WATER GLOBAL PRACTICE

Sustainability Assessment of Rural Water Service Delivery Models

AUGUST 2017

Findings of a Multi-Country Review

WORLD BANK GROUP

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Executive Summary

Rationale to Examine the Conditions for Sustainable Rural Water Services

The recently issued baseline for the Sustainable Development Goals (SDGs) states that 844 million people in 2015 remain without access to basic water services, and an estimated 2.1 billion without access to safely managed drinking water services, the large majority of those living in rural areas (WHO and UNICEF 2017).

Failure by governments and development partners to ensure sustained access to basic water supplies in rural areas is, to a large extent, the result of inadequate investment to deliver infrastructure where needed. It is also the result of a failure to ensure that infrastructure, once in place, continues to effectively provide the expected services over time. Impressive gains from the Millennium Development Goal (MDG) era remain fragile and at risk, with various empirical studies indicating that 30 percent to 40 percent of rural water infrastructure is not functioning or functions below expected service levels (RWSN 2010).

With the adoption of the Sustainable Development Goals (SDGs), governments have committed to ensure universal access to water, to close the urban-rural and equity gap, and to deliver higher levels of services in terms of quality, accessibility, and reliability. This implies that a shift in policies and resource allocation is increasingly urgent, going beyond infrastructure delivery and addressing the longer term sustainable management and financing of rural water services. Such a shift needs to respond to well-known capacity gaps for rural water service delivery, which are often exacerbated by decentralization processes (Bakalian et al. 2009; Van Ginneken et al. 2011). The SDGs thus pose a triple challenge: to reach unserved population groups, to improve service levels, and to sustain existing and future services.

The issue of the sustainability of rural service provision is not new, and has received widespread attention since the international decade on water and sanitation (1981-90). Initially, the focus to address scheme failure was at the level of the community, particularly during the implementation phase of new schemes. The Demand-Responsive Approach (DRA) was elaborated in the 1990s to ensure that interventions respond better to community needs. However, DRA proved insufficient to address the requirements for support mechanisms to rural populations beyond project implementation (World Bank 2012). Since the 2000s, more emphasis has been placed on post construction support to rural service providers, professionalization, and diversification of service delivery models, including various forms of private sector involvement (Smits and Lockwood 2011). With increasing demand for higher service levels, a service delivery approach is now emerging. This approach recognizes the importance of wider systems of governance and the enabling environment, political economy aspects, life cycle costs, and the role of local institutions (Whaley and Cleaver 2017). In this context, it has become essential to better understand the factors of sustainability for rural water services.

Aim, Scope and Limitation of the Assessment

This assessment uses a multi-country case study approach to identify good practices and challenges toward building sector capacity and strengthening sustainable service delivery models for rural areas. The overall aim is to contribute to the global knowledge base on what countries are doing to improve the conditions that are likely to have a bearing on the long-term sustainability of rural water services. The case studies also serve to provide policy guidance and practical recommendations to country teams and governments on how to improve the sustainability of their service delivery approach.

This assessment does not explicitly focus on the planning, design, and implementation phase of developing water supply facilities, which is equally critical especially for predicting short-term functionality rates. Rather, it analyzes the *ongoing* service delivery approach for rural water. The scope of the study did not allow for primary data collection at the level of water schemes within the 16 countries. A parallel study was first commissioned by the World Bank to better define sustainability metrics, in order to inform further research (World Bank, forthcoming).

In summary, recognizing the limitations of the DRA, the emergence of various management models, the identified need for ongoing support to rural service providers, and the critical role of enabling institutions and policies beyond the community-level, the added value of this assessment lies in:

- The development of a comprehensive analytical framework that can be used to analyze and operationalize a more sustainable service delivery approach for rural water supply
- The rich set of cases and good practices from the 16 countries informing the global body of "knowledge in implementation"
- The formulation of recommendations and policy directions to improve the sustainability of services depending on sector development stage and the rural service delivery context

Country Selection

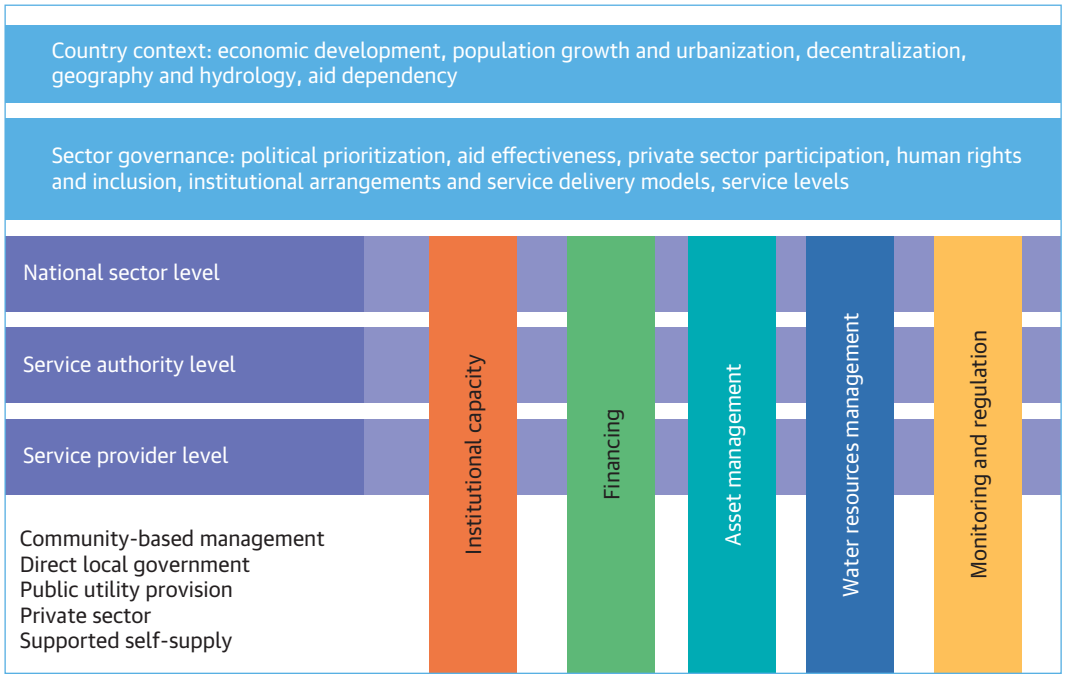
The following countries were selected, based on a diverse range of socioeconomic context, regional representation, and presence of World Bank operations: Bangladesh, Benin, Brazil (state of Ceará), China (Zhejiang and Shaanxi provinces), Ethiopia, Ghana, Haiti, India (Punjab and Uttarakhand states), Indonesia, the Kyrgyz Republic, Morocco, Nepal, Nicaragua, the Philippines, Tanzania, and Vietnam. While some countries have made significant progress in improving access to rural water services (for example, Benin, Brazil, China, Nepal, and Vietnam), others still face challenges in providing basic levels of service to a majority of the rural population (for example, in Tanzania, Haiti, and Ethiopia). For most countries, access to piped water services onto premises remains low. Only Brazil, China, and the Kyrgyz Republic provide such services at scale, with 70 percent, 55 percent

and 42 percent respectively. Middle-income countries, such as Vietnam and Indonesia, face the challenge of increasing service levels as only 10 percent and 9 percent of their rural populations benefit from piped supplies at the household level.

The Building Blocks of Sustainability

The analytical framework of the study is based on five "building blocks" of sustainability: institutional capacity, financing, asset management, water resources management, and monitoring and regulatory oversight (see figure ES.1). These building blocks, which represent the progress countries have made in putting in place the optimum conditions for sustainability of service provision, were identified based on previous research, mainly from the Sustainable Services at Scale project[1], validated through consultation with World Bank staff. The framework recognizes three institutional levels: national level (through legislation, policy, and the establishment of national authorities), service authority level (authorities with responsibilities for delivering services, often local governments) and service provision level. How services are organized, and which national and local policies and mechanisms are in place to facilitate services, define the service delivery model. In this assessment, service delivery models refer to the management model (for example, community-based management, or private operator), in addition to the full complement of policies, capacities, regulations, and financing in support of it.

FIGURE ES.1. Analytical Framework to Understand Sustainability of Rural Water



A Scoring to Assess Progress toward Sustainability

To provide a snapshot assessment of each country's progress in establishing the conditions for sustainable rural water services, a scoring is applied at two levels based on a set of questions pertaining to the five building blocks (see Appendix B). Firstly, the assessment considered progress realized at sector level and whether essential conditions for sustainability have been put in place in the enabling environment. Secondly, the assessment examines whether and how this progress is reflected at service delivery level, considering each of the formally established service delivery models in a country. Scores are aggregated at country level for each building block and combined into a country sector sustainability score, as well as by service delivery model, to allow for an analysis across countries and service delivery models to determine common trends, strengths, and weaknesses. It should be noted that for some of the larger countries (Brazil, China, and India) the analysis was carried out in one or two states or provinces. Assessments were based on secondary data and desk reviews combined with primary data from interviews with key informants in-country.

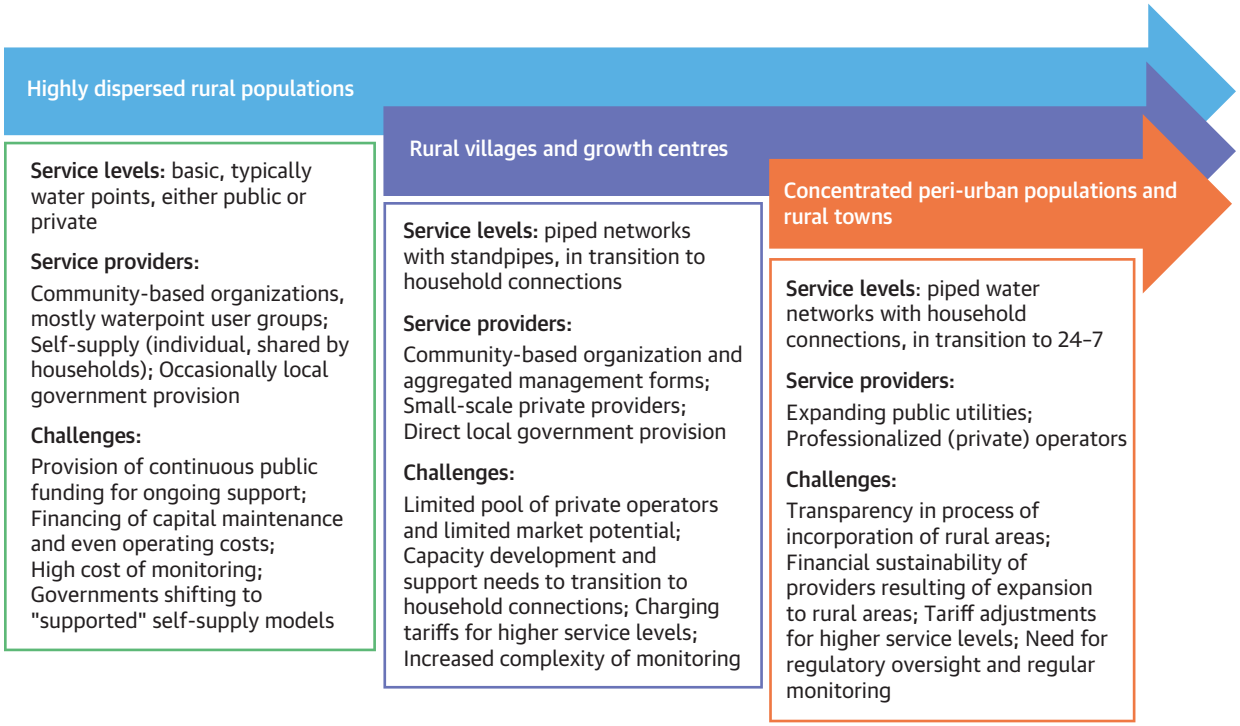
Different Service Delivery Models are Operating Across Different Rural Population Segments

While the community-based management model remains the dominant service delivery model, a differentiation of service delivery models based on local context was found. In upper-middle income and higher income countries, an emerging trend toward urban utilities integrating peri-urban and denser rural populations into their service areas was seen (China, Morocco, the Philippines). Aggregated management models, under which service providers manage multiple rural centers, were also identified (for example, India's multi-village schemes). Management delegated to private operators was found for rural small towns (Haiti, Bangladesh, Vietnam), sometimes even managing standalone systems in their service areas (for example, Benin). Service levels, service delivery models and the most common challenges for three main population segments are illustrated in figure ES.2.

Progress Realized in Establishing Sustainable Services: Lessons and Challenges

By aggregating the findings from the 16 cases, a global picture emerges in terms of how far the building blocks for sustainability are progressing across different country contexts and service delivery models, recognizing that sector governance and country context will have a bearing on the scores (see table ES.1). Generally, institutional capacity has advanced furthest, with financing, and monitoring and regulation following. The relatively low scores for asset management indicate the novelty of the concept for rural water supplies in many countries. Low scores are found for water resources management, except for Morocco and Ceará state in Brazil, both with a long tradition in water resources management. Total sustainability scores at sector level show high performers such as Brazil, China, and Morocco, and countries that are less advanced in putting in place the building blocks for

FIGURE ES.2. Different Segments of Rural Water Service Delivery



sustainability, such as Bangladesh, Ethiopia, Haiti, the Kyrgyz Republic, and Nepal. The main body of this report illustrates the various good practices across the 16 countries, while the section below highlights key findings for each of the building blocks. The individual country working papers are available upon request from AskWater@worldbank.org.

Institutional Capacity

Good progress has been made, particularly at national level, to improve institutional capacity and put in place policies and guiding frameworks for sustainable service delivery. Strong institutional capacity is found where rural water is a development priority, translating into clear mandates for national institutions to plan infrastructure development in consultation with local authorities: this was the case in Morocco, India, Indonesia, Vietnam, and the Philippines. Both Ethiopia and Benin have shown persistent sector leadership: Benin in reforming the rural water sector transitioning to professional private sector management models, and Ethiopia through the establishment of a sector-wide approach, known as the One WASH National Program. In several countries, national programs have moved beyond infrastructure provision and aim to support local governments in fulfilling their mandates for service provision. However, local governments have not often made that shift and prioritize infrastructure over post construction support to service providers and monitoring. At service provision level, good institutional capacity is seen when service providers benefit from capacity building

TABLE ES.1. Aggregated Scores for Sustainability Building Blocks, by Country

Country	Institutional capacity	Financing	Asset management	Water resource management	Monitoring and regulation	Total sector score
Benin	6	4	5	2	3	20
Bangladesh	4	1	2	2	1	10
Brazil	6	5	5	8	5	29
China[a]	5	5	6	5	7	28
Ethiopia	5	4	2	2	2	15
Ghana	3	5	5	2	4	19
Haiti	3	1	2	2	3	11
India[b]	6	5	5	3	5	24
Indonesia	5	4	2	3	4	18
Kyrgyz Republic	2	3	3	3	2	13
Morocco	7	5	5	7	5	29
Nepal	3	3	2	3	3	14
Nicaragua	5	4	5	4	6	24
Philippines	3	4	2	3	6	18
Tanzania	3	3	2	5	3	16
Vietnam	3	5	4	5	3	20
Average all countries	**4.3**	**3.8**	**3.6**	**3.7**	**3.9**	**19.3**

Note: Each building block scores "0," "1," or "2" over a series of four questions, with a possible maximum score for each building block of eight points. Scores are then summed across all building blocks to give a country aggregate score with a maximum of 40; aggregate scoring thresholds are 0–15 = red; 16–25 = yellow; 26–40 = green. Detailed evidence for scores can be found in the individual country working papers.

[a] For China, this score is for both Zhejiang and Shaanxi.

[b] For India, this is a combined score for both Punjab and Uttarakhand.

programs and have access to ongoing support or assistance, either from service authorities or national level, or a combination of these. Some countries have made service provider support a key component of rural water supply programs, such as in Indonesia, Benin, Brazil, India, and Tanzania. Services were typically provided by i) local governments; ii) federations or associations of service providers acting as technical assistance providers; iii) higher tier public entities or utilities, mandated and well-funded to do so.

Financing

The rural water sector has benefited from increased capital investments, delivered as part of national investment plans. However, weaker arrangements were found for operational costs and capital maintenance. Good practices were found in over half of the countries where governments planned capital investments in rural water services based on sector-wide approaches and where investments are systematically co-financed through national and

local tax revenues, augmented with development partner transfers. Driven by the access agenda, a common challenge remains implementing sustainable financing mechanisms to cover recurrent costs, capital maintenance, and capital replacement, whether through tariffs, taxes, or transfers. Tariff policies remain urban-biased, ill-defined, and not tailored to the rural context. They tend to require full cost recovery, without detailed guidelines, or differentiation between operational, capital maintenance and capital replacement costs, and lack mechanisms for enforcement. A common approach is that local governments are called to the rescue upon scheme failure through a "fix-on-failure" rather than a planned life-cycle cost approach. Lack of political prioritization by service authorities further puts rural water schemes at risk. Tariff guidelines that accurately define and allocate responsibility for financing different life cycle costs, emerge as good examples (for example, Brazil). The implementation of such guidelines can help operationalize policies at local level and overcome low willingness-to-charge by service authorities. Affordability constraints by rural households were not identified as a critical issue in the study countries (see Appendix F for details). Other good practices identified to increase the financial sustainability of rural water services are: i) assessment of realistic demand and flexible design standards; ii) investments in communications to transition to metered house connections; iii) diversify management models with utility and private sector models; iv) use of result-based financing to incentivize service delivery focus.

Asset Management

Asset management is a relatively new concept in the rural water sector. Regardless of economic development, half of the countries still need to address basic issues such as clarity around asset ownership, clearly defining responsibilities for capital maintenance and renewal, and carrying out first-time inventories or water point mapping exercises. Over half of the countries have clear ownership arrangements, mostly retaining ownership with the service authority, or allowing options for joint ownership depending on the financier of the assets. Common challenges are that de-facto practices conflict with legislation. Incomplete legal frameworks, and overlapping responsibilities at different levels of government, add to the ambiguity in asset management responsibilities (the Philippines, Bangladesh, and Indonesia). Moreover, the delegation process to the service provider is rarely supported by a clear allocation of responsibilities for asset repairs and maintenance, particularly regarding what is understood by "minor repairs" (often by the service provider) and "large repairs" (often by the service authority). Asset management of small water schemes, managed by communities or local governments, is mostly absent. Better scores for asset management at service provider level are found in contexts with urban and regional utilities, private sector models, or multi-village schemes with aggregated, professionalized management arrangements, such as the case in Benin, China, India, Morocco, Nicaragua, and Vietnam. Ghana is a good example where the government has identified: i) clear asset ownership; ii) allocation of responsibilities for different asset maintenance categories;

iii) financing mechanisms, iv) and has prepared asset management guidance documents and tools. Some innovative financing mechanisms for capital maintenance of rural schemes were identified, for example, pooled fund arrangements, sourced from tariff revenues and local taxes (China and Ghana).

