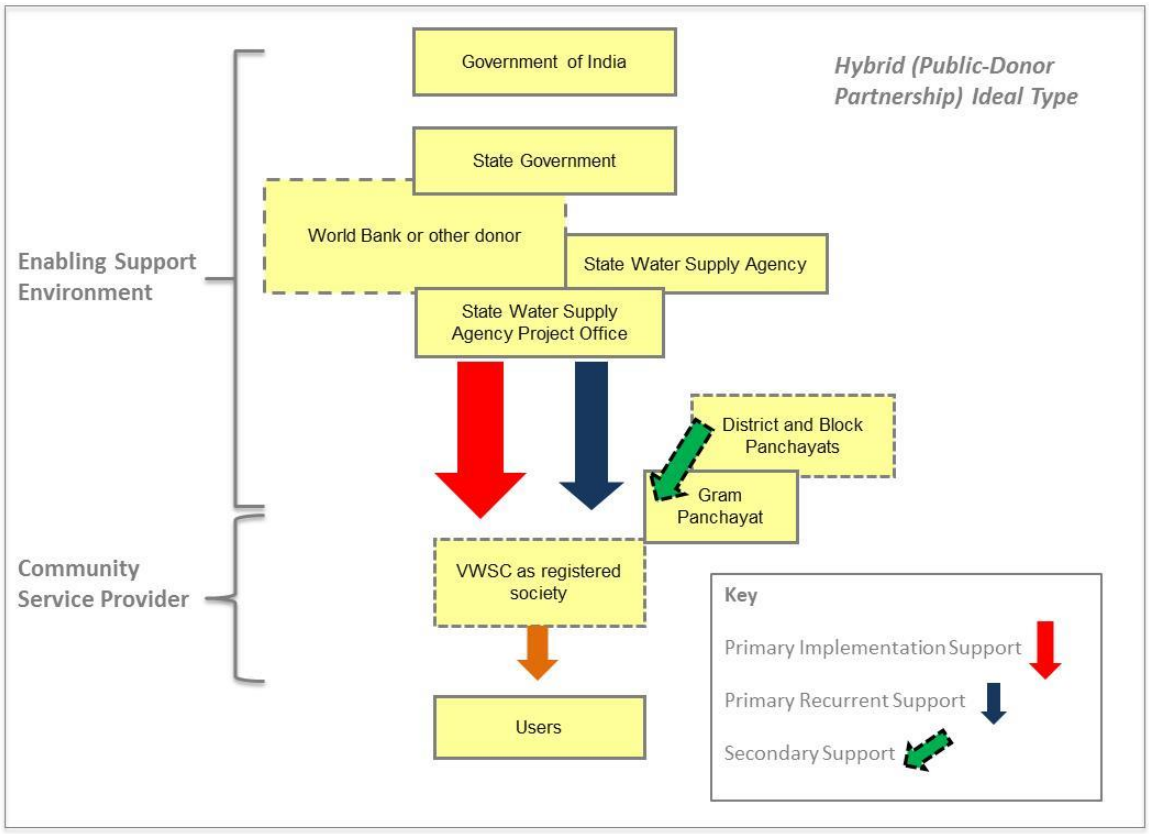

Figure 5-3 - Institutional set up of a hybrid (public-donor partnership) enabling support environment

An ideal type institutional set-up for the public-donor partnership is presented in Figure 5-3. It shows that the conventional set-up found within World Bank programmes in India is to form a Project Unit within an existing SRWSA which will receive additional funding from the World Bank and have distinct operating rules to the broader SRWSA, usually including a stronger emphasis on software support and different cost sharing prescriptions following the principles of the 'demand-responsive approach' to community management (Harris et al., 2016a; James, 2011; Saraswathy, 2016a). This was the case in the *Jalanidhi* programme, in Kerala, and *Jal Nirmal* programme, in Karnataka, however an issue with this approach is that there can be a lack of coordination or even conflict between the Project Unit and the broader SRWSA (Ramamohan Roa and Raviprakash, 2016a). The more recently implemented Punjab Rural Water Supply and Sanitation Project has avoided this issue through adopting a Sector

Wide Approach (SWAp) meaning that the SRWSA receives additional funding and capacity building from the World Bank but rolls out the support model across the state, rather than limiting it to a specific project office (Harris et al., 2016a). Despite these differences, the important point in terms of support from the public-donor partnerships (and the hybrid enabling support environments more widely) is that the government agencies, usually the SRWSA, remain the dominant partners and are the primary agencies providing support on the ground but this support is shaped by conditions placed on the SRWSA by donors. The role of the donor is then to provide additional finance as well as capacity building to the SRWSA and then to closely monitor performance.

The final typology of support is classified as external agency support and contains three cases whereby support is provided without the direct involvement of the Indian state (Chary Vedala et al., 2016a; Javorszky et al., 2016; Smits et al., 2016). This is a rare situation in India due to the strong role of the state in developmental activities and the traditional hostility between government and NGOs (Sen, 1999). However, where it exists, there can often be a tiered structure of NGO support as international or even national NGOs often operate through local NGOs, as shown in Figure 5-4. For example, in Uttarakhand this was the case with the Tata Foundation supported Himmotthan Water Supply and Sanitation Initiative which provided support through a local subsidiary known as the Himmotthan Hospital Trust.

There are exceptions to this set up such as the Gram Vikas programme in the state of Odisha in which the NGO works directly at scale with thousands of villages (Javorszky et al., 2016). Either way, the NGO cases tend to provide support in relatively niche situations, such as small, remote Himalayan communities (Smits et al., 2016), fluoride affected areas (Chary Vedala et al., 2016a) or areas dominated by the tribal castes that have traditionally been poorly provided for by the Indian state (Javorszky et al., 2016). In part due to this selective approach and smaller scale provision, the NGO support can often be much more tailored than the support provided through the government

systems. Such differences will now be further highlighted through a comparative analysis of these different enabling support environment typologies.

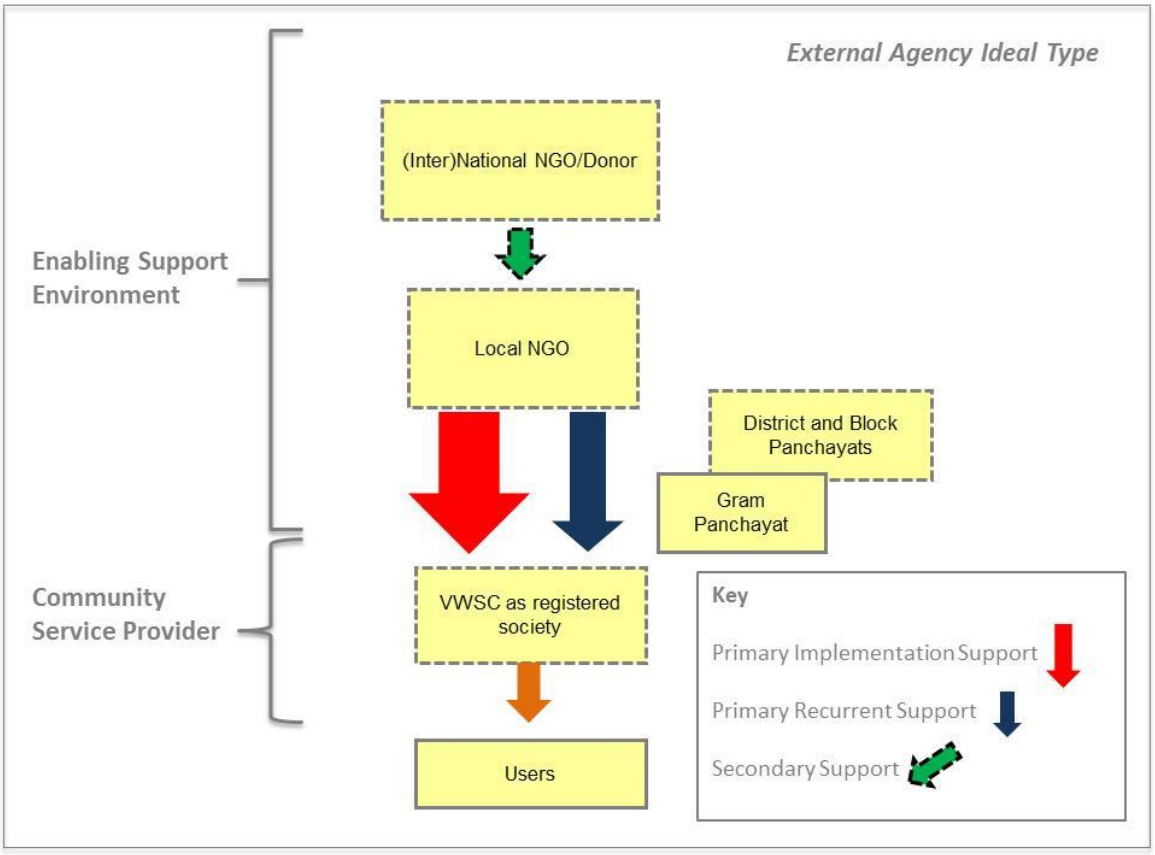

Figure 5-4 - Institutional set up of an External Agency enabling support environment

5.1.3 Characteristics of enabling support environments

The research methodology has developed a number of indicators that can be used as a means for comparing and categorising the characteristics of these typologies. The critical indicator in terms of validating the level of success in rural water services is the service level outcomes and so this section starts by comparing the outcomes across the categories, with Figure 5-5 showing the results. A proportionally higher number of people in the government programmes achieve basic or above service levels on the composite service level indicator. The decentralised LSG cases achieve the highest score with 67% of people receiving basic or above service levels whilst in the centralised

SRWSA the proportional of people reaches 63%. The hybrid and external agency categories, on the other hand, have slightly lower outcomes at 56% and 54% respectively. This is partly explained by the inclusion within these groups of case studies from the most challenging contexts, such as the delta regions of West Bengal that have salinity in groundwater (Smits and Mekala, 2015) or the quality-affected areas of Madhya Pradesh (Ramamohan Roa and Raviprakash, 2016a), which drag the average down. Overall, though, there are not large differences between the enabling support environment types in terms of service level outcomes.

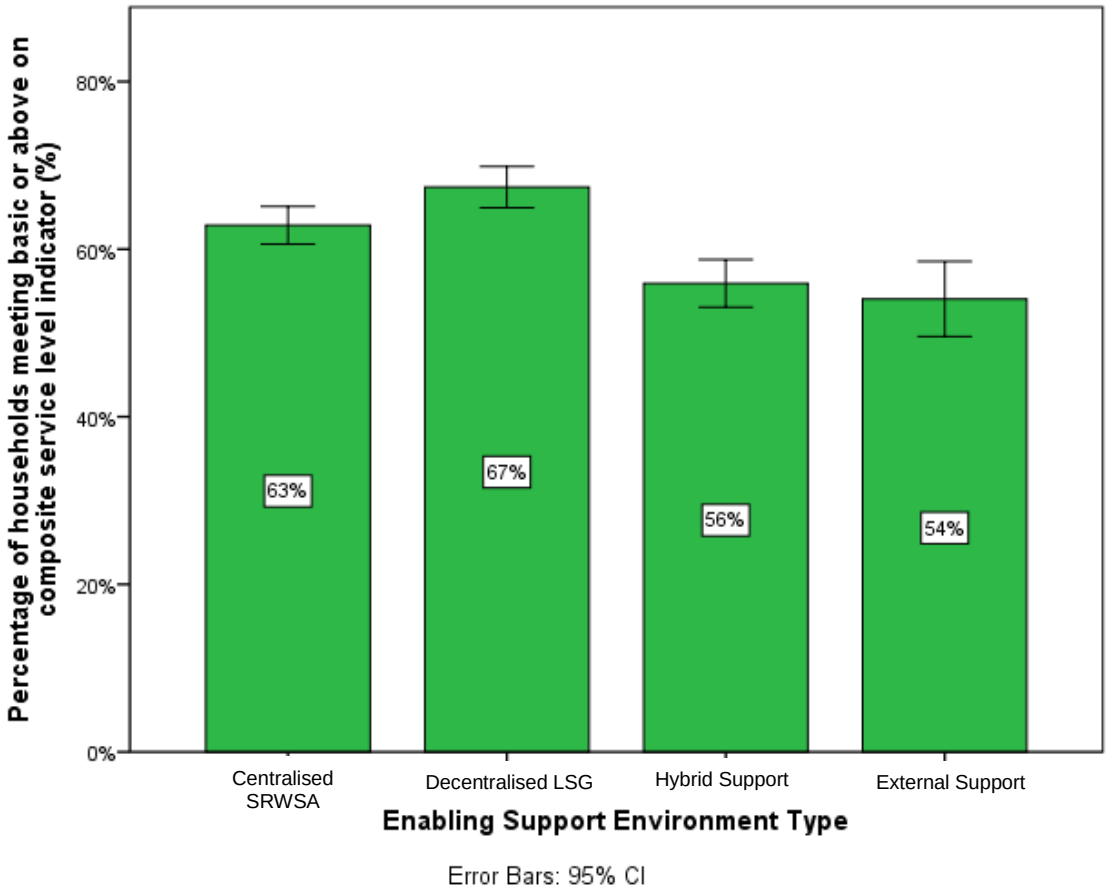

Figure 5-5 - Percentage of survey respondents achieving basic or above on the composite service level indicator by enabling support environment type (programme villages only: n = 1732)

A key concept associated with the conventional community management approach (and rural water services more broadly) is participation (Harvey and Reed, 2006; Jones, 2011; Kleemeier, 2000; Marks and Davis, 2012). Measured

in this research as the level of decision-making power communities have through the service delivery cycle, Table 5-3 below shows the median ranking for the ‘implementation’ and ‘service delivery’ stages across the categories. It shows some subtle differences across the cases with lower levels of participation in the centralised SRWSA cases compared to the decentralised LSG cases. However, the most significant difference is considered to be in the ranking at the service delivery phase. In the government programmes this is ranked as either functional or interactive whilst the hybrid and external typologies have a ranking of self-mobilisation. This is thought to reflect the Government of India moving away from the ideal that communities should be taking responsibility for service delivery and moving towards an on-going partnership approach, in the case of the decentralised LSG, or one in which government retains the majority of control, as is the case with the centralised SRWSAs. In comparison, the hybrid and external agency approaches tend to retain an ‘international character’ that reflects the conventional view that groups of private citizens in the form of a VWSC should take responsibility for service delivery tasks. These findings are considered to indicate a broader point about how community management has evolved in India to become increasingly embedded within the local government institutional framework. As will be further developed in Chapter Seven, this is considered to represent a shift towards the “institutionalised co-production” (Joshi and Moore, 2004) of rural water services.

Table 5-3 - Participation categorised ranking across the enabling support environment (mode)

Category	Participation in Implementation	Participation in Service Delivery
Centralised SRWSA	*3 (Functional Participation) – "The community is provided with a detailed implementation plan that they discuss and they have a chance to amend limited elements."*	*3 (Functional Participation) – "The community is provided with administration, management and operation and maintenance arrangements that they discuss and they have a chance to amend limited elements."*
Decentralised LSG	*5 (Self mobilisation) – "The community practices self-supply and seeks to improve this, or have developed an implementation plan and seek external support."*	*4 (Interactive Participation) – "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."*
Hybrid	*4 (Interactive 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"*	*5 (Self mobilisation) – "The community take responsibility for administration, management and operation and maintenance, either directly or by outsourcing these functions to external entities."*
External Agency	*4 (Interactive 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."*	*5 (Self mobilisation) – "The community take responsibility for administration, management and operation and maintenance, either directly or by outsourcing these functions to external entities."*

An important argument to improve outcomes within the community management plus paradigm is the need to drive the professionalisation of rural water services and move beyond an approach reliant on volunteerism and poorly trained individuals (Lockwood and Smits, 2011; Moriarty, Butterworth, Franceys, et al., 2013). As explained in the methods, the consolidated professionalisation indicator used to assess this was based on the mean score of Qualitative Information System data processing tools. In Table 5-4 the mean indicator data has been presented in raw form and re-categorised into the five-point-scale that the QIS follows using basic rounding. It shows the level of professionalisation is categorised as high across all the enabling support environment categories, although the mean indicators that have the highest level are found in the hybrid and decentralised LSG cases.

Table 5-4 - Professionalisation indicator for enabling support environment and community service provider

Category	Professionalisation of Enabling Support Environment Consolidated Indicator (out of 100)	Categorisation
Centralised SRWSA	63	*High Professionalisation*
Decentralised LSG	75	*High Professionalisation*
Hybrid	77	*High Professionalisation*
External Agency	65	*High Professionalisation*

The research also tried to characterise the relationship between the enabling support entities and the community service provider. For this purpose the partnering assessment tool was used, with Table 5-5 displaying the partnering type that was most strongly highlighted for each category of cases. For the external agency category the partnering type was highlighted as operational, reflecting that communities contribute labour and resources together with the enabling support entities. For example, in the case study from Odisha (Javorszky et al., 2016), it is common for the VWSCs to organise community members to contribute labour to the construction of new schemes, which are managed by the NGO Gram Vikas. The difference in partnering types across the other categories reflects the transactional approaches taken to structure relationships in the centralised SRWSA and hybrid approaches. This reflects 'low' levels of partnering in which there is a distinct division between organisational responsibilities and not much joint working, but is considered appropriate for scaled programmes covering many hundreds of villages. The decentralised LSG cases are ranked as having a collaborative partnering typology in which the enabling support environment and community service provider share responsibility and take joint decisions regarding service delivery. This is considered to reflect the greater capacity that the community service providers have in the decentralised case studies.

Table 5-5 - Partnering assessment between enabling support environment and community service provider

Category	Dominant Partnering Mode in Service Delivery
Centralised SRWSA	*Transactional – The ESE and CSP fulfil different elements of the administration, management, and operation and maintenance functions as per negotiated arrangements.*
Decentralised LSG	*Collaborative – ESE and CSP share responsibility for decisions regarding administration, management and operation and maintenance.*
Hybrid	*Transactional – The ESE and CSP fulfil different elements of the administration, management, and operation and maintenance functions as per negotiated arrangements.*
External Agency	*Operational – ESE and CSP work together contributing labour and/or resources to support administration, management, operation and maintenance.*

The final research processing tool which was used to assess organisational elements of the case studies was the adapted Institutional Assessment Tool (Cullivan et al., 1988). For the purpose of the synthesis, Table 5-6 presents the organisational area which was ranked as the strongest and weakest for each category of enabling support environment. It shows that the centralised SRWSA are ranked as having strong technical capability but weak organisational culture. This is considered to reflect the "hierarchical and technocratic bureaucracy" described by Hueso and Bell (2013, p. 1013) that is designed to deliver physical infrastructure but has an organisational culture that is too static and rigid to adapt to providing broader support functions as the sector has changed.

The decentralised LSG category comes out as scoring well on leadership, which is a characteristic associated with successful organisational performance across numerous sectors (Lieberson and O'Connor, 1972). The lowest ranked trait is autonomy which again is considered to be reflective of organisations embedded within the inflexible bureaucracy of the Indian state. Whilst potentially framed as a criticism it is noted that bureaucratic process can be a very powerful force for promoting standardisation (and therefore consistency) for enabling support entities that can have responsibility for many tens of millions of people, which is often the case in India. Finally, the external agencies have strong organisational culture reflecting the socially-orientated character of

many NGOs, but are limited in terms of technical capability, often as they focus on software elements rather than hardware.

Table 5-6 - Institutional assessment outcomes

Category	Strongest Organisational Area	Weakest Organisational Area
Centralised SRWSA	Technical Capability - is the measure of the institution's competence in conducting the technical work required to carry out the responsibilities of the institution.	Organisational Culture - is the set of values and norms which inform and guide everyday actions. The culture forms a pattern of shared beliefs and assumptions which translate into behaviour which can be observed.
Decentralised LSG	Leadership - is the ability to inspire others to understand the institution's mission, to commit themselves to that mission, and to work toward its fulfilment.	Organisational Autonomy - is the institution's degree of independence from the national government or other governmental or regulatory bodies. While not unrestrained, this independence must exist to the extent that the institution is able to conduct its affairs and meet its responsibilities in an effective manner with minimum interference and controls by other entities.
Hybrid Partnership	Technical Capability- is the measure of the institution's competence in conducting the technical work required to carry out the responsibilities of the institution	Leadership - is the ability to inspire others to understand the institution's mission, to commit themselves to that mission, and to work toward its fulfilment.
External Agency	Organisational Culture - is the set of values and norms which inform and guide everyday actions. The culture forms a pattern of shared beliefs and assumptions which translate into behaviour which can be observed	Technical Capability - is the measure of the institution's competence in conducting the technical work required to carry out the responsibilities of the institution

The various organisational-based assessment tools help distinguish between the characteristics of different enabling support environment types. Recognising the possible fallibility of specific tools, it is when triangulating these types of results together that it is possible to identify patterns across the different types of support. Focusing on the government support approaches, many of the measures support a more positive picture of the decentralised LSG model compared to the centralised SRWSA. It has a ‘collaborative’ partnership approach between entities that both rank in the ‘high professionalisation’ category, with higher levels of community participation and ultimately better overall service level outcomes. The research cannot say conclusively whether one of these aspects has a causal link to the other but, it is argued, these types

of processes are likely to be synergistic creating positive feedback loops between different elements to deliver better overall outcomes. It should be noted that the decentralised LSG cases tend to be found in richer states with better governance capacity and in this sense are likely to reflect the broad capacity to deliver services effectively that appears to comes with greater wealth and development (Hutchings et al., 2015). The WASMO case studies from the wealthy state of Gujarat also support this hypothesis as, although they follow a centralised approach, they have adopted what has been described as a reformed SRWSA approach and have better outcomes across the various organisational-based assessment tools as well as service levels, compared to the poor states following a centralised model.

Further developing the institutional analysis, this section ends by considering the financial differences between the enabling support environment typologies. As will be examined in greater detail during the following chapter, there is a high degree of variability between case studies in terms of financial costs. This is reflected in Table 5.7 that shows the interquartile range for total CapEx and recurrent costs (OpEx, OpEx Enabling Support and CapManEx) by the enabling support environment types. With the ranges overlapping for CapEX across all categories there are no clear conclusion to draw from the table in terms of the level of total implementation-related investment across the typologies. This suggests that the enabling support environment categories do not tend towards different levels of costs and, as examined in the next chapter, that other factors are more important in terms of differentiating CapEx.

Table 5-7 Enabling support environment typology overall costs

Enabling Support Environment Type	CapEx		Recurrent	
	LIQR	UIQR	LIQR	UIQR
SRWSA	$85	$208	$6	$11
Local Self Government	$128	$251	$28	$73
Hybrid	$166	$342	$10	$46
External Agency	$38	$279	$2	$16

For recurrent costs, however, the interquartile range for the local self-government supported case studies shows higher levels of recurrent investment than the other cases. The lower quartile for OpEx in that category is higher than the upper quartile reported for SRWSA and external agency cases, indicating different investment patterns between these enabling support environment types. The hybrid-supported cases fall in-between with higher levels of recurrent investment than the SRWSA and external agency but lower levels than the local self-government. In Chapter Two, it was argued that recurrent financing was an area of underinvestment in the rural water sector (Burr and Fonseca, 2013; Franceys et al., 2016). The data presented in Table 5.7 indicates that the local self-government case studies receive the highest level of recurrent expenditure on average. In the following chapter further evidence is presented on how these costs, and others, are split between the support entities themselves and the community helping to provide clarity of the issue of cost sharing found in successful cases from India.

In summary, this section has highlighted a number of trends in the organisational arrangements for community management in India. It has shown a difference in the pattern of emphasis between programmes which are considered to be domestically-driven (i.e. Government of India) and those which are more internationally-driven (i.e. hybrid and external agency). It has been argued that this is leading to a split between programmes that retain a conventional community management approach and a shift to the institutional co-production (Joshi and Moore, 2004) of rural water services. The following section will develop these ideas by focusing on a review of the community service provider arrangements found across the case studies.

5.2 Community service providers

This section advances the analysis of organisational arrangements to focus on the community service provider level. Again, the intention here is to provide a synthesis on the *types* and *characteristics* of the community service providers across the case studies. There are considered to be two main types of service

provider found across the case studies that can be classified as 'community management through local self-government' and 'community management through societies'. Across the classifications the entities that take on the service delivery tasks are most commonly referred to as Village Water and Sanitation Committees (VWSCs) and, although there are some variations, VWSC will be used to describe such a body in all circumstances. As will be explained there is a division within each classification regarding the status of the VWSCs. There is a split between what are described as 'VWSCs as autonomous sub-committees of the local self-government' and 'VWSCs as representative sub-committees of the local self-government' and then a distinction between 'VWSCs as registered societies' and 'VWSCs as unregistered societies'. Table 5-8 shows the allocation of cases and then each typology is described below.

Table 5-8 - Overview of case studies by type of enabling support environment

VWSCs as registered societies	VWSCs as unregistered societies	VWSCs as autonomous sub-committees of the local self-government	VWSCs as representative sub-committees of the local self-government
3. Orissa 8. Telangana 12. Uttarakhand *11.* Punjab *13.* Kerala I *14.* Kerala II *15.* Gujarat - Gandhinagar *16.* Gujarat - Kutch	*2.* Madhya Pradesh *7* West Bengal *10.* Himachal Pradesh	*6* Rajasthan	*1.* Jharkhand *4.* Chhattisgarh *5.* Meghalaya *9.* Karnataka *17.* Tamil Nadu I *18.* Tamil Nadu II *19.* Maharashtra *20.* Sikkim

5.2.1 Community management through societies

The community management through societies approach is presented first, as this approach is most reflective of conventional ideas outlined in the initial community management paradigm. There are two cases that will be used to illustrate this which come from different ends of the technical spectrum. Case study Kerala I from Mallappuram district is an example of a Registered Society managing a SVS piped water supply scheme from a surface water source. The other case study discussed is from West Bengal case study that involves an

Unregistered Society managing handpumps. First it is useful to explain the importance of the Indian Societies Registration Act which is a piece of legislation from the colonial era, administered by the Ministry of Corporate Affairs (Government of India, 1860). All charitable bodies (as well as scientific and literary societies) should be registered under the act which means notifying the state of at least seven Board members and the agreed upon rules and regulations of the society. A Registered Society can then open a bank account and have official (i.e. contractual) agreements with government entities. They retain, however, independence from government as they are a distinct organisational body. VWSCs that are not the sub-committee of the Gram Panchayat should be registered under this model.

The described principles can be seen in the Kerala I case study (and six other cases outlined in Table 8 above). In the Kerala example, VWSCs are formed at the habitation level by community members to take on the management of rural water services. The VWSCs are Registered Societies so have an independent bank account and an established set of rules and regulations for managing the service. The relationship with the local self-government is arranged through a Memorandum of Understanding (MoU) that sets out the division of responsibility between the VWSCs and the local self-government. In Kerala, the Registered Society is supported by an enabling support environment that was classified as a form of decentralised local self-government support in the section above. This situation emerged partly due to the larger administrative boundaries found in Kerala, which makes the Gram Panchayats at a scale whereby they can provide support to a number of different VWSCs, rather than being at the scale of a single VWSC.

The case studies also contain examples of Unregistered Societies and in such situations the broad institutional model of relationships is similar to the Registered Society approach. The case study from West Bengal, for example, is of VWSCs that are established to manage single hand pump installations. The professionalisation of these VWSCs is comparatively very low compared to other cases and they follow a reactive approach to repairs by collecting money

as need arises and hence do not require a bank account and registered status (Smits and Mekala, 2015). Again, the Gram Panchayat is part of the enabling support environment rather than the service provider and it receives support from a complex of NGOs and private pump mechanics to aid it with these tasks. This type of Unregistered Society is rare in India and is only found in this research in three cases where NGOs or donors have operated (Himachal Pradesh, Madhya Pradesh and West Bengal).

Either way, the institutional architecture of community management through societies is outlined in Figure 5-6. This shows that the set-up follows the classical ideas for public service delivery set-up by the accountability triangle (World Bank, 2004). This means there is independence between the service provider and the oversight functions within the system. As illustrated in the diagram this means there are two routes for users to hold the service provider to account, which are described as ‘route of local service responsiveness’ in which community members can go directly to the Registered Society if there is a problem and the ‘route of local service oversight’ in which the users can go to the local self-government who have the power to effectively revoke the right of the Registered Society to continue their role of service provider. In this way and under this set-up, the village-level local self-government is part of the enabling support environment rather than service provider.

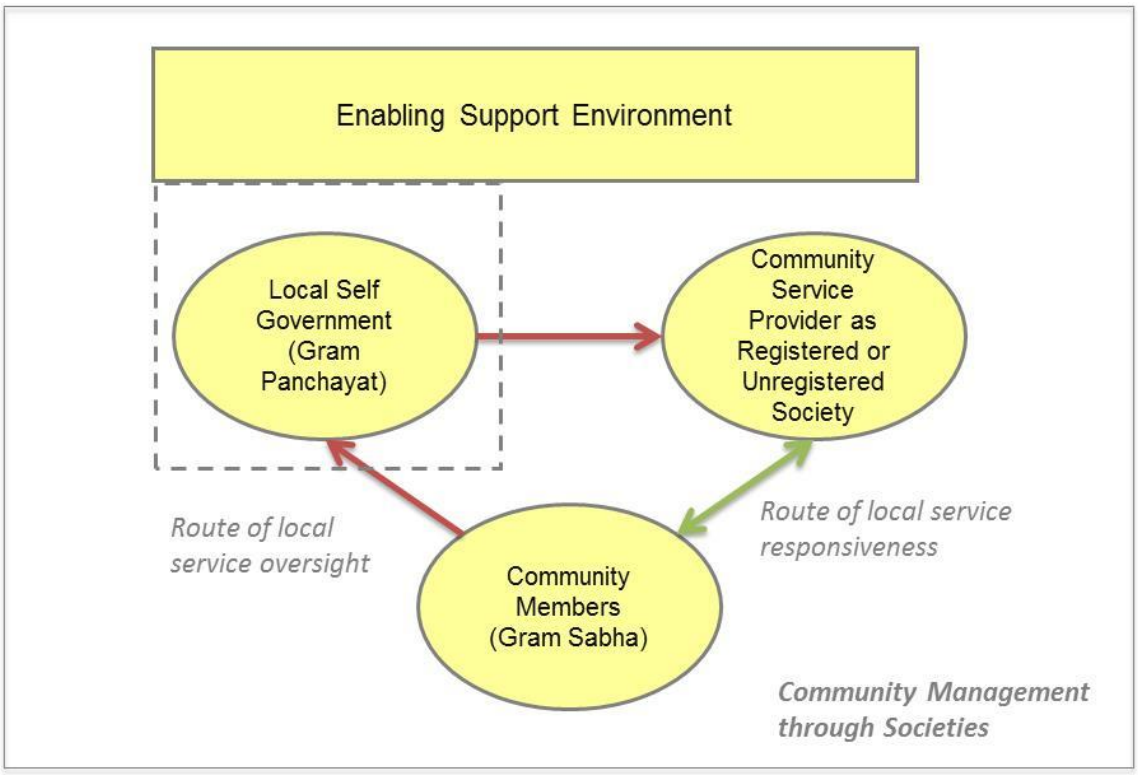

Figure 5-6 – Formal routes of accountability in the 'community management through societies' model

5.2.2 Community management through local self-government

Although some form of registered or un-registered society was the service provider in twelve of the cases, the Constitution of India mandates that rural water services are the responsibility of the local self-government of the Gram Panchayat (Constitution of India, 1950). Under the Swajaldhara (Government of India, 2003) and later NRDWP (Government of India, 2013a) policy programmes, the turn to community management sought to reconcile this promotion of private citizens taking on the role of service provision with this constitutional requirement for local self-government playing a role, through requiring VWSCs to be established as sub-committees of the local self-government. This means a common model for community management within government programmes is one in which the VWSC is embedded within the broader institutional architecture of the local self-government system of the Panchayat Raj. However, this research has indicated that there has been a shift

in the more recent NRDWP (Government of India, 2013a) between the extent to which VWSCs operate as an autonomous body of the broader local self-government, to a situation in which the local self-government becomes the direct service provider and the VWSC plays a representative role. This has led to the development of two sub-categories: the 'autonomous VWSC' and 'representative VWSC'.

Having an autonomous VWSC, which is not a Registered Society as described in the previous section, is limited to just one case but is labelled as a sub-category to help illustrate the change in the government approach between its two most recent policy programmes. The Rajasthani case study was part of the Swajaldhara (Government of India, 2003) programme under which the VWSC remains a sub-committee of the Gram Panchayat but operates largely in an independent manner, having a clear division of responsibility between the VWSC and broader Gram Panchayat. This partly reflects the greater emphasis the Swajaldhara placed on establishing and training VWSCs as a condition for receiving government support. However, as the report on the Rajasthan case study makes clear (Harris et al., 2016b), the VWSCs in this case can be more accurately described as isolated rather than autonomous. The policy design is considered to reflect the greater international influence on the ideas of community management that were incorporated into the first nation-wide community management programme, compared to the later NRDWP.

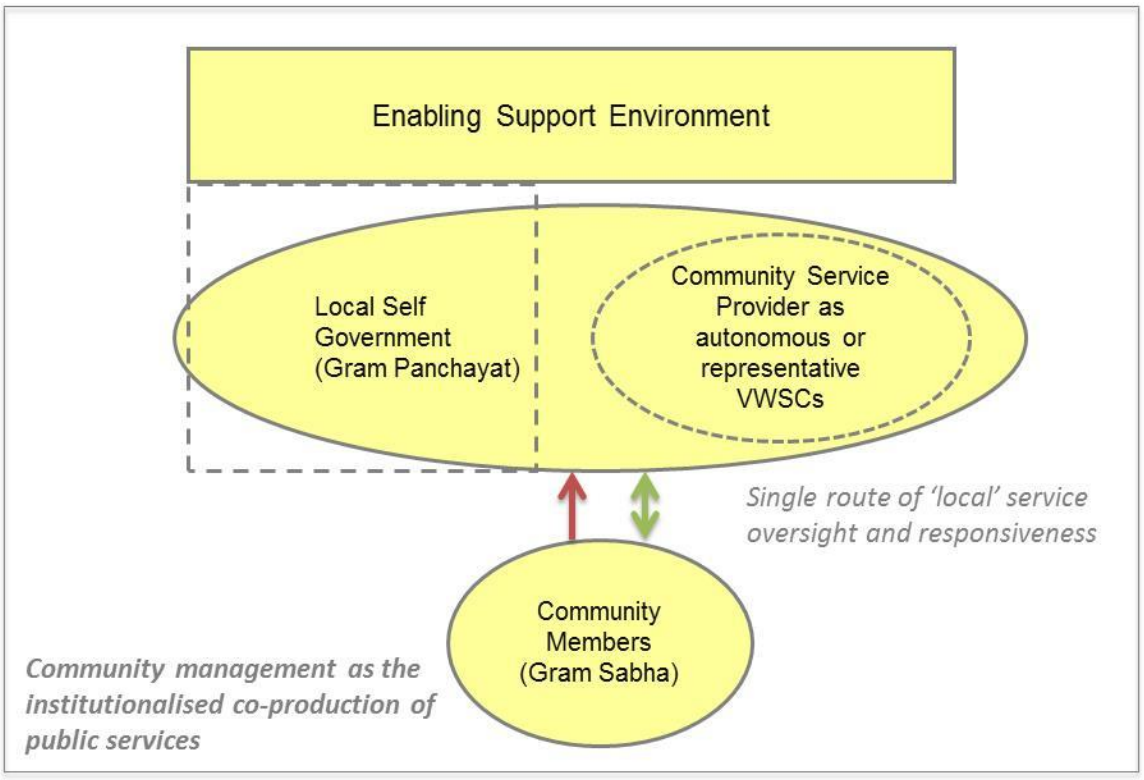

Figure 5-7 - Formal routes of accountability in the 'community management through local self-government' model

What is described as the representative VWSC model is now more common across the government case studies with this model found in Chhattisgarh, Jharkhand, Meghalaya, Maharashtra, Tamil Nadu and Sikkim. In these examples, VWSCs are formed but the effective operation of the committees is completely dependent on the Gram Panchayat of the local self-government. With the VWSCs mandated to make key members of the committees the most powerful figures from the local self-government it means the everyday operation of the systems are controlled by the Gram Panchayat office. This is considered to bring both benefits and dangers. It means that the institutional resilience of the system is much stronger as the local self-government is a permanent organisation that is financially supported through the broader taxation system. However, it does provide dangers regarding the conventional ideas about the local lines of accountability for this public service.

As indicated when comparing Figure 5-6 and Figure 5-7, having the VWSC as the sub-committee of local government means that that the service provision and oversight tasks become integrated into the same institution. At a single village level there is not the organisational capacity to have an executive division of the government providing services and a legislative/regulatory branch that holds the executive to account. This means it could be argued this set-up is less accountable to the users as it removes the principle of an independent service provider. This is intentional, however, as according to officials in various interviews and meetings conducted as part of this research, the primary purpose of this institutional design is to simplify the overall governance system and reduce the number of different bodies that operate at the village level. So the idea goes, concentrating power in the Gram Panchayat reduces the potential for conflict between opposing leaders and/or bodies with villages, which has been a barrier to development activities in India due to the 'vibrancy' of local democracy.

5.2.3 Characteristics of the community service provider types

This section now compares the characteristics of the community service provider arrangements starting with service level outcomes. What it shows is that, contrary to the paradigmatic claims about the importance of the enabling support environment, it is the type of community service provider arrangements that shows the biggest differences between sub-groups. There is a group of cases that are clearly more successful in terms of service levels, which are those where the service provider is a Registered Society, where 80% of the population receive services meeting all the government norms. The next best performing category is the Representative VWSC model, which is considered the 'standard' Government of India approach to community management following the NRDWP. Here, over half the people receive services meeting all government norms and the median service level is basic. The Unregistered Society and Autonomous VWSC categories are much rarer across the study and have the worst outcomes from any type of service provider arrangements.

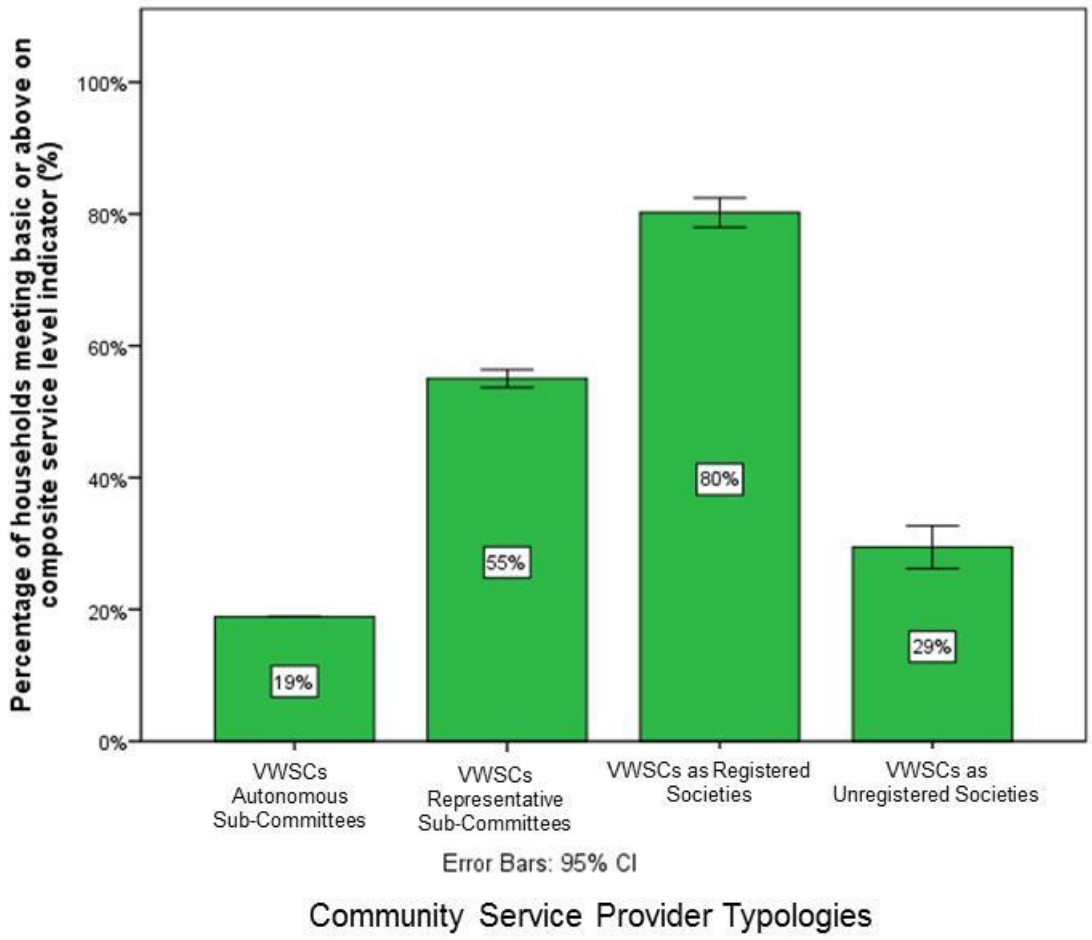

Figure 5-8 - Percentage of survey respondents achieving basic or above on the composite service level indicator by community service provider type (programme villages only: n = 1732)

The indicator for the professionalisation of service provision tasks follows a similar pattern to the service level outcomes, as shown in Table 5-9. This indicates that professionalisation of service provision could be an important factor in whether services are successful. The requirements around registration under the Societies Act and also the requirements for representative VWSCs as sub-committees of the local self-government, are considered to at least be aligned, if not helping to drive, the higher professionalisation in these groups. The Unregistered Societies are by definition going to score lower on the professionalisation indicator that reflects partly the formal mandate that the entity has to deliver services. It is hard to draw too many conclusions about the autonomous VWSC model as it is only reflecting one case study from the older

Swajaldhara programme. The differences in participation are more subtle and harder to interpret, but they do not appear to be as critical to service level outcomes as professionalisation at this level.

Table 5-9 - Participation and professionalisation of community service provision types

Type of Community Service Provider	Participation		Professionalisation	
	CapEx	OpEx	Score	Categorisation
Registered Society	5. Self-mobilisation - *"The community practices self-supply and seeks to improve this, or have developed an implementation plan and seek external support."*	*4 (Interactive Participation) – "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."*	*73*	*High Professionalisation*
Unregistered Society	4. Interactive - *"The community in partnership with the service provider and/or support entities engage in a joint-analysis of implementation options before developing a plan"*	*4 (Interactive Participation) – "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."*	*48*	*Medium Professionalisation*
Autonomous VWSC	3. Functional – "The community is provided with a detailed implementation plan that they discuss and they have a chance to amend limited elements."	3. Functional – "The community is provided with administration, management and operation and maintenance arrangements that they discuss and they have a chance to amend limited elements."	*33*	*Low Professionalisation*
Representative VWSC	4. Interactive- *"The community in partnership with the service provider and/or support entities engage in a joint-analysis of implementation options before developing a plan"*	*4 (Interactive Participation) – "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."*	*61*	*Medium Professionalisation*

The data at the community service provider level indicates that differences at this level appear to have a greater impact on service level outcomes than the

type of enabling support environment. Recognising that the researcher does not believe, nor is trying to test, that there is some specific causal element for successful community management these findings are nonetheless relevant to answering the research questions about what type of organisational arrangements deliver successful rural water services. In terms of charateristics, the data suggests that the professionalisation of service providers is associated with higher levels of success, whilst in terms of organisation types, it indicates that having a Registered Society model of community management is the most effective model. Overall this is considered to provide important data on the importance of the community service provider as compared to the enabling support environment, which can be considered to at least partly contradict one of the hypotheses that underpin the community management plus paradigm.

As was completed above for the enabling support environment categories, the broad levels of financing reported across the community service provider typologies is presented here. Table 5-10 shows that there is again significant variability in the CapEx costs in the categories apart from the single case study category of the autonomous VWSC. The Registered Society case studies have markedly higher CapEx, with a lower quartile starting at $176 per person. With this category also enjoying the standout results in terms of service levels, the data could indicate a relationship between higher overall CapEx costs and service levels outcomes. Such relationships are considered in the following Chapter Six, Section 6.8., that examines the correlations between service level outcomes and financing levels. For recurrent costs there is again some overlap between the interquartile ranges for all the community service provider categories, however the upper quartile for the Unregistered Society and the single data point for the Autonomous VWSCs are markedly lower than the other two categories. This indicates that higher ranges of recurrent investment were found in the Registered Society and Representative VWSC models, which also had the most successful outcomes in terms of service levels.

Table 5-10 Community service provider types overall costs

Community Service Provider Types	CapEx		Recurrent	
	LIQR	UIQR	LIQR	UIQR
Registered Society	$176	$263	$8	$31
Unregistered Society	$38	$342	$2	$10
Representative VWSC	$99	$266	$6	$37
Autonomous VWSC	$93	$93	$11	$11

This section now ends by briefly showing how these classifications match across the analytical levels, with an overview given in Table 5-11. It shows that within this study there is great diversity of potential organisational set-ups and that even within a specific category of enabling support environment there are different community service provider set-ups depending on the case study. This shows that there is adaptability within enabling support environments in terms of the type of service providers they can support. Saying this, there are also some broad patterns of institutional matching which can be highlighted. The concept of an autonomous VWSC sub-committee of the local self-government is a limited model for service provision which can be described as a legacy of a previous policy programme so it not relevant in this discussion. The Representative VWSC approach, however, is the most common model for government-run enabling support environments types. It can be described as the standard model in India that reflects the nexus of the local self-government and VWSCs at the community service provider level. However, this analysis shows it can be supported by either a centralised agency in the form of a SRWSA, within the decentralised local self-government model or the hybrid approach.

Table 5-11 - Matching of organisational arrangements across the case studies

Type of Community Service Provider	Autonomous VWSC	Representative VWSC	Registered Society	Unregistered society
Centralised SRWSA	*6. Rajasthan*	*1. Jharkhand, 4. Chhattisgarh 5. Meghalaya 19. Maharashtra*	*15. Gujarat I 16. Gujarat II*	*X*
Decentralised LSG	*X*	*17. Tamil Nadu I 20. Sikkim II*	*14. Kerala II*	*X*
Hybrid	*X*	*18. Tamil Nadu II 9. Karnataka*	*11. Punjab 13. Kerala*	*2. Madhya Pradesh 7. West Bengal 10. Himahcal Pradesh*
External Agency	*X*	*X*	*3. Orissa 7. Telangana 12. Uttarakhand*	*X*

The external agency led enabling support environments operate beyond the local self-government system and therefore representative VWSCs are not found within this approach. Registered Societies are even more adaptable and are found across the four support models. As this is the highest-performing service provider form, it is encouraging that it can be adapted to each of the support environments. Within this model, the local self-government can remain involved with rural water services but it moves to becoming part of the (local) enabling support environment rather than as a sub-component of the community service provider. In contrast, the Unregistered Societies are only found in the hybrid enabling support environments cases where NGOs or donors are part of the support environment. In Madhya Pradesh and West Bengal NGOs have worked to establish management committees at sub-village level with this smaller scale considered to lend itself to the unregistered VWSC models. Similarly the scale of management in Himachal Pradesh is also at the sub-administrative village level and hence is considered to play a role in this informality. Overall this section has compared the performance of the different community service provider arrangements and has considered how they match

the enabling support environment types showing that there is much diversity in the patterns of institutional matching.

5.3 Chapter conclusions and contributions

This chapter has shown that the research has covered a variety of different organisational arrangements for community management in India. This is considered to reflect the effective decentralisation of rural water services from the federal government to the state level, whilst the diversity between states can be partly explained by the varied level of *intra*-state decentralisation. Two major typologies of government enabling support environments were identified: the centralised SRWSA and the decentralised LSG models. The centralised model, the most common approach, was linked to the on-going legacy of supply-driven rural water services whilst the decentralised local self-government approach was reflective of the effective maturity of the devolution processes in Kerala, Tamil Nadu and Sikkim, where the on-going support for service delivery has been transferred from the SRWSA to the local self-government institutions. Even among the hybrid approaches the strong role of the SRWSA and local self-governments was stressed.

Recognising that the cases were purposively selected, and are not therefore representative of all rural water services across India, the prevalence of government support across the case studies is still considered to show the strong role of the state in rural water services in India, and thus the comparatively weaker role of civil society and the private sector. This is of relevance when considering the historical development of the community management model around the world which emerged in part due to NGOs and donors attempting to bypass failing (local) governments (Harvey and Reed, 2006; Moriarty, Butterworth, Franceys, et al., 2013). The situation documented in India is completely distinct from this idea of community management as a way to bypass government. Rather the case studies here show that government – in its different forms – is the primary agent supporting community management. Building on this theme, at the community service provider level,

this chapter has highlighted the overlap and tension between the concept of community management as a form of autonomous – effectively private – management of water services by citizens and what could be described as the "institutionalised co-production" of services (Joshi and Moore, 2004) between the state and community. The implication of this tight intersection between government and community is discussed in greater detail in Chapter Seven.

Yet whilst recognising these developments in India, this chapter has also provided important findings that can be considered, at least partly, to contradict one of the core research hypotheses underpinning the community management plus movement. That is, the type and characteristics of the community service provider are more closely linked to success than the type of enabling support environment. It is accepted that the research has not provided any causal analysis and as will be shown in the next chapter, various factors relate to successful outcomes. However, the finding echoes the results from the systematic review of successful community management around the world, which indicated that community-level aspects appear to be at least as equally as important as external support activities (Hutchings et al., 2015). The lesson here is that whilst external support may be important, programme managers and other stakeholders must work hard to establish the most appropriate service provider arrangements within villages.

6 THE COST OF GOOD COMMUNITY MANAGED RURAL WATER SERVICES IN INDIA

This chapter progresses the thesis to consider the service level and financial cost data. It is designed to verify the level of success found across the case studies, as measured through the household surveying, and to interrogate how much it costs to deliver the types and levels of service found. The chapter provides a contribution to the literature on the financial sustainability of rural water services (Burr and Fonseca, 2013; Hutton and Varughese, 2016; Mcintyre et al., 2014) by providing guidance on the levels of investment found in successful community management programmes in India.

Structurally, it first focuses on the service levels across the cases to provide a descriptive analysis of outcomes at the whole sample level before focusing on individual cases and groups of cases. This is followed by the financial analysis that follows a similar pattern of moving from the whole sample to case-by-case data before analysis by different sub-groupings of cases. The chapter ends by bringing these two elements together to consider whether it is possible to identify patterns of financial costing arrangements that are associated with certain service level outcomes.

As with the previous chapter, an overview of key results is presented overleaf in Table 6-1 to provide a reference point for readers to use alongside the summaries via Appendix B.

Table 6-1 – Summary of key service level and finaincial findings by case study

Case	State	Service Level (median)	% of population reaching basic or above service level	Capital Expenditure (CapEx)	% Support Contribution to CapEx	Annual Recurrent Costs	% Support Contribution to Recurrent
1	Jharkhand	Sub Standard	31%	$208	100%	$6	71%
2	Madhya Pradesh	No Service	35%	$166	100%	$10	3%
3	Odisha	High	69%	$169	82%	$4	10%
4	Chhattisgarh	Basic	55%	$112	100%	$3	26%
5	Meghalaya	Sub Standard	45%	$85	95%	$6	61%
6	Rajasthan	Sub Standard	19%	$93	89%	$11	15%
7	West Bengal	No Service	0%	$38	98%	$2	77%
8	Telangana	Improved	87%	$279	88%	$16	59%
9	Karnataka	Sub Standard	37%	$282	95%	$12	4%
10	Himachal Pradesh	High	65%	$342	97%	$6	3%
11	Punjab	High	98%	$247	94%	$50	46%
12	Uttarakhand	No Service	0%	$536	91%	$13	54%
13	Kerala I – World Bank	High	100%	$184	83%	$30	52%
14	Kerala II – Local self-government	High	94%	$221	97%	$32	30%
15	Gujarat – WASMO Gandhinagar	Improved	87%	$73	92%	$6	73%
16	Gujarat – WASMO Kutch	High	98%	$196	91%	$9	52%
17	Tamil Nadu – Local self-government	Improved	63%	$128	90%	$28	75%
18	Tamil Nadu – Public-Private Hybrid	Improved	53%	$17	91%	$46	72%
19	Maharashtra	Improved	94%	$1,019	100%	$13	53%
20	Sikkim	Sub Standard	45%	$251	98%	$73	94%

6.1 Service levels across the sample

The analysis of service levels begins by presenting an overview of the composite service level indicator for both programme and control villages across the entire sample. Although the data distribution shares a similar U-shape, as shown in Figures 6-1 and 6-2, there is a clear difference in the skewness of the data, with proportionally over twice as many households in the programme villages receiving high service levels as compared to the control villages. Based on the research methodology's definition of success, as measured by the composite service level indicator, and the use of median as the appropriate central tendency measure for ordinal data, this difference in skewness is reflected in the median service level in programme villages being 'improved' (4) compared to 'sub-standard' (2) in the control villages. The Mann Whitney Test confirms the difference in medians as statistically significant at the 0.00 level, as shown in Table 6-2. This verifies that at the whole sample level the study compared more successful service delivery in the programme villages than in the control villages.

Table 6-2 - Descriptive statistics for composite service level (programme v control; whole sample)

Village type	Median	Mean	N	Std. Deviation	Kurtosis	Skewness	Mann Whitney U-Test Comparing Medians
Programme Village(s)	4.00[12]	3.17	1684	1.543	-1.527	-.217	Reject the null hypothesis (the samples are statistically different at the 0.00 significance level - test statistic 358.192)
Control Village(s)	2.00	2.54	554	1.493	-1.436	.367	
Total	3.00	3.02	2238	1.554	-1.583	-.071	

However, even for programme villages, over 40% of the sample report having water services that score 'sub-standard' or 'no service' with regards to the composite indicator. This indicates that within these purposively selected high performance programmes there are still a significant minority of the population receiving inadequate services. In the WASHCost research it was reported that the 'majority' of

[12] (1 = no service, 2 = sub-standard, 3 = basic, 4 = improved and 5 = high)

people with improved-water sources do not receive a ‘basic’ service level (Burr and Fonseca, 2013). Here, the results are at least reversed in that the majority of households (54%) in programme villages *do* achieve ‘basic’ or above service levels. However, the research can be considered to confirm a pattern of results found in other studies – that the improved-water source access figures can mask variable service levels in rural water service programmes (Clasen, 2012; Godfrey et al., 2011).

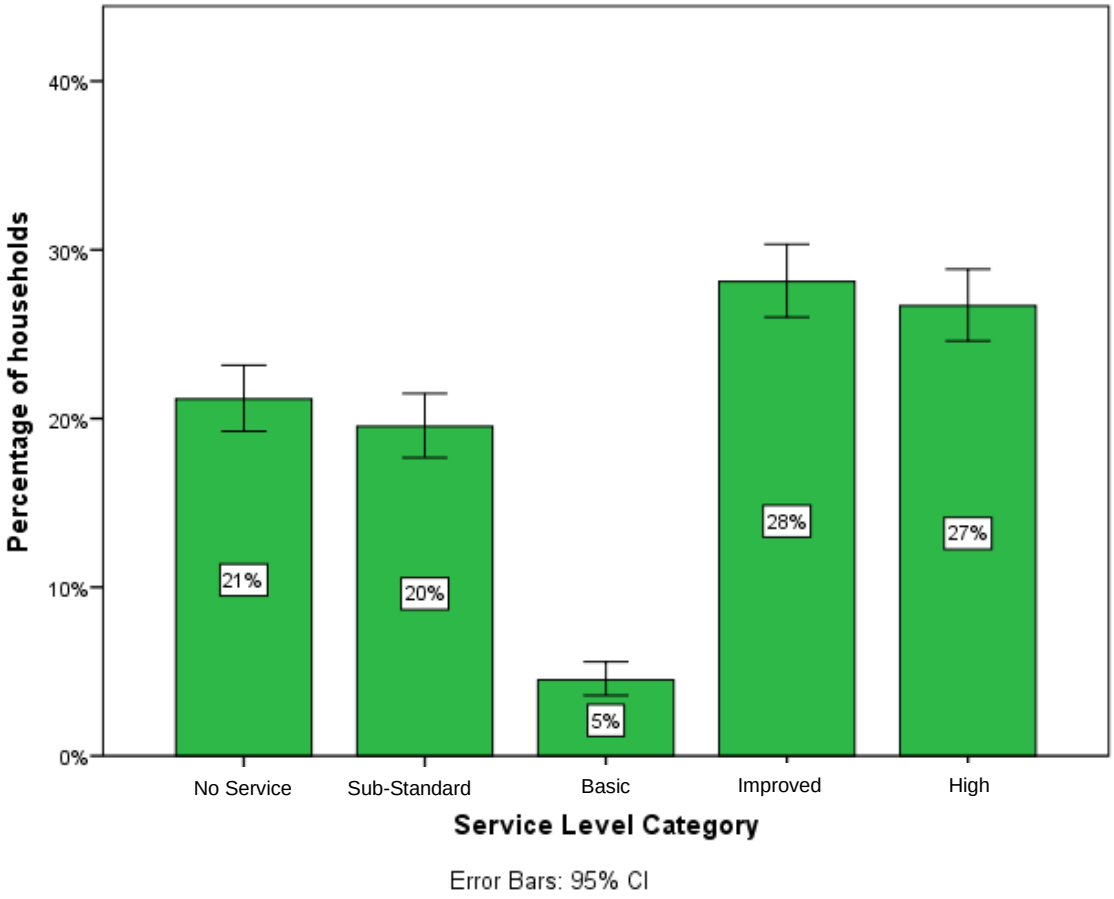

Figure 6-1 - Consolidated Service Level Indicator (programme villages)

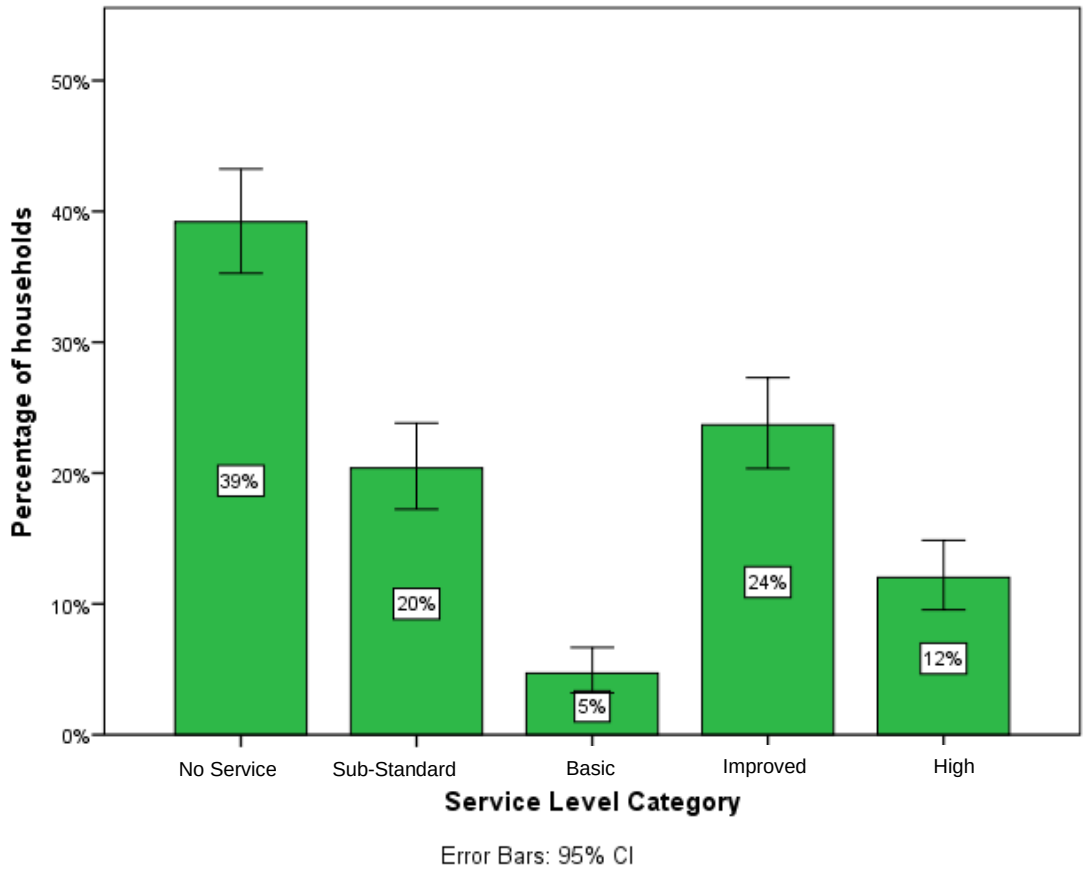

Figure 6-2 - Consolidated Service Level Indicator (Control villages)

Moving onto an analysis of the disaggregate service level it is helpful to understand which of the service level parameters are having the most influence on the composite indicator. In total, across the whole sample 1,019 (31%) respondents failed on at least one parameter meaning that due to the nominal logic of the composite indicator they were labelled as sub-standard or no service. Of those failures, 573 failed on just one indicator, 319 failed on two indicators whilst the rest failed on three or more indicators. Table 6-3 illustrates there is greatest variability in the parameter for quantity, compared to accessibility, perceived quality, reliability and continuity. The distribution of the data is split for quantity with a median measure of 'high' (5) across the sample but the highest standard deviation of any measure.

This is reflected in the number of households failing on that measure with this coming out at 676 (30% of the sample). Accessibility is the next measure that is most likely to be reported as failing to meet the service level (16%) followed by reliability

and continuity at 11%. Only 3% of respondents reported unacceptable quality but as explained in the methods this is only a measure of perceived quality so has to be treated with caution. The disaggregated service level data therefore shows that a focus on increasing the quantity of water supplied will have the biggest impact in terms of moving populations up the service level ladder from 'no service' or 'sub-standard' to 'basic' or above. Evidence indicates that having a water-source in or close to the home increases the quantity of water people consume (Howard and Bartram, 2013) and so, in this sense, the Government of India drive for household connections is well focused in terms of improving service level outcomes (Government of India, 2013a).