Water Resources Management

Most countries have legal frameworks for water resources management that prioritize allocation to the domestic water supply. However, water resources management bodies at sub-basin or local levels remain weak in the majority of countries. Only in a few countries do sub-basin or local WRM bodies have rural drinking water interests represented through rural service providers or service authorities. Good practices in both policy and operations are seen in water-scarce environments, such as Morocco and Ceará state in Brazil, both of which have a long tradition of water resources management, driven by their physical water scarcity. However, such water resources management institutions are not present in all water scarce contexts (for example Punjab in India). Other examples of good practices have emerged, including: i) proactive measures by drinking water entities to recharge aquifers, set up aquifer management initiatives, and integrate catchment protection and management in rural water programs (India, Nicaragua); and ii) local-level planning initiatives to enhance collaboration among water users, local governments, communities, and water resources management entities (Nepal). Advanced practices such as water safety programming and vulnerability assessments were only found for urban utilities serving rural areas. Thus far, adapting such approaches to a rural context with fragmented service providers has been challenging.

Monitoring and Regulatory Oversight

Monitoring is an area that has witnessed significant progress in many countries, although wealthier countries have advanced more, such as China (for utilities and multi-village schemes), Morocco, India, the Philippines, and Nicaragua. Monitoring is increasingly receiving attention, with emerging national monitoring systems under development or improvement, for example in Ethiopia, Tanzania, and Ghana. Unsurprisingly, monitoring and regulation tend to be better organized for public utilities, and in some cases for private operators. A common challenge is to make the transition from a water point mapping exercise toward a well-functioning monitoring platform that is updated and receives regular financing from central and local government budgets. Challenges persist in the proactive use of monitoring outputs to take remedial actions, improve performance, and inform programming. Good practices are nation (or state) wide systems, such as Nicaragua's and Uttarakhand's monitoring systems, which include indicators on scheme assets, functionality, service levels, scheme performance, and sustainability indicators indicating which communities need support to prevent (further) scheme failure (for example, SIASAR in Nicaragua). Although most countries have defined service standards, regulatory oversight is still nascent in many countries, especially in terms of the development of and adherence to

tariff guidelines. Emerging good practices promoting better oversight and accountability for rural services are: i) a national water registry for all small operators to bring them under regulatory oversight, and introduction of light-handed regulation tailored to the capacities of operators to comply (the Philippines); ii) assignment of dedicated agencies or units to oversee the sector, as in China, Nicaragua, and the Kyrgyz Republic, although political interference remains challenging; iii) introduction of social accountability measures and a feedback mechanism (India); and iv) regulation of private operators under contract with local governments, with oversight by a national regulatory unit.

Lessons from Service Delivery Models

Table ES.2 illustrates to what extent sustainability conditions are met for various service delivery models across all countries. The public utility provision appears the most robust, with all the building blocks furthest advanced. Introducing private sector provision provides

TABLE ES.2. Sustainability Scores for Service Delivery Models, by Country

SDM scores	Community-based management	Local government provision	Public utility	Private sector	Supported self-supply
Bangladesh	13	10		21	
Benin		10		19	
Brazil	21				
China	16		37	29	
Ethiopia	7				8
Ghana	9			13	
Haiti	5			13	
India	28				
Indonesia	23				
Kyrgyz Republic	15				
Morocco	26	21	34	36	
Nepal	14				
Nicaragua	20				
Philippines	14	18	26	25	
Tanzania	17				
Vietnam	8	18		24	
Average all countries	**16**	**15**	**32**	**22**	**8**

Note: For each Service Delivery Model present in a country, every building block is scored with "0," "1," or "2" over a series of four questions, with a possible maximum score for each building block of eight points. Scores are then summed across all building blocks to give an SDM aggregate score with a maximum of 40; aggregate scoring thresholds are 0–15 = red; 16–25 = yellow; 26–40 = green. Evidence for scores is provided in detail in the individual country reports.

[a] For China, this score is for both Zhejiang and Shaanxi.

[b] For India, this is a combined score for both Punjab and Uttarakhand.

an opportunity to improve the sustainability of services, despite mixed country experiences and often the modest scale of such models in any country. There is a wealth of experience with community-based management, present in all countries but Benin, although the sustainability of the model remains to be strengthened. Some countries, such Morocco, India, Indonesia, and Brazil, are leading the way through aggregated management arrangements, decentralization reforms, nationwide monitoring and systematic post construction support. Direct local government provision tends to perform poorly, especially in low capacity environments. Despite the various efforts to promote supported self-supply as a formal service delivery model, there is a remarkable lack of documentation critical to convince policy makers of the benefits of this model for remote and dispersed communities. Further lessons are included in box ES.1.

BOX ES.1. Lessons for Service Delivery Models

Community-based management model: Although community management is formally recognized in all countries, the majority of community organizations are neither legally established nor supported by service authorities. However, the model scored higher, especially on institutional capacity and financing, in cases where there is structural support. This would ideally include support for operations and maintenance, financial support on major repairs, and access to administrative and institutional assistance and training opportunities. Such models are found in various forms, but principally through aggregation or federation of service providers and professional supervision. Examples are the Uttarakhand Jal Sansthan, which is a designated state agency for backstopping of Water Supply and Sanitation Committees, as well as the three-tier support system in Ceará, where i) water supply associations carry out basic daily tasks, ii) activities that require economies of scale are carried out by federations, and iii) the state utility provides monitoring and supervision and takes care of new system development and major rehabilitation. Community organizations responsible for distribution only, with utilities responsible for bulk supply, score better on dimensions of sustainability (Morocco, Ghana).

Direct local government provision: All variants of the local government provision model scored low and were particularly weak in terms of institutional capacity and financing. Water supply units within local government administrations are not corporatized entities and often fail to operate along commercial lines, without the possibility to ring-fence water operations from the general budget. In some countries, the model appears as an interim solution (Benin), while in others, more permanent arrangements are found for various reasons: i) no technical assistance to set up municipal enterprises or joint stock companies or ii) no clear guidance or regulations to delegate to private operators

box continues next page

BOX ES.1. Lessons for Service Delivery Models (continued)

(for example, in Vietnam). Central governments can support direct government provision in several ways, such as with technical assistance for i) project preparation to ensure demand-responsiveness, ii) tariff guidance and ring-fencing budgets, or iii) legal support to transition to other management models.

Public utility provision: Public utility provision for rural water was found to exhibit the best conditions for sustainability, although it is present only in China, Morocco, and the Philippines, where rural villages are integrated into their service areas. Public utilities tend to show professional management of water assets, are staffed with more qualified personnel, have better financial capacity and access to funding, and are subject to monitoring and regulation. However, the rural water sector does not present attractive commercial revenue opportunities for such utilities. Obligatory service mandates for rural areas, combined with subsidies as incentives, are used to facilitate expansion. Integrating rural areas under public utilities' service areas comes with challenges, such as extending billing and collection services and monitoring to remote areas, and ensuring an adequate financial position of the utility.

Private sector provision: This model consistently scored well on financing, and to some extent on asset management and monitoring. Private sector participation was found through a range of contractual mechanisms, from build, operate and transfer (Bangladesh) to joint stock companies (Vietnam) and lease and concession contracts (Benin). In China, community enterprises commercially manage multi-village schemes. Private sector provision has also successfully mobilized private equity and commercial finance (Benin and Vietnam). Result-based subsidies have been used to leverage private investment. Successful experiences with private sector participation emerge from long-term development partner engagement in the sector to address upstream legal and policy gaps, support due diligence, provide transaction support and assistance to national and local governments, and build capacity of private operators. Private sector models still operate at a small scale or are scaling up, and critical gaps need to be addressed to realize their full potential.

Supported self-supply: Ethiopia is the only country with a supported self-supply program. In a few countries, supported self-supply is a *de facto* model, receiving limited support from national entities and service authorities (Vietnam, Brazil). This interest reflects the recognition that in dispersed settings, communal systems may not be feasible. In Bangladesh, where two-thirds of the rural population use individual supplies, there is no formalized support, despite the pressing need to improve water quality. In spite of efforts to promote supported self-supply as a formal model, there is a remarkable lack of documentation, which is critical to convince policy makers of the benefits of this model for remote and dispersed communities.

Recommendations and Policy Directions

Improving Sustainability Requires Actions at All Three Institutional Levels

The five building blocks represent the ideal or optimum conditions for rural service delivery and frame the diagnostic of a country's rural water sector. While some countries may have a number of these conditions in place, for others, establishing the building blocks will require adopting lengthy reforms in the sector. Gradual but persistent interventions will be needed, and countries will have to prioritize. There is evidence to suggest that even low-income countries can make substantial progress on improving institutional capacity, financing, and asset management, while in the face of competing priorities, robust monitoring systems should be addressed first, with regulatory oversight to be developed in later stages. All interventions should consider the three levels: the national enabling environment, service authority, and service provider. A comprehensive set of practical recommendations for each of the building blocks at each of the three institutional levels is included in section 5.1.

Interventions Vary Based on Sector Development Stage and Rural Population Segment

As the speed of reform and sector capacity vary from one country to another, the transition toward more sustainable services will follow a gradual path. Figure ES.3 shows a "ladder" with three stages or levels of rural water sector development. It illustrates how incremental progress can be achieved from basic to intermediate, and from intermediate to an advanced stage of rural water sector development in a given country. This sector development trajectory needs to be put in the context of the changing landscape of rural service delivery, as countries will see different population segments develop at different paces, namely i) remote dispersed populations, ii) rural villages and growth centers, and iii) peri-urban and rural small towns.

With the adoption of the SDGs and its focus on equity and universal access, country governments have in theory committed themselves to simultaneously addressing the challenges across all population segments and leaving no one behind. Nevertheless, the biggest leap for many lower and lower-middle income country governments will be to respond to the demand for higher service levels from a growing middle class, and the transition to metered household connections. The country cases show that aggregation of rural service delivery can result in economies of scale, scope and more professional provision, either through public utilities, private sector operators, or well-supported federated community-based providers. Of equal importance is the aggregation of technical support functions to service providers, especially for complex activities such as major repairs and rehabilitation. The analysis shows that future rural water policies must ensure that a wider range of rural providers will be more effectively supported and monitored.

However, a challenge for all countries, including for upper-middle economies, is to develop adequate service delivery models for remote and dispersed rural populations, who continue to rely on either poorly supported community-based management or self-supply. Without new approaches, there is a danger that remote and dispersed rural populations will be left with stagnating service levels, whilst denser agglomerations will benefit from

FIGURE ES.3. Basic, Intermediate, and Advanced Stage of Sector Development toward Sustainable Rural Water Services

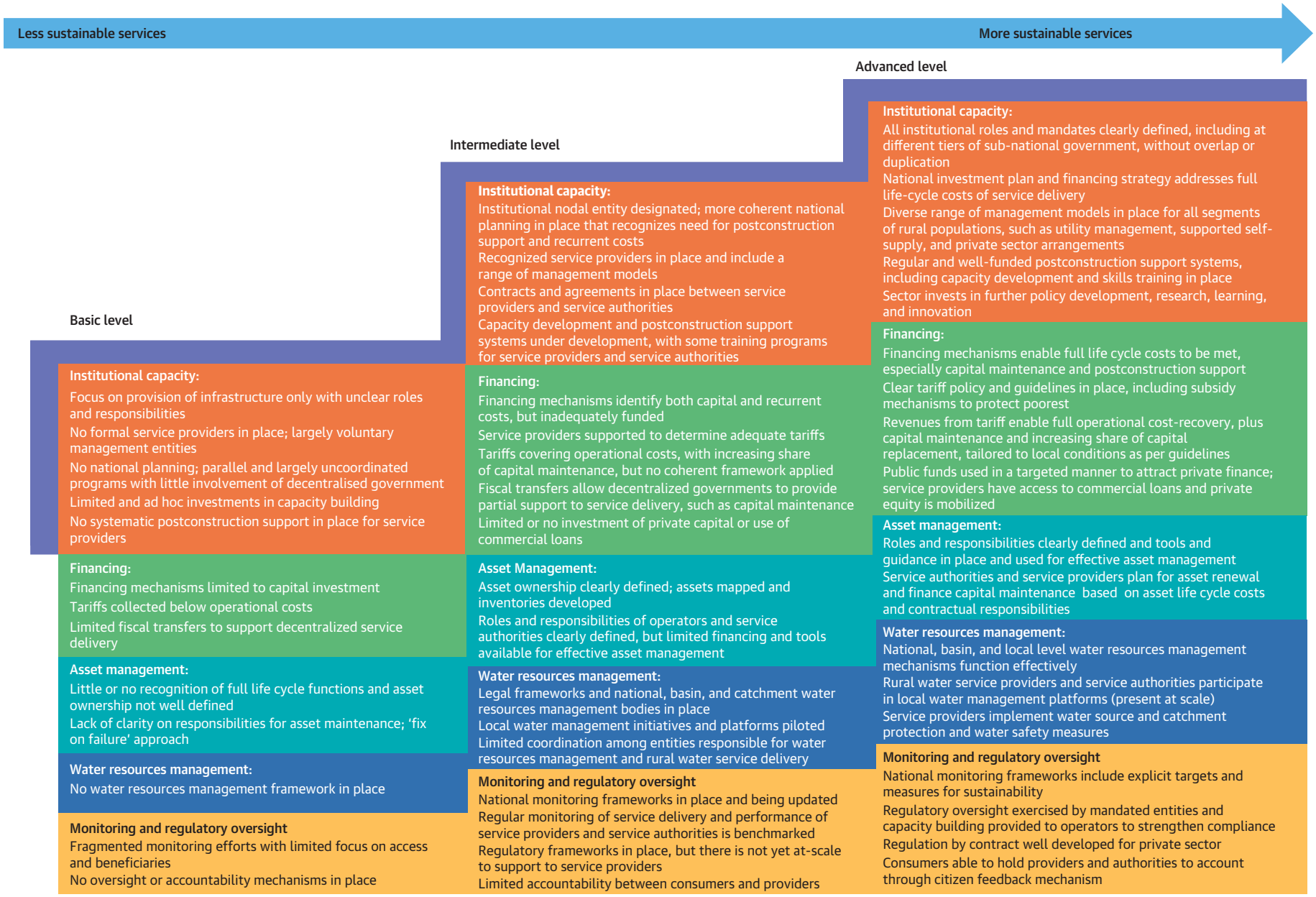


TABLE ES.3. Overview of Key Interventions for Different Service Delivery Contexts

Stage of sector development	Highly dispersed rural hamlets	Rural villages and growth centers	Peri-urban and small towns
From basic to intermediate	• Allocate public funding for maintenance support • Develop policies for supported self-supply in well-defined areas • Develop monitoring system for functionality and density of access	• Register and legally recognize service providers, with clear asset ownership • Professionalize service providers for transition to metering through postconstruction support • Promote regular tariff payments for higher level services and metering • Conduct asset inventories and build capacity of local governments on asset management • Develop financing policy and tariff guidelines	• Define policies and targets for integration of peri-urban and rural areas under utility management • Support utilities in rural asset inventories, adjustment of business plans, and customer communication • Develop incentives and financing strategy to integrate peri-urban and rural towns • Optimize public-private partnerships (PPP) • Establish regulatory oversight with regular tariff adjustments • Develop technical assistance facilities
From intermediate to advanced	• Establish program for supported self-supply, including accreditation of suppliers, and targeted household subsidies • Allocate public funds for improving water quality and communications • Establish pooled support and financing mechanisms for major capital maintenance by local governments • Expand monitoring system for all providers	• Initiate service provider performance benchmarking, linked to structured postconstruction support • Prepare local government annual maintenance and medium-term asset management plans and ring-fence budgets • Define regulatory oversight and introduce clustering for attractive PPP contracts • Introduce service contracts with service providers to strengthen oversight • Execute local water resources management initiatives	• Improve customer orientation of service providers (small-town and larger utilities) • Implement business and performance improvement plans (financial, commercial, and technical issues) • Support service authorities in project preparation, tendering, and supervision of PPP contracts • Increase access to commercial financing • Scale-up use of targeted subsidies to leverage private financing • Mainstream water resources management and protection practices

professionalized service provision models. While self-supply is a *de facto* model in all countries, governments could formally adopt supported self-supply for remote and dispersed populations with a focus on improving water quality aspects. This should not be seen as a route for governments to abdicate their obligations, but rather as a way to support a management model better suited to reach the most remote and marginalized households.

Which interventions to prioritize for which segment of the rural population will clearly depend on the stage of rural water sector development in a country. Table ES.3 includes key interventions that country governments could prioritize for each of the segments to transition from basic to intermediate and from intermediate to an advanced stage.

Future Policy Directions Require National Governments to Step-Up Their Engagement in Rural Water Services and Increase Support to Service Authorities

Based on this multi-country assessment, box ES.2 summarizes key policy directions that governments—with the support of development partners—are encouraged to take on to

improve the sustainability of rural services. The message underpinning these policy recommendations is that national governments need to continue to play a major role and cannot discharge state responsibilities for essential services to rural-based citizens, communities, and weakly funded, low-capacity local governments. National governments are required to step up their engagement in policy, financing, and technical support domains, in order to make a dent in the triple challenge of rural service provision: i) expand services to the unserved, ii) improve service levels, and iii) sustain existing and future services.

BOX ES.2. Policy Priorities to Improve the Sustainability of Rural Service Provision

Institutional capacity

1. ***Develop enabling policy and define institutional arrangements and functions for service authorities and rural service providers***. Specifically:
   - Assign functions for postconstruction support to and monitoring of rural service providers and technical support to local governments, in line with decentralization policy
   - Define clearly the roles and responsibilities of different tiers of sub-national government
   - Formalize (a wider range of) management models in policies and develop policies for integration of rural areas under service areas of existing utility companies
2. ***Develop systems with sustainable funding flows for postconstruction support and technical assistance to rural service providers***, including:
   - Technical and financial support, especially with respect to major repairs of rural water assets
   - Management and institutional support to ensure that (community-based) service providers keep functioning
   - Monitoring mechanisms to ensure that postconstruction support is effectively delivered by designated technical assistance providers or local governments

Financing

3. ***Adopt a financing policy and implement a tariff guideline for rural water that distinguishes the different life cycle cost elements of the full cost of service provision***, with:
   - Different segments (geography, management model) having a different level of cost recovery through tariffs—that is, the full costs are funded through a different mix of taxes, transfers, and tariffs
   - Identification of sources of funds and responsibility for major repairs, capital maintenance, and asset replacement, combined with ring-fencing mechanisms (for example, maintenance funds, earmarking taxes)
   - Social pricing for the most vulnerable groups to ensure affordability

box continues next page

BOX ES.2. Policy Priorities to Improve the Sustainability of Rural Service Provision (continued)

Asset management

4. ***Formalize asset ownership through legal frameworks and support service authorities—when assigned as asset holders—in the management of assets***, through:
   - Asset inventories and asset condition assessments on a regular basis
   - Capacity building measures using asset management tools, and the gradual introduction of medium-term asset management plans

Water resources management

5. ***Strengthen representation of rural drinking water users' interests in catchment and local water management platforms, especially in water scarce areas***, through:
   - Participation of service authorities and service providers in local water management bodies
   - Programs to support service providers to engage in catchment protection and water safety planning

Monitoring and regulatory oversight

6. ***Develop a comprehensive monitoring system for rural water services, and allocate resources for its operation and usage to inform planning and strengthen regulatory oversight.*** Such a system would:
   - Include a basic set of indicators to monitor service levels, functionality and water facility condition
   - Be gradually expanded to monitor service provider performance and effectiveness of service authority or technical assistance providers
   - Be used to strengthen regulatory oversight in terms of adherence to service level standards, compliance with drinking water, and tariff-setting in line with guidelines

Note

1. For more information on the Sustainable Services at Scale project, see the IRC website at http://www.ircwash.org/projects/triple-s.

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Abbreviations

Ayl-Okmotut	local government (Kyrgyz Republic)
BOO	build own operate
BOT	built operate transfer
CAGECE	*Companhia de Água e Esgoto do Ceará* - Water and Sewerage Company of Ceará (Brazil)
CAPS	*Comités de Agua Potable y Saneamiento* - Drinking Water and Sanitation Committees (Nicaragua)
CMP	Community Management Projects (Ethiopia)
CWRB	County Water Resource Bureau (China)
DfID	Department for International Development (United Kingdom)
DPHE	Department for Public Health Engineering (Bangladesh)
GDP	gross domestic product
GNI	gross national income
GP	Gram Panchayats, unit of local government (India)
IDA	international development association
IWRM	integrated water resources management
Lpcpd	liters per capita per day
M&E	monitoring and evaluation
MDG	Millennium Development Goal
MMDA	Metropolitan and Municipal District Assemblies (Ghana)
O&M	operation and maintenance
ONEE	*Office National de Electricité et l'Eau Potable* - National Office for Electricity and Drinking Water (Morocco)
PAMSIMAS	*Penyediaan Air Minum dan Sanitasi Berbasis Masyarakat* - community-based water supply and sanitation program (Indonesia)
PCERWASS	Provincial Centers for Rural Water and Sanitation Service, departments within provincial governments (Vietnam)
PPC	Provincial People's Committees (Vietnam)
PPP	public-private partnerships
SDG	Sustainable Development Goals
SDM	service delivery model
SNK	Shikayat Nivarn Kendra (Punjab, India)
SIASAR	Sistema de Información de Agua y Saneamiento Rural - rural water and sanitation information system (Latin America)
SISAR	*Sistema Integrado de Saneamento Rural* - integrated rural sanitation system (Brazil)

SALINTUBIG	*Sagana at Ligtas n*a *Tubig Para sa Lahat*, government program targeting waterless poor municipalities in the Philippines)
SSA	Sub-Saharan Africa
Union Parishad	unit of local government (Bangladesh)
Woredas	Ethiopian administrative unit, equivalent to a district
WSMT	Water and Sanitation Management Teams (Ghana)
VWSC	Village Water and Sanitation Committee (India)

Chapter 1 Introduction

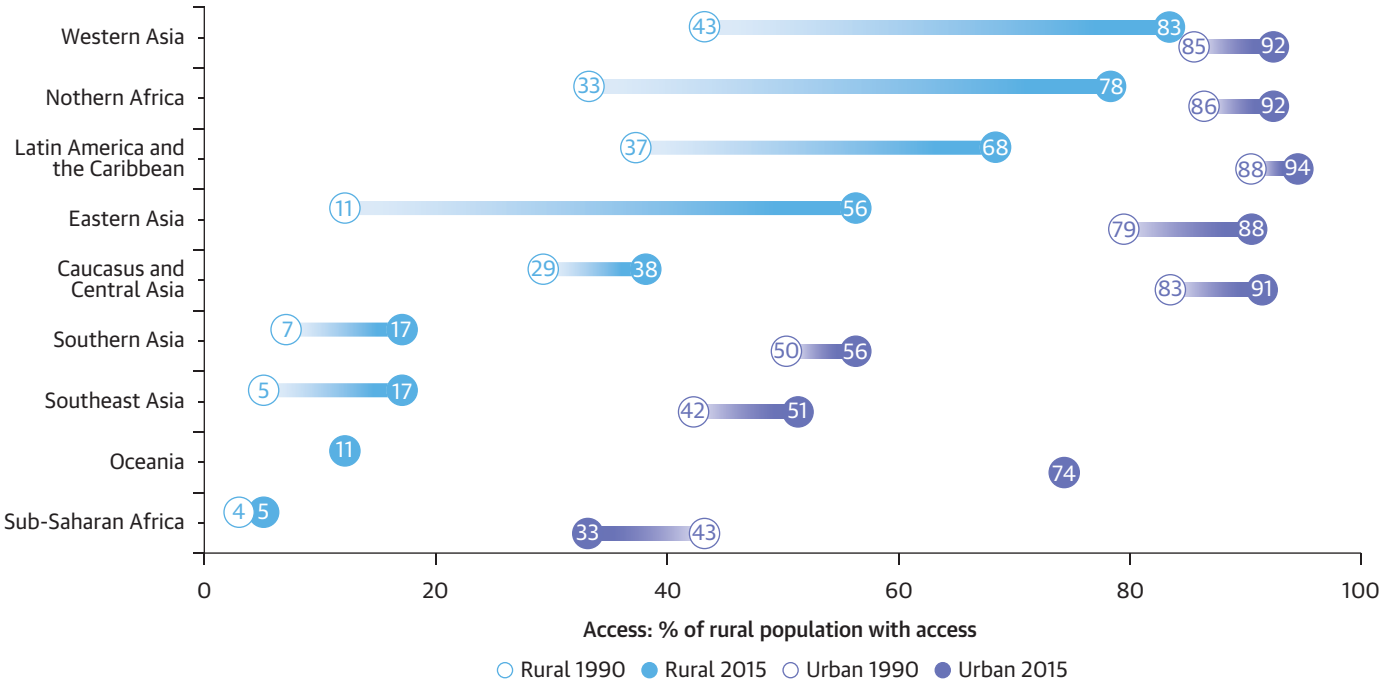
Global Challenges Facing the Rural Water Sector

While first time access under the Millennium Development Goals (MDGs) has seen impressive results, the Sustainable Development Goals (SDGs) pose a triple challenge: expanding to universal access, improving, and sustaining service levels. Much progress has been made globally in terms of access to improved[1] water supply, and the target for the water MDG was met with significant investments in the rural water sector, estimated to be in the order of US$50 billion between 1990 and 2008 (Carter and Lockwood, 2011). Globally, the proportion of people with access to piped water on premises went up from 44 percent to 58 percent (JMP 2015). When examining these successes carefully, a more nuanced and complex picture emerges. In 2015, 663 million people still lacked improved drinking water sources, eight out of 10 people without access live in rural areas, and access remains skewed toward the richer quintiles in many countries. The recently issued baseline for the SDGs states that 844 million people in 2015 remain without access to basic water services, and estimates that 2.1 billion without safely managed drinking water services, the large majority of those living in rural areas (WHO and UNICEF 2017). Although first time access in rural areas has seen remarkable improvements (see figure 1.1), including access to piped water supply in some regions, sustaining this access is under threat. This is manifested by high rates of hardware failure, poor performance of service providers and low levels of services (Moriarty et al. 2013).

Failure by governments and development partners to ensure access to improved water supplies in rural areas is, to a large extent, the result of inadequate investment and planning to deliver infrastructure where it is needed. However, it also results from the inability to ensure that once infrastructure has been put in place, services continue to be delivered effectively. As argued by Whaley and Cleaver (2017), in relative terms the longer-term sustainability took second place to achieving targets for coverage.

Empirical evidence from various reports indicates that in sub-Saharan Africa (SSA), 30 to 40 percent of handpumps, the predominant type of water infrastructure in SSA, are not functioning (RWSN 2010; Duti 2012). Data from four SSA countries show that 20 to 25 percent of handpumps are abandoned in the first year of installation. Data on piped water scheme functionality is scarce, partly related to the fact that "functionality" is not adequate to capture service levels delivered by this type of infrastructure. However, reports indicate that piped services can also quickly fall into disrepair. In Tanzania, for example, where most communal water points are based on piped networks, nearly 40 percent of water points were not functional in 2016 according to the latest government water point mapping dataset.[2] A national survey in 2015 in Nigeria found that over half of all water points and schemes were not functioning, of which 25 to 30 percent failed in the first year (World Bank 2017a).[3]

FIGURE 1.1. Increase in Access to Improved and Piped Water Services, 1990–2015



Source: JMP 2015.

If water quality is taken in to account, the achievement of the MDG for water is likely to be revised downwards (Bain et al. 2012). Onda et al. (2012) estimate that some 18% of people accessing improved sources, as defined by the JMP, use water with significant bacteriological pollution risks. Although the study does not differentiate between urban and rural areas, it is likely that these risks are higher in rural areas, where treatment and disinfection of water supplies are often very limited or non-existent.

With the adoption of Sustainable Development Goal 6 (SDG 6) for water and sanitation, reducing the inequality between urban and rural populations is now a priority. Goal 6.1 is to "*achieve universal and equitable access to safe and affordable drinking water for all*" by 2030. The proposed indicator for SDG 6.1 implies higher levels of service, defined as "safely managed drinking water," meeting priority water quality parameters, being accessible on household premises with reliable hours of supply and affordable to all.

The SDGs imply that a shift in policies and resource allocation is increasingly urgent, going beyond infrastructure delivery and addressing the longer-term sustainable management and financing of operations and maintenance (O&M), capital maintenance, and rehabilitation to ensure that adequate service levels continue over time. Such a shift needs to respond to the well-documented capacity gaps for rural water service delivery, which are often exacerbated by incomplete decentralization processes (Bakalian et al. 2009; Van Ginneken et al. 2011).

The impressive gains from the MDG era remain fragile and at risk. For many countries, the triple challenge is therefore to reach the remaining unserved population groups, to improve service levels, and to sustain existing and future services.

Changing demographics and urbanization are differentiating service demands, compounding the challenge of sustainable service delivery. Progress toward SDG 6.1 will continue to be shaped by the context of economic growth and demographic changes across countries, such as accelerating rates of urbanization, the growth of settlements with peri-urban characteristics, and outmigration from rural areas, often leaving the most vulnerable behind. According to the United Nations Development Program, by 2050, about 70 percent of the world's population is expected to live in urban areas, of which half will be in urban centers with less than half a million inhabitants (UNDP 2011). Cities are expanding into peri-urban and sometimes enclosing rural areas, further blurring the lines between 'urban' and 'rural'. This trend will continue to generate higher and more differentiated demands for water services. On the one hand, users in rural growth centers and small towns are increasingly demanding services similar to those in urban areas: piped supplies into the home providing more water, of better quality, and with a reliable supply. In rural areas, such demand for higher levels of services can also be observed, driven by both domestic and small-scale productive needs. As economies grow and service level aspirations increase, users are increasingly willing to pay for higher levels of service. Willingness to pay for private connections and for large improvements in service provision were found to be higher than for incremental changes in service levels (Van Houtven et al. 2017). On the other hand, there is, and will remain for many years, a significant segment of the poorest households living in remote dispersed settlements for which community-managed point source supplies will likely be the only viable solution in the medium to long term.

At the same time, in urban and rural areas, people are practicing self-supply, for example by developing private wells or rainwater harvesting to complement inadequate communal or utility services, or are resorting to self-supply in the absence of any public service provision. Changing geographic and climatic conditions, pollution of water sources, and unregulated use such as in agriculture, are putting pressure on quality and quantity of water resources. As a result, increasing water scarcity is compounding the challenge to deliver sustainable water supply services, especially to vulnerable rural population groups (Lockwood and Smits 2015).

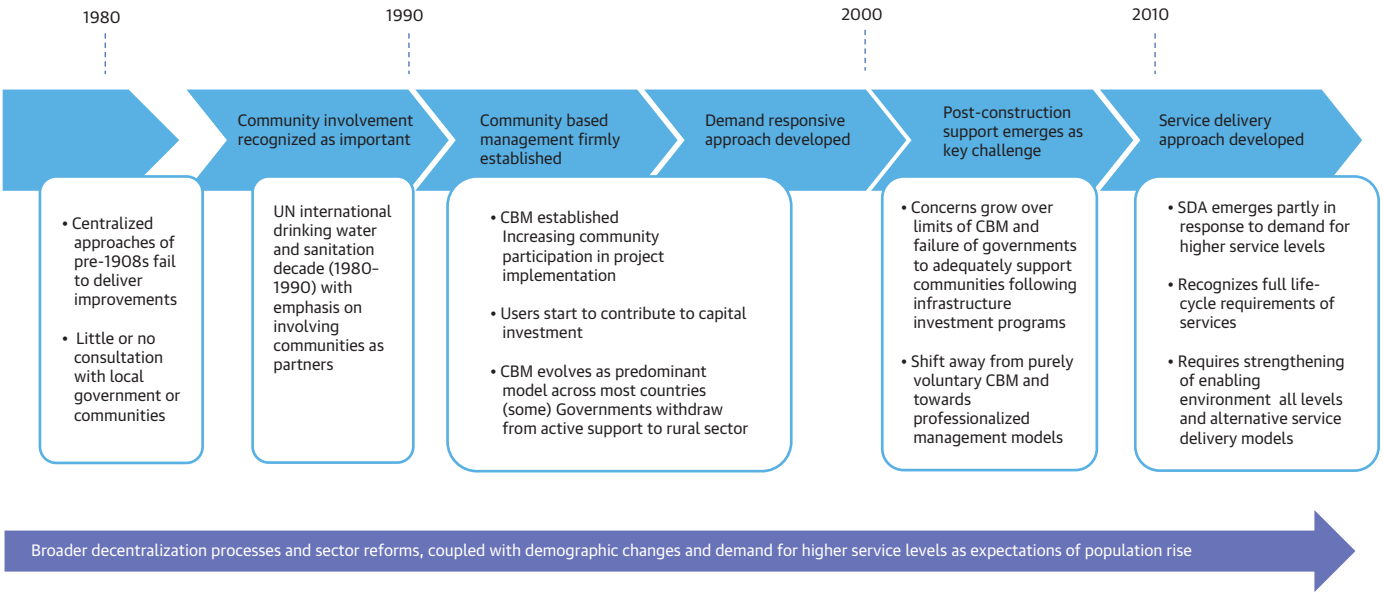
The changing rural landscape, higher service level aspirations of rural populations, and the sector's poor track record on functionality and the SDGs requirements, evidently require a more effective and sustainable rural service delivery approach than witnessed thus far.

A rethinking of the service delivery approach is needed, recognizing the enabling environment beyond the community level and the need for support structures for service providers. The issue of the sustainability of rural service provision is not new, and has received widespread sector attention since the international decade on water and sanitation from 1980-90. Paradigms toward rural water service delivery evolved over time with

progressing insights (see figure 1.2). In the early 1990s, the failure of supply-driven top-down implementation of rural water supply schemes was recognized, and a growing consensus emerged that interventions needed to be "demand responsive." This entailed that, especially during the implementation phase, interventions needed to include community participation, community contribution toward capital and O&M costs, and an overall reduced dependence on higher levels of government (Sara and Katz 1997). The Demand-Responsive Approach (DRA) was elaborated in the 1990s, and progress was made in ensuring that communities take ownership of their water supply systems and that technologies are in line with the needs and capacities of users. The DRA approach evolved as its limitations became clear and the need for ongoing technical, institutional and financial support to community organizations was identified.

A review of the World Bank's program on rural water supply in India articulated the need for institutional linkages between local governments and communities, embedded in a decentralized mandate for service delivery (World Bank 2012). A rigorous analysis of the sustainability and performance of "demand responsive" versus "supply-driven" water schemes in Kerala revealed that demand responsive schemes were more successful on all elements of comparison: service levels, consumer satisfaction, O&M and overall performance. However, it also concluded that more attention is still needed to create stronger community-based service providers and institutions to provide operational and financial support to schemes when needed (Andres et al. 2017).

FIGURE 1.2. Evolution of Paradigms in the Rural Water Sector, 1980–2010s



Source: Adapted from Lockwood and Smits 2011.

Since the early 2000s, more emphasis has been placed on providing ongoing support to rural service providers – this is commonly referred to as post construction support, and is often provided by various entities of government (Lockwood 2002). Whaley and Cleaver (2017) review a large volume of literature that underscores the need for such regularized and structured support to community-based service providers, which goes beyond *ad hoc* technical assistance to increase the ability of community-based service providers to fulfil administration and O&M functions. The 2000s also witnessed the emergence of so-called professionalized service delivery, moving away from solely voluntary-based community arrangements to a diversification of service delivery models, including various forms of private sector involvement in rural and small town service delivery. With the increasing demand for higher service levels and the development of piped systems in rural areas, there is a growing recognition that governments' role encompasses a much wider range of responsibilities than infrastructure provision and support during the implementation phase (Smits and Lockwood, 2015). Since the 2010s, the rural water paradigm emphasizes the importance of including wider systems of governance, including a national enabling environment and political economy aspects, a life cycle cost approach, and the importance of institutions in support of a diverse range of service providers. In seeking solutions for more sustainable service delivery, it remains critical to appreciate the complex and heterogeneous characteristics of rural water supply and the intricacies of local socio-political and technical contexts.