Table 6-3- Descriptive statistics on the disaggregated service level indicators

		Quantity	Accessibility	Quality	Reliability	Continuity (piped only)
N	Valid	2244	2207	2286	2167	1809
	Missing	74	111	32	151	509
Mean		3.61	4.27	4.68	4.49	3.70
Median		5.00	5.00	5.00	5.00	3.00
Std. Deviation		1.607	1.380	.792	1.101	1.102
Skewness		-.575	-1.541	-2.218	-2.203	.130
Kurtosis		-1.334	.676	3.356	3.543	-1.542
Number of household failing on this parameter		676	355	69	239	195
Percentage of households failing on this parameter		30%	16%	3%	11%	11%

Shifting the focus to the case-by-case service level data, the analysis shows that 13 of the cases studies have a median measure of 'basic', 'improved' or 'high' on the composite indicator in programme villages. The services delivered in these cases therefore, on average, meet or exceed the standards for all the individual service level parameters. From these, there are six case studies that have a median service level of 'high', giving a sub-group of what can be considered very successful service level outcomes. In the middle there are seven that achieve the 'basic' or 'improved' level, whilst seven of the case studies have medians that come at either 'sub-standard' or 'no service'.

Based on the research methodology, those latter seven case studies cannot be considered 'successful' rural water services as per government norms. For this

research the three groups, as shown in Table 6-4, can be labelled as the ‘high service level group’, ‘basic or improved service level group’ and ‘sub-standard or no service level group’. This finding can be interpreted in different ways. It shows that community management can play a role in delivering service levels at various ranks of success suggesting it has a role to play in countries progressing from a focus on basic access to increasing service levels. However, it also shows that a third of ‘reportedly successful’ community management programmes fail to deliver even basic service levels calling into question the overall approach the sector takes to delivering such services.

Table 6-4 - Descriptive statistics on service level composite indicator (all cases, programme villages only)

Service Level Grouping	Case Study #	Case Study State	Median	Mean	N	Std. Deviation	Kurtosis	Skewness	Mann Whitney	Null Hypothesis (programme and control are the same)	Sign.
High Performance Group	14	Kerala II	5	4.97	90	0.181	26.553	-5.288	0	Reject	0
	13	Kerala I	5	4.76	90	0.812	12.763	-3.648	1032.5	Retain	0.8
	11	Punjab	5	4.63	70	0.705	11.224	-2.895	720.5	Reject	0
	16	Gujarat II	5	4.57	90	0.735	6.522	-2.231	14	Reject	0
	3	Odisha	5	3.87	91	1.586	-1.041	-0.872	615.5	Reject	0
	10	Himachal Pradesh	5	3.78	60	1.574	-1.36	-0.681	1067	Reject	0.045
Medium Performance Group	19	Maharashtra	4	3.89	90	0.461	13.884	-3.947	0	Reject	0
	15	Gujarat I	4	3.74	91	0.68	2.961	-2.213	830	Reject	0
	8	Telangana	4	3.66	38	0.878	3.494	-2.027	321	Reject	0.001
	17	Tamil Nadu I	4	3.16	89	1.032	-1.338	-0.387	708	Reject	0
	5	Meghalaya	4	3.06	89	1.792	-1.833	-0.086	1076	Retain	159
	18	Tamil Nadu II	4	2.93	90	1.169	-1.571	-0.343	628	Reject	0
	4	Chhattisgarh	3	2.68	90	1.235	-0.757	0.276	720	Reject	0
Low Performance Group	9	Karnataka	2	2.69	49	1.025	-1.579	0.418	1037	Reject	0.001
	20	Sikkim	2	2.69	89	1.345	-1.523	0.11	1365	Retain	0.848
	1	Jharkhand	2	2.24	90	1.074	1.146	1.108	871500	Reject	0.002
	6	Rajasthan	2	2.13	90	0.902	0.344	0.953	834	Retain	0.194
	2	Madhya Pradesh	1	2.18	88	1.369	-1.648	0.488	2190	Reject	0
	7	West Bengal	1	1.06	90	0.23	13.884	3.947	1275	Retain	0.189
	12	Uttarakhand	1	1.14	80	0.347	2.67	2.146	724.5	Retain	0.073

6.2 Service level outcomes by sub-groups

This section now considers patterns of service level outcomes across different groups of cases. It begins by providing some further details linked to the previous chapter by comparing the types of enabling support environment and community service providers. However, it also goes beyond these categories to consider service level outcomes by technical stratifications and the context of the case study. The intention of this analysis is not to identify a single critical stratification but to illustrate how outcomes change across groups so to provide further insight into the conditions that are associated with successful rural water services.

6.2.1 Organisations types

Focusing on the differences between organisational types, Table 6-5 and 6-7 confirm the findings presented in the previous chapter. Using a Kruskal Wallis test they prove that there are statistically significant difference between at least one the organisational types from the remainder of the sample in terms of service level outcomes at both the enabling support environment and community service provider level. The post hoc Dunn-Bonferroni tests as presented in Tables 6.7 and 6.9, respectively, show the pair-wise differences between these organisational types. As argued in the previous chapter, these differences are more marginal when stratifying the cases by enabling support environment with three categories – SRWSA, LSG and Hybrid – delivering a median outcome of ‘improved’ (4) whilst the external support category comes out at the ‘sub-standard’ (2) level. The lower performance of the external agencies is considered to reflect the role the largely NGO-orientated category plays in the Indian sector – they operate in the most challenging contexts when government supplies have failed and hence the level of service they deliver is likely to be lower.

Table 6-5 – Composite service level outcomes by enabling support environment category (programme villages only)

Category	Median	Mean	N	Std. Deviation	Kruskal-Wallis Test	Null Hypothesis the samples are the same	Statistical significance
External Support	2.00	2.78	209	1.723	27.259	Reject	0.000
Hybrid	4.00	3.20	557	1.673			
LSG	4.00	3.54	268	1.399			
SRWSA	4.00	3.19	630	1.352			

Table 6-6 – Enabling Support Environment categories pair-wise testing (Dunn-Bonferroni post hoc test results for significant Kruskal-Wallis test)

Sample 1	Sample 2	Test Statistic	Adjusted Significance	Null Hypothesis the samples are the same
External Support	SRWSA	-95.635	0.061	Retain
External Support	Hybrid	-126.123	0.005	Reject
External Support	LSG	-218.324	0.000	Reject
SRWSA	Hybrid	30.487	1.000	Retain
SRWSA	LSG	122.688	0.002	Reject
Hybrid	LSG	-92.201	0.047	Reject

For the community service provider typologies the difference in terms of service level outcome is more pronounced. The Registered Society as a VWSC has a median outcome of ‘high’ (5) that shows that this is the organisational type that can most directly be associated with high service level outcomes. The VWSCs as representative sub-committees of the LSG achieves a ‘basic’ (3) level of service whilst the other two categories come out at sub-standard and no service. As these categories were the subject of extensive discussion in the previous chapter they are not discussed in detail here but it was considered appropriate to present the descriptive statistics within this chapter and within the broader statistical analysis.

Table 6-7 - Composite service level outcomes by community service provider category (programme villages only)

Category	Median	Mean	N	Std. Deviation	Kruskal-Wallis Test	Null Hypothesis the samples are the same	Statistical significance
LSG Autonomous	2.00	2.13	90	.902	370.716	Reject	0.000
LSG Representative	3.00	2.93	676	1.282			
Registered Society	5.00	3.99	660	1.421			
Unregistered Society	1.00	2.16	238	1.567			

Table 6-8 – Community Service Provider categories pair-wise testing (Dunn-Bonferroni post hoc test results for significant Kruskal-Wallis test)

Sample 1	Sample 2	Test Statistic	Adjusted Significance	Null Hypothesis the samples are the same
LSG-Autonomous	Unregistered Societies	-1.872	1.000	Retain
LSG-Autonomous	LSG-Representative	-208.054	0.000	Reject
LSG-Autonomous	Registered Societies	-563.279	0.000	Reject
Unregistered Societies	LSG-Representative	203.182	0.000	Reject
Unregistered Societies	Registered Societies	561.408	0.000	Reject
LSG-Representative	Registered Societies	-355.225	0.000	Reject

6.2.2 Types of water-source access and system design

The pattern of service level outcomes by system design and the type of water-source access are now considered. Figure 6-3 helps illustrate how services levels vary by system design with what is considered to be a distinction between three overall groups. Non-piped water supply, in this study from a single case containing a handpumps, delivers universally unacceptable service levels. The SVS from open wells and gravity-fed systems delivered services where the majority of survey respondents reported service levels that did not

meet the basic criteria. This is considered to be because of the use of public stand posts in such contexts (Ramamohan Roa and Raviprakash, 2016a; Saraswathy, 2016b, 2016c). The other types of piped supply delivered services where the majority of the population received acceptable service levels.

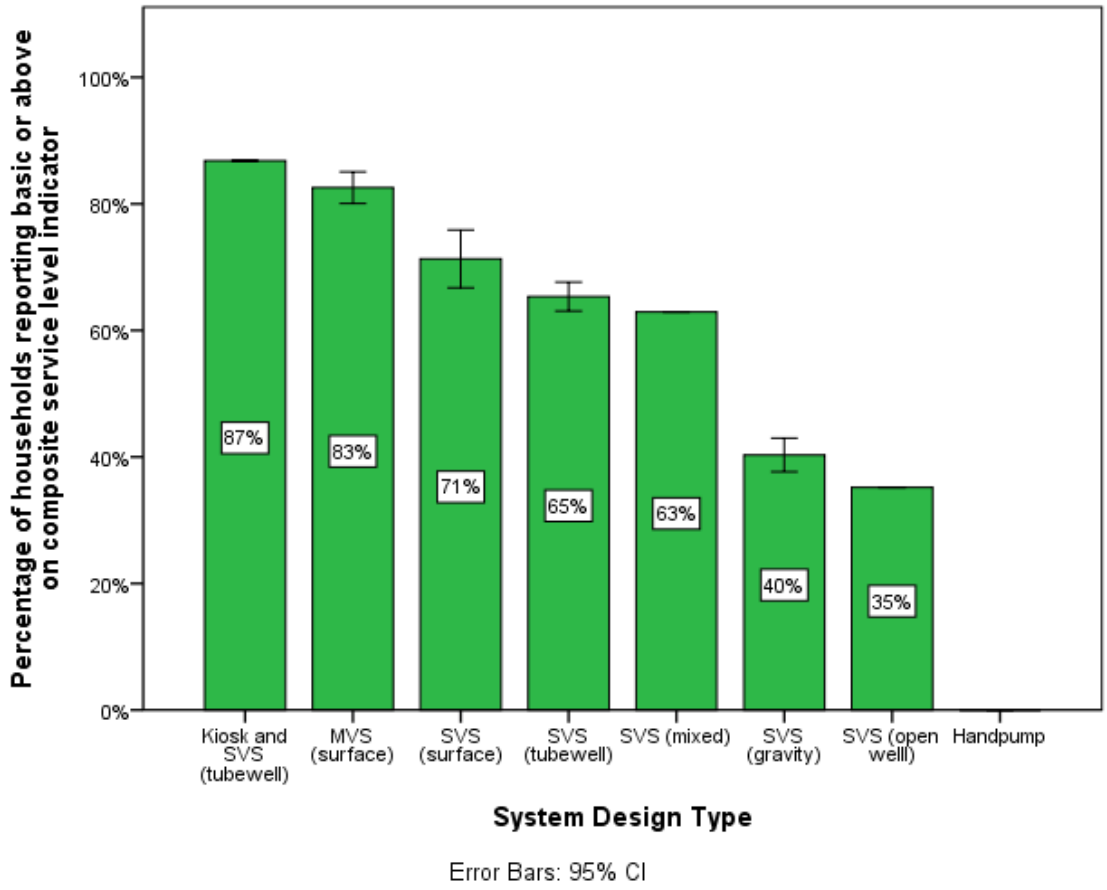

Figure 6-3 – Percentage of households meeting at least basic on the composite service level indicator across water source types

As well as the technical system design, the household survey recorded the type of water-source access available to respondents. This could be a household tap connection, public stand post or hand pump, for example. The sub-sample sizes for these categories indicate that the sample predominately covered services provided through household connections rather than communal sources. With Indian policy focusing on piped water supply (Government of India, 2013a) the data shows that household connections deliver significantly better services than public stand posts (and that even private wells deliver consistently higher

services than public stand posts). Overall, the data here suggests that the type of water delivery is an extremely important factor in terms of differential performance between the case studies, more so, than the technical design of the system. In additional to the figures provided, Table 6.9 and 6.10 provide further details on the descriptive statistics.

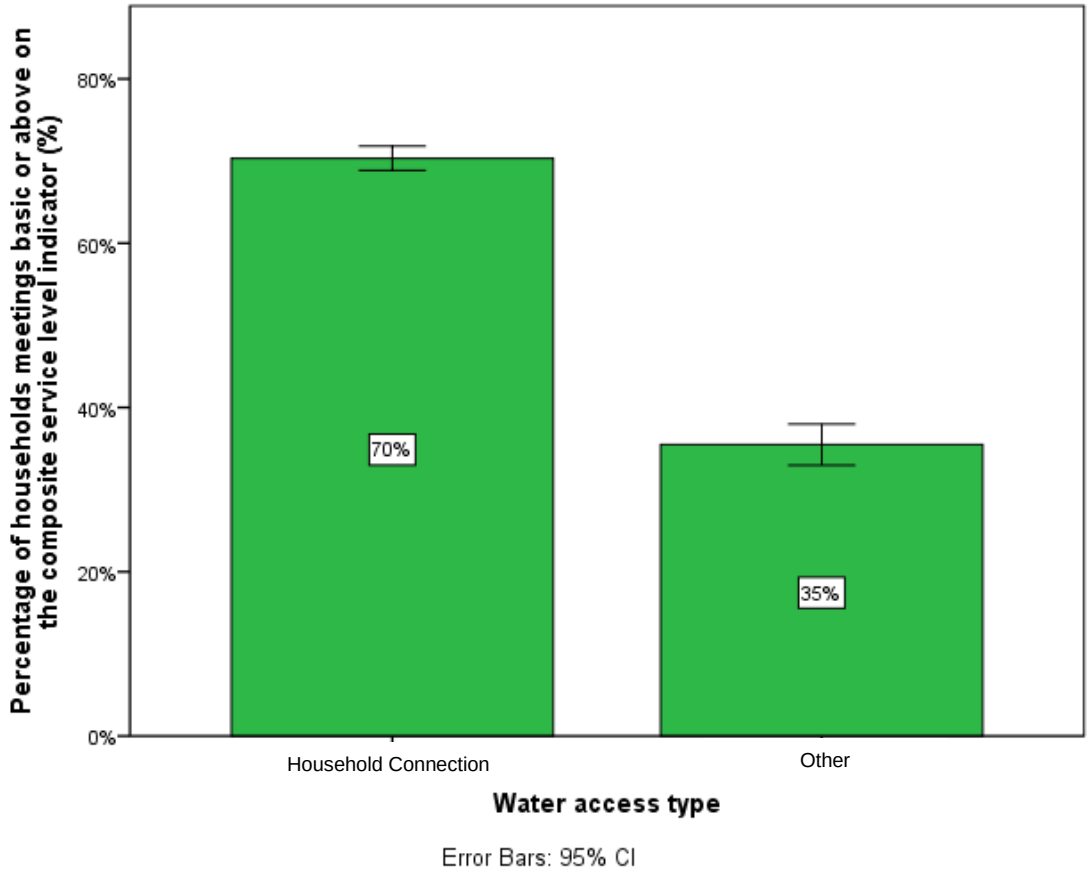

Figure 6-4 - Percentage of households meeting at least basic on the composite service level indicator across water delivery types

Table 6-9 - Descriptive statistics for water delivery types (service level indicator; whole sample)

Tech	Median	Mean	N	Std. Deviation	Kruskal-Wallis Test	Null Hypothesis the samples are the same	Sign.
Household Connection	4.00	3.51	1537	1.400	393.814	Reject	0.000
Public Stand Post	1.00	1.92	287	1.289			
Private Well	2.00	2.68	60	1.444			
Handpump	1.00	1.14	179	.379			
Spring	2.00	2.69	119	1.364			
Other	1.00	2.11	56	1.569			

Table 6-10 Water delivery types pair-wise testing (Dunn-Bonferroni post hoc test results for significant Kruskal-Wallis test)

Sample 1	Sample 2	Test Statistic	Adjusted Significance	Null Hypothesis
Other	Public Standpost	-236.994	0.000	Reject
Other	Private Well	-361.456	0.000	Reject
Other	Spring	-454.056	0.000	Reject
Other	Household	739.468	0.000	Reject
Public Stand Post	Private Well	124.462	1.000	Retain
Public Stand Post	Spring	217.062	0.001	Reject
Public Stand Post	Household	502.473	0.000	Reject
Private Well	Spring	-92.600	1.000	Retain
Private Well	Household	378.011	0.000	Reject
Spring	Household	285.412	0.000	Reject

6.2.3 Broader context of case study

Due to links between broader development indicators and rural water services (as outlined in Chapter Three) it is considered useful to assess the cases by the two broad contextual factors that were related to rural water service outcomes at the state level. It is acknowledged that the case studies cannot be considered representative of state-level trends as they are purposively selected single cases, however the strength of the synergistic relationship between water services and broader societal development mean that this approach is still considered useful. As such, Figure 6-5 shows service level outcomes are better in the case studies from the richest states (when excluding case studies from the mountain and hilly states which it was previously argued are considered a special case for water services in India).

Comparing the middle-income to high-income aggregate service level data also reinforces the arguments made about the social democratic tendencies versus development tendencies which tend to be found in the middle-income and high-income states (Kohli, 2012), respectively . Control villages in the middle-income state have better service level outcomes than programme villages reported on in low-income and mountainous states, whereas the control villages in the development states have the lowest overall outcomes from across the whole study. This would support the connections the thesis makes between the political economy of the state and rural water service outcomes. The Maharashtra and Tamil Nadu II case studies, for example, are considered to reflect examples whereby the state government has taken a top-down approach to constructing large MVS piped supply, which delivers strong service level outcomes to the villages it serves. However, beyond these large schemes, the ‘forgotten’ villages seem to lack the capacity or enabling environment to deliver good service themselves, whereas, in Kerala, for example, even for villages outside the main programmes studied, widespread literacy and development appears to allow villages to deliver services adequately.

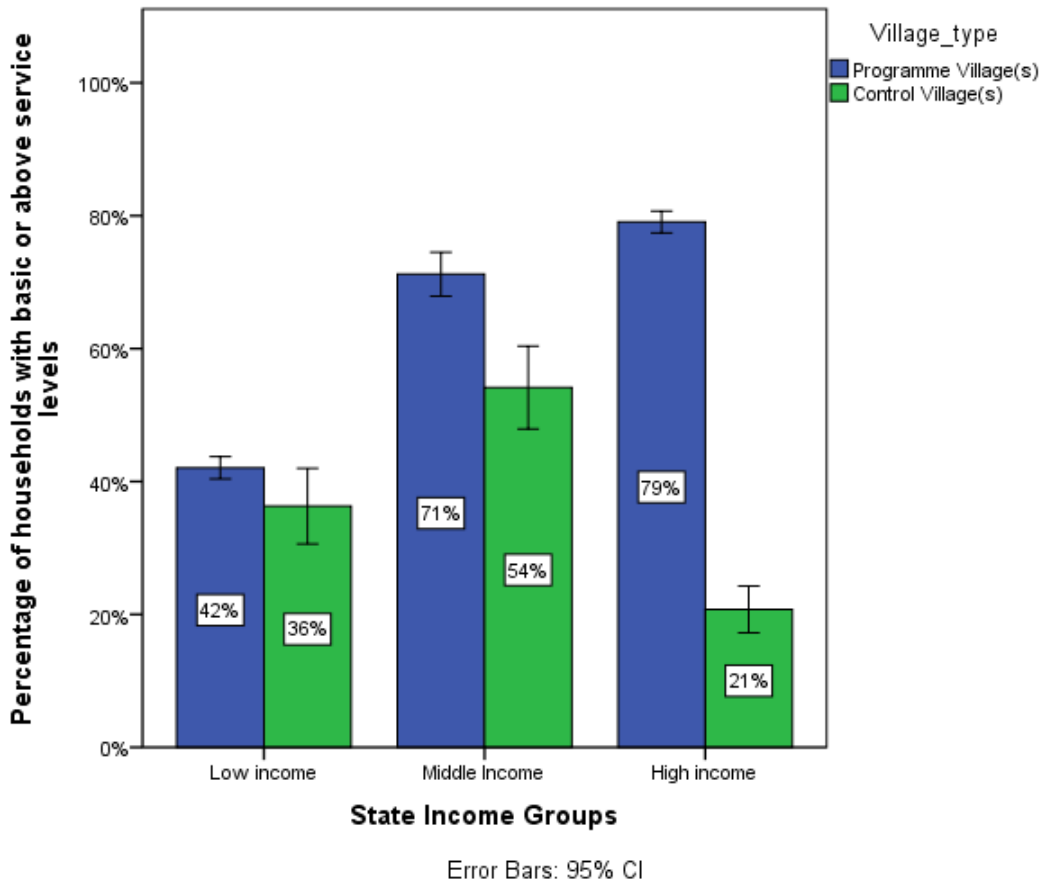

Figure 6-5 – Percentage of households meeting at least basic on the composite service level indicator across wealth categories

The difference between the service level outcomes in the case studies from the mountainous and hilly states versus the rest is less clear, as shown in Figure 6-6. In the programme villages, the rest of the sample outperforms the mountainous case studies but the control villages have better outcomes than the programme villages in the mountainous villages (although the difference is within the margin of error). This may reflect a sampling bias for the control villages in the mountainous states. In conversation with the field-researchers for these case studies the remoteness of the programme villages was mentioned, specifically in relation to the Uttarakhand and Himachal Pradesh case studies (Harris et al., 2016c; Smits et al., 2016). Selecting control villages that were as remote as the programme villages may have been due to a geographically-orientated sampling bias with researchers selecting control villages that were

closer to the main roads. Similar sampling bias has been reported in other development research projects (Chambers, 2008).

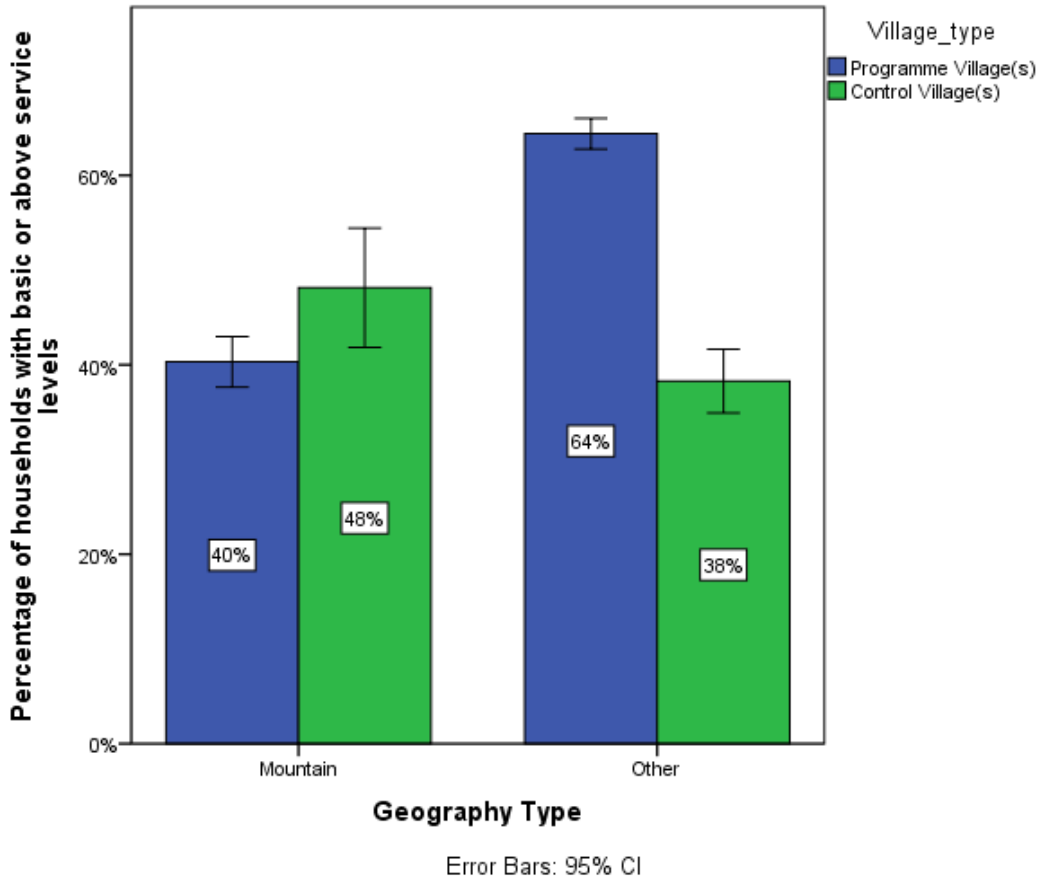

Figure 6-6 - Percentage of households meeting at least basic on the composite service level indicator across wealth categories

6.3 Service level overview

The analysis of the service level data from the household surveying has revealed that there are statistically significant differences across various sub-groups of the sample that support the theoretical justifications for selecting the case studies. This includes higher service levels in programme rather than control villages, differences between economic income categories, technical mode of supply and organisational types. It is not argued, nor was the analysis intended to test, whether any of these factors are causal variables as the research understands rural water service outcomes to be shaped by complex pathways of causality. Rather the descriptive analysis was designed to validate

the level of success across the cases and provide empirically-grounded insights into the conditions associated with success that can be used to further structure, and triangulate with, the broader analysis of community management in India.

6.4 Financial analysis

This section begins the process of moving the quantitative analysis from the validation measures of the study (i.e. service levels) to one of the critical elements for answering the research questions (i.e. financial flows). Similarly, it begins by providing an overview of the general financing pattern across the major cost categories. It then moves to a cross-case analysis that disaggregates the cost sharing arrangements between communities and external support entities for each case study. These patterns are then analysed by the major groupings used in the previous section including organisational types, technical modes of supply and economic income categories.

As discussed in the methodology chapter, the financial data was consolidated to the case level based on the average of three programme villages at the community service provider level and the costs collected at the enabling support environment level. Inconsistent data was collected at the enabling support environment level for control villages so the financial analysis does not compare programme against control data. With this section focusing on financial data, the basic central tendency measure used is the mean and the interquartile range (IQR) as opposed to the median in the section before. With significant variability in interval data this is deemed an appropriate approach (Black, 2012) – especially as this replicates the approach followed in the WASHCost research (Burr and Fonseca, 2013; Fonseca et al., 2011; Mcintyre et al., 2014) enabling direct comparison between the data as the analysis is presented.

6.5 Financial costs across the sample

There is considerable variability across the cases in terms of the level of financial investment found. As shown in Table 6-11, at the whole sample level

the average CapEx on hardware was $207 per person with an IQR of $93 to $233, whilst the mean CapEx on software was $25 with an IQR of $0.7 to $17. With the mean above the IRQ it is clear an outlier has pulled up the average for the CapEx on software. The mean recurrent costs come to around $20 per person but again there was variability across the programmes. For OpEx and OpEx Enabling Support this research reports ranges of $3.5 to $12 and $0.1 to $2.4 per person, respectively. These compare against the international benchmarks in contrasting ways for CapEx and OpEx as compared below.

Table 6-11 - Descriptive statistics on major cost categories (whole sample)

		CapEx Hardware	CapEx Software	OpEx	OpEx Support	CapManEx Hardware	CapManEx Software
Programmes (N)		20	20	20	20	20	20
Mean		$207	$25	$8.75	$2.35	$7.58	$0.19
Std. Deviation		214.30	51.88	7.85	5.21	10.88	0.68
Percentiles	25	$93	$0.72	$3.56	$0.14	$0.38	$0.00
	50	$164	$2.83	$5.72	$0.51	$4.75	$0.00
	75	$233	$17	$12	$2.40	$11	$0.00

First, comparing CapEx costs, the new data reported here are significantly higher than compared to the WASHCost datasets (Burr and Fonseca, 2013). Based on the consolidated global dataset, the WASHCost research reported the following IQR for CapEx of $31 to $132 per person for rural piped schemes (Burr and Fonseca, 2013). Yet when focusing on just the WASHCost India data the benchmarks are even lower at $23 to $81 for CapEx (Burr, 2015). This means the lower IQR for CapEx hardware from this study is already higher than the highest benchmark reported from the WASHCost Andhra Pradesh research.

Second, for OpEx costs, the data from the international WASHCost IQRs are $0.5 to $5.3 and for OpEx Enabling Support they are $1.1 to $3.2 (Burr and Fonseca, 2013). The data from this research provides a much higher range of OpEx costs but lower OpEx Enabling Support costs. This is considered to reflect the way operational support is structured in India, which includes significant direct subsidy to community service providers during the OpEx stage, which in turn allows the level of OpEx Enabling Support to be lower.

Overall, the whole sample findings from this research indicate higher combined OpEx and OpEx Enabling Support costs than the international benchmarks. Again, when comparing directly to the WASHCost India data the differences are even greater. That study found recurrent costs in the Indian sector hard to come by but reports a benchmark for the combined costs of between $0.2 and $2.5 per person per year (Burr and Fonseca, 2013). When comparing that against the findings from this thesis, again the lower benchmarks from this research are higher than the upper benchmarks provided by the WASHCost project.

The final cost categories reported on are for CapManEx in hardware and software. There were 18 case studies in which CapManEx was reported but two case studies (Odisha and Karnataka) reported no CapManEx hardware data. There were only four cases where any form of CapManEx software was conducted suggesting this is an area of underinvestment. The data provided gives a range of $0.4 to $11 for CapManEx compared to the WASHCost India range of $0.0 to $1.2. At this aggregate level, the data presented here clearly shows that the levels of expenditure found in these 'reportedly successful' community managed rural water service programmes are at a significantly higher level than has been previously reported.

6.6 Financial cost sharing between support and community

A core contribution this thesis makes to the literature is to reassess what cost sharing arrangements can support successful community management in the context of the various calls for a shift to community management plus (Baumann, 2006; Lockwood, 2002, 2004; Moriarty, Butterworth, Franceys, et al., 2013). This section focuses on this issue through analysing the financial cost sharing arrangements between support agencies and communities.

As shown in Table 6-12, the mean proportional contribution of communities to capital costs is 5% which is around half of the often held standard for 'demand-responsive' community management which was 10% of capital costs in the Indian context (Government of India, 2003; Hutchings, Franceys, et al., 2016). The range given for community contribution to CapEx across the cases is 0%-

7%. Significantly, there are four case studies where communities do not contribute any money to capital costs which reflects a complete departure from the principle that communities need to make a financial contribution in the implementation phase of a community management programme in order to demonstrate some degree of 'ownership' and therefore commitment to future management. For CapEx software this research indicates a range of between 1%-7% of total capital costs which is lower than the 10% estimate used by the Water and Sanitation Program of the World Bank in their calculation of investment needs in the sector (Hutton and Varughese, 2016).

Table 6-12 - CapEx cost sharing

Descriptive Statistics	CapEx Hardware Support	CapEx Software Support	CapEx Community
Mean (%)	84%	11%	5%
IQR	99%-87%	1%-7%	0%-7%

The recurrent cost sharing arrangements are presented in Table 6-13. The IQRs presented show greater variability in the pattern of cost sharing for recurrent costs than capital costs. Focusing on the operational costs, the IQR for community contributions is 52-93% of the total. Reflecting this finding back against the principles of the demand-responsive approach to community management it is clear that generally speaking communities are not covering 100% of operational costs as is implied under a demand-responsive model (Government of India, 2003; Hutchings, Franceys, et al., 2016). Instead, they are reliant on significant direct and indirect financial support. The direct support through subsidies to OpEx range from 1-30% and the OpEx Enabling Support range from 6-18% of the overall operational costs. In Chapter Two the financing used in the Capital Maintenance Phase of the service delivery cycle, was identified as the critical failure point in many rural water service programmes. The data here shows communities can contribute 11-21% of these costs in successful programmes with the remaining 29-89% covered by supporting agencies. The study found very little CapManEx on software across the cases indicating this is an area of systemic underinvestment, although also perhaps a

function of studying generally longer-life piped water supply systems (as compared to handpumps).

Table 6-13 - Recurrent cost sharing

Descriptive Statistics	OpEx direct support	OpEx enabling support	OpEx community	CapManEx support hardware	CapManEx support software	CapManEx community
Mean (%)	26%	21%	53%	82%	3%	15%
IQR	1%-30%	6%-18%	52%-93%	79%-89%	0%-0%	11%-21%

The cost sharing data in terms of dollars invested by support and community is now considered. This helps to quantify the level of financial investment found and shows an IQR of $2.4 to $6.6 per person for community contributions to OpEx costs whilst the external support for that category is $0.6 to $4.8 each year, as displayed by Table 6-14. This indicates there is a "willingness to pay" for services through the community management model but tariffs continue to require significant subsidy even to cover the basic OpEx costs. Similarly the data shows that for many of the case studies community members demonstrated a willingness to pay for capital costs of up to around $17 per person for a one-off payment for CapEx and just over $2 annually to cover CapManEx.

Table 6-14 – Financial data on cost sharing

	CapEx Support	CapEx Community	OpEx Support and OpEx Enabling Support	OpEx Community	CapManEx Support	CapManEx Community
Mean	$220	$13	$5.3	$5.8	$5.6	$2.2
IQR	$98-$245	$0-$17	$0.6-$4.8	$2.4-$6.6	$0.0-$8.2	$0.1-$4.6

The cost sharing data has so far been focused on the trends across the sample but the individual case study data is also presented below to illustrate specificities across the cases. It shows some outliers in terms of the cost sharing such as the four case studies where there has been no community contribution to CapEx (Jharkhand, Madhya Pradesh, Chhattisgarh and

Maharahstra). As argued, this is considered to represent a significant departure from the principles that communities should contribute to CapEx. There are also three cases where the proportional contribution of support to recurrent costs is less than 5% showing that there are still examples where communities cover the vast majority of OpEx. However, for the majority of cases, the substantial levels of recurrent support found confirm the community management plus paradigmatic claims that substantial on-going support is required for successful community management.

Table 6-15 – Case by case cost sharing financial data

Case No.	State	CapEx Support	CapEx Community	OpEx Support and OpEx Enabling Support	OpEx Community	CapManEx Support	CapManEx Community
1	**Jharkhand**	$207.50	$0.00	$3.9	$1.2	$0.0	$0.4
2	**Madhya Pradesh**	$165.78	$0.00	$0.3	$3.6	$0.0	$5.9
3	**Odisha**	$137.92	$30.74	$0.4	$3.5	$0.0	$0.0
4	**Chhattisgarh**	$112.32	$0.00	$0.7	$2.3	$0.1	$0.2
5	**Meghalaya**	$80.83	$3.92	$3.4	$2.4	$0.3	$0.0
6	**Rajasthan**	$82.69	$10.63	$1.0	$5.0	$0.7	$4.4
7	**West Bengal**	$37.18	$0.97	$0.8	$0.4	$1.0	$0.1
8	**Telangana**	$245.03	$33.99	$3.0	$5.9	$6.7	$0.8
9	**Karnataka**	$267.86	$14.10	$0.5	$11.3	$0.0	$0.0
10	**Himachal Pradesh**	$330.78	$11.00	$0.2	$5.7	$0.0	$0.6
11	**Punjab**	$231.42	$15.94	$5.7	$21.4	$17.3	$5.9
12	**Uttarakhand**	$487.36	$48.43	$5.1	$1.1	$2.0	$4.8
13	**Kerala Kodur**	$152.55	$31.60	$4.4	$13.5	$11.3	$1.0
14	**Kerala Nenmeni**	$214.30	$6.77	$0.0	$13.9	$9.6	$8.6
15	**Gujarat**	$67.08	$5.98	$4.4	$1.7	$0.1	$0.0
16	**Gujarat Kutch**	$178.13	$17.83	$4.6	$3.7	$0.0	$0.6
17	**Tamil Nadu**	$115.23	$12.72	$8.5	$6.9	$12.2	$0.0
18	**Tamil Nadu II**	$16.50	$1.65	$28.6	$6.4	$4.6	$6.6
19	**Maharashtra**	$1,019.41	$0.00	$4.3	$3.6	$2.7	$2.5
20	**Sikkim**	$245.21	$5.70	$25.5	$3.4	$43.6	$0.9

6.7 Financial costs by sub-group

This section investigates the cost sharing arrangements by organisational types, technical modes of supply and economic wealth. As the sample becomes stratified the number of cases in each sub-group becomes smaller, yet the approach is still to present the IQRs to indicate that there is variability even

between sub-groups. However, it is acknowledged for some analysis this means that the IQR can reflect the entire range of results.

6.7.1 Organisational types

Developing the arguments made in the previous chapter about the different organisational types, this section explains the cost sharing patterns between these groups. At the enabling support environment level, a notable difference is the higher levels of investment in the service delivery stage in the decentralised LSG cases compared to the other enabling support environment types. This includes higher tariff payments by communities and also greater external support from governments. The interquartile ranges of the other costs categories did not suggest a strong pattern of difference between the models as shown in Table 6-16.

Table 6-16 - Financial costs by enabling support environment type

ESE	CapEx Support	CapEx Community	OpEx Support and OpEx Enabling Support	OpEx Community
SRWSA	$81-$208	$0-$11	$1.0-$4.4	$1.7-$3.7
LSG	$115-$245	$6-$32	$4.4-$25.5	$3.4-$13.5
Hybrid	$166-$331	$0-$16	$0.2-$5.7	$3.6-$13.9
External Agency	$37-$245	$1-$34	$0.4-$3.0	$0.4-$5.9

Figure 6.7 provides a box and whisker plot illustrating the proportions of costs covered by communities under each type of programme. For CapEx, the SRWSA and hybrid support approaches have an interquartile range 0-9% and 0-6% respectively. The lower quartile of 0% is considered to be a relevant finding to highlight as it indicates the shift away from communities necessarily contributing towards CapEx, which had been a key principle in the popular demand-responsive mode of community management (Joshi, 2003; Moriarty, Butterworth, Franceys, et al., 2013; Schouten and Moriarty, 2003). With local self-government and external agency support systems there is an interquartile range of community contribution to CapEx of 2-17% and 3-18%, respectively. The high variety indicates the level of investment is programme specific and can

range from significantly below, to nearly double, the 10% contribution level highlighted in the literature as standard practice (Joshi, 2003; Moriarty, Butterworth, Franceys, et al., 2013; Schouten and Moriarty, 2003).

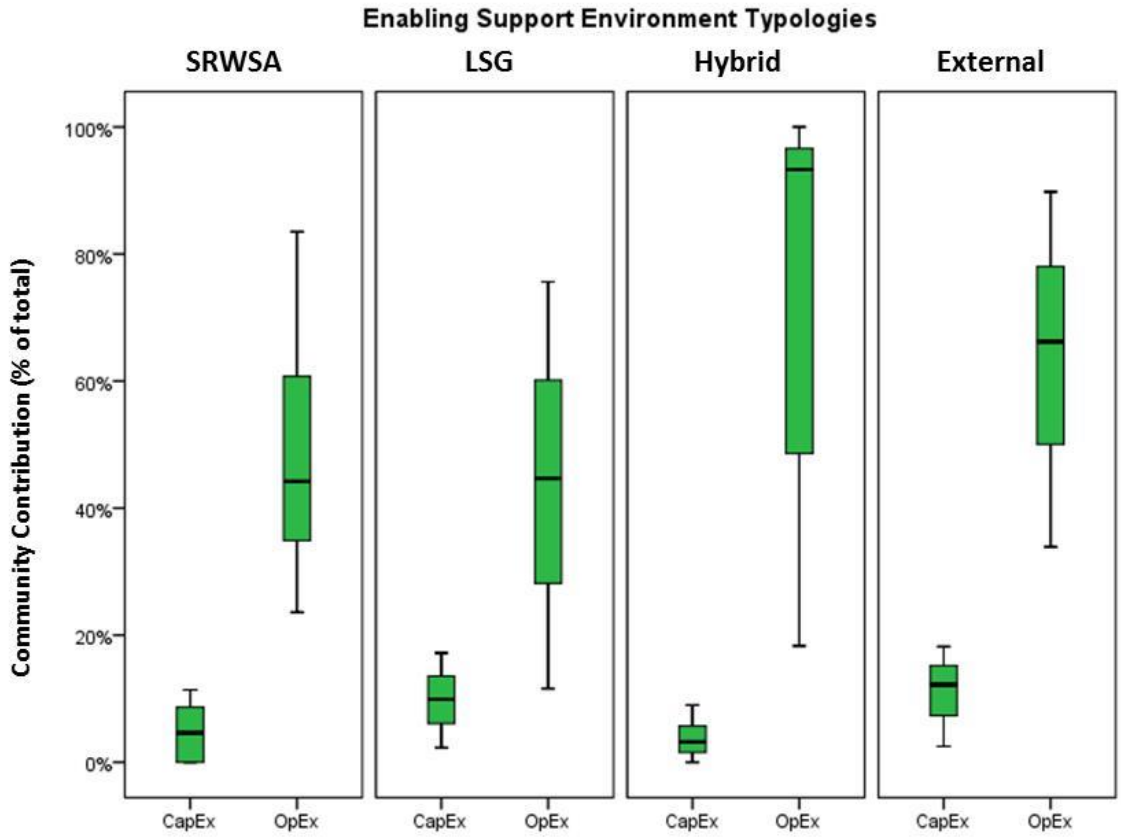

Figure 6-7 - Community proportional contribution to CapEx and OpEx by enabling support environment type

The proportional community contribution to OpEx also has high variety across the enabling support environment types. Yet in considering the interquartile ranges, the difference between the two government support programmes types – the SWRSA and LSG – and the hybrid and external agency is with regards to the upper quartiles. Those government enabling support environment types share an upper quartile of 75% whilst in the other categories it is 90% (external agency) and 97% (hybrid). Again, this is considered indicative of the shift in Government of India supported community management away from the cost sharing principles that have come to be associated with community

management (Joshi, 2003; Moriarty, Butterworth, Franceys, et al., 2013; Schouten and Moriarty, 2003), including that communities cover 100% of OpEx. It is the community management programmes either lead by or in partnership with non-government partners where the upper quartiles getting close to the 100% level for community contribution associated with the demand responsive approach to community management (Joshi, 2003). This difference between the domestic interpretation of the community management model and the more international ideals of community management is considered in more detail in Chapter Seven.

When cutting the case studies by community service provider types, the previous chapter demonstrated that the Registered Societies as VWSC model for the community service provider was the typology most associated with good service level outcomes. The financing of this type of model shows it has the highest level of community contribution to CapEx and OpEx suggesting a link between the level of community contribution and the success of these services. Direct support for OpEx and OpEx Enabling Support are also higher in in the Registered Societies than the next most successful typology of Representative VWSCs.

Table 6-17 Financial costs by community service provider type

CSP	CapEx Support	CapEx Community	OpEx Support and OpEx Enabling Support	OpEx Community
Autonomous VWSC (single case)	$83	$11	$1.0	$5.0
Representative VWSC	$97-$257	$0-$9	$2.1-$17.0	$2.4-$6.6
Registered Society	$145-$238	$11-$33	$1.7-$4.8	$2.6-$13.7
Unregistered Society	$37-$331	$0-$11	$0.2-$0.8	$0.4-$5.7

In considering the proportional cost-sharing between community and support, the Representative VWSC – which are so closely intertwined with the local self-government system – and Unregistered Societies, have very low levels of

community contribution to CapEx. The interquartile range is 0-5% and 0-3%, respectively. As the Representative VWSC case studies is the institutional set up most closely linked to the prescriptions of the NRDWP guidelines (Government of India, 2013a), it shows how this shift is part of the institutionalised move away from community contribution to CapEx as a precondition for a community management programme in India. Interestingly, though, the Registered Society which has the best overall service level outcomes retain the more conventional cost sharing arrangements for CapEx with a interquartile range of 7% to 15% for the case studies in that category. This would suggest that there remains a link between community contribution and service level performance, which can be considered an implicit assumption underpinning the community management model.

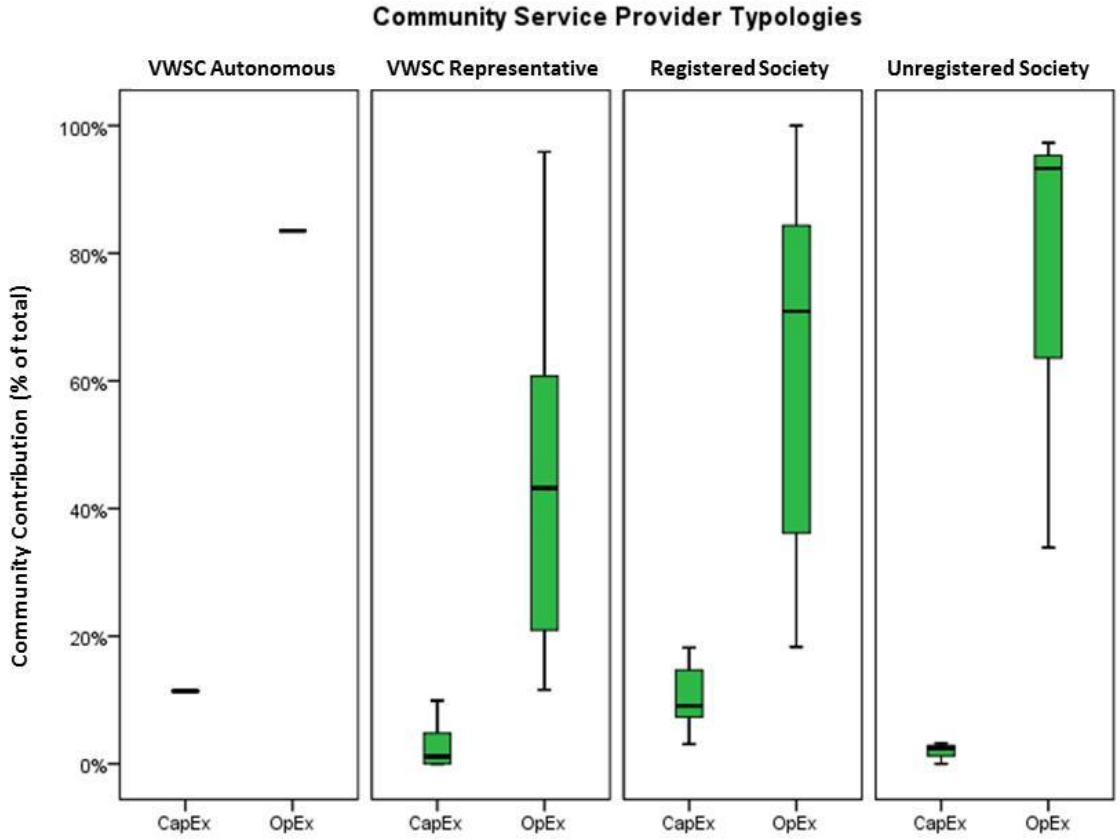

Figure 6-8 Community proportional contribution to CapEx and OpEx by community service provider type

As shown in Figure 6.8 and Table 6.18, comparing the community service provider typologies by OpEx contribution again indicates the lower levels of contribution found within the government prescribed model of the Representative VWSC as compared to the other types of service provider arrangements. That typology has an interquartile range of 21-61% against 36%-84% (Registered Society) and 34-97% (Unregistered Society) with the single Autonomous VWSC having 83% community contribution for OpEx. This is again considered evidence of a distinction between the most recent Government of India influenced case studies, and those that have non-government actors involved as well.

Table 6-18 - Financial costs by community service provider type

CSP	CapEx Support	CapEx Community	OpEx Support and OpEx Enabling Support	OpEx Community
Autonomous VWSC (single case)	$83	$11	$1.0	$5.0
Representative VWSC	$97-$257	$0-$9	$2.1-$17.0	$2.4-$6.6
Registered Society	$145-$238	$11-$33	$1.7-$4.8	$2.6-$13.7
Unregistered Society	$37-$331	$0-$11	$0.2-$0.8	$0.4-$5.7

6.7.2 Technical mode of supply

The difference between costs of services by technical system design are now considered. Assessing costs in this way shows that CapEx increases along what can be described as a crude technical spectrum of complexity from the lowest level with the most simplistic technology to the highest level with very sophisticated systems (as shown in Figure 6-9). For example, the gravity-fed MVS in the Maharashtra case study is over 26 times more expensive per person than the handpumps in West Bengal, mainly because of the hydro-geological need for long-term bulk water storage that justifies the construction of a multi-use dam.

The other forms of piped water supply regularly have a CapEx in the range of $100 to $200 per person, although the gravity-fed schemes tend to have a higher upper value, which is in part explained by the mountainous contexts of Sikkim and Himachal Pradesh. Here, the technical design of schemes is often more sophisticated whilst the construction and material costs tend to be higher. This is all compounded by small village sizes that reduce the economies of scale at which work can be undertaken.

Higher CapEx costs do not necessarily mean higher recurrent costs though as the Maharashtra case has relatively low recurrent costs partly due to the lack of energy needed for pumping water (the design in this case taking advantage of the higher elevation of the reservoir and treatment works), which is normally a major recurrent cost requirement. In this sense, higher CapEx can be used to reduced recurrent costs but overall the recurrent costs of piped supply are still higher than handpumps.

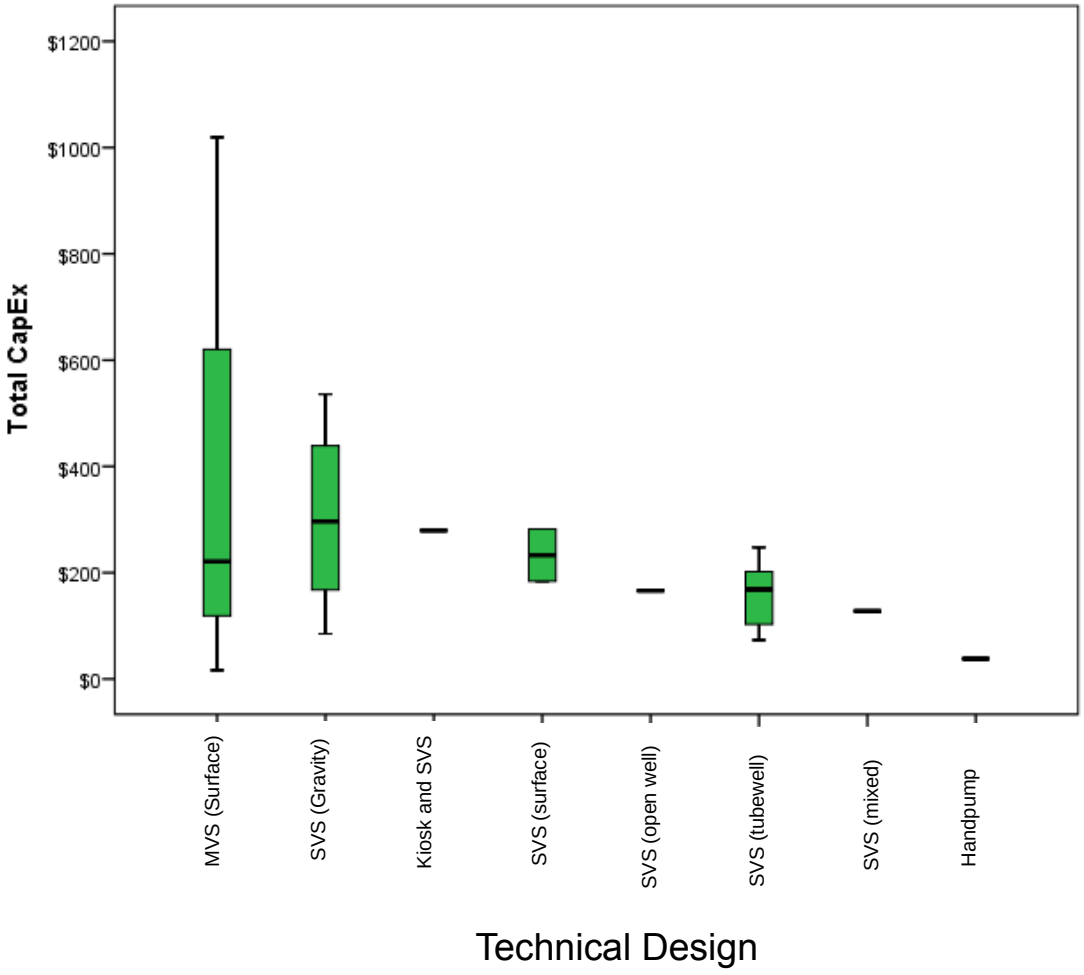

Figure 6-9 – Capital costs by technical design of the system

6.7.3 Context of case studies

This section now considers the differences when cutting the cases by income group. Figure 6-10 below displays the data for operational costs, which combines both OpEx and OpEx Enabling Support. It shows the median level of per capita investment in support rises across the economic groupings from less than $1 in the low-income states to around $2.50 in the middle-income states and up to over $4.50 in the high-income states. The biggest difference in the figures is the higher levels of community contribution found in the middle-income states, with a median of nearly $14 per person, compared with $3 to $3.50 per person in the low-income and high-income states.

These patterns of cost sharing are considered to be partly reflective of the different types of organisational arrangements across states but also partly reflective of the modes of political economy that dominate development processes in the different income groups. The case studies from the middle-income states can be characterised as being more likely to follow the bottom-up – 'social-democratic' – approach to rural water services in which populations are the drivers of the development process and therefore are willing to contribute financially to public services (as shown in the data in Figure 6-8. However, in the high-income states the approach is more top-down – 'developmental' – as the support entities take on a higher level of investment and communities invest less of their own finance. In the low-income states the overall capacity for investment is lower and therefore this leads to lower levels of investment across the categories.

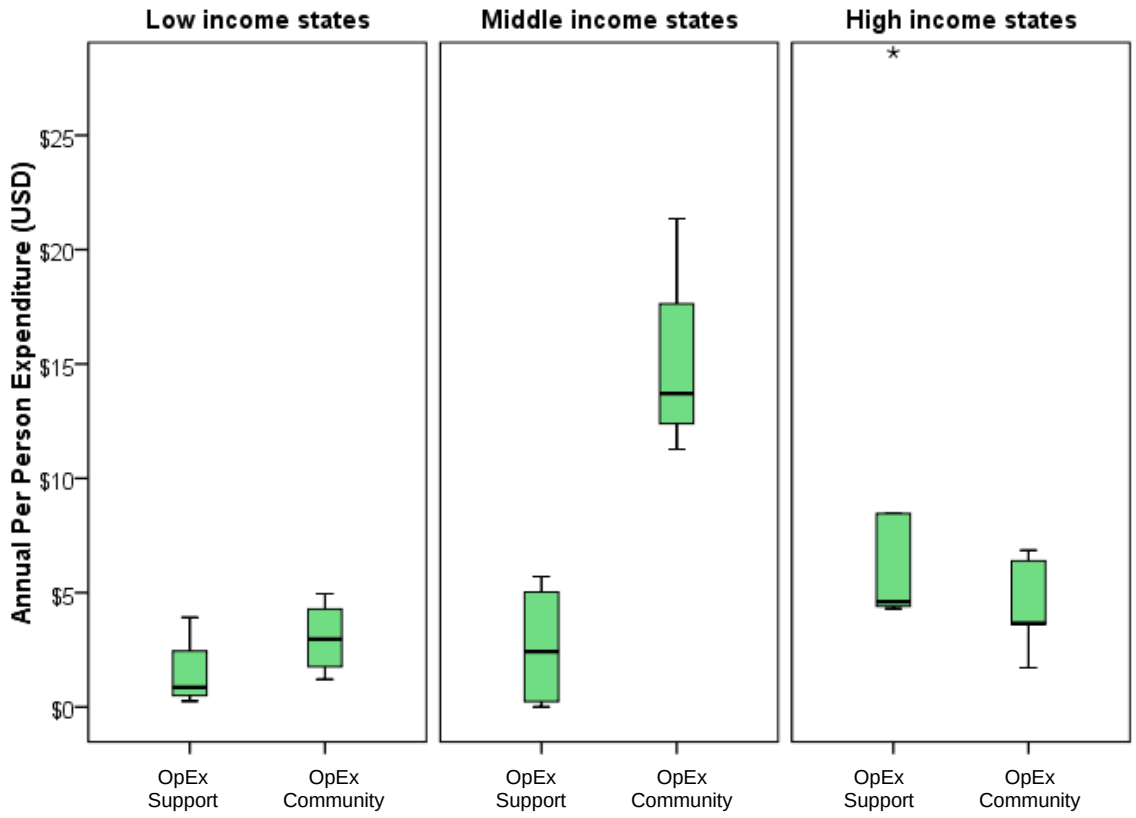

Figure 6-10 - Recurrent costs across socio-economic groupings of cases

6.8 Costs and performance categories

This section now considers how the level of financing directly relates to service level performance. It does this first by assessing the cases by the service level performance category set out in Section 6.1 before a simple correlation analysis between financial categories and service level outcomes is conducted. As shown in Table 6-19, the high performance category is shown to have higher levels of community contribution to CapEx and OpEx than the other categories – for example, a mean of $10 per person for OpEx in the high category against $4 and $3 in the medium and low categories, respectively. This again suggests a link between the performance of services and a willingness to pay although it is not possible to identify whether higher community payments lead to better performance or is because of it. The low performance category has higher levels of CapEx from the enabling support environment but recurrent levels of

investment are generally lower. This would therefore suggest that the level of CapEx is a less important category for determining the level of success.

Table 6-19 – Costs of services by performance category

Performance Category	Statistic	CapEx Support	CapEx Community	OpEx Support and OpEx Enabling Support	OpEx Community	CapManEx Support	CapManEx Community
High	Mean	$208	$19	$2.5	$10.3	$6.4	$2.8
	IQR	$153-231	$11-31	$0.2-4.6	$3.7-13.9	$0-11.3	$0.6-5.9
Medium	Mean	$237	$8	$7.6	$4.2	$3.8	$1.4
	IQR	$67-245	$0-13	$3-$8.5	$2.3-6.4	$0.1-6.7	$0-2.5
Low	Mean	$213	$11	$5.3	$3.7	$6.7	$2.4
	IQR	$83-268	$0-14	$0.5-$5.1	$1.1-5	$0-2	$0.1-4.8

A correlation analysis was also conducted on a dataset containing all the case studies. The two dependent variables were the median service level outcomes as per the composite service level indicator and the percentage of the surveyed population that meets 'basic' or above on that indicator. The analysis shows that there is only one cost category that has a highly significant positive correlation with these two variables. That is the level of OpEx costs. As shown in Table 6-20, the correlation between the OpEx is medium to large for the Kendall's tau test (Field, 2013). In considering this relationship the relative correlation of the community and support contribution to OpEx was also tested with this showing a significantly higher association between higher levels of community contribution to OpEx and higher service level outcomes. This again indicates that high levels of community contribution are a good indicator of success but as explained earlier in this chapter it is not possible to answer conclusively whether the higher contribution from community drives stronger performance or whether when good services are provided populations are more likely to pay for them.

Table 6-20 – Correlation analysis between service level outcomes and OpEx

Overall Contribution	Statistic Test	Service Level (% meet all norms)	Composite Service Level Indicator (Median)	Interpretation
OpEx	Correlation Coefficient (Kendell Tau)	.468	.506	Medium to large positive correlation at the highly significant level for both service level outcomes
	Sig. (2-tailed)	0.004221	0.003835	
	N	20	20	
OpEx Enabling Support	Correlation Coefficient (Kendell Tau)	0.210987	0.282466	Small positive correlation at a non-significant level for both service level outcomes
	Sig. (2-tailed)	0.258897	0.157914	
	N	16	16	
OpEx Communtiy	Correlation Coefficient (Kendell Tau)	.436	.483	Medium positive correlation at the highly significant level for both service level outcomes
	Sig. (2-tailed)	0.007675	0.005835	
	N	20	20	

Beyond the OpEx category there is no linear relationship that is statistically significant between the cost categories and service level outcomes for CapEx, OpEx Enabling Support or CapManEx investments. This would suggest that as the sector increases levels of investment, concentrating more financial subsidy directly to service provision tasks is likely to lead to better outcomes. However, the absorptive capacity of the service provider – in terms of being able to effectively use the additional financial resources effectively – is likely to be conditional on broader factors which can most likely be improved by broader investments in terms such as OpEx Enabling Support. Ultimately, the research continues to suggest that there is no single factor that leads to successful community management. However this section has helped identify the conditions in which success arises within the Indian context which do involve substantial on-going support to communities reflecting the assumptions of the community management plus paradigm.

6.9 Chapter summary and contribution to the thesis

This chapter has provided a descriptive analysis of service level outcomes and financial data across the case studies. For the service level outcomes, the analysis shows that community management can deliver high service levels with six cases being labelled as high performance case studies. Yet even though all cases have 100% access to an improved water source there remain seven cases with basic performance and seven cases that fail to meet government norms. The research therefore adds to the evidence about the limited nature of using the concept of *access* as a measure of success in rural water services (Clasen, 2012). The research also reinforces the importance of having household connections as compared to communal water points, such as public stand-posts or handpumps, with the service levels from these water sources significantly higher than any other type of improved water source.

Beyond the service level analysis, this chapter provided a descriptive analysis of the financial data to answer research question two on the indicative financial costs of supporting successful community management programmes in India. Table 6-21 provides a summary of the total levels of financial investment in CapEx and recurrent expenditure for different levels of service level performance from this research against the WASHCost benchmarks. It shows that the levels of investment found are higher than these most widely used benchmarks for rural water service financing (Burr and Fonseca, 2013; Hutton and Varughese, 2016). The data from this research is most strikingly different to the results from the WASHCost India study that suggested extremely low levels of financing in the India sector, especially for recurrent costs. This research indicates an inverse situation in which the Indian sector has higher levels of financing than the suggested ranges for low and lower middle income countries.