Recognizing the evolution of the rural water sector beyond the Demand Responsive Approach, the emergence of various management models, the identified need for ongoing government support to rural service providers, and the critical role of enabling institutions and policies beyond the community level, the added value of this assessment lies in:

- The development of a comprehensive analytical framework that can be used to analyze and operationalize a more sustainable service delivery approach for rural water supply
- The rich set cases and good practices from the 16 countries informing the global body of "knowledge in implementation"
- The formulation of recommendations and policy directions to enhance sustainability of rural services within different sector development and rural contexts

Objectives and Scope of the Assessment

The scope of this study is focused on the conditions or factors that are likely to have a bearing on the long-term sustainability of the service delivery approach in the countries selected for this study. This assessment does not explicitly focus on the planning, design, and implementation phase of developing water supply facilities, which are equally critical in predicting short-term functionality rates. Aspects such as adequate community participation in start-up and implementation, technically sound feasibility studies and

designs, adequate drilling practices, sound water resources yield assessment, and quality construction and procurement of materials, when addressed poorly, explain a large part of the high failure rates of water schemes within the first one or two years of operation. For example, in Nigeria, in the first year of operation, factors that can be controlled in the design, operations, and implementation stages explained 65 percent of water point failures (Andres et al. 2017).

Rather, this assessment analyzes the ongoing service delivery approach for rural water, using 16 countries as case studies. It aims to evaluate the conditions, challenges, and emerging good practices that support sustainability, the current service delivery models, and the broader policy, institutional and regulatory environments in which the rural water sector operates.

Thus, the objectives of this assessment were to:

- Identify factors contributing to long-term sustainability of rural water supplies and organize these in a comprehensive framework that can be used to analyze and operationalize sustainability of rural water service delivery
- Identify, based on countries' experiences, emerging good practices and common challenges in building sector capacity and sustainable service delivery models
- Provide, through analysis of country cases, prioritized policy directions to World Bank task teams, governments, and other practitioners to enhance the sustainability of the service delivery approach

The scope of the study did not allow for primary data collection at the level of individual water schemes within the 16 countries. In parallel, the World Bank has carried out a review to define metrics and indicators that describe and may predict the sustainability of rural water services, which could inform further primary research (World Bank, forthcoming 2018).[4]

To reap the highest operational benefits of this global analysis, the study focused on 16 countries with an existing or pipelined World Bank engagement in the rural water sector: Bangladesh, Benin, Brazil (the state of Ceará), China (Zhejiang and Shaanxi provinces), Ethiopia, Ghana, Haiti, India (Punjab and Uttarakhand states), Indonesia, the Kyrgyz Republic, Morocco, Nepal, Nicaragua, the Philippines, Tanzania, and Vietnam. These countries were deliberatively selected as a sample representing a range of geographies, socioeconomic indicators, level of aid dependency, progress toward universal access to water supply, prevailing types of water facilities, and government-led approaches to rural water supply service provision. As such, the countries do not present a random sample to be used for statistical analysis, but rather a range of different contexts from which key insights are drawn.

Based on country case analysis, individual country reports were developed with key findings and recommendations to inform short- and medium-term actions to help transition sectors to more advanced levels of sustainable service delivery and expand service delivery models. For each of the 16 countries, two-page summaries of all the country reports are

included as appendix G, while the individual country working papers are available upon request at AskWater@worldbank.org.

Structure of the Report

The rest of this report contains four further chapters, as follows:

- **Chapter 2** describes the analytical framework of the study and methodological approaches used; this includes a description of the building blocks of sustainability (or conditions to enhance sustainability).
- **Chapter 3** presents an overview of country contexts, for example, socioeconomic development, access to rural water supplies, water resources situation, institutional and policy frameworks based on country context; different population segments of rural service delivery are presented.
- **Chapter 4** presents the main findings of progress against the building blocks of sustainability, highlighting good practices. It identifies persisting common challenges and promising directions for enhancing different service delivery models.
- **Chapter 5** provides practical recommendations to improve rural water sustainability for each of the building blocks. It also presents a staged concept for sector development and proposes interventions to transition to advanced levels of sustainability for different rural service delivery contexts. It concludes with a set of policy directions.

In addition:

- **Appendix A** presents the detailed study protocol.
- **Appendix B** includes the questions used to assess sustainability scores for sector and service delivery models.
- **Appendix C** presents an overview of key rural water demographic data in study countries.
- **Appendix D** summarizes national institutions responsible for water supply by their functions.
- **Appendix E** presents a typology of service delivery models found in the 16 countries.
- **Appendix F** describes current tariff guidelines and ranges of tariff levels.
- **Appendix G** includes country summaries for each of the 16 countries; country-level policy recommendations are not included but are available in the country case study reports.

Notes

1. Improved is defined as a drinking water source that by the nature of its construction adequately protects the source from outside contamination, particularly fecal matter. The report was prepared before the launch of the SDG baseline and thus refers to access to an improved source rather than the new definitions of “basic” and “safely managed” drinking water services.

2. For more information on water point mapping, see the Ministry of Water website at http://wpm.maji.go.tz accessed May 2016.

3. Chapter 2 includes functionality rates that were found in the countries under this study.

4. In line with the analytical framework of this assessment, the elements for sustainability metrics are i) functionality or water facility performance, ii) service levels, iii) performance of service providers, and iv) performance of service authorities or support providers.

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Chapter 2 Conceptual Framework and Methodology

Analytical Framework

Definition of Underlying Concepts and Terminology

The analytical framework of the study relies on key concepts pertaining to service delivery, which are presented in box 2.1. In addition, this study and the framework use the term "system" explicitly to refer to the entire ecosystem of institutions, policies, financing, decision-making and regulation that needs to be in place at the level of the enabling environment, as opposed to a water supply scheme or facility.

Sustainability and functionality are related but not the same.

Although the term functionality is often used as a proxy for sustainability, the concepts are not synonymous. Functionality represents a snapshot in time, whilst sustainability is about the delivery of service over time (Carter and Ross 2016).[1] Functionality is interpreted as a direct measure of the delivery of water, to agreed service levels, at individual water supply scheme level. However, the capacities, functions, and conditions necessary to ensure the effective provision of water services must exist not only at the level of service provision—community, small town and even household in the case of self-supply—but *also* at higher levels, which may vary according to country or regional contexts. The presence of such favorable conditions at various levels is an important step toward ensuring sustainability of services, but it is no guarantee as all elements need to be adequately financed and functioning effectively.

Therefore, the framework for analyzing the complex and interrelated factors for sustainability is done at three institutional levels:

- *National sector level.*[2] Those government institutions or agencies responsible for defining policy, legal, institutional, and financing frameworks that ensure capital investment funding flows, coordination, planning, and regulatory functions.
- *Service authority level*. Key functions of planning, contracting, monitoring and oversight, as well as support to service providers and potentially regulatory activities. These functions are typically carried out by local governments or deconcentrated branches of national ministries.
- *Service provider level.* Entities responsible for the day-to-day provision of water supplies, including management, operation, billing, tariff collection, maintenance tasks, and in certain contexts capital investments. In many countries, this is done by community committees in rural areas; services can also be provided directly by local governments, central government agencies, private operators, NGOs, or in some cases regional or municipal utilities.

BOX 2.1. Key Terms and Definitions

- *Enabling environment*. A set of interrelated conditions—legal, organizational, fiscal, regulatory, informational, political, and cultural—that impact on the capacity of partners, including national governments, donors, and NGOs to engage in developmental processes in a sustained and effective manner (adapted from Thindwa 2001).
- *Rural water supply facility*. The physical infrastructure and its components (for example, pipe networks, reservoir tanks, boreholes and so on).
- *Rural water supply scheme*. The physical facility and the soft components such as management, administration, and financing at the point of supply.
- *Rural water service delivery.* National definitions for both rural populations and the rural water sector. Rural water may therefore refer to supplies both in remote rural areas as well as growth centers and small towns that fall under rural service provision according to sector institutional arrangements.
- *Service authority.* The institution(s) with the legal mandate to ensure that water services are planned and delivered. Service authorities are usually, but not always, equated with local government, and are not necessarily involved in direct service delivery themselves (although they may be in some cases).
- *Service levels.* Definitions and agreed norms regarding expected service levels, typically expressed as minimum quantities, by quality parameters, and aspects such as reliability, accessibility and in some cases affordability.
- *Sustainability of services.* Water services that are continuous over time and which meet agreed service levels. The definition made by WaterAid UK—which itself builds on an earlier one by Abrams (1998)—is useful and considers sustainability as "*whether or not (water services) continue to work and deliver benefits over time. No time limit is set on those continued services, behavior changes and outcomes. In other words, sustainability is about lasting benefits achieved through the continued enjoyment of water supply (and other) practices*" (adapted from WaterAid 2011).
- *Service delivery model.* The combination of management model at service delivery level (for example, community-based organizations, private, public utility, and so on) and the necessary vertical legal, policy, institutional, regulatory and financing frameworks that support these management structures and allow them to function effectively.

At the service provider level, there are typically a number of relatively common approaches, known as management models. Within each typology there can be variations and hybrids depending on context. The most common models include:

- *Community-based management.* Where communities have been delegated responsibility to operate and manage water facilities; this option includes many variations, from purely voluntary committees, to those with systematic support, to those outsourcing tasks to individuals and even private companies, but where the community retains governance and oversight.
- *Direct local government provision.* Where local governments are non-corporatized service providers for rural communities and directly carry out these services; this is also sometimes referred to as "direct municipal services (which may also include other services such as electricity)"; this model excludes municipal enterprises or corporations, which are classified under public utility provision.
- *Public utility provision.* Where a separate public entity is assigned and/or established, which may be at central, regional, or municipal level, to provide management of services for communities or small towns in their assigned service area, which can vary from larger regions to the territory of smaller municipalities. This group includes deconcentrated government entities, government-owned utilities and parastatal companies operating on a more commercial basis.
- *Private sector management.* Where private operators either own water assets and manage the services, or have been delegated responsibility for operation and management of publicly owned water systems through public-private partnership (PPP) arrangements, increasingly under contract of local governments. PPPs may or may not involve private capital investment to build or extend assets.
- *Supported self-supply.* Where households, or small clusters of households, provide their own solutions to water supply; this form of management is most typical in highly dispersed communities. This is still a common option in many developed countries for remote rural populations, as well as in countries where state provision through other management models has not reached very far or services are perceived to be inadequate. This study refers to "supported self-supply" when the approach is formally recognized by government and they have adopted programs of structured support to accelerate and improve service delivery under this model.

These models may have different "labels" in different countries; there are also a number of different hybrids or variants under this main taxonomy (see chapter 3). In this study, in a given country, only management models were considered that were formally recognized by government or are being tested at a relevant scale.

The term service delivery model goes beyond the management model of the service provider.

The term service delivery models (SDM) is used to include not only the management model typology, but the full complement of factors and capacities that need to be in place at all levels, incorporating both "soft" components—policy, monitoring, institutional and regulatory frameworks—and more tangible elements such as financing, maintenance regimes, human resources, and physical assets. Within this study, the sustainability of the SDM relates to the whole system being in place to ensure that water services last over time, for example, financing, capacity support at different levels, monitoring, and so on.

Analytical Framework: the Five Building Blocks of Sustainability

The analytical framework developed for this study derives primarily from previous research conducted under the Sustainable Services at Scale project, so called "Triple-S"[3], which identified 10 building blocks for sustainable rural water service delivery. The "systems approach"[4] adopted under Triple-S concluded that for sustainable water and sanitation service delivery, a number of building blocks need to be in place at sector level. The methodology that has resulted in the identification of these building blocks is described in Box 2.2.

In this study, and based on consultation with various World Bank staff involved in the country studies, the Triple-S building blocks[5] were condensed into four categories, namely institutional capacity, financing, asset management and monitoring and regulatory oversight. In addition, in the context of growing recognition by governments of the challenges of water scarcity and the ability to provide water services in rural areas, the consultation confirmed that water resources management and security would be included as a fifth building block of sustainability.[6]

These five building blocks are presented in detail below:

- *Institutional capacity.* Includes the assessment of enabling environment factors at national and sub-national levels, meaning clearly defined and implemented policies, strategies and delineation of roles, functions (for example, planning, policy making, regulation, budgeting, and investment) and effective coordination. The ability of service authorities to deliver on their mandates and organize effective technical, administrative, and institutional support to service providers is an important element of this building block. At service provider level, it considers the capacity of various organizations and entities, including community, public and private sectors, to manage day-to-day service delivery in an effective and sustainable manner.
- *Financing.* Focuses on the assessment of initial capital investments, operation, and maintenance costs, as well as indirect support costs, that is, for building and sustaining institutional capacity, policy development, regulation and monitoring, and other key sector activities. Financing for rural water services has commonly been derived from a combination of sources from the "3Ts," namely tariffs, taxes, and transfers. In many aid-dependent countries, rural water financing is dominated by transfers, especially for initial capital investment, with little or no allocation of funds from domestic sources (taxes) and a low expectation of financing sector costs through tariffs. It is increasingly

BOX 2.2. Overview of Triple-S Research and 10 Building Blocks for Sustainable Water Supplies

Under the Sustainable Services at Scale (Triple-S) research program funded by the Bill and Melinda Gates Foundation and implemented by IRC of the Netherlands and Aguaconsult of the UK, a study was conducted in 2009–10 to identify factors that contribute to or constrain the delivery of sustainable rural water services at scale. The study sought to identify incentives and barriers that shape the way in which sector institutions approach rural water services and was carried in a deliberate selection of 13 countries (Benin, Burkina Faso, Colombia, Ethiopia, Ghana, Honduras, India (Gujarat, Maharashtra and Tamil Nadu), Mozambique, South Africa, Sri Lanka, Thailand, Uganda and the USA).

The methodology followed a similar format across all countries, employing a combination of secondary data collection, such as document and literature reviews, and primary data collection by a team of experts through in-depth informant interviews and stakeholder group meetings. A consultation and validation process with sector stakeholders took place in the majority of countries.

An analytical framework that conceptualized three institutional levels—national, intermediate (later named "service authority" level) and service provider—was used, where for each of these three levels the rural water sector was assessed against 18 principles. These principles represent normative elements for service delivery, and were derived from earlier principle-based frameworks for rural water supply, such as by RWSN's thematic group on community-based rural water supply. The empirical findings and analysis across the countries pointed to a number of inter-dependent building blocks, which the research team deemed critical to facilitate a shift towards the delivery of sustainable services, as follows:

TABLE B2.2.1. Ten Building Blocks for Sustainable Service Provision as identified in Triple-S project

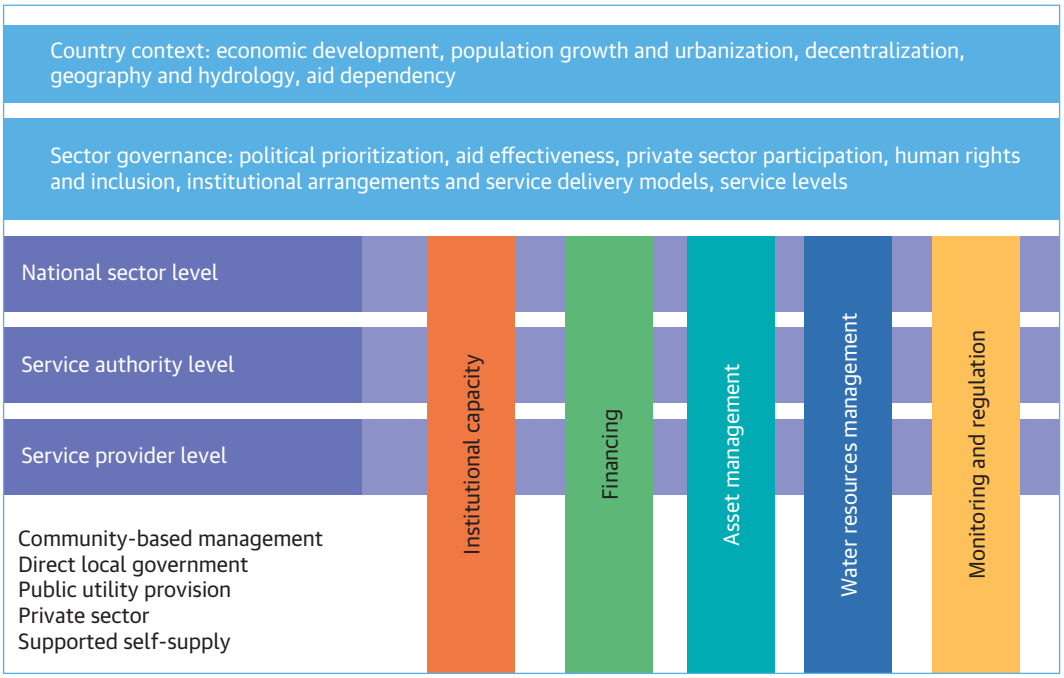
Professionalization of community management with policy embedding, adequate legal frameworks; move away from voluntarism	**Support to service providers** with technical, admin, and institutional support to and monitoring of community and other service providers
Recognition and promotion of alternative service provider options beyond community management model (self-supply, PPPs)	**Capacity support to local governments** to enable them to fulfil their roles (for example, planning, asset management, monitoring and regulation)
Monitoring service delivery and sustainability with systems that track indicators of functionality, performance, and service levels	**Asset management** through systematic planning, inventory updates, and financial forecasting for assets with asset ownership clearly defined
Harmonization and coordination among development partners and government, and alignment with national policies and systems	**Regulation of rural services and service providers** with performance through mechanisms appropriate for small rural operators
Learning and adaptive management supported at national and decentralized levels to enable the sector to adapt based on experience	**Financing to cover all life cycle costs**, especially capital maintenance, support to service authorities and service providers, monitoring and regulation

recognized that the sector needs to move toward more sustainable, blended financing modalities, where taxes and tariffs take a more prominent role and new sources could ideally be mobilized through commercial financing if the enabling environment is right. The building blocks also review whether mechanisms are put in place to allow tariffs and fees to be affordable to the most vulnerable population groups.