Table 6-21 – Summary of financial requirements for successful community management

Source	CapEx (IQR)	Recurrent (IQR)
High Service Level Performance (Community Water Plus)	$184-$247	$6-$32
Medium Service Level Performance (Community Water Plus)	$73-$279	$6-28
Low Service Level Performance (Community Water Plus)	$93-$281	$5-$13
WASHCost International Benchmark (Burr and Fonseca, 2013)	$31-$132	$4-$16
WASHCost Andhra Pradesh Benchmark (Burr, 2015)	$38-$66	$0.5-$1.6

Conducting this research revealed many of the costs that go into the Indian sector are opaque and hard to trace without a detailed case study approach to the research. In a government programme, for example, finance comes through various State and Federal Government funds directly into the local self-government Gram Panchayat accounts whilst other funding can be funnelled directly to VWSCs accounts or may come from indirect subsidies – often unacknowledged – such as discounted rates for electricity power. For this reason, it is contended that previous research has underestimated the cost of delivering services in India. The WASHCost project itself acknowledged that evidence of recurrent costs were hard to come by in the Andhra Pradesh study (Burr, 2015) and therefore many estimates were used. In this sense, although the research cannot be considered representative of the general workings of the India sector, the level of divergence between the estimates provided and the recurrent estimates from the WASHCost project, suggest that the accepted understandings of working in 'low-cost' India should be revised as there is significant financing being poured into the India sector.

In terms of the financing patterns most strongly associated with delivering good service level outcomes, the analysis presented showed that higher levels of OpEx correlated with high performance outcomes. It was shown that the level of community contribution to OpEx was especially strongly correlated. This

indicates that although the sector is concentrating on how to structure and finance an effective enabling support environment for community management, providing direct financing to service providers and promoting community tariff contributions can be considered useful approaches for driving up performance levels.

The following chapters further develop the theoretical implications of the research and draw out the conclusions by bringing together and triangulating the findings presented here with those presented in Chapter Five on the organisational arrangements for community management. Those chapters also considers what the implications of the findings are for the practice and policy of community management in India and other contexts, as well as what it means for conceptual understandings of the model.

7 DISCUSSION – THE INSTITUTIONALISED CO-PRODUCTION OF RURAL WATER SERVICES IN CONTEMPORARY INDIA

This research started from the premise that community management was a flawed paradigm for rural water services due to the way it has led to the abdication of responsibility from governments and an overemphasis on the role of local communities (Broek and Brown, 2015; Moriarty, Smits, et al., 2013). With empirical evidence pointing particularly to the lack of sustainability during the service delivery and rehabilitation phases of water programmes (Lockwood and Smits, 2011; Reddy et al., 2010), the concept of community management plus – involving more continuous support to communities from governments and other agencies throughout the service delivery cycle – was framed as a potential new paradigmatic approach (Baumann, 2006; Lockwood and Smits, 2011; Moriarty, Smits, et al., 2013). Through studying twenty case studies of reportedly successful community management programmes within India, the research sought to provide empirical evidence on the features and characteristics of such programmes so to inform the broader debates about the future of community management. This chapter now builds on that evidence, which was presented in Chapter Five and Six, to further develop the theoretical contribution of the thesis.

In those chapters, it was argued that the dominant traits of successful community management programmes in India do better reflect the principles of community management plus rather than the conventional community management model. However, it was also shown, that the level of involvement of local self-government institutions went beyond much of the standard description of community management plus in the literature (Baumann, 2006; Lockwood and Smits, 2011; Moriarty, Smits, et al., 2013). This was because the institutional set-up in many programmes involved local self-government employees working together with private-community members to coproduce services between the state and community. As visually represented in Figure

7.1, there was a significant overlap between community management approaches and local self-government provision as mandated through the Constitution of India (Government of India, 1993). The thesis therefore adopted the concept of "institutionalised co-production" (Joshi and Moore, 2004) as a more appropriate framing of this hybrid approach. This chapter further advances that specific theoretical contribution of the thesis and explains how it informs the understanding of the emerging community management plus paradigm.

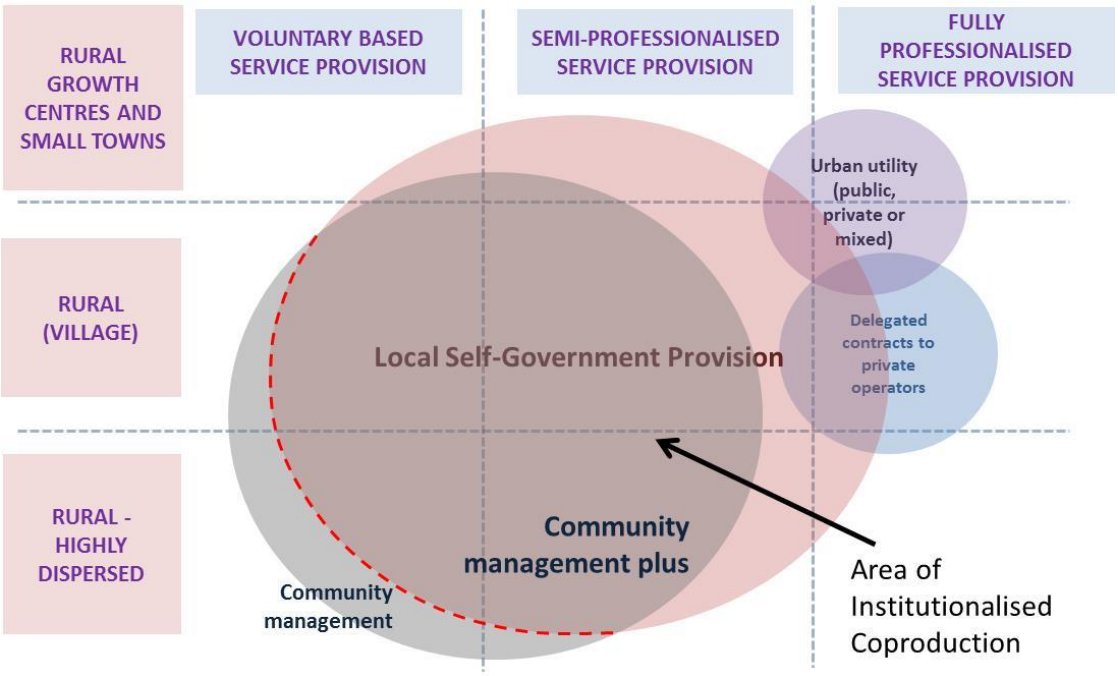

Figure 7-1 - Visual representation of service delivery model (adapted from Lockwood and Smits, 2011)

The structure of discussion follows the advice of Whetten (1989) regarding the building blocks of a comprehensive theoretical discussion. It begins with explaining 'what' is being claimed by (re)assessing the empirical results reported in Chapters Five and Six against the four criteria of institutionalised co-production explained in the foundational paper on the concept (Joshi and Moore, 2004). It then provides insight into 'how' the identified patterns of service delivery have emerged within the Indian context by bringing in a discussion of the political economy of Indian public administration and devolution. The chapter then advances to more exploratory territory to consider 'why' such

patterns of public administration and service delivery emerged specifically in India by considering the different international and domestic ideologies of development that influence the rural water sector in the country. Finally, the chapter examines the boundaries of the theoretical discussion in terms of Whetten's (1989) 'who? where? when?" questions regarding the context in which any theoretical inferences are considered appropriate. Together, these sections provides an opportunity for the chapter to consider the broader implications of the institutionalised co-production as an approach to rural water service delivery both going forward within the Indian context but also within the broader international context.

7.1 Institutionalised co-production of rural water services

This section now seeks to further justify the application of the institutionalised co-production concept as empirically valid in explaining the dominant forms of service delivery found in this research. As described in Chapter Two, the basis of the co-production concept – which has been applied in both the developed and developing world (Bovaird, 2007; Bovaird et al., 2015; Cepiku and Giordano, 2014; Joshi and Moore, 2004) – is to describe a form of public service provision that involves the sharing of resource, labour and responsibility between public agencies and citizens. However, beyond that basic notion, Joshi and Moore (2004, p. 50) develop four particular characteristics they used to characterise it more precisely within the context of low and middle-income countries, in order to develop their specific sub-concept of institutionalised coproduction:

1) service delivery that involves substantial resource contribution from the state and private citizens;
2) service delivery that is based on long-term relationships between the involved parties;
3) service delivery that has the potential for informal arrangements governing those relationships;
4) service delivery that involves a blurring of distinctions between the traditional divide of public and private actors.

This section now considers each of these four points in turn. The discussion presented is intentionally framed as an examination of the dominant trends across the case studies and thus seeks to explain the most common arrangements. This is particularly in relation to the 17 case studies that involved water committees that were either part of the local self-government or were registered under them, as identified in Chapter Five, Section 5.2.

The research investigated the financial costs of services across the case studies, which provides evidence regarding the balance of resource contribution from between the state and citizens. It was explained in Chapter Two that the most common 'default' cost sharing arrangement for community management involved communities covering 100% of the on-going OpEx for rural water services (Joshi, 2003). In that context, the sector understanding of community management is not considered to reflect a sharing of resources as per the institutional coproduction principle. The community management plus literature does, however, advocate for structured and continuous support to communities (Baumann, 2006; Lockwood and Smits, 2011; Moriarty, Smits, et al., 2013) but does not specify further details on cost sharing and the available evidence on such recurrent support costs is limited (Burr and Fonseca, 2013). This research helps fill that gap by showing that in these successful programmes from India, there is significant cost sharing between communities and support agencies.

Taking direct OpEx across all the case studies, the findings reported in Chapter Six, show that communities cover 63-94% (IQR) of OpEx costs with support agencies providing subsidy for the remaining 6-37% (IQR). This means that significant subsidies cover everyday costs, such as energy and bulk water. Beyond direct operational costs, there are OpEx Enabling Support costs which are covered by support agencies so, overall, 7-48% (IQR) of the everyday-recurrent costs of services come from external agencies. The evidence that is provided therefore clearly indicates that both citizens and support agencies – usually government – provide substantial recurrent resource contribution in these successful cases of 'community management' in India. However, due to the extent and consistency of resource sharing, these arrangements are

considered to be more appropriately framed within the institutionalised coproduction concept (Joshi and Moore, 2004).

The longevity of the relationship between the state and citizens is another characteristic highlighted by Joshi and Moore (2004). At a basic level, as reported in Chapter Four, the average length of operation across the cases was seven years which helps to verify that the service delivery arrangements studied are durable at least over the medium term. Yet more broadly, part of the challenge of shifting from community management to community management plus, is related to developing a bipartite sense of responsibility between communities and support agencies over the long term (Lockwood, 2002, 2004). What this research indicates is that there is a high degree of permanence in institutional relationships within government programmes in India as they have been embedded and partially prescribed within constitutional reforms from the early 1990s (Banerjee, 2013; Government of India, 1993). That constitutional amendment prescribes that the local self-government of the village – the Gram Panchayat – is ultimately responsible for the local management of rural water services (Government of India, 1993) and successive policy programmes have sought to maintain this principle whilst promoting community management (Government of India, 2003, 2013a)[13].

As described in Chapter Five, this means that the water committee can be an official sub-committee of the local self-government, as shown in nine case studies. Within the government system, it is also possible to have a water committee that is a separate Registered Society (as found in eight case studies) yet these only exist with official approval and oversight from the Gram Panchayat. It was only in three case studies documented in this research, that the Gram Panchayat did not have an official role within service provision, with this described as the NGO-influenced Unregistered Society model. Despite this

[13] The reconciliation of the domestic devolution agenda with what could be described as the more internationally influenced ideals of community management is considered critical to understanding the Indian context and is a point further examined in Section 6.3 and 6.4 below.

last group, the dominant trait across the case studies was for the institutionalisation of 'community management' within the government system. This is considered to compare favourably to the model of community management that had become common in some parts of the world whereby external agencies such as NGOs have a minimal relationship with communities beyond the implementation phase of projects, or even no relationship at all (Broek and Brown, 2015; Harvey and Reed, 2006). The Indian experience suggests that for developing permanence in relationships between citizens and support agencies it is most likely to be beneficial to root such arrangements within the (local) government system. Conceptually, however, this shifts the arrangement from one which is best described through the prism of community management to a set-up more accurately described as a form of coproduction.

Part of the arguments developed by Joshi and Moore (2004) is that despite having some level of permanence the arrangements for institutionalised co-production can be based on informal relationships. This research suggests that this is rare in India with it only being found in the three Unregistered Society case studies described above, with the remaining 85% of the cases being recognised formally within the legislative framework of Indian law. In this sense, the informality proposed by Joshi and Moore (Joshi and Moore, 2004, p. 50) is not recognised in this research at this legalistic level, however they position this as a tendency rather than a rule, specifying that *"institutionalised co-production need not involve the kinds of contractual or quasi-contractual arrangements between state agencies and organised non-state actors".* Therefore, this is not considered to invalidate the applicability of the institutionalised co-production concept in describing the general patterns of institutionalised arrangements found across the case studies. Moreover, as discussed in the methodological limitations section in Chapter Four and reconsidered in the following conclusion chapter, the cross-case study analysis methodology was considered limited in capturing informal arrangements across the case studies. Synthesising evidence from twenty case studies has involved a selection bias towards more codified and standardised data (Yin and Heald, 1975), such as the comparative

participation ladder. Within the specific case study delivered by this author in Tamil Nadu, there was evidence that even within the local self-government system there are informal processes that take place such as Gram Panchayat President using personal money to supplement government subsidy in order to gain democratic advantage at forthcoming elections (Hutchings, 2015). It is expected that such informality could be identified in the workings of local self-government in many villages across India.

The final key criteria associated with institutionalised co-production is that it: *"implies blurring and fuzziness in the lines that Max Weber, in particular, taught us to try to define clearly and precisely: the boundaries between public and private."* (Joshi and Moore, 2004, p. 50). This is considered to be especially applicable to describing the public-private institutional set-up found in the case studies where the VWSC is an official sub-committee of the local self-government. Under this arrangement as prescribed in the official rural water supply policy (Government of India, 2012, 2013a), the water committee should have between nine and twelve members. However, at least two of the most important members of the water committee are employees of the local self-government and their role is considered part of their duty as a public servant. These two members include the President of the Gram Panchayat who operates as the water committee chairman and the Secretary of the Gram Panchayat who is the treasurer of the committee. In this sense, much of the key labour contribution comes through professionalised public servants with the remainder of the committee made up of private citizens. The level of contribution from the private committee members can be limited to attendance of committee meetings, rather than direct labour contributions towards the operation, maintenance or administration of the system. Beyond the chairmanship and book keeping, undertaken by the public servants, the most labour intensive role is the 'pump operator' which is undertaken by a private citizen directly appointed by the committee. This individual is paid a wage agreed by the committee but together with the public servants it means that the individuals contributing towards service delivery tasks are all remunerated for

that purpose. This again helps distinguish the Indian experience captured in this research with the implicit volunteerism that is associated with the community management model in an international context (Moriarty, Butterworth and Franceys, 2013). In the context of the institutionalised coproduction concept, the arrangement shows how services are delivered through an institutional structure that combines public servants, private employees and voluntary members leading to a model that blurs the line between public-provision and private-community management.

In summary, the thesis is considered to have provided sufficient evidence on the institutional arrangements and resource sharing arrangements to indicate that government agencies (and in some cases other external entities) play a major role alongside citizens in coproducing rural water services in the programmes studied. In order to reflect the role of these external agencies, the thesis has moved beyond the discourse of community management and, even, community management plus to adopt the concept of "institutionalised co-production" (Joshi and Moore, 2004). This is to help shift the discourse of the sector beyond community management which is considered to misrepresent what an effective – and sustainable – balance of responsibility should be between private citizens and public servants in delivering rural water services in India and other similar contexts.

7.2 The political economy of institutionalised coproduction

This section now examines in further detail how – and to some extent why – the institutionalised co-production arrangements have emerged within India. To inform this discussion, the section again makes use of the Joshi and Moore (2004) paper that introduced the concept and which argues that that there are two main drivers of shift to institutionalised coproduction:

*"Some co-production arrangements have evolved in response to declines in governance capacity at local or national level. Government no longer provides certain services very effectively, and as a result, organised groups of citizens with something at stake move in to help shore them up…*Some services cannot effectively be delivered to the ultimate recipients by state agencies for reasons that *are more 'natural': because the environment is too complex or variable, and the costs of interacting with very large numbers of poor households is too*

great, especially in rural areas. In such cases, users become involved in an organised way at local level." (Joshi and Moore, 2004, p. 41)

Both these drivers are framed in relation to the capacity of the state to deliver public services and, in this sense, they provide a simple description of drivers that provide a useful starting point for assessing and comparing the major underlying processes of change. Before proceeding, it is acknowledged that the research methodology is cross-sectional in nature and has not sought to track longitudinal trends over time. Yet Chapters Two and Three provide historical context to changes in global and Indian policy whilst the history of each case study was reviewed in developing the case summaries (as presented in Appendix C). Together, those contributions inform this discussion of the institutionalised co-production arrangements presented in this section.

Applying the logic of the governance and logistical drivers to the emergence of community management in a broader context, they neatly fit the arguments made in Chapter Two. In that chapter, it was argued that in the 1980s and 1990s community management emerged as a 'model-solution' for donors and NGOs that could use it to circumvent deficient local governments in developing countries (Broek and Brown, 2015; Harvey and Reed, 2006). It was framed as a way international actors could respond to a lack of capacity in local government (i.e. a decline in or absence of governance capacity). Furthermore, the setting of rural water services meant that the preferred service delivery model had to be appropriate for sparse and remote communities leading to a 'natural' preference for involving local communities (i.e. a logistical driver) (Harvey and Reed, 2006). The contemporary situation in India, as documented throughout the thesis, can also be analysed by this framework but the situation is considered to fit an almost reversal of that early community management narrative. Instead, the local self-government has become constitutionally empowered within rural water services to such an extent that it prohibits an independent form of community management emerging (i.e. a governance driver towards coproduction). Furthermore, the long-term trajectory of economic growth and societal development (World Bank, 2016b), means the logistical drivers that may have

traditionally prevented the state's effective involvement in rural water services have shifted as public administration becomes (at least relatively) more effective even in the complex and high cost rural areas. In this sense, the overarching and long-term drivers within India are considered to be shifting away from community management towards institutionalised coproduction.

Building on this logic, however, it could be argued that as states become richer and institutional capability grows, then the governance and logistical drivers will shift further to placing the government in charge of public services with less intense forms of community involvement in service delivery. Yet this research would suggest that such a model of progression is an oversimplification and that instead shifts in service delivery are also shaped by the political economy of rural water services in particular states. In developing Kohli's (2012) State-Society Framework to explain the developmental, social democratic and neo-patrimonial tendencies found across Indian states, Chapter Three sought to provide some insight into the different development models found across India. For example, the top-down 'developmental' pathway that shaped development in Maharashtra was contrasted with the 'social democratic' model of Kerala (Kohli, 2012). The cross-case analysis reflected this divide, with the Maharashtra state programme scoring the lowest level of "passive participation" on the participation ladder (Chary Vedala et al., 2016c). In contrast, the case study from the Kerala state programme (Chary Vedala et al., 2016b), retained a high participation ranking of "interactive participation" despite being a relatively wealthy state. It is acknowledged that differences are more nuanced between states with less distinctive political economy tendencies. Yet these are highlighted to illustrate how coproduction is not considered the result of some form of linear march from community management towards full public-provision but is something that is shaped by the political-economy context of particular states. This indicates that governments in other parts of the world can actively pursue coproduction through public policy but should be prepared to allow national and/or regional adaptation in how the relationship between local government and communities is structured and organised.

7.3 Ideologies of institutionalised coproduction

"My idea of the village Swaraj is that it is a complete republic independent of its neighbours for its own vital wants." – Mahatma Gandhi

The constitutional reforms that have been linked to institutionalised coproduction throughout this thesis are rooted in the political-ideology of *Swaraj* or "homerule" (Banerjee, 2013; Johnson et al., 2005b). As explained in Chapter Three, that ideology, developed during the Indian freedom struggles, advocated a form of home rule that went beyond ending European – chiefly British – colonial rule, to a more radical vision of Indian society based around a collection of self-ruling village republics[14]. It was this adopted ideology that shaped the constitutional reforms that empowered the Panchayat Raj system of local self-government which has in turned shaped the forms of rural water service delivery documented in this research. This section therefore moves to more exploratory territory to argue that understanding the intersection of the domestic *Swaraj* political-ideology and the 'international' ideologies of community management is a potential route to understanding the fundamental causes of institutionalised coproduction in India.

In order to develop that argument, the section again begins by revisiting the arguments made about community management in Chapter Two. In that section, it was contended that the political malleability of community management contributed to its widespread adoption around the world (Broek and Brown, 2015; Harvey and Reed, 2006; Schouten and Moriarty, 2003). The two most dominant development-ideologies of the late 20th Century included neoliberalism and the "grassroots post-Marxist developmentalists", with both advocating rolling back the state and promoting local control over public services (Broek and Brown, 2015, p. 51). Community management fitted the narrative of both ideologies by placing local people at the centre of rural water

[1414] The Swajal also a more deeply philosophical aspect links to the aspiration of self-realisation or enlightenment which is rooted in Hindu teachings. However, for the purpose of this thesis the research is interested in how the ideology has shaped the devolution agenda within India.

services contributing towards the popularity of the model in the eyes of Western-dominated donors and NGOs (Harvey and Reed, 2006). It was such agents that have been influential in spreading the model and cementing its positions as the dominant paradigm for rural water service delivery (Broek and Brown, 2015). In this sense, part of the justification for community management was that it was an alternative to deficient public provision with the principle that NGOs could help facilitate community participation as some kind of replacement for public sector involvement, rather than having that public participation as facilitated through the public sector itself.

However, within the contemporary Indian context, this kind of narrative is not considered applicable. First, for a structural reason, the relative influence of non-governmental actors is lower than in many other low and lower-income countries. This is partly because of the general hostility or suspicion that Government of India has had of international NGOs (Sen, 1999) but also due to the sheer size of the sector that means the influence of NGOs or, even, donors is minimal compared to other national contexts. Second, for more ideological reasons, the way community management is framed within India is not in opposition to the state but rather as an approach that is compatible with the local self-government system (as explained within the National Rural Drinking Water Programme policy document: Government of India, 2013a). With the constitution seeking to promote the self-rule of villages through the democratic system, the local self-government system is considered to be the vehicle for community empowerment, rather than some kind of barrier to it. This makes the narrative of community management in India qualitatively different to what could be described as the generic international narrative of community management as a response to the deficient local government.

This research sought to define participation as a form of “citizen power” and traced its modern day origins back to the community development movement in the USA (Arnstein, 1969). This approach is considered to have implicitly adopted a rivalrous distinction between community participation and government, which is rooted in a Western-centric division between citizen

power and government power. Within the Indian context the distinction between participatory approaches and the *Swajal* inspired devolution is not clear and it is difficult to divide them. Relating this point back to the arguments about institutionalised coproduction, Joshi and Moore (2004) maintain they do not associate their conception of the term with "communitarian or participatory" approaches to public service delivery (Joshi and Moore, 2004, p. 50). Yet within this research's context, its application is still considered valid due to the way public participation is framed within the democratic election of local self-governments within India. Further empirical and theoretical investigation into the way public participation is understood within the local self-government system could prove fruitful for further unpacking how and why 'community management' has taken the form it has within India.

Looking forward, however, this researcher would also argue another critical distinction for understanding the future trajectory of institutionalised coproduction in India is likely to be the interaction of local self-government and the centralised SRWSAs. The legacy of devolution across in India is not even and there are still states where centralised state agencies have not ceded power to the local self-government system (Banerjee, 2013). In this research, it was shown in Chapter Five that the SRWSA continue to play an important role in all government programmes with a mandate to take on many implementation tasks, however in some states – particularly the poorer ones – they also retain a strong role in recurrent support for service delivery even though this should be the domain of the local self-government. In a separate study, these agencies have been labelled as "hierarchical and technocratic bureaucracies that are well suited to send down technical designs and subsidies for physical infrastructure" but which are poorly suited to promoting local control and participation (Hueso and Bell, 2013, p. 1013). In this sense, in places where devolution is not fully implemented and SRWSAs retain control, the future trends in the Indian sector may shift towards low participation models as seen in Maharashtra rather than the community-engaged form of institutionalised coproduction reported on in Kerala. Understanding the roles and relationships of the local self-government

and centralised agencies across different states is also considered another potentially productive avenue for anticipating the balance of community and state provision when looking forward at the trajectories of development in specific states.

7.4 The limits to the institutionalised co-production of rural water services

In rounding off the theoretical discussion it is important to clarify its application to specific contexts, which means answering Whetten's (1989) questions on the 'who? where? when?' on the range of the discussion. The application of the institutionalised coproduction concept to describing the dominant modality of service delivery from the case studies has been initially limited to describing the seventeen case studies whereby the water committee is either part of, or supported by, the local self-government. That is, those case studies, which were described as the Representative VWSC, Autonomous VWSC and Registered Society models in Chapter Five. In each of those cases, the programme set-up was considered to meet the four criteria of institutionalised coproduction described in Section 6.1. However, this conceptual framing is positioned as *emergent* from the research findings as the researcher adopted the concept in order to explain a set of results that was not well accounted for by either the community management or community management plus paradigms described in Chapter Two. This is encouraging as it suggests novelty in the research yet it is considered to make it difficult to precisely specify the limits of the institutionalised coproduction concept in explaining rural water service delivery in India, as it was not built into the research design. However, the research is still considered to provide some key insights that help indicate where these could be but before tackling them in detail, a broader point is made about the relevance of the discussion to the broader literature.

There have been critiques and concerns raised about community management as unsustainable (RWSN, 2009), inequitable (Chowns, 2014) and not reflecting consumer-demand (Hope, 2015). The notion that the approach had reached it 'limits' has been raised (Moriarty, Butterworth, Franceys, et al., 2013) and yet it

remains a dominant approach for managing rural water services in many parts of the world (Broek and Brown, 2015). In this context, the reforms towards community management plus are considered radical in terms of recasting responsibility for service delivery as a shared responsibility between governments and communities (Baumann, 2006) yet, discursively, they are extremely reformist-in-scope. That is, they have retained the discourse of 'community management' and continue to be limited by the traditional distinctions of the public-private divide. Yet in India the dominant forms of service delivery documented throughout this study exhibit institutional and financial costing arrangements that reflect a balance of recurrent inputs from the state (or other agencies) and communities that challenge that public-private divide and, more broadly, the discourse of community management. In explaining the arrangement found it is tempting to still be limited by a binary discourse with a continued emphasis on either describing it as a form of community management when the community takes the lead, or in cases where Gram Panchayats are more prominent, then a form of direct public provision (Rout, 2014). Yet the findings from across the case studies consistently suggested a more nuanced situation with water committees working within, alongside and with approval from local self-government in nearly all 'community management' programmes captured in this study. The services provided are also recurrently financed between a balance of tariffs and public subsidy (taxes) and so, in response, this researcher sought to introduce the emergent concept of institutionalised coproduction (Joshi and Moore, 2004) into the rural water service lexicon to explain these more nuanced arrangements.

The introduction of this concept forms a modest attempt to suggest a shift in discourse beyond community management, which promotes a sense of equivocation or, even, contradiction when used by governments, NGOs and donors to describe the programmes that *they* deliver. Even in the conventional community management paradigm, external agencies played a critical role in leading the implementation of schemes, including finance, construction and capacity building, but with ambiguous on-going support arrangements.

Community management plus was an attempt to emphasis the on-going responsibility of the governments, NGOs and donors to those programmes in terms of recurrent monitoring, finance, technical support and capacity building (Lockwood and Smits, 2011). Yet this is considered to reflect a sort of discourse-lag, in which the conventional discourse of the sector has been reformed rather than changed. This is considered to provide a sense that the status quo is acceptable rather than highlight the importance of fully reconceptualising how rural water services should be delivered. In this sense, the coproduction discourse, which through its basic definition, indicates a shared role for governments and communities, is considered such a potentially useful route for shifting sector thinking beyond the 'limits' of community management as an approach.

Beyond those comments on the general application of the institutionalised coproduction concept as a means for shifting the sector discourse, this section now seeks to further clarify the specific application of the term in this research. Firstly, the precise mode of institutionalised coproduction discussed throughout this chapter is considered to be limited to the Indian-national context. This is due to its intersection with the Panchayat Raj devolution agenda and more broadly with the ideology of the *Swajal*. This makes any inferences from the theoretical discussion limited in their direct relevance to other national contexts. Secondly, in a temporal sense, the theoretical claims made are considered to apply particularly to the period from the Swajaldhara (2003) policy programme, in which Government of India began to reconcile community management with its own public devolution agenda. However, the situation is considered dynamic and has changed since this time. In Chapter Five evidence suggested that there were differences between the Swajaldhara programme and the later, more flexible, NRDWP (2009-onwards). In the later programme many of the internationally influenced ideas about community management had become diluted. It had become only an option (rather than a requirement) to include community contribution to CapEx, for example, whilst the role of the Gram Panchayat was strengthened relative to the VWSCs. This is considered to

reflect a process in which the Indian state has adapted and re-casted many of the basic assumptions about community management to better suit its own political economy of rural administration. This means that the concept of institutionalised co-production has become more relevant since 2009 in terms of explaining the major approaches followed, particularly in government programmes. It is therefore likely that the arrangements described throughout the research will become even more relevant for explaining rural water service delivery in the coming years.

7.5 Chapter summary and contribution to the thesis

This chapter has further developed the theoretical contribution of the thesis in terms of institutionalised coproduction and explains how this challenges the understanding of the emerging community management plus paradigm. It began by explaining how the dominant institutional models and financial cost sharing arrangements analysed in this research matched the ideals underpinning the concept of institutionalised coproduction in terms of resource sharing, longevity as well as challenging the public-private divide (Joshi and Moore, 2004). That section was designed to demonstrate that the application of the 'emergent' concept of institutionalised coproduction is both empirically valid and theoretically coherent in terms of explaining the dominant trends found in the research.

The following section then sought to analyse the context and form of institutionalised coproduction that have emerged within India through linking it with the broader political economy context. For this purpose, it applied the logic of the governance and logistical drivers of coproduction, as proposed by Joshi and Moore (2004), to compare the emergence of community management, as explained in the international literature (Broek and Brown, 2015; Harvey and Reed, 2006; Schouten and Moriarty, 2003), to the evolution of community management in the Indian context. This led a discussion of the influence of local self-government devolution in the country. In this sense, it was argued that community management programmes had taken on the characteristics of

institutionalised coproduction due to active public policy, rather than just resultant of insufficient public or community capacity to deliver the services.

Building on these arguments the chapter moved to more exploratory territory to contend that a key difference between India, and what can be described as the international WASH sector, is with regard to how community participation is understood in relation to government. With the Indian ideal – based on the ideology of *Swajal* and expressed through the local self-government system – positioning community management as operationalised through the state. In contrast, the implicit position of the international WASH community, at least historically, positions community management in opposition to the state – as a way to circumvent deficiencies in local government.