- *Asset management.* Refers to a set of approaches and practices that collectively ensure the continued functioning of a water supply facility, and hence the services delivered by that facility. This is typically much less common in the rural sector than in urban water supply. Good asset management starts with sound development of the initial asset (that is, good design and quality assurance during construction) and clearly defined asset ownership. The assessment includes not only whether the technical know-how and engineering is in place, but the extent to which the systems and tools for asset management have been developed and whether core activities have been institutionalized at the appropriate levels within any given sector.
- *Water resources management and security.* Looks not only at physical water resource availability and quality, but also at the institutional links between those entities that manage watersheds and the service authorities and providers responsible for drinking water. Changes in land use, deforestation, and increasing climatic variability, matched with increasing pressures from growing population and industrial activities, all pose challenges to the perennial supply of water. Especially within the context of numerous rural water providers, adequate planning and design of infrastructure, factoring into account current and future potential water demands and resource availability as well as water safety planning, are increasingly essential.
- *Monitoring and regulatory oversight.* Assesses the extent to which sectors have successfully established monitoring systems that can routinely collate relevant data about the quality of services and the performance of service providers. Critically, the assessment includes the extent to which information and outputs of a monitoring system are made available at different levels and are used to inform improved service delivery, governance and learning. This building block also examines whether and how regulatory oversight is exercised to protect the interests of consumers and service providers, whether service standards and tariff guidelines are in place, and if support is available to use these. In rural settings, regulatory oversight can be achieved by mandating such a function to dedicated agencies or entities, or in the case of private sector service provision through contracts.[7]

The framework for analysis combines the three institutional levels with the five building blocks, as shown in figure 2.1. The framework also recognizes the importance of country-specific factors relating to sector governance and general country context. All of these are important to consider when assessing the overall arrangements and performance of rural water service delivery.

FIGURE 2.1. Analytical Framework to Understand Sustainability of Rural Water



Methodology

Country Selection and Data Collection Method

The selection of countries was primarily based on the following criteria: i) current or pipelined World Bank rural water operations, and ii) representation of a range of regional contexts and socioeconomic environments. While the same analytical framework was applied across all countries, the data collection methodology was differentiated as indicated in table 2.1. In seven countries, it was deemed that sufficient secondary information was available for a desk study, while in four countries national experts gathered additional in-depth and less easily accessible secondary data sources. In-country visits were made by the international study team along with a national expert in five countries with limited existing documentation, and primary data was collected through interviews. In all cases, the methodology included a desk review with the collection and analysis of available secondary data and grey literature reports.[8]

Assessment Protocol and Sustainability Scoring

The framework presented in figure 2.1 was used to structure data collection and analysis. This analysis was guided by a series of data collection tools focusing on each of the building blocks, as well as country context, sector organization and governance. The main entry points for analysis and data collection used in the application of the framework are given in appendix A. A mix of qualitative and quantitative data was used either from secondary sources or through interviews with key informants.

To provide a snapshot assessment of each country's progress in establishing the conditions for sustainable rural water services, a scoring is applied at two levels based on a set of four questions pertaining to each of the five building blocks, with questions detailed in appendix B. Firstly, the assessment considered progress realized at sector level and whether essential conditions for sustainability are in place in the enabling environment. Secondly, the study examined whether and how this progress is reflected at service delivery level,

TABLE 2.1. Data Collection Method

Data collection approach	Countries
Desk study	Brazil (Ceará), Ethiopia, Ghana, Nepal, Nicaragua, Philippines, and Tanzania
Desk study aided by national expert in-country data gathering	Bangladesh, Benin, Indonesia, and India (Punjab and Uttarakhand)
Desk study with in country visits by international expert with national experts	China (Zhejiang and Shaanxi), Haiti, Kyrgyz Republic, Morocco, and Vietnam

BOX 2.3. Scoring Definition for Sector Sustainability Score and Service Delivery Model Scores

For each question, a score is given as follows:

- 0 = very limited conditions or elements in place, or no evidence of progress toward the building block or performance of the service delivery model
- 1 = partial conditions in place or some evidence of progress toward the building block or performance of the service delivery model
- 2 = most conditions or elements are in place and there is good evidence of progress toward the building block or performance of the service delivery model

Aggregate scoring is as follows:

- Maximum possible score per building block at sector level and SDM level is 8 points
- Scores are summed across all building blocks (country at SDM level) to give an aggregate score with a maximum of 40 points
- Traffic light scoring based on: 0–15 = red; 16–25 = yellow; 26–40 = green

considering each of the formally established service delivery management models that were found in a country. Both at sector level and at service delivery level, for each question a possible score of "zero," "one," or "two" could be obtained, as indicated in box 2.3. Scores were then aggregated at country level for each building block and into a country sector sustainability score, as well as for each service delivery model (SDM) to allow for an analysis across management models to determine common trends, strengths, and weaknesses.[9]

It should be noted that for the three larger federal countries (Brazil, China, and India) the analysis was carried out in one or two states or provinces, as in these countries the responsibility for rural water supply lies with the state or province. Therefore, scoring applies to these selected states or provinces only and *not* the entire country. However, some aspects of sector level scoring may reflect national policies and institutional arrangements. The scoring is based on available data through the data collection

methodology adopted. For quality assurance, all country working papers were reviewed by World Bank staff operating at country level, as well as by the team members, coordinating the multi-country assessment.[10]

Study Limitations

Given the scope, methodology, and resources available, an obvious limitation is that no direct associations could be made between sustainability at scheme level, evidenced by primary data collection, and the conditions that influence the sustainability of the entire ecosystem of rural water services. This implies that, in the scoring assessment, sustainability is assumed to be a function of the normative conditions as defined for each of the building blocks, while recognizing that country contextual factors will influence the assessment. Once sustainability metrics and indicator measurement are better defined (World Bank, forthcoming 2018), follow-up research is suggested to include such primary data collection at user, water facility, service provider, and service authority level. This would help strengthen the empirical evidence base to determine the critical sustainability conditions that are associated with enhanced sustainability and service levels. In addition to a normative or principle-based approach, as adopted under this multi-country assessment, political economy analysis, for example, binding constraints diagnostics, can also help to improve our understanding of how power relations in water governance influence sustainability outcomes.[11]

Other considerations to bear in mind include:

- Although the use of the scoring method and reference to secondary data sources aims to make the assessment as objective as possible, there may be inherent bias as scoring to some extent depends on expert judgement.
- For the group of countries with desk studies only, there were limitations to the availability of comprehensive data or recent and relevant sector analysis, hindering the assessment of implementation of policies in practice.
- The sector enabling environment, as well as secondary data sources, are constantly evolving; the assessment presents a snapshot in time (especially relevant for countries with high dynamics).
- For Brazil, China, and India, it proved challenging to completely isolate a sector assessment at state or province level from national level.

Nevertheless, the added value of this assessment lies in the development of the analytical framework to shape our understanding on progress by a range of countries toward the establishment of sound systems for long term sustainability of rural water services. The diverse case studies and lessons learnt provide practitioners with practical insights into how to operationalize the building blocks for sustainability and add to the global body of "knowledge in implementation." The recommended interventions and policy directions derived from the case studies aim to help governments in other countries to put in place a more sustainable service delivery approach.

Notes

1. As explained in Whaley and Cleaver (2017): On a day of inspection, a water point/scheme may be not functioning for one reason or another, but over the course of the time delivers a sustainable supply of water; on the other hand, a different water point may be functioning at the time of inspection, but is challenged by one or more fundamental physical or management-related faults, meaning its likelihood of delivering a sustainable supply of water is small.
2. In federal countries, this may be at state or provincial level.
3. For detailed information on Triple-S see IRC website at http://www.ircwash.org/projects/triple-s.
4. The concept of building blocks derives from similar experiences in health systems thinking (De Savigny and Adam 2009; WHO 2010). This approach starts from the recognition that in order to achieve sustainable delivery of health services, six building blocks of health systems need to be in place, such as finance, an information system, and health workforce, amongst others. These building blocks describe the elements of what needs to be in place to provide health services. How they are established and what specific forms they take varies across countries as they are shaped by country contexts, including available resources, both financial and human.
5. In the development of the analytical framework for this study, other frameworks were also reviewed, including UNICEF's WASH Bottleneck Analysis Tool, WaterAid's sustainability framework, USAID's Sustainability Index Tool and the FIETS taxonomy (see Schweitzer et al 2014).
6. Although it is recognized (see chapter 5) that further analysis and research is needed to develop this building block.
7. This building block does not prescribe the establishment of full-blown independent regulators as are usually found in the urban utility sector.
8. The country working papers include a full listing of secondary data and grey literature that was accessed.
9. Countries were scored based on their progress or lack of progress of the building blocks in an "absolute" manner, that is, without assessing this progress against development status or specific country contexts. An interesting finding is that, across the study countries, there is considerable variation in the progress on the building blocks for sustainable water services across countries with similar economic development status.
10. In Uttarakhand and Punjab, state government officials were *ex-ante* consulted in the scoring, while in other countries, the evidence-based scores were presented and discussed with government in sector meetings *ex post*.
11. Whaley and Cleaver (2017) review the evolution of normative governance analysis as well as political economy analysis with respect to rural water services.

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Chapter 3 Context of Selected Country Cases

Socioeconomics and Water Resources Situation

The 16 countries present a wide range of socioeconomic contexts, in terms of income levels, aid dependency, rural population demographics, and water scarcity levels.

Taking a broad overview at least three main groups can be identified, as illustrated in table 3.1.

- The upper-middle income group, composed of Brazil and China, which have high levels of access to rural water services and high levels (over 55 percent) of access to piped services on premises.
- The lower-middle income group, which includes Bangladesh, Ghana, the Kyrgyz Republic, Nicaragua, the Philippines, Morocco, India, Indonesia, and Vietnam, with low to medium levels of piped access from 1 to 40 percent. This group displays a high level of heterogeneity, with some countries having relatively low GNI per capita but high levels of piped access (that is, the Kyrgyz Republic and Nicaragua) or higher levels of GNI with little progress toward increasing piped access in rural areas, such as Bangladesh and Indonesia.
- A third group of low-income countries consisting of Benin, Ethiopia, Haiti, Nepal, and Tanzania, with all—except for Nepal—having low access rates to piped supply (less than 6 percent), and a GNI below US$2,600 per capita.

Appendix C provides an overview of the demographics relating to rural populations in all 16 countries, including definitions of "urban" versus "rural," absolute numbers, rural population shares, and growth rates. The economic contexts present opportunities for the development of sustainable rural water services, especially for middle-income countries such as Brazil and Morocco, and poses significant challenges for those at the lower end of the spectrum, such as Ethiopia and Haiti.

Table 3.1 indicates the level of available renewable water resources, which can impact the service provision in rural areas. As per IWMI (2007) classification on water scarcity,[1] Brazil (Ceará), China (Shaanxi), India (Punjab) and the Kyrgyz Republic experience physical water scarcity and in these context, declining water resources are already directly affecting drinking water supply systems at significant scale. Most other countries are experiencing economic water scarcity, which, for example, means that storage or conveyance capacity is inadequate to capture and allocate resources effectively and both supply-side and demand-side water resources management measures would be necessary. Countries may also have different degrees of vulnerability to extreme weather events such as floods and typhoons and other natural hazards that regularly damage water supply infrastructure and put further pressure on sustainability of service delivery, as in Bangladesh, Vietnam, Nepal, Haiti, and the Philippines.

TABLE 3.1. Overview of Development Indicators and Access Levels for Study Countries

Country	GNI per capita (PPP US$)	Income groupings (WB)	Aid as percentage of GNI	Rural access improved (%)	Rural piped access (%)	Rural population (as percentage of total population)	Rural population growth (%)	Renewable water resources (cubic meters per capita per year)
Brazil (Ceará)	15,020[a]	Upper-middle	0	87	70	25	−0.90	850 (Ceará)
China (Zhejiang and Shaanxi)	14,160[b]	Upper-middle	0	93	55	35.1; 47.4	−2.2	2,018 (national)[c]
Indonesia	10,680	Lower-middle	0.0	79	9	46.3	−0.4	7,839
Philippines	8,900	Lower-middle	0.1	90	30	55.6	1.8	4,757
Morocco	7,680	Lower-middle	1.9	65	23	39.8	0.1	843
India (Punjab and Uttarakhand)	6,020[d]	Lower-middle	0.1	93	16	66 and 69.45	0.6	1,458 (national)[e]
Vietnam	5,690	Lower-middle	2.5	97	10	66.4	0.1	9,461
Nicaragua	5,050	Lower-middle	4.7	69	31	41.2	0.4	27,047
Ghana	4,070	Lower-middle	2.9	84	3	46	0.9	2,050
Bangladesh	3,550	Lower-middle	1.3	87	1	65.7	0	7,621
Kyrgyz Republic	3,300	Lower-middle	7.6	86	42	64.3	1.9	3,976[f]
Tanzania	2,620	Low-income	7.8	46	6	68.4	2.1	1,800
Nepal	2,500	Low-income	4.5	92	18	81.4	0.7	7,372
Benin	2,100	Low-income	7.2	72	5	56.1	1.8	2,456
Haiti	1,760	Low-income	13.8	48	5	41.4	−1.6	1,310
Ethiopia	1,620	Low-income	8.0	49	1	80.5	1.9	1,227

Sources: World Bank http://data.worldbank.org/indicator; UNDP http://hdr.undp.org/en/data; FAO Aquastat, http://www.fao.org/nr/water/aquastat/main/index.stm; Census of India 2011, http://censusindia.gov.in/; and JMP 2015.

Notes: GNI = gross national income; PPP = purchasing power parity.

a. National GNI; in the GDP per capita classification, Ceará is 23rd out of 27 states in Brazil.

b. National GNI; in the GDP per capita province classification Zhejiang is fifth and Shaanxi 14th of 31 provinces.

c. Physical water scarcity in Shaanxi province.

d. National GNI; in the classification of the states' GDP per capita, Punjab is 14th and Uttarakhand 12th of 36 states.

e. Physical water scarcity in Punjab and economic water scarcity in Uttarakhand.

f. The Kyrgyz Republic experiences physical water scarcity in specific basins.

Access, Service Levels, and Functionality of Rural Water

Driven by consumer demand and government aspirations, a transition from "improved access" to "piped access" is taking place, although with a varying rate of change.

Table 3.1 indicates that while some countries have made significant progress in improving access to rural water services including piped services, others still face challenges in providing basic levels of service to a majority of the rural population (for example, in Tanzania, Haiti, and Ethiopia). Access to piped water services at household level remains generally low in rural areas, except for Brazil, China, and the Kyrgyz Republic with 70 percent, 55 percent and 42 percent respectively. Nonetheless, given the absolute size of the rural population in China and Brazil, there are still many millions who do not have access to such level of service. For several countries that are close to 100 percent improved

access in rural areas, the challenge is the transition from point source supplies to piped supplies[2] and improving the service levels in terms of quality and reliability. This transition is driven by demand of users combined with government aspirations and the influence of high-level decision makers. The Kyrgyz Republic, Nicaragua, the Philippines, Nepal, and Morocco are pursuing such a transition, as well as Vietnam and India. Here, access to piped services are also gaining ground, supported by national policies and targets. There is an overall trend to move away from communal standposts to household—often metered—connections, although if water resource issues are not adequately addressed, supplies may be inadequate to meet demand.

The lack of access to piped supply does not necessarily mean that households have poor service levels, particularly in terms of quantity and access. However, quality may be more at risk, as in many countries households have opted for water on premises through household solutions and self-supply such as rainwater harvesting and private wells (such as in Bangladesh).

Definitions of normative service standards for rural water supply are increasingly found, which can facilitate better accountability if monitoring and regulatory oversight is in place.

Service levels and the choice of technologies are driven by a combination of factors including demand, policy, levels of investments, demographics, socioeconomic context and water resources availability. Different technologies were found across the countries including i) large piped network schemes, where urban networks connect rural areas, or in the form of multi-village schemes; ii) small piped networks, typically serving a single village or a few hamlets; iii) communal point water sources, such as handpumps and water kiosks; and iv) household point sources, including private wells and rainwater harvesting systems, which are often used as complementary sources.

Most countries have clearly defined normative service levels, sometimes even differentiated by type of supply. This indicates a positive development for a number of reasons. Firstly, defining service levels lays the groundwork for accountability; that is to say, describing access to services which citizens can expect as a (human) right. Secondly, it provides a benchmark against which to hold service providers to account. By clearly setting out expected levels of service it is possible to monitor whether or not users are actually receiving these in practice. How monitoring is carried out, and the success of building national monitoring and evaluation (M&E) frameworks differs from country to country and a framework for regulatory oversight can enhance accountability relationships between users, service providers and the state (section 4.5). The varying service levels across the country cases clearly illustrates that countries are facing different challenges in providing universal and sustainable service for all. The Sustainable Development Goal (SDG) for water can help spur countries to understand how their service standards correspond with the stringent definition of "safely managed drinking water." Findings on service standards are presented in box 3.1.

Nationwide systems monitoring the functionality of water facilities face many limitations, but are a work in progress in most countries.

BOX 3.1. Different Service Level Definitions across the Case Studies

- *Quantity.* For handpumps, typically 20 liters per capita per day, and for piped schemes much higher (35–100 liters per capita per day). Standards tend to have an urban bias, leading to overdesign, which affects technical performance and continuity and financial performance in the long run.
- *Quality.* All countries have national water quality standards, some of which reflect specific issues such as the acceptable level of arsenic as in Bangladesh and Nepal. In general, standards are not differentiated at national level between rural and urban populations and follow WHO standards.
- *Accessibility.* A few countries define household connection as the minimum standard (Brazil and China), otherwise accessibility is defined by distance to the water point. This can vary significantly between countries (for example, in India and Nicaragua it is only 100 meters whereas in Ethiopia it is 1.5 kilometers); mountainous Nepal breaks down access by vertical as well as lateral distance.
- *Continuity.* For piped supplies, it is normally stated as 24/7, with the exception of Bangladesh (eight hours per day), the Kyrgyz Republic (12 hours per day), and India (for example, eight hours per day, with certain states moving to 24/7.
- *Reliability.* Some countries have specific norms for acceptable levels of downtime (particularly for hand pumps), such as Ghana and Ethiopia.

Out of the 16 countries examined, 11 have set up—or are in the process of establishing—monitoring systems for the functionality of rural water supply schemes. Based on the data gathered, functionality rates of water schemes vary between 60 percent and 94 percent across countries (table 3.2). However, such figures should be considered with caution because:

- Functionality, as generally used, is a binary concept that does not allow an adequate evaluation of service levels: for example, a scheme may be deemed functional even though it does not produce water as per its design capacity or up to the water quality requirements (non-functionality are less ambiguous, as there is no service provided).
- Data on functionality is often partial and only concerns a selective sample of schemes, e.g., related to a project that is being closely monitored, as in Vietnam or Indonesia, or only related to a certain management model.
- National averages may hide regional disparities. This is the case for Vietnam, for example, where functionality rates in remote and mountainous areas are far lower than national averages, estimated at 48 percent against the national average of 75 percent.
- In the absence of common metrics for functionality, conclusions as to "high performers" against "low performers" in terms of functionality are difficult to draw.

TABLE 3.2. Functionality Rates of Water Schemes Based on Country Reported Data

	Non-functionality rates as of 2016 (%)	Technology monitored	Representativeness
Bangladesh	16	Tube wells	National
Benin	18	Small piped water schemes	National
China (Zhejiang)	10	Large piped water schemes	115 schemes
Ethiopia	26	Hand pumps and piped water schemes	National
Haiti	14	Small piped water schemes	114 schemes
Indonesia	6	Small piped water schemes	15,000 villages targeted in the national program, PAMSIMAS
Kyrgyz Republic	39	Small piped water schemes	National
Nepal	39	Small piped water schemes	National
Nicaragua	6	Small piped water schemes; wells with hand pumps	Water schemes under the SIASAR monitoring system
Tanzania	40	Hand pumps and piped water schemes	National
Vietnam	25	Small piped water schemes	16,200 schemes constructed under the national program for rural water

Source: Sustainability Assessment of Rural Water Service Delivery Models - Country Working Papers; available upon request.

Despite the above limitations, non-functionality rates obtained for eleven countries indicate that some countries face daunting challenges for sustaining services. Tanzania, Nepal and the Kyrgyz Republic have non-functionality rates close to or equal to 40 percent of rural water schemes[3]. As further discussed in section 4.5, nationwide monitoring systems that go beyond functionality and include dimensions of service provider performance and other metrics of sustainability are even harder to come by.

Institutional Arrangements

National Level Entities

In most countries, an institutional "home," or nodal agency, for rural water supply is established, however low political prioritization, lack of institutional coordination, and unassigned mandates for service provider support and regulatory oversight are common.

National level bodies responsible for different functions relating to rural water supply were analyzed to determine their roles and responsibilities, including policy making, capital investment, regulation, technical assistance, drinking water quality surveillance and water resources management (including quality of source water). The findings are presented in appendix D, summarizing which institution(s) are responsible across the 16 countries. In general, there is an adequate differentiation of roles and, in most cases,

there is either a ministry or other government agency assigned to lead the rural water sector. However, there are a number of important observations:

- Not all countries have a dedicated "water services ministry." In several middle-income countries, the responsibility for water supply falls within a ministry with broader mandates such as housing, development, public works or cities. Although this may not necessarily be problematic, it could mean that the rural sub-sector specifically has a low political profile and low priority.
- Some countries have gone through substantive sector reforms at national level (or state-level reforms) resulting in the separation of policy making and investment functions between national bodies (for example, Nicaragua and Indonesia); effective coordination mechanisms between national government bodies remain challenging.
- Few countries have mandated regulatory oversight functions for rural water supply and smaller water operators to dedicated regulatory bodies (Brazil, Nicaragua, and the Philippines); some countries have delegated oversight to national or subnational entities (for example, Ghana and China).
- Health ministries or other technical standard agencies are mostly mandated for water quality surveillance and *de jure* enforcement of compliance.
- Technical assistance functions tend to be decentralized to local (or regional) level, or are not at all articulated as functions to any institution; in most cases they do not fall under the mandate of national level bodies.

Service Authorities

In the majority of countries, local governments are the service authorities or duty bearers for rural water supply. However, unclear assignment between different subnational levels and incomplete decentralization processes are hindering local governments in exercising their roles effectively.

In most countries, but not all, the service authority is the local government, such as district, commune, governorate, or municipality, depending on the designation of the relevant local public administrative unit in the country. In some cases, service authorities are also asset holders, but again this varies from country to country. Service authority functions may also be shared—although often unclearly—between different administrative levels, for example, between provincial and district authorities, or between village and district levels, depending on the degree and form of decentralization.[4] Specific functions, such as water quality monitoring, may be carried out by mandated deconcentrated entities. Table 3.3 presents the service authorities across the case studies, including the average population size of a service authority, which can vary significantly. The level at which the service authority is defined is relevant, as it implies the extent to which financial and human resources may be available to execute its functions effectively. The atomization of local governments in some countries may thus undermine the capacity and effectiveness of service authorities.

TABLE 3.3. Assignment of Service Authority Level across the Analyzed Countries

Country	Service authority	Avg. rural population per service authority[a]	Institutional level
Bangladesh	Union Parishad	21,000	Municipality
Benin	Commune	77,000	Municipality
Brazil (Ceará)	Municipality	12,000	Municipality
China (Zhejiang and Shaanxi)	County or city, district, or province depending on size of scheme	579,000 and 233,000 (Zhejiang, Shaanxi)	Municipality or district, some schemes province
Ethiopia	Woreda	120,000	Municipality or district
Ghana	Metropolitan, Municipal and District Assembly	80,000	Municipality or district
Haiti	Commune	31,500	Municipality or district
India (Punjab and Uttarakhand)	Gram Panchayat (GP) or district	PJ: 487,600 district; 835 GP UT: 372,000 district; 640 GP	Village, some schemes district
Indonesia	District government	234,000	Municipality or district
Kyrgyz Republic	Ayl-Okmotu	9,000	Village or municipality
Morocco	Commune	10,500	Municipality
Nepal	District development committee	312,000	District
Nicaragua	Municipal government	17,000	Municipality or district
Philippines	Barangay and municipality	35,600	Village or municipality
Tanzania	Local government authority	203,500	Municipality or district
Vietnam	Province or district depending on size of scheme	115,000 (district)	District or province depending on size of scheme

Source: World Bank calculations.

[a] Based on number of administrative units and rural population and is indicative only; population per service authority unit may vary considerably within a given country depending on population densities.

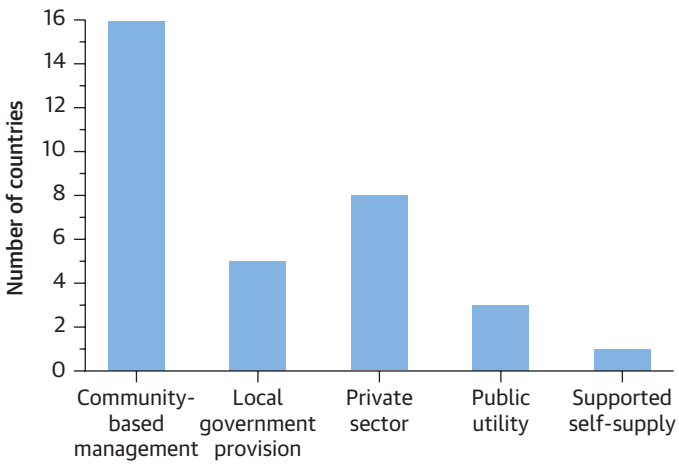
It must be noted that in several countries, administrative, political, and fiscal decentralization is an ongoing endeavor and a comprehensive and clear assignment of functions with the corresponding allocation of (financial and human) resources has *de facto* not yet happened (even if *de jure* this transfer of functions is in place). As a result, it was found that service authorities *de facto*: i) delegate their mandate to another entity, or ii) are deliberately bypassed in an interim period until local capacities have improved, as in Haiti, where the National Directorate through its regional deconcentrated entities is fulfilling the role of service authority.

Service Delivery Models

The community-based management model remains the most common model while diversification of management models is taking place in most countries.

As indicated in figure 3.1, community-based management was found to be the most prevalent management model in all 16 countries. Six countries only had one model, namely some form of community management (India, Indonesia, Nepal, Nicaragua, the Kyrgyz Republic, and Tanzania). At the other end of the spectrum, four countries exhibited four or more different models, namely Ethiopia, Morocco, the Philippines, and Vietnam. Although community

FIGURE 3.1. Distribution of Service Delivery Models across All Countries



Source: Sustainability Assessment of Rural Water Service Delivery Models - Country Working Papers; available upon request.

management is found in all countries, the model is typically used for small schemes. This means that the percentage of the population served by community-managed schemes may be smaller than for other models. This is particularly the case in the higher-income countries such as China, Morocco, and the Philippines, where public utility models serving rural areas are commonplace. Within the scope of this study, it was not possible to estimate rural population shares by the various management models due to lack of accurate data. It should be noted that in each country variations of the five typologies can be found, and are described in more detail in appendix E.

Direct local government provision is common in about half of the countries. The step toward corporatization of provision has only been made in a few places. For example, in Vietnam, Provincial Centers for Rural Water and Sanitation Services (PCERWASS), which are directly linked to their provincial governments, manage many of the schemes recently constructed under the national program for rural water supply without having formed a separate corporate entity.

Public utilities serving rural communities were found in three countries and tend to only serve rural communities that are adjacent to urban areas. In China, this is an increasingly important model as significant parts of the rural population are living in areas adjacent to urban service networks. For example, in Zhejiang province, with higher rural population densities, some two-thirds of the rural population, or 20 million people, are served by such utilities and multi-village schemes operated by utilities. In Morocco, the national utility *Office National de Electricité et l'Eau Potable* (ONEE, the National Office for Electricity and Drinking Water) is increasingly expanding its services to rural areas.

The research found various private sector service provision models, ranging from community enterprises[5] (China) to long-term concession contracts, build-own-operate (BOO, as in Vietnam), land management and lease contracts (Benin, Bangladesh and Haiti). Although not strictly a private sector management model, communities are outsourcing major maintenance works through service contracts (Tanzania, Morocco, and Ghana). Many of the private sector initiatives are still at pilot scale, which is not without its challenges, such as in Bangladesh and Haiti.

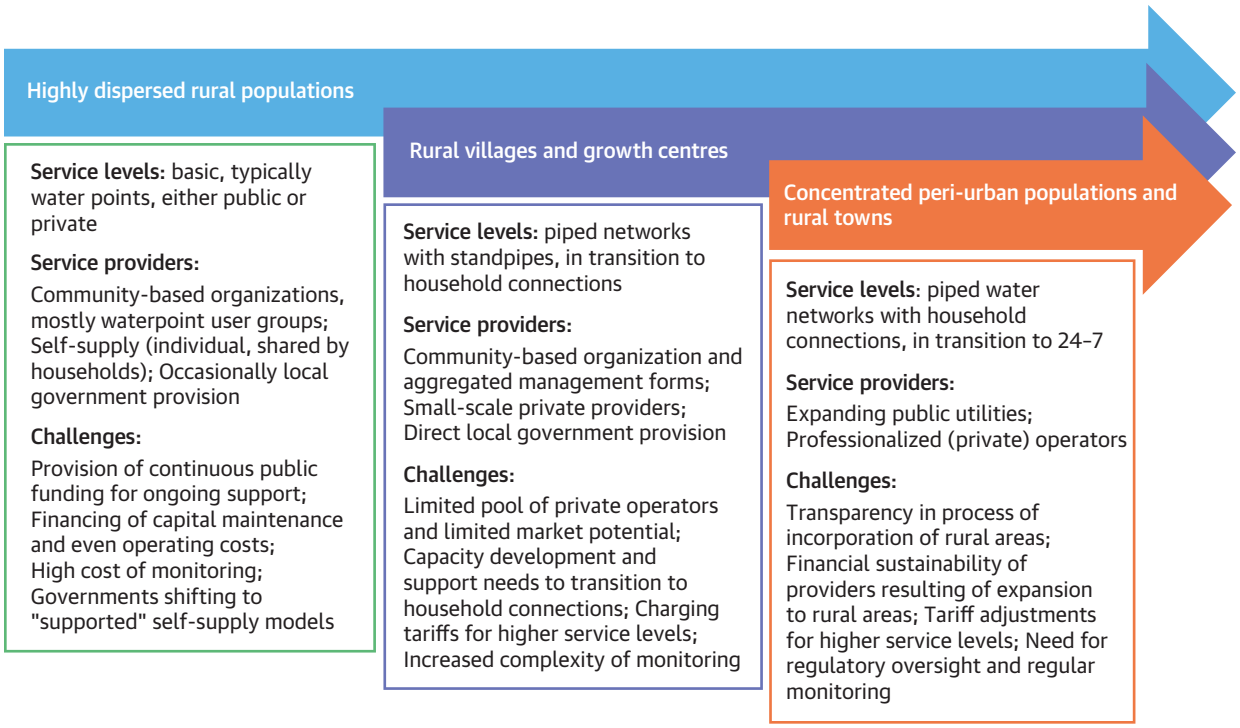
Among the 16 case countries, only Ethiopia formally recognizes self-supply as an official service delivery model, implementing a program to accelerate self-supply as part of its strategic sector plan. In both Brazil and Indonesia there are programs of financing and support to individual household supplies, but these are not reinforced by an official recognition of the approach. China is discouraging self-supply, especially in water scarce areas relying on groundwater, through stricter regulations and awareness, including the

decommissioning of open wells and private boreholes once an improved supply has been established. Despite limited examples of supported self-supply, non-supported self-supply forms an important *de facto* modality to provide a complementary supply for many households.

Different service delivery models are operating in different rural population segments, each with distinct service levels and challenges.

While the community-based management model remains the dominant service delivery model, a differentiation of service delivery models, based on local context was found. In upper-middle income and higher income countries, an emerging trend toward urban utilities integrating peri-urban and denser rural populations into their service areas was found (China, Morocco, the Philippines). Also aggregated management models, under which service providers manage multiple rural centres were found (for example, India's multi-village schemes). Private operators with delegated management for rural towns were commonly found (Haiti, Bangladesh, Vietnam), sometimes including standalone smaller systems in their service areas (for example, Benin). Service levels, service delivery models and some common challenges for three main population segments are illustrated in figure 3.2. Chapter 4 will further elaborate on these challenges and the emerging good practices for various service provider models (section 4.6).

FIGURE 3.2. Different Segments of Rural Water Service Delivery



Notes

1. Physical scarcity is where water demand exceeds available renewable water resources, such that no further water resources can be developed without affecting other uses. Such scarcity differs from economic water scarcity, a situation in which available water resources exceed demand, but infrastructure and institutions are not able to harness those resources to meet demands. Scarcity is defined mostly at river basin scale, so within a country different degrees of scarcity can exist.

2. Or actually, the challenge is to transition to universal "safely managed drinking water services" as per the new SDG definitions, which requires access at the household premises, as well as quality and reliability of supply.

3. It should be mentioned that which schemes are included in the "universe" of schemes will be an important driver of the reported non-functionality rate. For example, in Kyrgyz Republic, many schemes were built in the 1950s and 1960s, and are beyond their economic lifespan, so non-functionality of these schemes is no surprise.

4. The amount of power and authority transferred and the degree of autonomy of the decentralized units in performing their functions increases along the spectrum of centralized provision, deconcentration, delegation, and devolution (Boex 2015).

5. The term community enterprise in the China context refers to a form of public-private partnership with companies holding a delegated management contract. It is typical for these companies to be established under the auspices of a government authority, but operating along commercial lines. Typically, the government retains ownership of the physical assets and sets performance and reporting standards for each company, which are expected to cover their operating expenses and in some cases to contribute to capital maintenance.

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Chapter 4 Emerging Good Practices for Sustainable Rural Water Service Delivery

This chapter provides the main findings in terms of progress toward establishing the enabling environment for sustainable services at sector level and for the various service delivery models. It analyzes each of the five building blocks and highlights good performance and practices that have contributed to putting in place these building blocks. Where the assessment found common challenges, these are also presented. To frame the results, an overview of the findings across all countries is given in table 4.1, followed by five sections, each unpacking one of the five building blocks. For each building block, a summary box is presented as well as two graphs, one representing sector and service delivery models scores for each country, and a second graph showing sector score against country wealth (GNI per capita). This is to illustrate whether wealthier countries tend to be more

TABLE 4.1. Total Sector and Building Block Sustainability Scores, by Country

Country	Institutional capacity	Financing	Asset management	Water resource management	Monitoring and regulation	Total sector score
Benin	6	4	5	2	3	20
Bangladesh	4	1	2	2	1	10
Brazil	6	5	5	8	5	29
China[a]	5	5	6	5	7	28
Ethiopia	5	4	2	2	2	15
Ghana	3	5	5	2	4	19
Haiti	3	1	2	2	3	11
India[b]	6	5	5	3	5	24
Indonesia	5	4	2	3	4	18
Kyrgyz Republic	2	3	3	3	2	13
Morocco	7	5	5	7	5	29
Nepal	3	3	2	3	3	14
Nicaragua	5	4	5	4	6	24
Philippines	3	4	2	3	6	18
Tanzania	3	3	2	5	3	16
Vietnam	3	5	4	5	3	20
Average all countries	**4.3**	**3.8**	**3.6**	**3.7**	**3.9**	**19.3**

Note: Each building block scores "0," "1," or "2" over a series of four questions, with a possible maximum score for each building block of eight points. Scores are then summed across all building blocks to give a country aggregate score with a maximum of 40; aggregate scoring thresholds are 0–15 = red; 16–25 = yellow; 26–40 = green. Detailed evidence for scores can be found in the individual country working papers.

a. For China, this score is for both Zhejiang and Shaanxi.

b. For India, this is a combined score for both Punjab and Uttarakhand.

effective in addressing this building block, pointing to a natural sequencing alongside the economic development path.[1] This chapter concludes with a summary of key findings and lessons that have been explored through the country case studies. Appendix G includes two-page summaries for each of the 16 country case studies and country working papers with detailed evidence of scoring are available upon request at AskWater@worldbank.org

Table 4.1 presents the sustainability building block scores and total sector sustainability score across all countries,[2] recognizing that sector governance and country context will have a bearing on the scores. Generally, institutional capacity has advanced furthest, with financing and monitoring and regulatory oversight following. The relatively low scores for asset management indicate the novelty of the concept for rural water supplies in many countries. Low scores are also found for water resources management, except for Morocco and Ceará state in Brazil, both of which have a long tradition in water resources management. Total sustainability scores at sector level are high in Brazil, China, and Morocco, while countries that are more challenged in putting in place the building blocks for sustainability include Bangladesh, Ethiopia, Haiti, the Kyrgyz Republic, and Nepal.

Institutional Capacity

Box 4.1 summarizes key findings from the assessment for the institutional capacity building block.

BOX 4.1. Key Findings of Institutional Capacity Building Block

Good progress has been made, particularly at national level, to improve institutional capacity, and develop policies and decentralization frameworks to improve sustainable service delivery. Strong institutional capacity is found where rural water is a development priority, translating into clear mandates for national institutions to plan infrastructure development in consultation with local authorities, such as for Morocco, India, Indonesia, Vietnam, and the Philippines. Both Ethiopia and Benin have shown persistent sector leadership: Benin in reforming the rural water sector transitioning to professional private sector management models, and Ethiopia through the establishment of a sector wide approach, known as the One WASH National Program.