The chapter ended by considering the broader implications of the theoretical discussion in terms of the community management plus paradigm. It was argued that although community management plus offers an appropriate response to the deficiencies of the community management paradigm, retaining the community management discourse indicates a reformist agenda that could lead to the status quo being perpetuated as people continue to use the reformist discourse of community management plus. Whereas, through moving towards a discourse of coproduction – and as this research would suggest institutionalised coproduction – the paradigm of rural water services can be more effectively moved on to reflect the need for shared responsibility between states (and other agencies) and communities to ensure successful service delivery over the long-term.

8 CONCLUSION

This chapter considers the conclusions from the research. First, it brings together the major findings from the thesis and considers them in relation to the research questions and the general paradigmatic claims about community management, as set out at the end of Chapter Two. Second, it discusses the implications of the research in relation to the SDGs that will shape the global approach for delivering rural water services over the next 15 years. Third, it offers some further reflection on the strengths and weaknesses of the research methodology. Fourth, it discusses routes for further research building on the thesis. Fifth, the thesis is concluded with a final comment on the relevance of the research findings to the wider rural water sector.

8.1 Assessing the paradigmatic claims in the community management of rural water services

A number of general paradigmatic claims about community management were set out in Chapter Two, Section 2.3. These were designed to summarise the literature into what were described loosely as the ‘paradigmatic claims of community management’ and the ‘next generation paradigmatic claims of community management plus’. These were also related to each research question as represented in Table 8-1. Together, the findings reported in Chapters Five and Six, were considered to reflect the community management plus paradigm rather than the conventional community management paradigm. However, more broadly, it was argued in Chapter Seven that re-conceptualising the forms of service delivery identified as a form of ‘institutionalised coproduction’ (Joshi and Moore, 2004), was a discursively more appropriate framing for the rural water sector. Concluding remarks about the major sources of evidence and underpinning logic for this argument are discussed in this section.

Table 8-1 – Paradigmatic claims in the community management of rural water services

Level of investigation	Paradigmatic claims for community management	New generation paradigmatic claims for community management plus
Research Question One - What are the type and characteristics of organisational arrangements found in successful community management programmes in India?	- Community participation in service delivery will deliver successful service outcomes (Prokopy, 2009)	- Professionalisation of community role in service delivery will delivery successful service outcomes (Lockwood and Smits, 2011)
Research Question Two - What are the indicative financial costs and cost sharing arrangements for successful community management programmes in India?	- Community contributes 10% of capital costs and then covers recurrent costs through tariffs (Joshi, 2003)	- Recurrent costs have to be subsidised by support agents to become sustainable – although the level of subsidy is not clear
Research Question Three - To what extent do the findings from questions one and two support the justification for the community management plus paradigm as a dominant management model for rural water services in India and other relevant contexts?	- Paradigm framed through ideas about collective-action and participation	- Institutionalised co-production of public services to frame new generation of community management

In Chapter Six, the financial analysis demonstrated that successfully served communities receive significant recurrent support both via direct subsidy to OpEx and through OpEx Enabling Support activities that account for 7-48% of recurrent expenditure, excluding CapManEx. This evidence, presented specifically in Section 6.6, is in stark contrast to the conventional principle that communities can cover 100% of recurrent costs (Joshi, 2003; Schouten and Moriarty, 2003). In this sense, it is considered to validate the next generation community management plus paradigmatic claims on the importance of external support for successful service delivery, as set out in Table 8.1. However, the research also showed that community contribution to OpEx – effectively tariff payments – is the factor most strongly associated with high service level performance across all case studies, as reported in Section 6.8. This to some extent reaffirms the emphasis on the value of community contribution in the

conventional community management paradigm. Withstanding that finding, the research is considered to have robustly demonstrated that community contributions should be matched by significant recurrent subsidy from governments and other agencies to deliver successful outcomes. Practically, the thesis also provided some level of guidance for the wider sector on the extent and level at which this support should be subsidised, as summarised in Chapter Six, Section 6.9.

Within the institutional analysis, as presented in Chapter Five, the various qualitative-quantitative indicators that were used to compare case studies can also be considered to support the 'next generation paradigmatic claims'. In Section 5.2, on the organisational arrangements for community service provision, it was shown that, on average, high levels of professionalisation in service provision are more closely associated with successful service level outcomes than high levels of community participation. However, more fundamentally, the institutional analysis revealed a close intersection between the local self-government and water committees as the key characteristics of the service deliver arrangements studied in India. When compared to the international origins of community management as a vehicle for bypassing failing government supply (Harvey and Reed, 2006), the contemporary Indian experience shows different situation in which a constitutionally empowered local self-government played a significant role within the programmes studied. This was described as a form of institutionalised coproduction rather than community management or community management plus.

In Chapter Seven, Section 7.1, it was explained that the conditions associated with institutionalised co-production were considered to be when public agencies work alongside private citizens to deliver public services and there is: substantial resource contribution from both parties; long-term relationships; informal or formal arrangements governing the relationship; and, there is a blurring of distinctions between public and private sectors (Joshi and Moore, 2004). That chapter demonstrated that the characteristics of service delivery studied in India were deemed to match these circumstances across all the case

studies apart from those three labelled as external agency support, which involve NGOs rather than governments. The introduction of this new concept was therefore considered empirically valid as a general description of the service delivery models studied. It was also considered discursively important as it explicitly takes into account the role of government in ensuring successful service delivery in the country.

This is an important contribution of the research as in Chapter One and Two the thesis started by expressing the general dissatisfaction with the community management paradigm and the associated levels of failure in rural water service delivery in both academic (Broek and Brown, 2015; Harvey and Reed, 2006; Hope, 2015; Moriarty, Butterworth, Franceys, et al., 2013) and practice-orientated literature (Lockwood and Smits, 2011; Lockwood, 2002, 2004). Ironically, this contemporary criticism of community management echoed the historic literature that called into question the supply-driven approach of governments in the 1970s and 1980s (Churchill, 1987; Saunders and Warford, 1976). In both situations the issues identified were connected to low levels of performance in the operation and maintenance of services that was leading to unsustainability. The contemporary practice of institutionalised coproduction in India can therefore be considered to be a kind of 'third-way' hybrid of public and community provision that offers some insights into future trajectories of service delivery models for low and lower middle income contexts.

8.2 Research implications

The major theoretical implications of the work have been discussed in Chapter Seven, so the intention here is to consider the research's implications for the policies and practices associated with rural water services. For this purpose, this section frames the discussion in the context of the Sustainable Development Goal 6 to "ensure availability and sustainable management of water and sanitation for all" (United Nations, 2015). That goal commits the global community a number of targets and principles of which two are particularly relevant in terms of this research:

- *Target 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all;*

- *Target 6.B: Support and strengthen the participation of local communities in improving water and sanitation management*

Target 6.1 has some particularly critical words in terms of shaping the ambitions of the global water community. They are considered to be *universal*, *equitable, safe* and *affordable*. This research has findings that are especially relevant for the debates about safe and affordable drinking water whilst it also provides findings that have secondary implications for debates about universal and equitable services. It also has implications for Target 6.B in terms of the participation of local communities which will be addressed below.

Initially, focusing on the notion of safe water services there is evidence that many improved water supply services do not provide technically safe water services (Clasen, 2012; Onda et al., 2012; Parker et al., 2010). This research did not attempt to measure water quality but through the service level approach provided a more sophisticated measure of different components of water services that contribute to their safety, as compared to the basic measure of improved and unimproved access used in the MDGs (Burr and Fonseca, 2013). As reported in Chapter Six, Section 6.2.2, the analysis showed that people with household connections were significantly more likely to have higher service levels, than any other water access point – over 70% of respondents with this type of access in programme villages reach at least basic on the composition service level indicator. In comparison, when taking data from the one case study with handpumps, 0% of respondents reported receiving a service that could be classified as basic on the service level ladder.

The research can therefore be considered to show that rural water service policy around the world should have the ambition of delivering piped water supply with household connections in order to deliver high service levels. This reinforces the timeliness of the Indian policy shift in 2013 (Government of India, 2013a) to concentrate resources on piped water supply with household

connections. Yet in terms of a wider context, Sub-Saharan Africa remains the region with the biggest overall need in terms of rural water services (WHO and UNICEF, 2013). In that context community management had become associated with handpumps, which are the most common form of water system in rural areas (Broek and Brown, 2015). The next generation challenge in that continent will be to move people from handpumps to piped water supply and, so, a key policy-related finding from India is that the forms of service delivery studied here can play a role in this transition.

However, with increased technical sophisticated, comes increased cost. Table 8-2 below illustrates the higher levels of investment found in this research than had previously been reported on (Burr and Fonseca, 2013; Burr, 2015). As discussed in Chapter Six, Section 6.9, through the cross-case study analysis methodology this research was able to reveal many 'hidden costs' related to rural water services, such as the subsidised power costs that rural water service providers receive in several states. It also revealed a diverse range of different funding mechanisms that feed into rural water services coming from various layers of government and specific funding streams. It is contended that previous research underestimated such costs by relying largely on survey data for collecting primary data on costs (Burr and Fonseca, 2013), rather than the key informant interviews that feed into the case studies for this work. In this sense, the research has demonstrated that the financial costs of delivering high-quality rural water services in India are higher than the widely used sector benchmarks indicated (Burr and Fonseca, 2013; Mcintyre et al., 2014), as illustrated in Table 8-2.

Table 8-2 – Summary of financial requirements for successful community management

Source	CapEx (IQR)	Recurrent (IQR)
High Service Level Performance (Community Water Plus)	$184-$247	$6-$32
Medium Service Level Performance (Community Water Plus)	$73-$279	$6-28
Low Service Level Performance (Community Water Plus)	$93-$281	$5-$13
WASHCost International Benchmark (Burr and Fonseca, 2013)	$31-$132	$4-$16
WASHCost Andhra Pradesh Benchmark (Burr 2014)	$38-$66	$0.5-$1.6

In the context of the SDG target 6.1, recognising the higher than previously recognised costs associated with successful services means that the affordability of services to all in society is a significant challenge. In India the solution to this problem has been for government to leverage the capability of the local self-government and to subsidy services either directly or indirectly, as shown in Chapter 6, Section 6.6. This is considered a critical lesson from this research: rural water services require significant levels of subsidy if they are to be successful – a finding that has been recently recognised in other studies (Franceys et al., 2016). Mobilising sufficient funds for public investment is considered to be critical for ensuring the related challenges of equitable and universal services are achieved. Yet with public fund mobilisation limited in most low and lower-income countries (Norman et al., 2015), ensuring users that are able continue to pay for at least some of the costs through user charges is still likely to be important going forward. This balance of funding, as well as other forms of joint-contribution between the state and communities, is considered critical for the future of the sector and why the notion of institutionalised co-production was discussed so extensively in Chapter Seven.

In that spirit, moving onto SDG target 6B on the need to support and strengthen community participation in water (and sanitation) management, this research raises a sceptical note. This is not because of a belief that community

participation is bad for rural water services but rather that community participation is not a necessary condition for success. This observation is made in two regards. First, the data from this research shows no relationship between the observed community participation level and service level outcomes, as presented in Chapter Five and discussed in Chapter Seven. Second, the emphasis – almost fetishism – of participation in rural water supply is considered to be misplaced in terms of achieving universal coverage as per the SDG target 6.1. There are many communities – or parts of communities – where active participation in rural water services is problematic due to issues such as social structures of patronage and exclusion (Nelson and Agrawal, 2008) or, simply, some community members having limited capacity to be effective managers of water services. Based on the evidence presented and the explained logic of reasoning, the thesis supports a change in emphasis in policy and practice around community participation. Communities should still be involved but there are different ways for this to happen – either through highly devolved democratic systems, conventional participatory approaches or shifting towards an urban-consumer type arrangement. Key to the shift though is that whatever role communities take in particular programmes there needs to be an emphasis on greater responsibility sharing with governments and other external agencies. It is in this sense, that a shift in the paradigmatic discourse of rural water supply from one focused on community management to one about coproduction is considered the most critical implication of the research.

8.3 Reflections on the limitations of the research

The limitations of the research methodology were considered in Chapter Four but this section provides a useful window for some brief, final reflections on the limitations of the research. As discussed in that chapter, the methodological tension in this research has been the balance between a conventional ‘large-n’ and ‘small-n’ research design into what has been described as a ‘med-n’ study. Synthesising so much quantitative and qualitative data within a thesis has necessitated having what could be described as a ‘constrained analysis’ on certain elements. In terms of qualitative analysis the approach has been

focused almost exclusively on formal organisational arrangements and characteristics. This research has not attempted to interrogate what could be characterised as the informal aspects of service delivery, such as how personal relationships at the village level may impact outcomes. This is partly because the resolution and scope of the synthesis was not considered conducive to studying such informality.

The precise methodology of qualitative synthesis relied on a series of qualitative-quantitative data processing tools. This researcher undertook a harmonisation process of results across the case studies through which it was clear that some elements had been interpreted in different ways by certain research teams. However, the research remained exposed to an inherent potential bias in the subjective interpretation of the use of these tools meaning that the findings from such a specific tool should be treated with some degree of caution. It is, however, through the process of triangulation between these types of qualitative-quantitative tools and other data streams (such as the financial analysis) that the research is able to provide a comprehensive picture of community management in India in one coherent study. In this sense, this mixed methodological approach, whilst exposing the study to potential bias, has also provided an inherent strength in that different types of data can be triangulated together to provide new evidence on this old problem.

8.4 Future research

The thesis is considered to have a number of implications for future research on rural water service delivery, institutionalised co-production and related areas. The empirical focus for these future research trajectories are considered to be both within India and also in the aforementioned context of Sub-Saharan Africa. Within the Indian context it is suggested that this thesis (and the broader Community Water Plus study more generally) has provided a comprehensive overview of contemporary practices of community-involved service delivery (which have been conceptualised as through the prism of institutionalised coproduction). As India is becoming increasingly wealthy and successful in

delivering rural water services, the pragmatic need for further research on such matters becomes reduced. This research has already largely captured which models are working in order to provide knowledge and insight for application in some of the lower performing regions of India and other countries. In this sense, the researcher does not advocate further large-scale research on a similar agenda in this context.

More broadly, a related challenge to water services in India remains sanitation access and use. Some 600 million Indians practice open defecation with the vast majority living in rural areas (WHO and UNICEF, 2013). The sanitation challenge is considered distinct to the water service challenge largely due to the scale at which systems are usually developed. For piped water services – and even handpumps – the physical systems developed are conventionally designed to serve a community which makes them 'naturally' suitable for some form of communal management structure. Sanitation, on the other hand, is conventionally (and most appropriately) constructed at a household scale – noting that most installations in rural areas will be non-networked and hence modular. There would therefore be an interesting research avenue in India seeking to assess the relationship between rural households and the public agencies in initiatives such as the *Swachh Bharat Mission (Gramin)* (Government of India, 2014) which is the main policy programme designed to promote sanitation use in rural areas. There are interesting questions regarding whether the institutionalised co-production between VWSCs and Gram Panchayats can facilitate the expansion and use of modular sanitation units at the household scale rather the communal water systems. Also, in a related sense, in assessing the level of support that is required from government agencies – in terms of financial subsidy and support services – to trigger sustainable sanitation use across varying contexts in the country. It is anticipated that the strategies for enabling this would differ from the rural water service sector and the continued low level of sanitation need in India indicates that there is a strong research need to deliver better solutions for this problem.

Beyond India the rural water services challenge remains significant. The successful forms of institutionalised coproduction in India are deeply intertwined with the particular system of local self-government. They are also linked to the increasing wealth of the country that enables the government to subsidise rural communities for a range of public services. Further research building on this study could therefore be focused on delivering research in a number of countries at varying levels of development and with different forms of government system (degrees of centralisation and decentralisation) particularly in the Sub-Saharan African context. With an attempt to identify forms of, or strategies for promoting, the institutionalised co-production of rural water services. A particular challenge for future research in such contexts will be focused on learning how best to facilitate, finance and govern the transition from handpumps to piped water supplies in rural areas using a community management plus approach.

8.5 Final conclusions

Evidence from the low and lower middle income world of low levels of sustainability and poor service level outcomes in rural water services had left many questioning the dominant management model – the community management approach. This had led to a number of calls for reform toward an approach in which communities received substantial recurrent support for service delivery – a model labelled community management plus. In this context, the research investigated twenty cases of successful community management programmes in India. This has revealed there is much to learn from these experiences that can provide answers to a number of simple questions: what does successful community management plus look like? How much does it cost to support it? And what do these successful approaches tell us, if anything, about the future of community management plus in contemporary India and elsewhere?

The research demonstrated that successful forms of ‘community management’ in India were distinct to what was described as ‘the conventional community

management paradigm'. It showed that communities received significant subsidy to cover operation and maintenance costs and therefore can be considered to confirm that these successful cases exhibit the characteristics of the community management plus paradigm. However, the showed that on-going support represented up to 50% of the recurrent costs of services whilst it was also identified how water committees has become embedded within the local self-government system in India. It was argued it was therefore useful to reconceptualise community management plus as a form of institutionalised co-production (Joshi and Moore, 2004). This shift in discourse is considered discursively important as it more accurately captures how private citizens work alongside the state to deliver rural water services, rather than it being the community's responsibility alone. Going forward, it is such coproduction that is considered essential to the world overcoming the cycle of unsustainability that has plagued the rural water sector.

REFERENCES

Adank, M., Kumasi, T., Abbey, E., Dickinson, N., Dzansi, P., Atengdem, J., Laari, T., et al. (2012), *The Status of Rural Water Supply Services in Ghana, A Synthesis of Findings from 3 Districts*, IRC, The Hague.

Adnan, S., Dhaka, R.& A.S.O.:, Bangladesh and Oxfam-Bangladesh. (1992), *People's Participation, NGOs, and the Flood Action Plan: An Independent Review*, Research & Advisory Services, Dhaka, Bangladesh, available at: http://books.google.co.uk/books/about/People_s_participation_NGOs_and_the_Floo.html?id=LuzsAAAAMAAJ&pgis=1 (accessed 30 June 2014).

Agrawal, A. and Gupta, K. (2005), "Decentralization and Participation: The Governance of Common Pool Resources in Nepal's Terai", *World Development*, Vol. 33 No. 7, pp. 1101–1114.

Agrawal, A. and Yadama, G. (1997), "How do Local Institutions Mediate Market and Population Pressures on Resources? Forest Panchayats in Kumaon, India", *Development and Change*, Vol. 28 No. 3, pp. 435–465.

Ahlers, R., Cleaver, F., Rusca, M. and Schwartz, K. (2014), "Informal space in the urban waterscape: Disaggregation and co-production of water services", *Water Alternatives*, Vol. 7 No. 1, pp. 1–14.

Amin, J., Denis, J., Harris, B., Ibenegbu, N., Javorszky, M., Maillot, E. and Tripp, S. (2015), *Determining Success in Community Managed Rural Water Supply Using Household Surveys*, Cranfield University Press, Cranfield.

Anekal, S.N., Samuel, S., Rao, A.S., Satish, S., Kumar, M., Misra, S., Kullappa, M., et al. (2016), *Taking on New Challenges : A Compendium of Good Practices in Rural Water Supply Schemes*, World Bank, Washington D.C., available at: http://documents.worldbank.org/curated/en/2016/01/25793476/taking-new-challenges-compendium-good-practices-rural-water-supply-schemes (accessed 19 February 2016).

Armitage, D. (2005), “Adaptive capacity and community-based natural resource management.”, *Environmental Management*, Vol. 35 No. 6, pp. 703–15.

Arnstein, S.R. (1969), “A Ladder Of Citizen Participation”, *Journal of the American Institute of Planners*, Routledge, Vol. 35 No. 4, pp. 216–224.

Asthana, A.N. (2003), “Decentralisation and supply efficiency: The case of rural water supply in central India”, *Journal of Development Studies*, Vol. 39 No. 4, pp. 148–159.

Bakalian, A. and Wakeman, W. (2009), *Post-Construction Support and Sustainability in Community-Managed Rural Water Supply: Case Studies in Peru, Bolivia and Ghana.*, World Bank, Washington D.C.

Banerjee, R. (2013), “What ails Panchayati Raj?”, *Economic and Political Weekly*, Vol. 48 No. 30, pp. 172–176.

Baumann, E. (2006), “Do operation and maintenance pay?”, *Waterlines*, Vol. 25 No. 1, pp. 10–12.

Bhaskar, R. (1998), “Philosophy and Scientific Realism”, in Archer, M., Bhaskar, A., Collier, T., Lawson, A. and Norrie, A. (Eds.), *Critical Realism: Essential Readings*, 1st ed., Routledge, London, pp. 16–47.

Bhatt, V. V. (1982), “Development Problem, Strategy, and Technology Choice: Sarvodaya and Socialist Approaches in India”, *Economic Development and Cultural Change*, Vol. 31 No. 1, pp. 85–99.

Black, M. and Talbot, R. (2004), *Water: A Matter of Life and Health*, Oxford University Press, New Delhi.

Black, T.R. (2012), *Doing Quantitative Research in the Social Sciences An Integrated Approach to Research Design, Measurement and Statistics*, 4th Editio., SAGE Publications, London.

Blaikie, N. (2007), *Approaches to Social Enquiry*, Vol. Second, Polity, Cambridge.

Blaikie, P. (2006), "'Is small really beautiful?' Community-Based Natural Resource Management in Malawi and Botswana", *World Development*, Vol. 34 No. 11, pp. 1942–1957.

Bloom, D.E., Canning, D. and Sevilla, J. (2004), "The Effect of Health on Economic Growth: A Production Function Approach", *World Development*, Vol. 32 No. 1, pp. 1–13.

Bolt, E. and Fonseca, C. (2001), *Keep It Working: A Field Manual to Support Community Management of Rural Water Supply.*, IRC, The Hague.

Bovaird, T. (2007), "Beyond engagement and participation: User and community coproduction of public services", *Public Administration Review*, Vol. 67 No. 5, pp. 846–860.

Bovaird, T., Van Ryzin, G.G., Loeffler, E. and Parrado, S. (2015), "Activating Citizens to Participate in Collective Co-Production of Public Services", *Journal of Social Policy*, Vol. 44 No. 01, pp. 1–23.

Briscoe, J. and Malik, R.P.S. (2005), *India's Water Economy: Bracing for a Turbulent Future*, Vol. 1, World Bank, Washington.

Broek, M. Van Den and Brown, J. (2015), "Geoforum Blueprint for breakdown ? Community Based Management of rural groundwater in Uganda", *Geoforum*, Elsevier Ltd, Vol. 67, pp. 51–63.

Brown, L.D. and Ashman, D. (1996), "Participation, social capital, and intersectoral problem solving: African and Asian cases", *World Development*, Vol. 24 No. 9, pp. 1467–1479.

Bryman, A. (2012), *Social Research Methods*, *Social Research*, 4th ed., Oxford University Press, Oxford, available at:http://doi.org/10.4135/9781849209939.

Burr, P. (2015), *The Financial Costs of Delivering Rural Water and Sanitation Services in Lower-Income Countries*, Cranfield University PhD Thesis, Cranfield.

Burr, P. and Fonseca, C. (2013), *Applying a Life-Cycle Costs Approach to Water: Costs and Service Levels in Rural and Small Town Areas in Andhra Pradesh (India), Burkina Faso, Ghana and Mozambique*, IRC, The Hague, available at: http://www.washcost.info/page/2665.

Census of India. (2011a), *Main Source of Drinking Water 2001-2011*, Government of India, New Delhi.

Census of India. (2011b), *Census Data: Preliminary Results*, Census of India, New Delhi.

Cepiku, D. and Giordano, F. (2014), "Co-Production in Developing Countries: Insights from the community health workers experience", *Public Management Review*, Vol. 16 No. 3, pp. 317–340.

Chambers, R. (1983), *Rural Development: Putting the Last First*, Routledge, London.

Chambers, R. (2008), *Revolutions in Development Inquiry*, Vol. 1st, Earthscan, London.

Chary Vedala, S., Jasthi, S. and Uddaraju, S. (2015a), *Users Becoming Managers of Water Supply; an Initiative of Water and Sanitation Management Organization, Gandhinagar District, Gujarat*, Administrative Staff College of India, Hyderabad.

Chary Vedala, S., Jasthi, S. and Uddaraju, S. (2015b), *Support to Community-Managed Rural Water Supply by the Water and Sanitation Management Organization in Kutch District, Gujarat*, Administrative Staff College of India, Hyderabad.

Chary Vedala, S., Jasthi, S. and Uddaraju, S. (2016a), *Professionally Managed - Community Owned Decentralized Drinking Water Service Delivery*, Administrative Staff College of India, Hyderabad.

Chary Vedala, S., Jasthi, S. and Uddaraju, S. (2016b), *Decentralisation Paving a Way for Efficient Service Delivery – A Case of Kodur Gram Panchayat,*

Kerala, Administrative Staff College of India, Hyderabad.

Chary Vedala, S., Jasthi, S. and Uddaraju, S. (2016c), *Community Involvement in a Multi-Village Scheme in Amravati District, Maharashtra*, Administrative Staff College of India, Hyderabad.

Chauhan, B.S. (2008), *Environmental Studies*, Firewall Media, Delhi, available at: https://books.google.com/books?id=Pw6WiYiHPhIC&pgis=1 (accessed 4 November 2015).

Chowns, E.E. (2014), *The Political Economy of Community Management: A Study of Factors Influencing Sustainability in Malawi's Rural Water Supply Sector*, Birmingham University PhD Thesis, Birmingham, available at: http://etheses.bham.ac.uk/5014/2/Decl_IS_Chowns.pdf (accessed 14 September 2015).

Churchill, A.A. (1987), *Rural Water Supply and Sanitation: Time for a Change*, World Bank, Washington D.C., available at: http://documents.worldbank.org/curated/en/1987/09/722210/rural-water-supply-sanitation-time-change.

Clasen, T.F. (2012), "Millennium Development Goals water target claim exaggerates achievement", *Tropical Medicine & International Health*, Blackwell Publishing Ltd, Vol. 17 No. 10, pp. 1178–1180.

Cleaver, F. (1999), "Paradoxes of participation: questioning participatory approaches to development", *Journal of International Development*, Vol. 11 No. 4, pp. 597–612.

Cleaver, F. (2012), *Development through Bricolage: Rethinking Institutions for Natural Resource Management*, Vol. 1st, Routledge, Oxford.

Colin, J. (1999), *VLOM for Rural Water Supply: Lessons from Experience*, No. Task No: 162, Loughborough, UK.

Constitution of India. (1950), *Constitution of India*, Consitution of India, Delhi, India, available at: http://lawmin.nic.in/olwing/coi/coi-english/Const.Pock

2Pg.Rom8Fsss(34).pdf.

Cornwall, A. and Brock, K. (2005), “What do buzzwords do for development policy? a critical look at ‘participation’, ‘empowerment’ and ‘poverty reduction’”, *Third World Quarterly*, Vol. 26 No. 7, pp. 1043–1060.

Costanza, R., Kubiszewski, I., Giovannini, E., Lovins, H., McGlade, J., Pickett, K.E., Ragnarsdóttir, K.V., et al. (2014), “Development: Time to leave GDP behind”, *Nature*, Vol. 505 No. 7483, pp. 283–285.

Counstruction Industry Development Council (India). (2016), “Construction Cost Indicies (CCI) (2007-2014)”, *Counstruction Industry Development Council (India)*, available at: http://www.cidc.in/new/cci-new.html (accessed 4 May 2016).

Cox, M. and Arnold, G. (2010), “A Review of Design Principles for Community-based Natural Resource”, *Ecology and Society*, Vol. 15 No. 4, p. 38.

Cross, P. (2013), *WASHCost End-of-Project Evaluation*, IRC, The Hague, available at: http://www.washcost.info/page/2974.

Cullivan, D., Tippett, B., Edwards, D., Rosensweig, F. and McCaffery, J. (1988), *Guidelines for Institutional Assessment of Water and Wastewater Institutions, WASH Technical Report No 37, Water and Sanitation for Health Project*, USAID, Washington D.C.

Danert, K. and Flowers, C. (2012), *People, Politics, the Environment and Rural Water Supplies*, Rural Water Supply Network (RWSN), St Gallen, Switzerland.

Das, K. (2014), *The Sector Reforms Process in Rural Drinking Water and Sanitation: A Review of the Role of WASMO in Gujarat*, GIDR, Gandhinagar, Gujarat, available at: http://www.gidr.ac.in/pdf/WP 221.pdf.

Datta, P. (2007), “Devolution of Financial Power to Local Self-Governments: The ‘Feasibility Frontier’ in West Bengal”, *South Asia Research*, Vol. 27 No. 1, pp. 105–124.

Dayal, R., Wijk-Sijbesma, C.A. and Mukherjee, N. (2000), *Methodology for Participatory Assessments : With Communities, Institutions and Policy Makers : Linking Sustainability with Demand, Gender and Poverty : METGUIDE*, Washington D.C.

Deaton, A. (1997), *The Analysis of Household Surveys*, *Johns Hopkins University Press*, John Hopkins University Press, Baltimore, available at:http://doi.org/doi:10.1596/0-8018-5254-4.

Demirjian, A. and Canada, A. (2002), *Partnering in Support of International Development Initiatives: The INTOSAI Case Study*, Consulting and Audit Canada, Ottawa.

Denscombe, M. (2010), *Good Research Guide*, *Open University Press*, Open University Press, Milton Keynes, available at: http://www.amazon.co.uk/Ground-Rules-Good-Research-Researchers/dp/0335206514.

Desai, M. (2006), *State Formation and Radical Democracy in India*, *State Formation and Radical Democracy in India*, Routledge, London, available at:http://doi.org/10.4324/9780203967744.

Deverill, P., Bibby, S., Wedgwood, A. and Smout, I. (2002), *Designing Water Supply and Sanitation Projects to Meet Demand in Rural and Peri-Urban Communities - Book 1: Concept, Principles and Practice*, WEDC, Loughborough, UK.

Dewey, J. (1989), “The development of American pragmatism”, in Thayer, H.S. (Ed.), *Pragmatism: The Classic Writings*, Hackett Publishing Co, Indiana, pp. 23–40.

Dynamics, C. and Berkes, F. (2006), “From Community-Based Resource Management to Complex Systems : The Scale Issue and Marine Commons”, *Ecology and Society*, Vol. 11 No. 1, p. 45.

Easterly, W. (2007), “Inequality does cause underdevelopment: Insights from a

new instrument", *Journal of Development Economics*, Vol. 84 No. 2, pp. 755–776.

Englebert, P. (2000), "Pre-colonial institutions, post-colonial states, and economic development in Tropical Africa", *Political Research Quarterly*, Vol. 53 No. 1, pp. 7–36.

Fewtrell, L., Kaufmann, R.B., Kay, D., Enanoria, W., Haller, L. and Colford, J.M. (2005), "Water, sanitation and hygiene interventions to reduce diarrhoea in less developed countries: a systematic review and meta-analysis.", *Lancet Infectious Diseases*, Vol. 5, pp. 42–52.

Field, A. (2013), *Discovering Statistics Using SPSS*, 4th ed., SAGE Publications, London.

Fisher, M.B., Shields, K.F., Chan, T.U., Christenson, E., Cronk, R.D., Leker, H., Samani, D., et al. (2015), "Understanding handpump sustainability: Determinants of rural water source functionality in the Greater Afram Plains region of Ghana", *Water Resources Research*, Vol. 51 No. 10, pp. 8431–8449.

Flyvbjerg, B. (2006), "Five Misunderstandings About Case-Study Research", *Qualitative Inquiry*, Vol. 12 No. 2, pp. 219–245.

Fogelberg, K. (2013), "From Adopt-a-Project to Permanent Services: The Evolution of Water For People's Approach to Rural Water Supply in Bolivia", *Water Alternatives*, Vol. 6 No. 3, pp. 367–383.

Fonseca, C. (2014), *Rural Water and Sanitation Household Costs in Lower-Income Countries*, Cranfield University PhD Thesis, Cranfield.

Fonseca, C., Franceys, R., Batchelor, C., Mcintyre, P., Klutse, A., Komives, K., Moriarty, P., et al. (2011), *Life-Cycle Costs Approach: Costing Sustainable Services*, *IRC*, IRC, The Hague, available at: http://www.washcost.info/page/196.

Franceys, R. and Cavill, S. (2011), *A Comprehensive Literature Review on*

Charging for and Subsidising WASH Services, UNICEF, New York.

Franceys, R., Cavill, S. and Trevett, A. (2016), "Who really pays? A critical overview of the practicalities of funding universal access", *Waterlines*, Vol. 35 No. 1, pp. 78–93.

Gandhi, A., Kumar, C., Saha, P., Sahoo, B.K. and Sharma, A. (2011), *India Human Development Report 2011 Towards Social Inclusion*, Oxford University Press, New Delhi, India.

Gerlach, E. and Franceys, R. (2009), "'Standpipes and beyond'-a universal water service dynamic", *Journal of International Development*, Vol. 22 No. 4, pp. 455–469.

Godfrey, S., Labhasetwar, P., Wate, S. and Pimpalkar, S. (2011), "How safe are the global water coverage figures? Case study from Madhya Pradesh, India", *Environmental Monitoring and Assessment*, Vol. 176 No. 1-4, pp. 561–574.

Le Gouais, A. and Webster, J. (2011), "Abandoning community management for 'professionalization' of water supply in rural Benin", *35th WEDC International Conference - The Future of Water, Sanitation and Hygiene: Innovation, Adaptation and Engagement in a Changing World*, WEDC, Loughborough, UK, available at: http://wedc.lboro.ac.uk/resources/conference/35/Le-Gouais-A-1049.pdf (accessed 4 May 2016).

Government of India. (1860), *SOCIETIES REGISTRATION ACT, 1860*, *Ministry of Corporate Affairs*, available at: http://www.mca.gov.in/Ministry/actsbills/pdf/Societies_Registration_Act_1860.pdf (accessed 14 April 2016).

Government of India. (1993), *The Constitution (Seventy-Third Amendment Act)*, *Constitution of India*, India, available at: http://indiacode.nic.in/coiweb/amend/amend73.htm.

Government of India. (2001), *Concepts and Definitions - National Sample Survey*, Ministry of Statistics and Programme Implementation, Delhi.

Government of India. (2003), *Swajaldhara*, Department of Drinking Water Supply, New Delhi.

Government of India. (2009a), *Report of Rajiv Gandhi National Drinking Water Mission*, Department of Drinking Water Supply, New Delhi.

Government of India. (2009b), *Report of the Expert Group to Review the Methodology for Estimation of Poverty*, Planning Commission (Government of India), New Delhi.

Government of India. (2012), *A Handbook for Gram Panchayats – to Help Them Plan, Implement, Operate, Maintain and Manage Drinking Water Security*, Ministry of Rural Development, Department of Drinking Water Supply and the Water & Sanitation Programme, New Delhi.

Government of India. (2013a), *National Rural Drinking Water Programme, Rajiv Gandhi Drinking Water Mission, Movement towards Ensuring People's Drinking Water Security in Rural India, Framework for Implementation (Updated 2013)*, Ministry of Drinking Water and Sanitation, New Delhi.

Government of India. (2013b), *Lok Sahba (Parliament of India) Unstarred Question No. 1863 on Panchayati Raj*, Ministry of the Panchayati Raj, New Delhi.

Government of India. (2013c), *National Water Policy 2012*, Ministry of Water Resources, New Delhi.

Government of India. (2014), *Guidelines for Swachh Bharat Mission (Gramin)*, Ministry of Drinking Water and Sanitation, New Delhi.

Government of India. (2015a), "Ranking of States by Devolution", *Ministry of Panchayati Raj*, available at: http://www.panchayat.gov.in/hidden/-/asset_publisher/c6nFXzynlfcc/content/ranking-of-states-on-devolution-index/pop_up?_101_INSTANCE_c6nFXzynlfcc_viewMode=print (accessed

4 May 2016).

Government of India. (2015b), “Government Constitutes National Institution for Transforming India (NITI) Aayog”, *Press Information Bureau*, available at: http://pib.nic.in/newsite/PrintRelease.aspx?relid=114268 (accessed 10 May 2015).

Government of India. (2015c), “Ranking of States on Devolution Index”, *Ministry of Panchayati Raj*, available at: http://www.panchayat.gov.in/hidden/-/asset_publisher/c6nFXzynlfcc/content/ranking-of-states-on-devolution-index (accessed 30 October 2015).

Hankin, P. (2011), “The Afridev Handpump Problems and Solutions”, *The 27th Annual WEDC Conference - People and Systems for Water, Sanitation and Hygiene*, WEDC, Loughborough, UK, pp. 121–124.

Harris, B., Brighu, U. and Poonia, R. (2016a), *24x7 Water Supply in Punjab: International Funding for Local Action*, Malaviya National Institute of Technology, Jaipur.

Harris, B., Brighu, U. and Poonia, R. (2016b), *Community Managed Water Supplies in Rural Jaipur: The Swajaldhara Scheme 15 Years on*, Malaviya National Institute of Technology, Jaipur.

Harris, B., Brighu, U. and Poonia, R. (2016c), *Community Water Classic: The Success of Community Managed Water Supplies in Himachal Pradesh with Limited on-Going Support*, Malaviya National Institute of Technology, Jaipur.

Harris, D., Kooy, M. and Jones, L. (2011), *Analysing the Governance and Political Economy of Water and Sanitation Service Delivery*, Overseas Development Institute, London.

Harvey, P.A. and Reed, R.A. (2006), “Community-managed water supplies in Africa: sustainable or dispensable?”, *Community Development Journal*, Vol. 42 No. 3, pp. 365–378.

Heller, P., Harilal, K.N. and Chaudhuri, S. (2007), “Building Local Democracy: Evaluating the Impact of Decentralization in Kerala, India”, *World Development*, Vol. 35 No. 4, pp. 626–648.

Hickey, S. and Mohan, G. (2005), “Relocating Participation within a Radical Politics of Development”, *Development and Change*, Vol. 36 No. 2, pp. 237–262.

Hood, C. (1995), “The ‘new public management’ in the 1980s: Variations on a theme”, *Accounting, Organizations and Society*, Vol. 20 No. 2-3, pp. 93–109.

Hood, C. (1998), *The Art of the State. Culture, Rhetoric, and Public Management*, Oxford University Press, Oxford.

Hope, R. (2015), “Is community water management the community’s choice? Implications for water and development policy in Africa”, *Water Policy*, IWA Publishing, Vol. 17 No. 4, p. 664.

Howard, G. and Bartram, J. (2013), *Domestic Water Quantity, Service, Level and Health Domestic Water Quantity, Service Level and Health Executive Summary*, World Health Organisation, Geneva, Switzerland.

Hueso, A. and Bell, B. (2013), “An untold story of policy failure: the Total Sanitation Campaign in India”, *Water Policy*, Vol. 15 No. 6, p. 1001.

Hutchings, P. (2015), *Supporting Community Management in Morappur, Tamil Nadu*, Cranfield University Press, Cranfield.

Hutchings, P., Chan, M.Y., Cuadrado, L., Ezbakhe, F., Mesa, B., Tamekawa, C. and Franceys, R. (2015), “A systematic review of success factors in the community management of rural water supplies over the past 30 years”, *Water Policy*, IWA Publishing, Vol. 17 No. 5, p. 963.

Hutchings, P., Franceys, R., Mekala, S., Smits, S. and James, V. (2016), “Revisiting the history, concepts and typologies of community management for rural drinking water supply in India”, *International Journal of Water*

Resources Development, pp. 1–18.

Hutchings, P., Parker, A. and Jeffrey, P. (2016), "The political risks of technological determinism in rural water supply: A case study from Bihar, India", *Journal of Rural Studies*, Vol. 45, pp. 252–259.

Hutton, G. (2013), "Global costs and benefits of reaching universal coverage of sanitation and drinking-water supply.", *Journal of Water and Health*, Vol. 11 No. 1, pp. 1–12.

Hutton, G., Haller, L. and Bartram, J. (2007), "Global cost-benefit analysis of water supply and sanitation interventions.", *Journal of Water and Health*, Vol. 5 No. 4, pp. 481–502.

Hutton, G. and Varughese, M. (2016), *The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene*, Water and Sanitation Program, World Bank, Washington D.C., available at: http://www.worldbank.org/en/topic/water/publication/the-costs-of-meeting-the-2030-sustainable-development-goal-targets-on-drinking-water-sanitation-and-hygiene?CID=WAT_TT_Water_EN_EXT.

IMF. (2016), *World Economic Outlook Jan 2016 - Subdued Demand, Diminished Prospects*, Washington D.C., available at: http://www.imf.org/external/pubs/ft/weo/2016/update/01/pdf/0116.pdf (accessed 23 April 2016).

Isham, J., Kahkonen, S. and Kähkönen, S. (2002), "Institutional Determinants of the Impact of Community-Based Water Services: Evidence from Sri Lanka and India", *Economic Development and Cultural Change*, Vol. 50 No. 3, pp. 667–691.

James, A.J. (2004), *India's Sector Reform Projects and Swajaldhara Programme A Case of Scaling up Community Managed Water Supply Submitted to the IRC International Water and Sanitation Centre*, IRC, The Hague.

James, A.J. (2011), *Supporting Rural Water Supply: Assessing Progress Towards Sustainable Service Delivery (India)*, IRC, The Hague.

Javorszky, M., Dash, P.C. and Panda, P.K. (2015), *Understanding Resource Implications of the "plus" in Community Management of Rural Water Supply Systems in India: The Case of DWSD in Jharkhand*, Xavier Institute for Social Service, Ranchi.

Javorszky, M., Dash, P.C. and Panda, P.K. (2016), *Communal Action for Private Connections: Gram Vikas' Approach to Supporting Community Management of Rural Water Supplies in Odisha*, Xavier Institute for Social Service, Ranchi.

Johnson, C. (1982), *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925--1975*, *MITI and the Japanese Miracle : The Growth of Industrial Policy, 1925--1975.*, Stanford University Press, Redwood.

Johnson, C., Deshingkar, P. and Start, D. (2005a), "Grounding the State: Devolution and Development in India's Panchayats", *Journal of Development Studies*, Vol. 41 No. 6, pp. 937–970.

Johnson, C.P.D., Deshingkar, P. and Start, D. (2005b), "Grounding the State: Devolution and Development in India's Panchayats", *Journal of Development Studies. Aug2005*, Vol. 41 No. 6, pp. 937–970.

Jones, S. (2011), "Participation as citizenship or payment ? A case study of rural drinking water governance in Mali", *Water Alternatives*, Vol. 4 No. 1, pp. 54–71.

Jones, S.D. (2015), "Bridging political economy analysis and critical institutionalism: an approach to help analyse institutional change for rural water services", *International Journal of the Commons*, 16 March.

Joshi, A. and Moore, M. (2004), "Institutionalised Co-production: Unorthodox Public Service Delivery in Challenging Environments", *Journal of Development Studies*, Vol. 40 No. 4, pp. 31–49.

Joshi, D. (2003), *Secure Water? Poverty, Livelihoods and Demand-Responsive Approaches*, London, available at: http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/1618.pdf (accessed 21 April 2016).

Kelsall, T. (2011), "Rethinking the Relationship between Neo-patrimonialism and Economic Development in Africa", *IDS Bulletin*, Vol. 42 No. 2, pp. 76–87.

Kleemeier, E. (2000), "The Impact of Participation on Sustainability : An Analysis of the Malawi Rural Piped Scheme Program", *World Development*, Vol. 28 No. 5, pp. 929–944.

Koehler, J., Thomson, P. and Hope, R. (2015), "Pump-Priming Payments for Sustainable Water Services in Rural Africa", *World Development*, Vol. 74, pp. 397–411.

Kohli, A. (2012), *Poverty Amid Plenty in the New India*, Cambridge University Press, New York.

Kugler, J. (2006), "The Asian Ascent: Opportunity for Peace or Precondition for War?", *International Studies Perspectives*, Vol. 7 No. 1, pp. 36–42.

Kuhn, T.S., Carnap, R., Philipp, C.M., Neurath, F.O., Joergensen, J., Rougier, L., Bohr, N., et al. (1970), *The Structure of Scientific Revolutions*, 2nd ed., University of Chicago Press, Chicago.

Lammerink, M. and de Jong, D. (1999), *Community Water Management.*, International Institute for Environment and Development, London.

Larsson, R. (1993), "Case Survey Methodology: Quantitative Analysis of Patterns across Case Studies", *The Academy of Management Journal*, Vol. 36 No. 6, pp. 1515–1546.

Laws, S., Harper, C. and Marcus, R. (2003), *Research for Development A Practical Guide*, 5th ed., SAGE Publications, London.

Leach, M., Mearns, R. and Scoones, I. (1999), “Environmental entitlements: dynamics and institutions in community-based natural resource management”, *World Development*, Elsevier, Vol. 27 No. 2, pp. 225–247.

Leftwich, A. (1993), “Governance, democracy and development in the Third World”, *Third World Quarterly*, Vol. 14 No. 3, pp. 605–624.

Lieberson, S. and O’Connor, J.F. (1972), “Leadership and Organizational Performance: A Study of Large Corporations”, *American Sociological Review*, Vol. 37 No. 2, p. 117.

Lockwood, H. (2002), *Institutional Support Mechanisms for Community-Managed Rural Water Supply and Sanitation Systems in Latin America*, USAID, Washington D.C.

Lockwood, H. (2004), *Scaling up the Community Management of Rural Wates Supply*, Vol. 1, IRC, The Hague.

Lockwood, H., Bakalian, A. and Wakeman, W. (2003), *Assessing Sustainability in Rural Water Supply: The Role of Follow-up Support to Communities; Literature Review and Desk Review of Rural Water Supply and Sanitation Project Documents*, World Bank, Washington, DC.

Lockwood, H. and Smits, S. (2011), *Supporting Rural Water Supply: Moving Towards a Service Delivery Approach*, Practical Action Publishing Ltd., Warwickshire, UK.

Mandara, C.G., Butijn, C. and Niehof, A. (2013), “Community management and sustainability of rural water facilities in Tanzania”, *Water Policy*, Vol. 15 No. S2, p. 79.

Mansuri, G. and Rao, V. (2004), “Community-Based and -Driven Development: A Critical Review”, *The World Bank Research Observer*, Vol. 19 No. 1, pp. 1–39.

Marks, S.J. and Davis, J. (2012), “Does User Participation Lead to Sense of Ownership for Rural Water Systems? Evidence from Kenya”, *World*

Development, Vol. 40 No. 8, pp. 1569–1576.

McCommon, C., Warner, D. and Yohalem, D. (1990), *Community Management of Rural Water Supply and Sanitation Services: WASH Technical Report 67*, Washington D.C.

Mcintyre, P., Casella, D., Fonseca, C. and Burr, P. (2014), *Supporting Water Sanitation and Hygiene Services for Life Uncovering the Real Costs of Water and Sanitation*, 1st ed., IRC, The Hague, available at: http://www.ircwash.org/sites/default/files/2014_priceless_mcintyreetal_1.pdf (accessed 22 April 2016).

McMillan, D.W. and Chavis, D.M. (1986), "Sense of community: A definition and theory", *Journal of Community Psychology*, John Wiley & Sons, Inc., Vol. 14 No. 1, pp. 6–23.

Ministry of Environment, F. and C.C. (2009), *State of the Environment*, Dehradun, available at: http://envfor.nic.in/soer/2009/SoE Report_2009.pdf.

Morgan, D.L. (2014), "Pragmatism as a paradigm for social research", *Qualitative Inquiry*, Vol. 20 No. 8, pp. 1045–1053.

Moriarty, P., Butterworth, J. and Franceys, R. (2013), "Trends in Rural Water Supply : Towards a Service Delivery Approach", Vol. 6 No. 3, pp. 329–349.

Moriarty, P., Butterworth, J., Franceys, R., Smits, S., Butterworth, J. and Franceys, R. (2013), "Trends in rural water supply: Towards a service delivery approach", *Water Alternatives*, Vol. 6 No. 3, pp. 329–349.

Moriarty, P., Smits, S., Butterworth, J. and Franceys, R. (2013), "Trends in rural water supply: Towards a service delivery approach", *Water Alternatives*, Vol. 6 No. 3, pp. 329–349.

Nelson, F. and Agrawal, A. (2008), "Patronage or Participation? Community-based Natural Resource Management Reform in Sub-Saharan Africa", *Development and Change*, Vol. 39 No. 4, pp. 557–585.

Norman, G., Fonseca, C. and Tremolet, S. (2015), *Domestic Public Finance for WASH: What, Why, How?*, Hague, available at: http://www.publicfinanceforwash.com/sites/default/files/uploads/Finance_Brief_1_-_Domestic_public_finance_for_WASH.pdf (accessed 4 August 2016).

OECD. (2009), *Managing Water for All An Oecd Perspective on Pricing And Financing*, Paris, available at: http://www.oecd.org/tad/sustainable-agriculture/44476961.pdf (accessed 22 April 2016).

Olivier de Sardan, J.-P. (2011), "Local Powers and the Co-delivery of Public Goods in Niger", *IDS Bulletin*, Vol. 42 No. 2, pp. 32–42.

Olson, M. (2002), *The Logic of Collective Action: Public Goods and the Theory of Groups*, Blackwell, Oxford, available at:http://doi.org/10.2307/2576430.

Onda, K., Lobuglio, J. and Bartram, J. (2012), "Global access to safe water: Accounting for water quality and the resulting impact on MDG progress", *International Journal of Environmental Research and Public Health*, Vol. 9 No. 3, pp. 880–894.

Ostrom, E. (1990), *The Evolution of Institutions for Collection Action*, Vol. 29th, Cambridge University Press, Cambridge.

Ostrom, E. (1996), "Crossing the Great Divide: Coproduction, Synergy, and Development", *World Development*, Vol. 24 No. 6, pp. 1073–1087.

Ostrom, E. (2010), "Analyzing collective action", *Agricultural Economics*, Vol. 41 No. 1, pp. 155–166.

Parel, A. (2011), "Gandhi and the state", in Brown, J.M. and Parel, A. (Eds.), *The Cambridge Companion to Gandhi*, Cambridge University Press, Cambridge, pp. 154–172.

Parker, A.H., Youlten, R., Dillon, M., Nussbaumer, T., Carter, R.C., Tyrrel, S.F. and Webster, J. (2010), "An assessment of microbiological water quality of six water source categories in north-east Uganda", *Journal of Water and*

Health, Vol. 8 No. 3, pp. 550–560.

Patton, M.Q. (2002), *Qualitative Research and Evaluation Methods*, *Qualitative Inquiry*, 3rd ed., SAGE Publications, London, available at:http://doi.org/10.2307/330063.

Paul, S. (1987), "Community Participation in Development Projects: The World Bank Experience", *Readings in Community Participation*, EDI, Washington DC.

Postma, L., James, A.J. and van Wijk, C. (2004), "QIS: A new participatory management tools to assess and act on field reality", *30th WEDC International Conference - People-Centred Approaches to Water and Environmental Sanitation*, WEDC, Loughborough, UK.

Pretty, J. (1994), "Alternative systems of inquiry for a sustainable agriculture", *IDS Bulletin*, Vol. 25 No. 2, pp. 37–48.

Prokopy, L.S. (2005), "The relationship between participation and project outcomes: Evidence from rural water supply projects in India", *World Development*, Vol. 33 No. 11, pp. 1801–1819.

Prokopy, L.S. (2009), "Determinants and Benefits of Household Level Participation in Rural Drinking Water Projects in India", *Journal of Development Studies*, Routledge, Vol. 45 No. 4, pp. 471–495.

Rajan, K., Kennedy, J. and King, L. (2013), "Is wealthier always healthier in poor countries? The health implications of income, inequality, poverty, and literacy in India.", *Social Science & Medicine (1982)*, Vol. 88, pp. 98–107.

Rajesh, K. and Thomas, M.B. (2012), "Decentralization and Interventions in the Health Sector", *Journal of Health Management*, Vol. 14 No. 4, pp. 417–433.

Ramamohan Roa, M.S. and Raviprakash, M.S. (2016a), *Empowered Community – Secured Safe Water Supply In Parts of Dhar District, Madhya Pradesh*, Centre for Excellence in Change, Chennai.

Ramamohan Roa, M.S. and Raviprakash, M.S. (2016b), *Jal Nirmal and beyond: Supporting the Community Management of Rural Water Supply in Belagavi District, Karnataka*, Centre for Excellence in Change, Chennai.

Ratna, V.R., Jayakumar, N., Venkataswamy, N. and Snehalatha, M. (2010), *Life-Cycle Costs Approach (LCCA) for Sustainable WASH Service Delivery: A Study in Rural Andhra Pradesh, India*, *WASHCost IRC Symposium*, CESS, Hyderabad.

Reddy, V.R. and Batchelor, C. (2012), "Cost of providing sustainable water, sanitation and hygiene (WASH) services: An initial assessment of a life-cycle cost approach (LCCA) in rural Andhra Pradesh, India", *Water Policy*, Vol. 14 No. 3, pp. 409–429.

Reddy, V.R., Ramamohan Roa, M.S. and Venkataswamy, M. (2010), *"Slippage": The Bane of Rural Drinking Water Sector (A Study of Extent and Causes in Andhra Pradesh)*, *WashCost (India)*, Vol. 6, CESS, Hyderabad.

Reserve Bank of India. (2015), *Handbook of Statistics on Indian Economy*, Reserve Bank of India, New Delhi, available at: https://www.rbi.org.in/scripts/PublicationsView.aspx?id=15283.

Ritchie, J. and Lewis, J. (2003), *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, *SAGE Publications*, SAGE Publications, London.

Ritchie, J., Lewis, J., McNaughton Nicholls, C. and Ormston, R. (2013), *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, Vol. 1, SAGE Publications, London, available at: https://books.google.com/books?id=EQSIAwAAQBAJ&pgis=1 (accessed 8 June 2015).

Robinson, M. (2007), "Introduction: Decentralising Service Delivery? Evidence and Policy Implications", *IDS Bulletin*, Vol. 38 No. 1, pp. 1–6.

Rodríguez-Pose, A. and Gill, N. (2003), “The global trend towards devolution and its implications”, *Environment and Planning C: Government and Policy*, Vol. 21 No. 3, pp. 333–351.

Rorty, R. (1996), “Deconstruction and Pragmatism”, in Chantal, M. (Ed.), *Deconstruction and Pragmatism*, Routledge, London, pp. 13–18.

Rout, S. (2014), “Institutional variations in practice of demand responsive approach: evidence from rural water supply in India”, *Water Policy*, IWA Publishing, Vol. 16 No. 4, p. 650.

RWSN. (2009), *Myths of the Rural Water Supply Sector*, *Rural Water Supply Network Perspectives*, Rural Water Supply Network, St Gallen, Switzerland.

Saraswathy, R. (2015), *Kathirampatti Village Panchayat, Tamil Nadu Rural Water Supply*, Centre for Excellence in Change, Chennai.

Saraswathy, R. (2016a), *Nenmeni Sudha Jala Vitharana Society (NSJVS) Kerala: Professionalised Management of Water Supply by Community*, Centre for Excellence in Change, Chennai.

Saraswathy, R. (2016b), *Community Managed Gravity-Fed Piped Water Supply in Himalayan Sikkim*, Centre for Excellence in Change, Chennai.

Saraswathy, R. (2016c), *The Dorbars and Gravity-Fed Piped Water Supply in Meghalaya*, Centre for Excellence in Change, Chennai.

Saunders, R.J. and Warford, J.J. (1976), *Village Water Supply: Economics and Policy in the Developing World*, World Bank, Washington D.C., available at: http://documents.worldbank.org/curated/en/1976/01/1561297/village-water-supply-economics-policy-developing-world (accessed 29 September 2015).

Sayer, A. (2000), “Realism and Social Science”, in Osborne, R. and Edgley, R. (Eds.), *Radical Philosophy Reader*, Vol. 1, Verso Books, London, p. 211.

Schell, C.O., Reilly, M., Rosling, H., Peterson, S. and Ekström, A.M. (2007),

"Socioeconomic determinants of infant mortality: a worldwide study of 152 low-, middle-, and high-income countries.", *Scandinavian Journal of Public Health*, Vol. 35 No. 3, pp. 288–97.

Schiffer, E. and Hauck, J. (2010), "Net-Map: Collecting Social Network Data and Facilitating Network Learning through Participatory Influence Network Mapping", *Field Methods*, Vol. 22 No. 3, pp. 231–249.

Schouten, T. and Moriarty, P. (2003), *Community Water, Community Management. From System to Service in Rural Areas.*, ITDG Publishing, London.

Schweitzer, R.W. and Mihelcic, J.R. (2012), "Assessing sustainability of community management of rural water systems in the developing world", *Journal of Water, Sanitation and Hygiene for Development*, Vol. Vol 2 No. No 1, p. pp 20–30.

Scott, J.C. (1998), *Seeing like a State*, Yale Agrarian Studies Series, New Haven, Connecticut.

Sen, A. (2004), "Development as Capability Expansion", in Fukuda-Parr, S. and Shiva Kumar, A.K. (Eds.), *Readings in Human Development: Conept*, Oxford University Press, Oxford, pp. 41–58.

Sen, S. (1999), "Some Aspects of State-NGO Relationships in India in the Post-Independence Era", *Development and Change*, Blackwell Publishers Ltd, Vol. 30 No. 2, pp. 327–355.

Sharma, V. (2015), "Are BIMARU states still Bimaru?", *Economic and Political Weekly*, Economic and Political Weekly, Vol. 50 No. 18, pp. 58–63.

Sheikh, M.A., Kumar, M., Bussman, R.W. and Todaria, N. (2011), "Forest carbon stocks and fluxes in physiographic zones of India", *Carbon Balance and Management*, Springer International Publishing, Vol. 6 No. 1, p. 15.

da Silva Wells, C., van Lieshout, R. and Uytewaal, E. (2013), "Monitoring for learning and developing capacities in the WASH sector", *Water Policy*, Vol.

15 No. S2, p. 206.

Sirkin, R.M. (2006), *Statistics for the Social Sciences*, SAGE Publications, London.

Smits, S. (n.d.). *International Implications of the Community Water Plus Research (Unpublished Manuscript)*, IRC, The Hague.

Smits, S., Franceys, R., Mekala, S. and Hutchings, P. (2015), *Understanding the Resource Implications of the "plus" in Community Management of Rural Water Supply Systems in India: Concepts and Research Methodology*, IRC, The Hague.

Smits, S. and Mekala, S. (2015), *The Effects and Costs of Support to Community-Managed Handpumps in Patharpratima, West Bengal*, IRC, The Hague.

Smits, S., Rojas, J. and Tamayo, P. (2013), "The impact of support to community-based rural water service providers : evidence from Colombia", *Water Alternatives*, Vol. 6 No. 3, pp. 384–404.

Smits, S., Shiva, R. and Kapur, D. (2016), *Support to Community-Managed Rural Water Supplies in the Uttarakhand Himalayas - the Himmotthan Water Supply and Sanitation Initiative*, No. 12, The Hague.

Smits, S., Verhoeven, J., Moriarty, P. and Fonseca, C.L. (2011), *Arrangements and Costs of Support to Rural Water Service Providers*, ernational Water and Sanitation Centre - WASHCost, The Hague.

Snehalatha, M., Busenna, P., Ratna Reddy, V. and Anitha, V. (2011), *Rural Drinking Water Service Levels: A Study of Andhra Pradesh, South India*, Centre for Economic and Social Studies, Hyderabad.

Srivastava, S. (2012), "Swajaldhara: ?Reversed? Realities in Rural Water Supply in India", *IDS Bulletin*, Blackwell Publishing Ltd, Vol. 43 No. 2, pp. 37–43.

Stalker Prokopy, L. and Thorsten, R. (2009), “Post-Construction Support and Sustainability in Rural Drinking Water Projects in Cuzco, Peru”, in Bakalian, A. and Wakeman, W. (Eds.), *Post-Construction Support and Sustainability in Community-Managed Rural Water Supply : Case Studies in Peru, Bolivia, and Ghana*, World Bank - Netherlands Water Partnership, Washington, DC, pp. 17–51.

Stebbins, R.A. (2001), *Exploratory Research in the Social Sciences*, Sage Publications, Thousand Oaks, California.

Sumner, A. (2012), *Where Do The World’s Poor Live? A New Update*, Institute for Development Studies, Brighton, available at: www.ids.ac.uk/research-teams/vulnerability-and-poverty-reduction-team/research-themes/poverty-inequality-and-wellbeing (accessed 23 April 2016).

Sutton, S. (2005), “The sub-Saharan potential for household level water supply improvement”, *31st WEDC International Conference, Kampala, Uganda, 2005*, WEDC.

Sutton, S. (2008), *An Introduction to Self Supply: Putting the User First*, Rural Water Supply Network, St. Gallen.

Tamayo, P. and Gracia, M. (2006), “Estrategia estatal para el fortalecimiento de entes prestadores de servicios públicos en el pequeño municipio y la zona rural. El programa cultura empresarial adelantado en Colombia”, *Apoyo a La Gestión de Comités de Agua Potable; Experiencias de Fortalecimiento a Comités de Agua Potable Con Gestión Comunitaria En Bolivia Y Colombia*, Centro Agua – UMSS, Cochabamba.

Teddlie, C. and Yu, F. (2007), “Mixed Methods Sampling: A Typology With Examples”, *Journal of Mixed Methods Research*, Vol. 1 No. 1, pp. 77–100.

TERI. (2016), “India close to being water scarce from water stressed: TERI”, Delhi, available at: http://www.teriin.org/files/press_release_iwf.pdf (accessed 4 May 2016).

Transparency International. (2014), “Corruptions Perceptions Index”, *Corruptions Perceptions Index 2014: Results*, available at: https://www.transparency.org/cpi2014/results (accessed 4 May 2016).

ul Haq, M. (2004), “The Human Development Paradigm”, in Fukuda-Parr, S. and Shiva Kumar, A.K. (Eds.), *Readings in Human Development : Concepts, Measures, and Policies for a Development Paradigm*, University of Oxford Press, Oxford, pp. 17–34.

UN Water and WHO. (2014), *Investing in Water and Sanitation: Increasing Access, Reducing Inequalities UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water GLAAS 2014 Report*, New York, available at: http://www.who.int/water_sanitation_health/glaas/en/ (accessed 22 April 2016).