In several countries, national programs moved beyond infrastructure provision and aim to support local governments in fulfilling their mandates for service provision. However, progress has been moderate in building capacity at lower tiers of government, at the service authority level, and across various types of service providers as evidenced in figure 4.1.

Figure 4.2 indicates that there is no clear pattern in terms of the relationship between country wealth and progress in addressing institutional capacity. Putting in place

box continues next page

BOX 4.1. Key Findings of Institutional Capacity Building Block (continued)

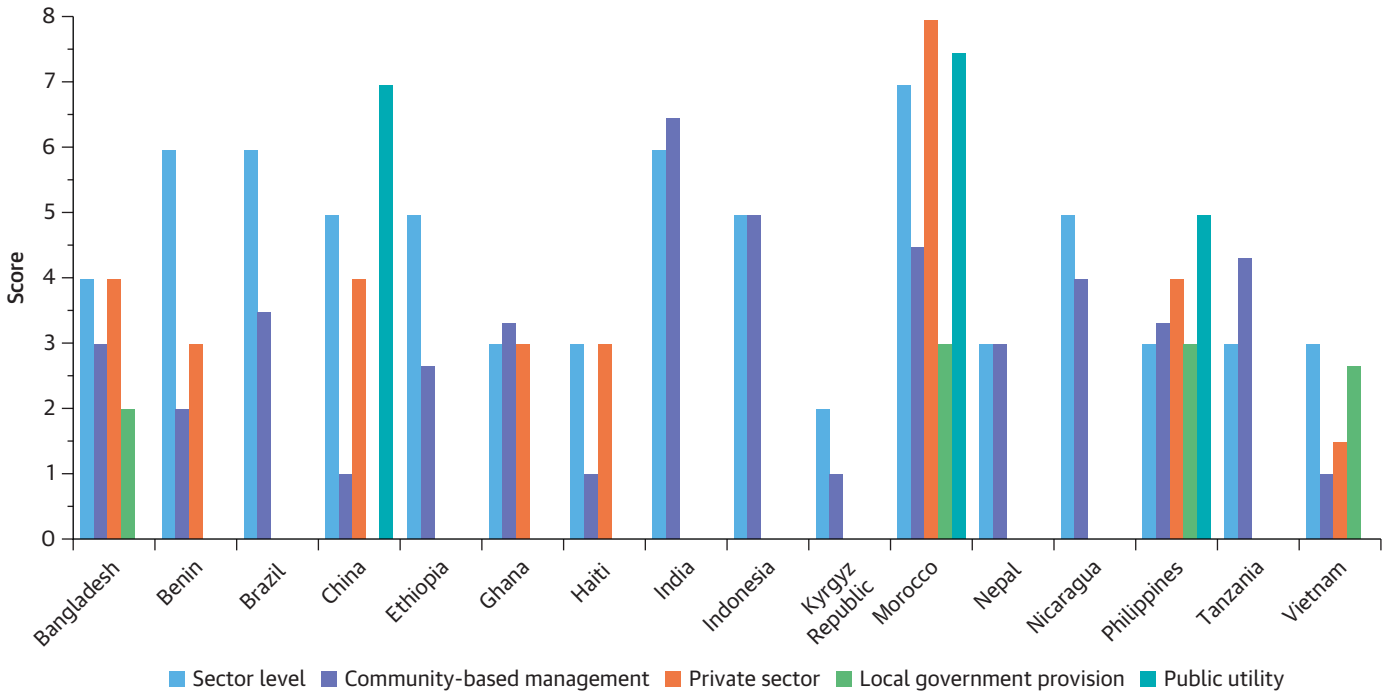
sound institutional arrangements shows clear outliers, such as Ethiopia and Benin, despite having low levels of GNI per capita (~US$2,000 per capita) and on the other hand, Philippines, challenged by institutional fragmentation despite a relatively high GNI per capita (US$8,900).

A number of effective institutional arrangements were identified that hold promise for improving service delivery. Providing structured post construction and monitoring support to service providers was critical. Lessons from Indonesia, Benin, Brazil, India, and Tanzania show this can be delivered through:

- Clearly defined, assigned and resourced local government functions
- Federated platforms/associations acting as technical assistance providers
- Higher tier public entities or utilities, well-funded and mandated to deliver ongoing support to service providers

Another example of improving institutional capacity is aggregating communities to make concession/lease contracts more attractive to private operators, combined with the delivery of capacity building programs for private operators and service authorities to effectively engage in such contracting.

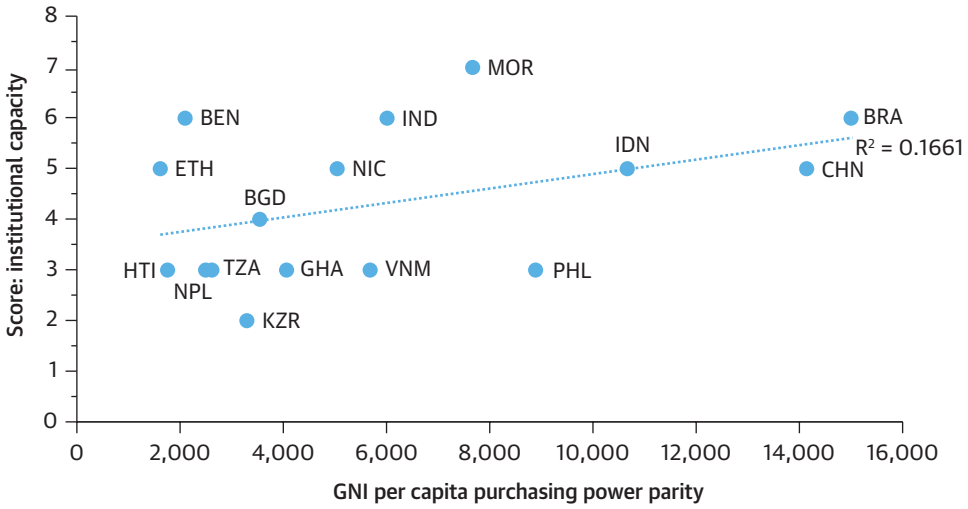
FIGURE 4.1. Institutional Capacity: Sector and Service Delivery Model Scores, by Country



Clarifying Institutional Roles and Developing Sector Leadership

National level progress on institutional capacity has been made by developing policies and frameworks to improve sustainable service delivery (see figure 4.1). Strong national institutional capacity is seen in countries where there is clarity in roles and responsibilities for different aspects of service delivery, where staffing levels are adequate, and funded programs for staff training are in place at different levels. These gains are evident, for example, in Morocco, Vietnam, and India, where rural water supply has been recognized as a key area of development.

FIGURE 4.2. Sector Scores for Institutional Capacity, by Country Wealth, 2015



Note: for Brazil, China and India the GNI figures are for the country as a whole and not only the state or province in the study. BGD = Bangladesh; BEN = Benin; BRA = Brazil; CHN = China; ETH = Ethiopia; GHA = Ghana; GNI = gross national income; HTI = Haiti; IND = India; IDN = Indonesia; KZR = Kyrgyz Republic; MOR = Morocco; NPL = Nepal; NIC = Nicaragua; PHL = Philippines; TZA = Tanzania; VNM = Vietnam

Effective leadership is required to bring rural water to the top of the political agenda, helping to create well-staffed ministries with high-caliber individuals. Sector leadership is often reflected in clear and updated policies, strategies, and legislation that effectively guides state and non-state actors in rural water supply service delivery (see box 4.2). The strength and coherence of the legislative, policy and strategy

BOX 4.2. Different Approaches to Policy Making and Programming

Countries show different approaches to policy making and programming. Although it was found that most countries have some type of either policy, strategy, or dedicated program for rural water services, there are differences in the effectiveness of such mechanisms.

There are cases where national programs are well developed, such as Ethiopia, with clear frameworks and supporting legislation. However, other cases, such as Bangladesh and Brazil, show deficiencies, either because rural water is not fully addressed or the frameworks are incomplete or contradictory. Nicaragua has a strong legal framework, but no targets in the policy and no underpinning strategy for how to operationalize its ambitions. Haiti is still developing its legal framework for water services. The rural water sector in Vietnam does not have a specific national policy but is governed by a number of ministerial decisions and decrees (for example, regarding construction standards, tariff policy and financing arrangements).

framework, as well as the extent to which rural water is addressed in poverty reduction plans, national strategic development plans, or through the integration in social investment programs, is further evidence of sector leadership. In Morocco, the impetus to rapidly expand rural water services led the government to assign the national utility ONEE to take on this mandate. In Vietnam, the delivery of a large-scale government program, the National Target Program[3], was hosted with a dedicated office within the lead institution for the sector, the Ministry of Agriculture and Rural Development (MARD). MARD also provided technical assistance through its National Centre for Rural Water Supply and Sanitation (NCERWASS), supporting provincial governments in planning and implementation. Ethiopia is another example of political leadership, through developing a sector wide approach known as the One WASH National Program (OWNP).

Assignment of Post Construction Support and Monitoring of Service Providers

All countries in the study have decentralized the responsibility of providing water services to local governments (at least in legal or policy terms, although not fully in practice). However, functions such as monitoring and regulatory oversight, as well as post construction support to service providers, were found to be ill-defined or missing in many cases. National programs have helped to build local government capacity to plan and implement rural water infrastructure development. For example, programs in Punjab and Uttarakhand in India were implemented through local government structures in line with decentralization of rural water responsibilities to Gram Panchayats to identify schemes, procure materials and contractors, and ensure the works are carried out. Ongoing support is provided from higher institutional levels, namely districts and state government, to strengthen GP and service provider capacity. Similar experiences are found in Vietnam and Indonesia, where local governments lead the planning process and are in charge of implementation. The Kyrgyz Republic has a clear and well-defined decentralization framework under which *Ayl-Okmotus* (local self-government administrations) are responsible for ensuring service delivery. However, they receive little or no guidance or support from the central ministry or its regional branches for rural water, in large part due to chronic underfunding and lack of staff.

In almost all countries, significant numbers of rural schemes exist with little to no oversight or without any form of support once infrastructure is in place. In the context of decentralization, defining and assigning responsibilities to local service authorities for post construction and monitoring support to service providers remains an area to be addressed in many countries.

In some countries, centralized agencies have yet to align with decentralization policies, maintaining a role in direct implementation rather than facilitating local government in executing their mandates. In Nepal, for a certain period, district authorities lacked elected officials and overall capacity to implement rural water services. The Department of Water Supply and Sewerage, through its divisional offices, continued implementation of water supply projects without district authorities' involvement,

justified by their low capacity. The foreseen introduction of a federal structure will modify support arrangements to local authorities and the extent of functional transfer. In Ghana, the Community Water and Sanitation Agency has a mandate to provide technical support and facilitation to the local government District Assemblies, as well as for resource mobilization. Due to the weak role of local government assemblies, the agency continues to be involved in direct implementation of investments. A review of functional assignment may be needed so that assigned roles are commensurate with capacities and resources of local government assemblies.

In many countries, government institutions and local governments have yet to institutionalize their roles and responsibilities for service delivery beyond project implementation. While understandably project-based approaches are prominent in fragile contexts such as Haiti, even countries with strong capacity such as Ghana, Morocco, and Vietnam are facing common challenges in building adequate institutional arrangements to monitor services and support service providers. Positive examples of institutionalized local government support to service providers can be found in Punjab and Uttarakhand. Both states adopted a sector-wide approach, so that—independent from the funding source—decentralized structures and arrangements would be followed. In both states, the community management model has transitioned into a decentralized local government model, with Gram Panchayats delegating service provision to village water and sanitation committees.[4]

Support to Service Providers Through Ongoing Training and Technical Assistance is Crucial, Although Often Underfunded

At service delivery level, satisfactory institutional capacity is seen where service providers benefit from capacity building—through continuous training programs on technical and financial management—and when providers have access to ongoing support. Although most capital investment programs include an initial component of capacity building for service providers, some countries have made support for service providers a key component of rural programs. This is the case in Indonesia's Community-based Water Supply and Sanitation program (*Penyediaan Air Minum dan Sanitasi Berbasis Masyarakat*, or PAMSIMAS), where targeted support is provided to community based organizations (CBOs) depending on their level of professionalization. In Benin, the government is actively pursuing training programs to develop private sector capacity to engage into concession contracts with local governments (see box 4.3).

Community-based service providers were found to be performing well when supported by larger, aggregated organizations (associations or federations) providing on-going technical assistance. In this professionalized community management model, activities that require economies of scale are carried out at a higher, or federated level, and those that can be done locally are done by the members. This type of tiered model was found in Ceará in Brazil in the *Sistema Integrado de Saneamento Rural* (SISAR) and to a lesser scale in Tanzania through the Water Services Facilities Trust model (see box 4.4).

BOX 4.3. Effective Initiatives to Build Service Providers' Capacity

In **Indonesia**, PAMSIMAS has introduced a grading system to assess community based organizations' (CBOs') professionalization level. This grading system initially classified CBOs into three categories, which enabled program implementers (districts and consultants) to tailor their support activities:

- *Growing CBOs*. Newly formed CBOs require extensive support, such as organizational development, administrative support, training for members, and tariffs setting, for example.
- *Developed CBOs*. Require some level of support, including training board members, on operations and O&M costs, planning and general administration.
- *Independent CBOs*. Those able to sustain their operations without much support.

In **Tanzania**, the World Bank has developed a water user committee (so-called COWSO) competency monitoring tool, adapted from the Indonesian experience. The tool is a checklist covering COWSOs' competency and service provision over a range of areas. It provides a score, which can be used for benchmarking of performance between COWSOs, which introduces the potential to incentivize excellence, and can be used by civil society for advocacy purposes. By using a structured checklist, the tool identifies what the COWSO is not doing or where it lacks in capacity, and therefore not only provides guidance on what areas of support they need, but also provides form of aspirational roadmap for the COWSOs on the direction that they should be working toward.

In **Benin**, a program of training to private operators was initiated as part of a pilot project funded by the World Bank, due to scale up in 2017. The program organized national workshops in different parts of the country to attract a large pool of private operators, and partnered with a local Business Development Service provider to develop a national training program for water operators, focusing on both technical and financial management. Operators that complete the program will obtain a certificate that will strengthen their profile when seeking commercial loans for investing in water schemes.

In **Uttarakhand (India),** capacity building of the water committees (UWSSC) and Gram Panchayats was scaled up by adopting a sector-wide approach in 2006: the same approach to capacity building was followed independently of whether funds came from the World Bank loan, or from regular State and Central government funds. During project implementation, a series of bodies at block, district and state level provided support to Gram Panchayats (GPs) and Village Water and Sanitation Committees (VWSCs), and were strengthened in the process, including facilitating necessary mergers and coordination mechanism. The block, district and state bodies have now taken on their role in providing continuous post construction support, for example, through the deployment of a dedicated back-stopping agency for operation and maintenance (O&M) in Uttarakhand.

BOX 4.4. Delivering Support to Community-Based Management Organizations through Larger Associations or Federations

In Ceará (Brazil), the SISAR model builds on the strengths of community management, complemented by the possibility of professionalizing operators through a federation and the technical assistance from the state water supply company (CAGECE), resulting in performance improvements. The model engages three entities, with different, but clearly defined, tasks in service delivery:

- The member associations are responsible for daily operations such as switching on pumps, local minor maintenance (for example, small leakage repairs), water meter reading and handing out water bills, as well as user awareness raising and hygiene promotion.
- The Federation is responsible for major maintenance, water quality testing, billing and tariff collection, and small expansion works. It is split into eight regional units, which are responsible for monitoring, planning and organizing maintenance work.
- CAGECE is responsible for supervising the implementation of new rural water systems or major rehabilitation works, thereby ensuring the technical quality of construction. In addition, CAGECE carries out performance monitoring of SISAR and delegates staff and equipment to SISAR units, and finally, it provides laboratory facilities, but these services are paid for by SISAR.

A critical aspect of this model is the way in which in the financing of the costs are aggregated. The tariff structure includes clearly established guidelines to define which part of the tariff remains at member association level, and what part goes to the Federation level. Moreover, there is predictable public finance for replacement of major infrastructure components.

In Tanzania, multiple COWSOs joined together to enable the centralization and professionalization of management of their water supply services. It is named locally as a "water services facilities trust." Examples of this management model can be found in Hai and Siha districts, some of which had been in existence since the early 2000s. Within this model, village water schemes are overseen by a Board of Trustees. These boards in turn aggregate to form Water Trusts. For example, each village would have a water committee (COWSO) responsible for daily upkeep, resolving local conflicts, and processing connection applications. A representative from each water committee is a member of a wider multi-village board, and in turn members of the board represent a multi-board trust. A chairperson, vice and three other board members are elected from among the village and board representatives to form the executive board. The overall trust employs a manager, accountant, and technicians to run particular branches of the system. This aggregated, centralized model generally has higher administrative and technical capacity than in single-scheme COWSOs. Their larger revenue base also allows them to better absorb 'shocks', such as unexpected system failure, and access loans for network improvement or expansion.

In several countries, national, regional, or local utilities are increasingly supplying water to rural populations. A range of utility services in rural areas can be found from integrating a few schemes as in the Philippines (Water Districts) or Vietnam (Joint Stock Companies) to wide-spanning service provision in rural areas in Morocco (ONEE) or China (Water Affairs Companies). Most of these utilities have sound technical capacity, enabling a higher service level for rural populations. Although rural water services are less commercially attractive, building on the capacity of larger urban or regional service providers is a promising avenue to improve rural services.

A critical challenge in building service provider capacity and monitoring their performance is securing sustainable funding streams for execution of these functions, from local governments and other sources. This is a critical gap in many countries, and even where responsibility for financing these important tasks is clear, funding is frequently inadequate. For example, in Nicaragua the costs of providing technical assistance and support to community organizations are supposed to be covered by municipal governments. However, according to national data, current levels of expenditure are only a fraction of what is needed and of 152 municipal water and sanitation units that were surveyed, 119 reported not having an operational budget for technical assistance in the field of water supply.

Financing

Box 4.5 summarizes the key findings under the financing building block.