United Nations. (2015), *Sustainable Development Goals*, *Sustainable Development Knowledge Platform*, United Nations, New York, available at: https://sustainabledevelopment.un.org/?menu=1300 (accessed 8 December 2015).

United Nations. (2016), “Population density and urbanization”, *United Nations Demographic and Social Statistics*, available at: http://unstats.un.org/unsd/demographic/sconcerns/densurb/densurbmethods.htm (accessed 20 April 2016).

De Vries, M. and Nemec, J. (2013), “Public sector reform: an overview of recent literature and research on NPM and alternative paths”, *International Journal of Public Sector Management*, Vol. 26 No. 1, pp. 4–16.

Weber, M. (1978), *Economy and Society: An Outline of Interpretive Sociology*, University of California Press, Berkeley.

Whetten, D.A. (1989), “What Constitutes a Theoretical Contribution?”, *Academy of Management Review*, Vol. 14 No. 4, pp. 490–495.

Whittington, D., Briscoe, J., Mu, X. and Barron, W. (1990), “Estimating the

Willingness to Pay for Water Services in Developing Countries: A Case Study of the Use of Contingent Valuation Surveys in Southern Haiti", *Economic Development and Cultural Change*, Vol. 38 No. 2, pp. 293–311.

Whittington, D., Davis, J., Prokopy, L., Komives, K., Thorsten, R., Lukacs, H., Bakalian, A., et al. (2009), "How well is the demand-driven, community management model for rural water supply systems doing? Evidence from Bolivia, Peru and Ghana", *Water Policy*, Vol. 11 No. 6, p. 696.

WHO and UNICEF. (2015), *2015 Update and MDG Assessment WHO Library Cataloguing-in-Publication Data*, *World Health Organization*, available at: http://www.who.int/about/licensing/copyright_form/en/index.html (accessed 18 April 2016).

WHO and UNICEF. (2012), *Progress on Drinking Water and Sanitation 2012 Update*, UNICEF and World Health Organization, New York.

WHO and UNICEF. (2013), *WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation*, Vol. 2013, WHO & UNICEF, New York.

World Bank. (2004), *World Development Report 2004: Making Services Work for Poor People*, *Washington, DC*, World Bank, Washington D.C., available at:http://doi.org/10.1093/jae/ejh019.

World Bank. (2016a), "GDP per capita, PPP (current international $)", *World Bank Data*, available at: http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD (accessed 27 April 2016).

World Bank. (2016b), *India - World Bank Data*, *World Bank Data*, World Bank, Washington D.C., available at:http://doi.org/http://data.worldbank.org/country/india.

WSP. (2002), *Discussion Paper #1 Sustainability of Rural Water Supply Projects: Lessons from the Past - South Asia Region.*, Water and Sanitation Program, Washington D.C.

Yin, R.K. (2003), *Case Study Research: Design and Methods*, SAGE Publications, London, available at: https://books.google.com/books?id=BWea_9ZGQMwC&pgis=1 (accessed 8 June 2015).

Yin, R.K. and Heald, K. a. (1975), “Using the Case Survey Method to Analyze Policy Studies”, *Administrative Science Quarterly*, Vol. 20 No. September, pp. 371–382.

APPENDICES

The Appendices provide supplementary material to the thesis. To maintain an appropriate length it has been decided to include what is considered to be the most relevant information directly in this document and then provide links to publically available documents for the full supplementary information.

Appendix A – Journal papers and author bibliography

This appendix provides access to two led-authored journal papers published that provide a broader review of the global evidence on community management plus and community management in India. It also provides a list of other publications published in the course of this PhD.

A.1 Systematic review paper

Water Policy 17 (2015) 963–983

A systematic review of success factors in the community management of rural water supplies over the past 30 years

Paul Hutchings*, Mei Yee Chan, Lucie Cuadrado, Fatine Ezbakhe, Baptiste Mesa, Chiaki Tamekawa and Richard Franceys

School of Applied Sciences, Cranfield University, Cranfield Water Science Institute, Vincent Building, Cranfield, Bedfordshire MK43 0AL, UK

**Corresponding author. E-mail: p.t.hutchings@cranfield.ac.uk*

Abstract

Community management is the accepted management model for rural water supplies in many low and middle-income countries. However, endemic problems in the sustainability and scalability of this model are leading many to conclude we have reached the limits of an approach that is too reliant on voluntarism and informality. Accepting this criticism but recognising that many cases of success have been reported over the past 30 years, this study systematically reviews and analyses the development pattern of 174 successful community management case studies. The synthesis confirms the premise that for community management to be sustained at scale, community institutions need a 'plus' that includes long-term external support, with the majority of high performing cases involving financial support, technical advice and managerial advice. Internal community characteristics were also found to be influential in terms of success, including collective initiative, strong leadership and institutional transparency. Through a meta-analysis of success in different regions, the paper also indicates an important finding on the direct relationship between success and the prevailing socio-economic wealth in a society. This holds implications for policy and programme design with a need to consider how broad structural conditions may dictate the relative success of different forms of community management.

Keywords: Community management; Participation; Rural water supply; Service delivery; Sustainability

Reference: Hutchings, P., Chan, M.Y., Cuadrado, L., Ezbakhe, F., Mesa, B., Tamekawa, C., Franceys, R. (2015). A systematic review of success factors in the community management of rural water supplies over the past 30 years. Water Policy. Vol 17, Iss 5, P 963-983.

Abstract: Community management is the accepted management model for rural water supplies in many low and middle income countries. However, endemic problems in the sustainability and scalability of this model are leading many to conclude we have reached the limits of an approach that is too reliant on voluntarism and informality. Accepting this criticism but recognising that many cases of success have been reported over the past 30 years, this study systematically reviews and analyses the development pattern of 174 successful community management case studies. The synthesis confirms the premise that for community management to be sustained at scale, community institutions need a 'plus' that includes long-term external support, with the majority of high performing cases involving financial support, technical advice and managerial advice. Internal community characteristics were also found to be influential in terms of success, including collective initiative, strong leadership and institutional transparency. Through a meta-analysis of success in different regions, the paper also indicates an important finding on the direct relationship between success and the prevailing socio-economic wealth in a society. This holds implications for policy and programme design with a need to consider how broad structural conditions may dictate the relative success of different forms of community management.

Keywords: Community management; Participation; Rural water supply; Service delivery; Sustainability

Link to published article (firewall):

http://wp.iwaponline.com/content/17/5/963

Link to public Dropbox:

https://www.dropbox.com/s/jh0fo2h6zo5utfz/Systematic%20review%20of%20global%20CM%20evidence.pdf?dl=0

A.2 History, concepts and typologies of community management in India paper

INTERNATIONAL JOURNAL OF WATER RESOURCES DEVELOPMENT, 2016
http://dx.doi.org/10.1080/07900627.2016.1145576

Routledge
Taylor & Francis Group

Revisiting the history, concepts and typologies of community management for rural drinking water supply in India

Paul Hutchings[a], Richard Franceys[a], Snehalatha Mekala[b], Stef Smits[c] and A. J. James[d]

[a]Cranfield Water Science Institute, Cranfield University, Cranfield, UK; [b]National Research Coordinator Community Water Plus, Hyderabad, India; [c]IRC, The Hague, the Netherlands; [d]Institute of Development Studies, Jaipur, India

ABSTRACT

Community management has been widely criticized, yet it continues to play a significant role in rural drinking water supply. In India, as with other 'emerging' economies, the management model must now adapt to meet the policy demand for ever-increasing technical sophistication. Given this context, the paper reviews the history and concepts of community management to propose three typologies that better account for the changing role of the community and external support entities found in successful cases. It argues that external support entities must be prepared to take greater responsibility for providing ongoing support to communities for ensuring continuous service delivery.

ARTICLE HISTORY
Received 25 August 2015
Accepted 20 January 2016

KEYWORDS
Community management; rural water supply; participation; service delivery; India

Introduction

As India undergoes rapid economic growth, its government aims to improve its public service delivery significantly. This is reflected in its ambitions to 'ensure at least 80% of rural households have piped water supply with a household tap connection' by 2022 (Ministry of Drinking Water & Sanitation (MDWS), 2013, p. 2). With 31% of households enjoying a piped connection in 2011 (Census of India, 2011), meeting this ambition will involve serving an additional 400 million people with household connections in little over a decade. This represents an important policy shift in rural drinking water supply, moving from an emphasis on expanding *access*, usually through handpumps, to an approach based on improving *service levels* through piped schemes. Change at this pace and scale poses significant challenges to the viability of the community management model for rural drinking water supply in India. Analysis of rural water supplies in India reports levels of over 30% of 'slippage' (Government of India, 2009), defined as the percentage of villages that once had achieved full coverage and which are now back to partial coverage, because either existing systems failed or villages have grown and system capacity has not kept pace with that growth. With 'community management' a declared part of many government-supported programmes, this type of poor

CONTACT Paul Hutchings p.t.hutchings@cranfield.ac.uk
Supplemental data for this article can be accessed at http://dx.doi.org/10.1080/07900627.2016.1145576

Reference: Hutchings, P., Franceys, R., Smits, S., Mekala, S. and James, V. (2016) Revisiting the history, concepts and typologies of community management for rural drinking water supply in India, International Journal of Water Resources Development, DOI: 10.1080/07900627.2016.1145576

Abstract: Community management has been widely criticized, yet it continues to play a significant role in rural drinking water supply. In India, as with other 'emerging' economies, the management model must now adapt to meet the policy demand for ever-increasing technical sophistication. Given this context, the paper reviews the history and concepts of community management to propose three typologies that better account for the changing role of the community and external support entities found in successful cases. It argues that external support entities must be prepared to take greater responsibility for providing ongoing support to communities for ensuring continuous service delivery.

Link to published article (firewall):

http://www.tandfonline.com/doi/abs/10.1080/07900627.2016.1145576

Link to public Dropbox:

https://www.dropbox.com/s/etpw7kxulj1ykho/CM%20of%20RWS_journalpaper.pdf?dl=0

A.3 Academic bibliography from PhD period

Journals

- Hutchings, P. et al. (2015) 'A systematic review of success factors in the community management of rural water supplies over the past 30 years', *Water Policy*, 17(5) IWA Publishing, p. 963. Available at: 10.2166/wp.2015.128 (Accessed: 7 May 2015).
- Hutchings, P. et al. (2016) 'Revisiting the history, concepts and typologies of community management for rural drinking water supply in India', *International Journal of Water Resources Development*, pp. 1–18. Available at: 10.1080/07900627.2016.1145576 (Accessed: 21 March 2016).
- Hutchings, P. et al. (2016) 'The political risks of technological determinism in rural water supply: A case study from Bihar, India', *Journal of Rural Studies*, 45, pp. 252–259.

Conferences

- Hutchings, P. and Franceys, R. (2016) 'Utilitisation' of rural water supply for villages and small towns in the developmental states of India. Proceedings of the International Water Association World Water Congress and Exhibition 2016. Brisbane.
- Franceys, R. and Hutchings, P. (2016). Community management *plus:* successful rural water supply (India). Proceedings of WASH Futures 2016. Brisbane.
- Hutchings, P., Franceys, R., Smits, S., and Mekala, S. (2015). Community Water Plus: Assessing the 'Plus' of successful community-managed rural water supply. Proceeding of the 38th WEDC International Conference. Refereed Paper 2194. Loughborough University. Loughborough.
- Snehalatha, M., Smits, S., Jasthi, S., Hutchings, P., Poonia, R., Daniel, Ch., Chandra Dash, P. Assessing the "Plus" of successful community-

managed water supply programs in India. Proceedings of India Water Week 2015. New Delhi.

- Hutchings, P. (2013). “Discourse, institution and technology in water crisis: Contested development in rural Bihar, India.” Proceeding of the Early Career Researchers in Water, Sanitation and Hygiene Conference. Cranfield, UK.
- Hutchings, P. (2013). “Water quality in North Bihar, India: Identifying tensions between macro-level governance and local institutional life”. Proceeding of the Royal Geographical Society Annual Conference. London.
- Hutchings, P. Parker, A. Jeffrey, P. (2013). Quality is a wicked problem that requires hybrid solutions. Proceedings of India Water Week 2013. New Delhi.

Appendix B – Research protocols and ethics form

The research protocols used for the fieldwork come in three documents covering a total of 92 pages. This section therefore provides links to the three fieldwork protocols which cover the Enabling Support Environment, Community Service Provider and Household level respectively. The household survey format used and the ethics form approving the research within the body are presented in this document below the links.

B.1 Protocol links

1 – Enabling Support Environment Research Guidance Document Community Water plus (March 2014)

Link to public Dropbox:

https://dl.dropboxusercontent.com/u/213512409/1%20-%20Enabling%20Support%20Environment%20Research%20Protocol.docx

2 – Community Service Provider Research Guidance Document Community Water plus (March 2014)

Link to public Dropbox:

https://dl.dropboxusercontent.com/u/213512409/2%20-%20Community%20Service%20Provider%20Research%20Guidance%20Booklet.docx

3 – Household Research Guidance Document Community Water plus (March 2014)

Link to public Dropbox:

https://dl.dropboxusercontent.com/u/213512409/3%20-%20Household%20Service%20Levels%20Research%20Guidance%20Booklet.docx

B.2 Household Survey Format

Household survey

1.1 IDENTIFICATION OF HABITATION

	Name (enter text)		Name (enter text)
Habitation		Gram Panchayat	
Revenue Village		District	
Location of the House from main water source/service reservoir	Close	Medium	Distant

1.2 HOUSEHOLD PARTICULARS (Enter text or circle the right option)

House Number						
Type of house	Pucca		Semi-pucca			Kuchcha
Religion	Hindu	Muslim	Christian			Others
Caste	OC	BC MBC	SC	ST		Others
Does he/she own land?	YES	NO				
If yes, how many acres	Wet:	Dry:				Others:
Does he/she have a ration card?	YES	NO	If yes	Pink	White	

1.3 HOUSEHOLD DETAILS

Circle who is being surveyed	Name	Sex (M/F)	Age (Yrs)	Education (Use Code)	Occupation (Use Code)		Annual Income	
					Main	Subsidiary	Main	Subsidiary
Head Male								
Head Female								
Survey respondent*								

Educational level: Illiterate– 1; 1st to 5th class -2; 6th to 10th Class-3; intermediate – 4; Degree – 5; Post Graduate – 6 and professional degree7, Occupation: Agriculture-1, Agricultural Wage Labour-2, Govt/Regular/Irregular non-farm employment-3, Self employment including business-4, Student-5, Retired – 6 Homemaker – 7 Others - 8

*Only complete if the survey respondent is not the Head Male or Head Female

1.4 HOUSEHOLD DETAILS CONT.

Total Family size	Males	Females	Children	Elderly	Disabled	Any other household income

2.1 WHAT WATER SOURCES DOES THE HOUSEHOLD USE?

Water Source label	List all the water sources the household uses for drinking, cooking, domestic (washing, bathing etc.), toilet usage, kitchen gardens and livestock each day.	Is this water source managed by the community service provider under study? (Enter: Yes, No or Don't Know)
A.		
B.*		
C.*		
Comments		

Source Code: 1 - Household connection, 2 - Pit tap, 3 - Public stand post, 4 - Private open well, 5 – Private well with handpump, 6 -Communal open well, 7 - Communal open well with hand pump, 8 - Agricultural well, 9 - Bottled water, 10 – Tanker, 11 – Other [explain in comments section].

*If further sources are used regularly alongside Source A, fill out the details for Source B & C. If not leave blank.

2.2. WHAT IS THE HOUSEHOLD WATER COLLECTION AND USE OF THE DIFFERENT WATER SOURCES EACH DAY?

	Source (use code)	Size of household storage*	Time it takes to fill storage *(mins)	Time it takes to use storage*(hours)	Time per trip** (min)	Size of water pot ** (litres)	Pots used per day** (number)	Trips per day** (number)	Water fetcher (use code)	Time available per day (min)	Regularity of supply (Y, N, DK)	Perception of Quality (tick)		
												Bad	Acceptable	Good
Summer														
Water Source A														
Water Source B														
Water Source C														
Non-Summer														
Water Source A														
Water Source B														
Water Source C														
Comments														

Source Code: 1 - Household connection, 2 - Pit tap, 3 - Public stand post, 4 - Private open well, 5 – Private well with handpump, 6 -Communal open well, 7 - Communal open well with hand pump, 8 - Agricultural well, 9 - Bottled water, 10 – Tanker, 11 – Other [explain in comments section].

Water Fetcher Women = W, Man = M, Child = C then add number to indicate how many of each (I.e. "W2, C1" indicates two women and one child collects water)

*These need only be answered if this water source is a household connection

**These need only be answered if the household fetches water from this water source

COLLECT FURTHER INFORMATION ON THE PRIMARY WATER SOURCES
(UP TO A MAXIMUM OF 3 SOURCES)

3.1 WATER SERVICE DELIVERY STATUS: WATER SOURCE A (Circle the right answer)

Satisfaction with supply (summer)	VS – Very satisfied Satisfied	SWS – Somewhat Satisfied	NS – Not
Satisfaction with supply (non-summer)	VS – Very satisfied Satisfied	SWS – Somewhat Satisfied	NS – Not
Comments			

3.2 WATER SERVICE BREAKDOWNS: WATER SOURCE A

Number of times this water supply has broken down in the last 12 months (enter number of times)	
Average time taken for repairs (enter time in hours)	
If you have a problem with this water supply, is it clear who you complain to? (circle the answer)	YES….NO
Have you ever had to complain about this water supply?	YES….NO
If so, was your complaint responded to adequately?	YES….NO….NA

3.3 PAYMENTS FOR WATER: WATER SOURCE A

3.3.1 Does the household pay a water tariff for this water source? YES NO NA

3.3.2 If yes, how much per month Rs. _____/ NA

3.3.3 If No, what are the reasons for non payment?

	Not satisfied with water service	YES NO
	Forget to pay on time	YES NO
	No compulsion to pay (e.g., penalties)	YES NO
	Other (specify)	YES NO
	Comments	

3.4 Have you had to pay an additional payment for repairs? YES NO NA

3.5 If yes, how much per repair Rs. _____ / NA

4.1 WATER SERVICE DELIVERY STATUS: WATER SOURCE B* (Circle the right answer)

*Complete when necessary

Satisfaction with supply (summer)	VS – Very satisfied Satisfied	SWS – Somewhat Satisfied	NS – Not
Satisfaction with supply (non-summer)	VS – Very satisfied Satisfied	SWS – Somewhat Satisfied	NS – Not
Comments			

4.2 WATER SERVICE BREAKDOWNS: WATER SOURCE B

Number of times this water supply has broken down in the last 12 months (enter number of times)	
Usual time taken for repairs (enter time in hours)	
If you had a problem with this water supply, is it clear who you complain to? (circle the answer)	YES….NO
Have you ever had to complain about this water supply?	YES….NO
If so, was your complaint responded to adequately?	YES….NO….NA

4.3 PAYMENTS FOR WATER: WATER SOURCE B

4.3.1 Does the household pay a water tariff for this water source? YES NO NA

4.3.2 If yes, how much per month Rs. _____/ NA

4.3.3 If No, what are the reasons for non payment?

	Not satisfied with water service	YES No
	Forget to pay on time	YES No
	No compulsion to pay (e.g.,	YES No
	Other (specify)	YES No
	Comments	

4.4 Have you had to pay an additional payment for repairs? YES NO NA

4.5 If yes, how much per repair Rs. _____ / NA

5.1 WATER SERVICE DELIVERY STATUS: WATER SOURCE C* (Circle the right answer)

*Complete when necessary

Satisfaction with supply (summer)	VS – Very satisfied Satisfied	SWS – Somewhat Satisfied	NS – Not
Satisfaction with supply (non-summer)	VS – Very satisfied Satisfied	SWS – Somewhat Satisfied	NS – Not
Comments			

5.2 WATER SERVICE BREAKDOWNS: WATER SOURCE C

Number of times this water supply has broken down in the last 12 months (enter number of times)	
Usual time taken for repairs (enter time in hours)	
If you had a problem with this water supply, is it clear who you complain to? (circle the answer)	**YES….NO**
Have you ever had to complain about this water supply?	**YES….NO**
If so, was your complaint responded to adequately?	**YES….NO….NA**

5.3 PAYMENTS FOR WATER: WATER SOURCE C

5.3.1 Does the household pay a water tariff for this water source? YES NO NA

5.3.2 If yes, how much per month Rs. _____/ NA

5.3.3 If No, what are the reasons for non payment?

	Not satisfied with water service	YES No
	Forget to pay on time	YES No
	No compulsion to pay (e.g.,	YES No
	Other (specify)	YES No
	Comments	

5.4 Have you had to pay an additional payment for repairs? YES NO NA

5.5 If yes, how much per repair Rs. _____ / NA

---

6. GENERAL INFORMATION ON COMMUNITY INVOLVEMENT IN WATER SUPPLY

6.1 Is any of your family a part of a water management committee?	Yes / No
6.2 Are any meetings held on water supply issues by the committee?	Yes / No
6.3 Did any one in the family attend any meetings on water supply?	Yes / No
6.4 Were there any awareness campaigns or training conducted in support of water supply issues?	Yes / No
6.5 Did any one in the family attend any training on water supply issues?	Yes / No

7. FINALLY IS THERE ANY COMMENTS ABOUT THE WATER SUPPLY SYSTEM THAT YOU WOULD LIKE TO MAKE?

---

8. ENUMERATOR SIGN-OFF

Investigator name, mobile number and email address
Date

B.3 Ethics form

Community Water Plus
High risk ethics proposal

Research conducted by: Alison Parker (a.parker@cranfield.ac.uk), Richard Franceys (PI, r.w.a.franceys@cranfield.ac.uk), Paul Hutchings (TBC) and subcontractors at ASCI, IRC, MNIT and CEC.

This research is high risk because some participants will be incentivised for participating, and only verbal consent will be obtained.

Fieldwork from Jan 2014 to March 2016.

The research question is:
What type, extent and style of supporting organisations are required to ensure sustainable community managed water service delivery relative to varying technical modes of supply?
Specific research sub-questions are:

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

The methodology will use interviews and focus-groups to develop 18 case studies of sustainable community managed water service delivery. The informants will be community members and key informants on the community management of water supply. These participants do not require insurance. The sponsor, AusAID, will not be providing access to the research participant's. No vulnerable groups will be targeted in the research although they may be encountered during the research activities as informants will be interviewed in their homes where vulnerable people may be present.

The information sought from community members is:

- Basic demographics and wealth indicators
- Household water supply service level
- Household financial contribution to water supply / willingness-to-pay
- Community engagement in the water supply system, looking at influence over technology choice, tariff setting, service level (demand) – and also discussing the structures of the community organisation

The information sought from key informants is:

- The structure and style of support services for the given water supply system
- The resource cost of these support services, including financial and labour costs
- The sources of funding for these support services
- Any available data on the performance of support services

The results will be published in academic journals as well as reported to AusAID.

The following ethical issues will be addressed:

Informed consent
Key informants will be asked to complete the consent form in Appendix A. Community members will have the statement in Appendix B read to them in their local language and asked to give verbal consent. Consent will be sought before the interviews start.

Deception
Participants will not be deceived at any stage in the study.

Freedom of participation
There will be no pressure on individuals to participate. Researchers will be aware of the influences of peer pressure, power relationships, and vested interests when approaching individuals to participate in a study. Community members will be identified to take part in the research by the village administration.

Confidentiality
Community respondents will not be identified in the research outputs. Key informants will be informed that their responses may not remain anonymous, although permission will be sought to use specific quotes. All data stored will be password protected.

Protection from harm
No physical,psychological, emotional, social, spiritual, career, reputational, financial or legal harm is anticipated form this activity.

Observational intrusion
No observation is planned, although participants' responses may be triangulated by informally observing practices in public areas. Particular account should be taken of local cultural values and of the possibility of intruding upon the privacy of individuals who, even while in a normally public space, may believe they are unobserved

Debriefing
Once data has been collectedrespondents will be thanked for taking part in the study and community members will be assured that data will be held anonymously. Respondents will be reminded of their right to withdraw their data without explanation although this opportunity might be time-limited (i.e.anonymising the data for analysis purposes will mean we are no longer able to identify their data). Respondents will be provided with the researcher contact details.

Right to withdraw
Respondents will be reminded of their right to withdraw their data without explanation at the start and the end of the interview.

Data storage
Data will be password protected.

Conflicts of interest
The conduct of research will be fair, honest and transparent. No conflicts of interest personal, professional, economic and political)between the researcher, funder/s, and/or participants and the wider community are anticipated but researchers will inform the relevant stakeholders if any arise.

Professional Conduct
The researchers will not engage in any of the following activities.

- Fabrication: e.g. the creation of fictitious data, evidence, documentation or results.
- Falsification: e.g. the inappropriate manipulation or selection of data, evidence, imagery or documentation.
- Misrepresentation: this may include:

- Misrepresentation of data: e.g. the undisclosed suppression of evidence or findings, or the deliberate or negligent presentation of a flawed interpretation of data.
- Misrepresentation of interests: e.g. the failure to disclose the interests of the researcher or of the funder of the research.
- Misrepresentation by the researcher of their qualifications or experience.
- Misrepresentation of involvement: e.g. the inappropriate or unjustified claim by a researcher to authorship or attribution, or the denial of others' rights to authorship or attribution.
- Misrepresentation of publication: e.g. the undisclosed duplication of publication, or undisclosed duplicate submission of works for publication, where this involves deception or the deliberate circumvention of publishers' or funders' policies.

• Plagiarism: the misappropriation or use of the ideas, intellectual property or work (written or otherwise) of others without acknowledgement or permission.

• Mismanagement of research data or results: the failure to ensure that research data, evidence and research results are preserved and accessible for a reasonable period after the completion of research.

• Breach of duty of care: this may occur where the researcher deliberately, recklessly or negligently: discloses improperly the identity of research participants, or information provided by research participants, without their consent or in breach of confidence.

Incentives or compensation for participants

Before research is commenced in any state, the state government will be consulted. If they request it, a resource payment will be made to all villages surveyed in the state. They payment will be made to the village administration, and will be 1000INR (~£10). As this payment is made to the village administration and is of quite a low magnitude, it will not be valuable enough to encourage someone to participate who would really prefer not to take part.

I confirm that as part of the research activity described above:

- I will secure and record the informed consent of all human subjects.
- I will ensure that no-one is coerced or compelled to participate in the research.
- I will not use any form of deception as part of the research method.
- I will explain to participants the level of confidentiality which they can expect and
- I will aim to maintain participant confidentiality wherever practicable.
- I will design and execute the research in a way which protects participants from
- harm (including but not restricted to - physical, psychological, emotional, social,
- spiritual, career, reputational, financial or legal harm).
- I will, prior to any data gathering activity, brief participants about the project and
- their rights.
- I will, prior to any data gathering activity, brief any individuals involved in data
- gathering on my behalf (e.g. translators or interviewers) about ethical research
- practices.
- I will, following any data collection activity, debrief participants.
- I will not be using any observationally intrusive methods.
- I will store any data I obtain in accordance with the Data Protection Act.

I also confirm that:

- The information I have provided on this form is accurate to the best of myknowledge and belief.

- I have read the advice on research ethics contained in the document ‘BasicPrinciples of Research Ethics for Studies Involving Human Subjects’
- The project described above will abide by the University’s Ethics Policy.
- There is no potential material interest that may, or may appear to, impair theindependence and objectivity of researchers conducting this project.
- Subject to the research being approved, I undertake to adhere to the projectdescription and statements provided above.
- I understand that the project, including research records and data, may besubject to inspection for audit purposes, if required in future.
- I understand that personal data about me as a researcher in this form will beheld by those involved in the ethics review procedure (e.g. the EthicsAdministrator and/or ethics reviewers) and that this will be managed accordingto Data Protection Act principles.
- All the individual projects that fitunder the generic project are compatible with this application.
- I undertake to inform SEREC of any significant changes to the research activitywhich might invalidate the statements made above

Name of individual submitting this form : Alison Parker
Email address of individual submitting this form : a.parker@cranfield.ac.uk

Electronic Signature of Researcher :
I am one of the staff supervising the project.

Appendix C – Case study summaries

This appendix provides access to the narrative summary of the individual case studies. These are presented by four different categories. These include three income groups of cases – low-income, middle-income and high-income – and there is a fourth category containing case studies from the mountainous and hilly states as these we identified as a special sub-group of cases in Chapter Three of the thesis. The document containing the summaries compiled by this author is available from the following link:

https://dl.dropboxusercontent.com/u/213512409/Appendix%20C%20-%20Case%20Study%20Summaries.docx

Appendix C Case study Summaries

This appendix contains a narrative summar of the individual case studies. It is structured by three income groups of the state – low-income, middle-income and high-income. There is a fourth category containing case studies from the the mountainous and hilly states as these we identified as a special sub-group of cases in Chapter 3 of the thesis.

C.1 Low-income case studies

This section first focuses on the government support community management in the low-income states and then the NGO support community management.

- **Government supported community management in Jharkhand, Chhattisgarh and Rajasthan**

The government supported programmes in this chapter help illustrate the differences between two of the recent Government of India flagship rural water supply programmes. The Rajasthani case provides insight into the earlier Swajaldhara (2002-2009) community management programme that followed the 'demand-responsive approach' with communities expected to contribute 10% to capital costs and operate schemes in relative independence (Government of India, 2003). In contrast, the Jharkhand and Chhattisgarh cases showcase the National Rural Drinking Water Programme (NRDWP) (2009-present.) that has shifted back to a more recognised supply-driven model with a stronger role for the GP (Ministry of Drinking Water and Sanitation, 2013). Figure 24 below helps illustrate the differences between the two with a simplified schematic of the organisational set-up across the programmes. As it shows, the arrangements are similar in that they both have a SWSA as the primary support entity for community management but in the NRDWP there is also meant to be a new organisation labelled a 'Block Resource Centre' that can provide specialist capacity building and broader software support to villages. However, in both the NRDWP cases presented in this chapter, these organisations were not found to be providing any direct support in the studied villages.

The full case study reports authored by the collaborating research teams are available online from the following link: http://www.ircwash.org/projects/india-community-water-plus-project

Appendix D – Data storage and management

Through the course of the synthesis a series of databases were compiled containing the household survey data, financial data and the qualitative-quantitative indicators. Ultimately these were consolidated into a database containing all the household survey data (n=2335) and then a database containing service level, finance and qualitative-quantitative indicators summarised to the case study level. In according with good data management procedures the main databases will ultimately be stored within the Cranfield University Data Storage System which is being developed to meet the standards set out by the Research Council United Kingdom (RCUK) specifications on good data storage management. However, these facilities are still in development at the time of submission of the thesis. Therefore, in the meantime, the databases will be available from the following links from the time of PhD submission to the completion of any steps set out in the viva examination. This data remains the property of Cranfield University and cannot be reproduced without explicit permission of this author. The format of the databases is “IBM SPSS Statistics 21”.

Household Survey Database

https://dl.dropboxusercontent.com/u/213512409/Household%20Database%20Community%20Water%20Plus.sav

Case-level database (Service levels, financial and qualitative-quantitative Indicators)

https://dl.dropboxusercontent.com/u/213512409/Case_level_data.sav