Wealthier Countries Tend to be Better Positioned to Develop Sound Financing Arrangements

The extent to which countries have put in place sound financing arrangements for the rural water sector tends to be more advanced with higher levels of country wealth (see figure 4.3). This refers to whether financing needs and commitments are known as part of a sector-wide investment plan, whether funds are leveraged from service authorities, whether sufficient resources are allocated beyond capital investments such as for direct support to service providers and indirect sector costs, and whether tariff policies are in place to ensure affordability of services for the poor. Limited financial capacity at central and local level, and limited capacity to put in place the necessary financing mechanisms, are perhaps to be expected in fragile countries as Haiti. On the other hand, lower-middle income countries, such as Bangladesh, remain challenged by a lack of a predictable and incentive-based financing to improve service levels and sustainability. Ethiopia and Benin—both low-income countries—have been more successful in establishing the mechanisms for effective financing, such as coordinated funding mechanisms, assessment of investment requirements and sound tariff policies (see figure 4.4).

The Majority of Countries have Developed Dedicated Longer Term Investment Programs for Rural Water, Financed through Central and Local Resources

All countries—except Haiti and Nicaragua—have carried out some type of sector-level assessment of capital investments required to achieve universal coverage (or other

BOX 4.5. Key Findings of Financing Building Block

Good practices were found where countries planned capital investments in rural water services based on sector-wide approaches and where investments are systematically co-financed through national and local tax revenues, augmented with well-coordinated development partner transfers. Fixed percentages of community contribution to capital inlays are being replaced with a flexible approach, where household contributions are upheld but aligned with affordability levels.

Driven by the access agenda, a common challenge remains implementation of sustainable financing mechanisms to cover recurrent costs, capital maintenance, and capital replacement, whether through tariffs, taxes, or transfers. Tariff policies remain urban-biased, ill-defined and not adequately tailored to rural contexts. The common approach is that local governments are called to the rescue upon scheme failure through an ad-hoc rather than a planned life cycle cost approach. Political prioritization of other sectors by service authorities further puts rural water schemes at risk.

Tariff guidelines that accurately define and allocate responsibility for financing different life cycle costs emerge as good examples. The implementation of such guidelines can help operationalize policies at local level and overcome low willingness-to-charge by service authorities. Affordability constraints by rural households were not identified as a critical issue in the study countries.

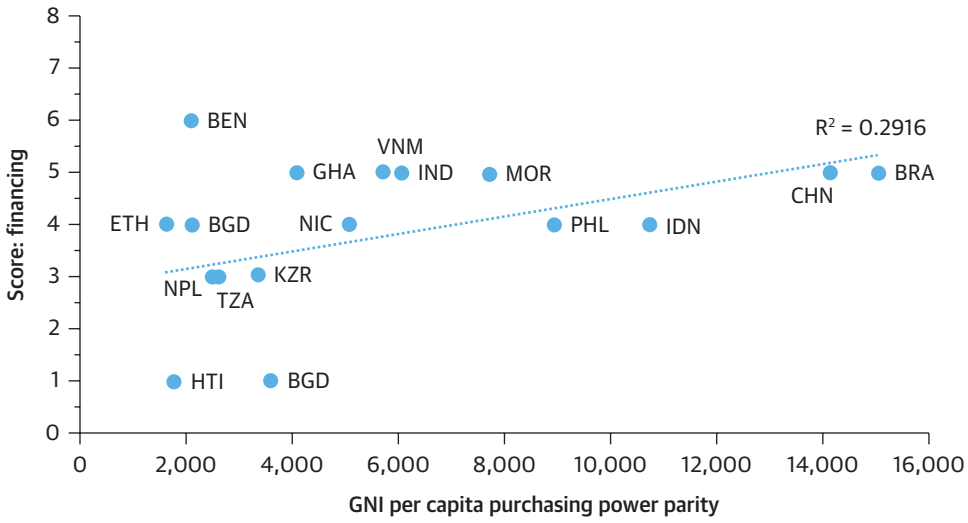
Other good practices identified to increase the financial sustainability of rural water services are:

- Assessment of realistic demand for services and the tailoring of design standards to local conditions
- Heavy investments in community mobilization and communications to accompany the transition to higher level services and metering
- Diversifying management models to include private sector and utility models, which tend to be exposed to formalized regulatory oversight and enforceable tariff regimes
- Addressing costs reductions through innovations such as solar pumping
- Introduce result-based finance mechanisms to incentivize governments to focus on sustainability of rural water investments

coverage targets). Several low and middle-income countries have put in place coherent national investment programs that are able to attract development partner funding and coordinate activities in the sector, for example, Ethiopia, Morocco, Tanzania, Indonesia, Benin, and Nepal.

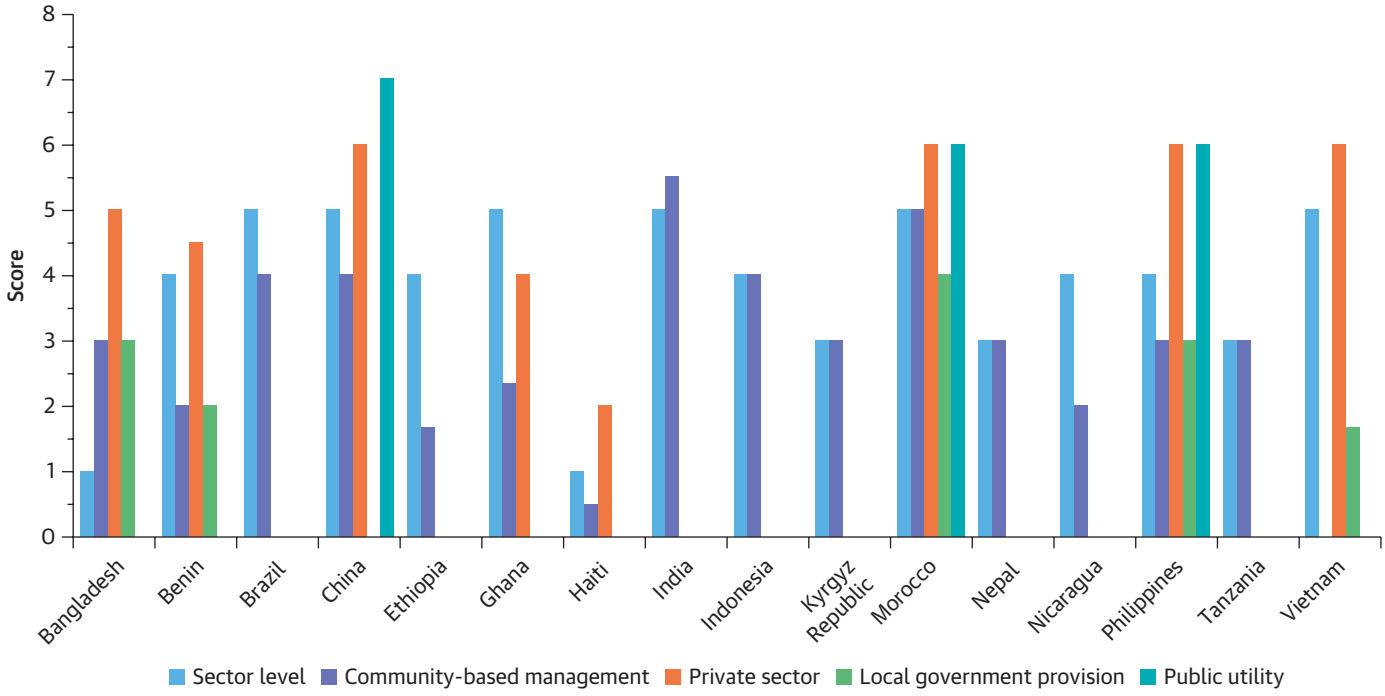
In at least nine countries, local governments are co-financing and implementing capital investments through earmarked central government transfers, supplemented with funds from locally raised revenues. In Vietnam, for example, provincial authorities have received earmarked funds through the National Target Program for rural water, with matching contributions from provincial budgets. The latter are expected to increase now that the National Target Program has ended. Similar arrangements are found in the Philippines, where municipal governments are implementing the so-called SALINTUBIG program[5] for rural water, and in Tanzania, where local government authorities are implementing the National Water Sector Development Program. In China,

FIGURE 4.3. Sector Scores for Financing, by Country Wealth, 2015



Note: for Brazil, China, and India the GNI figures are for the country as a whole and not only the state or province in the study. BGD = Bangladesh; BEN = Benin; BRA = Brazil; CHN = China; ETH = Ethiopia; GHA = Ghana; HTI = Haiti; IND = Indonesia; KZR = Kyrgyz Republic; MOR = Morocco; NPL = Nepal; NIC = Nicaragua; PHL = Philippines; TZA = Tanzania; VNM = Vietnam

FIGURE 4.4. Financing: Sector and Service Delivery Model Scores, by Country



local governments contribute significantly to capital investments, typically a third of investment requirements, in line with central government policy. Ethiopia's leadership has resulted in increased public expenditure from 0.41 percent of GDP in 2008-09 to 0.67 percent in 2011-12 and the establishment of a Consolidated WASH Account to bring together development partner financing.

Community Contribution Remains Important but is Looked at More Flexibly

With higher level of service requirements and the more challenging and often poorer communities left unserved, a dogmatic "5 to 10 percent community contribution" is being replaced with a flexible approach where household contributions are upheld as a principle, but aligned with affordability levels. While several countries have a policy for community contributions to capital investment[6], in reality, such contributions were reported to be relatively minor. Guidelines are not strictly followed (for example, in Vietnam) or have been dropped (for example, in Ghana). In the context of World Bank support projects in Punjab and Uttarakhand, the percentage-wise contribution has changed to a fixed amount, at a level considered to be more affordable, similar to in the Kyrgyz Republic. In Nepal, with a strong tradition of community driven development, contributions of around 20 percent of the capital cost are expected from households. This "self-help" approach has been acknowledged as a driver for Nepal's progress in increasing access in rural areas.

Financing Recurrent O&M Costs, Capital Maintenance and Capital Replacement Requires More Accurate Tariff Guidelines and Policy Frameworks

Driven by the access agenda, financing strategies for rural water have mainly focused on capital investments, with less attention to adopting realistic approaches to finance recurrent costs, capital maintenance and replacement. Only seven of the 16 countries have a formal tariff policy pertaining to rural water supply services. In most countries, policies do not differentiate between urban and rural contexts and require "full cost recovery" as a blanket policy without further guidance on how operational, capital maintenance and capital replacement would be financed in rural contexts, or for different type of schemes in rural areas. Moreover, the definition and understanding of the commonly cited "full cost recovery" is often inaccurate and ambiguous.[7] Countries with no national tariff policy include Brazil, Haiti, and Benin, although in the latter the *Direction Générale de l'Eau* provides guiding principles. The Kyrgyz Republic has just developed a national policy (2016), but it has yet to be applied.

One challenge across several countries is to see policies translated into practice at local level. In particular, most countries lack detailed guidelines for setting tariffs at scheme level. As a result, only a few countries identify which specific costs are to be covered out of tariffs, and which will be covered out of taxes (or transfers). Without a clear framework that allocates financing responsibilities between service providers, service authorities or central government, based on the real costs of water provision, the common approach of "fix on failure" prevails. By contrast, in Brazil—in the absence of a national policy—a tariff guideline

has been established under the SISAR model. In this system, user tariffs are designed to recover operation costs, costs for SISAR technical assistance agents, minor maintenance costs and short life-span assets (for example, pumps), whereas funding for replacement of distribution networks is expected to come from general state taxes.

When tariffs are insufficient to meet costs, local governments tend to come to the rescue, through an *ad hoc* rather than a planned life-cycle cost approach. Political prioritization of other sectors further erodes financial sustainability of rural water schemes. In the Philippines, for example, Barangay (village) governments often subsidize O&M costs, as revenues from tariffs are too low. In the Kyrgyz Republic, *Ayl-Okmotus* step in to cover major repairs, although in an *ad hoc* manner. Competing priorities mean that water services may not make it to the top of local governments' agendas. Even when local government funds are earmarked for sustaining water supplies, they may be used for more politically "attractive" projects such as roads. In Vietnam, despite a comprehensive national tariffs policy set by the Ministry of Finance, which recognizes the need to subsidize rural water services—including for operational costs, where affordability is a constraint—its application is limited by local governments' reluctance to invest their own funds in rural water services (see box 4.6).

For most countries, the challenge remains to increase the willingness to charge by service authorities and lift political resistance to such increases. This challenge is often rooted in the absence of an oversight and support mechanism to assist service providers and authorities in calculating tariffs, and transparent processes to approve them (see section 4.5).

BOX 4.6. Vietnam's Tariff Policy and its Implementation

Vietnam has developed comprehensive guidelines for calculating full cost-recovery tariffs, that is, which take into account operations costs, the cost of capital, and asset depreciation. The tariff setting process involves a first step of validation by the ministries concerned to verify the calculations behind the proposed tariffs. Once validated, service providers propose the tariffs to provincial authorities, or the Provincial People Committees (PPCs) for their subsequent approval, which takes into account affordability constraints.

Regardless, any tariff should be within the bracket set for rural areas—between D2,000 (US$0.08) and D11,000 (US$0.48) per cubic meter. If the tariffs required by the service provider to meet full cost recovery are above what would be considered affordable by the PPC (see Decree No. 117/2007/ND-CP), then PPCs must subsidize the difference between the social tariffs and the commercially viable tariffs. PPCs are required to disburse a subsidy to service providers to ensure that assets are adequately maintained. In practice, PPCs do not often implement the Decree, and there are no mechanisms to incentivize them to do differently.

Nicaragua is a case in point, where municipalities often do not exercise their authority—and responsibility—to review and approve the tariffs set by water committees; the same is true of a significant number of District Assemblies in Ghana. In other cases, such as China and the Kyrgyz Republic, tariff setting is supposed to be formally regulated and approved by third-party government bodies, Anti-Monopoly Commission and Financing Bureaus respectively, but in practice political influence often results in suppressed tariffs.

Willingness to charge was found to be especially critical in situations where service levels are transitioning from point-source or stand posts to piped networks with individual house connections. In these settings, community-based service providers are expected to professionalize and perform at a higher level, or in some countries service provision is delegated to the private sector, where a predictable revenue stream through regulation by contract becomes indispensable.

Affordability of Rural Water Services Does not Seem to be a Key Issue Based on the Current Rural Tariffs Levied

The study found that tariff levels for rural services were affordable across most countries, even for the poor. Appendix F includes details of tariff policies, tariff ranges and estimates of affordability. For most countries, water tariff expenditures were in the range of one to three percent of monthly income of poor households, with Benin, Brazil, and Ghana showing slightly higher values, still within the 5 percent affordability bracket. A global body of evidence confirms that those who are not connected to public services are often paying the highest price for water services. In Ghana and Bangladesh, tariffs that have been set by service authorities or providers are often only partially paid or more likely not paid at all, with user contributions collected upon failure of a facility. In Benin, household connections were found to be more affordable for the poor than stand posts services (see box 4.7). Attention is required to avoid large discrepancies between official tariffs—sanctioned by the service authority—and what customers pay at public stand posts, due to excessive mark-ups.

A Multi-Pronged Long-Term Approach is Needed to Develop Financially Sustainable Service Delivery Models

In the study countries, more advanced financing arrangements can be found for private sector models and public utility management models (figure 4.3). These management models tend to have more comprehensive and enforceable tariff regimes that aid their ability to generate revenues beyond operational costs, finance capital maintenance, and a part of asset replacement costs. In the absence of tariff guidelines for rural services, not many service authorities or service providers can source the full life cycle costs, or even have the capacity to determine these. Many countries face difficulties in even securing operational cost recovery, especially for (non-supported) community management models or direct government provision, eroding the sustainability of these models.

In addition to unclear tariff policy and inadequate allocation of responsibilities between service providers and service authorities, low consumption levels were found to limit the

BOX 4.7. Who Pays the Most: Households with Connections or Stand Post Customers?

Rural water schemes can be an attractive source of additional revenues for operators. In Benin, for example, tariffs in rural areas are generally higher than in urban areas (where they are set at CFAF488 per cubic meter or US$0.78 per cubic meter). Those who pay the highest price are those who use communal stand posts (often fed through small piped water schemes) managed by *fontainiers* or water kiosks operators. Reported tariffs applied by water scheme operators to *fontainiers* vary between CFAF420 (US$0.7) per cubic meter to over CFAF800 (US$1.3) per cubic meter in some areas.

However, tariffs that are applied at communal stand posts are three to four times higher than those applied by operators to the *fontainiers.* Commonly, a 20 litre bucket (often used by communities to fetch water at stand posts), is sold by *fontainiers* for CFAF25. This means that the tariff effectively disbursed by rural populations using stand posts is CFAF1250 per cubic meter (US$2), which is nearly double the average tariff applied for household connections (and the tariff paid by *fontainiers*). There is therefore a strong case for promoting household connections to support more affordable tariffs. Scaling-up higher service levels (that is, through household connections) requires adapting service delivery models to this new customer basis. For example, there may be a need to consider weekly bills before gradually moving to monthly bills so customers are gradually acquainted with the service delivery model.

Source: WSP 2015.

revenue streams of rural water schemes. Low consumption is generally due to households' easy access to alternative sources of water, combined with the low perceived benefit of using improved sources. In some cases, affordability constraints can be at play. Consumption is often low where households only have access to communal stand posts, as opposed to household connections.

Addressing willingness to pay for higher service levels and a transition to metered connections requires substantial efforts in community mobilization and communications. Without significant investments in communications campaigns from the design phase (throughout construction and until the early stages of operations), households may remain reluctant to use the newly installed connections. In Vietnam, for example, it was found that many large multi-commune schemes constructed under the World Bank-supported National Target Program were functioning at sub-optimal levels due to very low consumption levels. High switching costs—such as for in-house plumbing—may constitute additional barriers. In contrast, in Morocco, in programs led by the public utility ONEE, demand for household connections is carefully assessed through community mobilization activities and households

BOX 4.8. The Role of Community Mobilization for Extending Household Connections in Morocco

Community mobilization is at the heart of ONEE's approach in rural areas. Communication activities to generate buy-in from the population, identify demand for services (and the level of services) and explain the benefit of projects, are embedded at all implementation steps from design to construction. These activities are led on the ground by facilitators deployed in each village where ONEE is looking to extend the network.

A key objective of these activities is to identify the service levels required, and if they prefer household connections or whether communal stand posts would be sufficient to meet their demands. ONEE agrees to provide household connections only where 70 percent of the village population (*douar*) express such a demand and when communes are able to contribute toward financing 15 percent of required investments. In addition, households are required to pay the connection costs, set at DH3,500 (US$348) in rural areas. For households that are not able to disburse this sum upfront, a revolving fund has been set up to provide credit facilities.

ONEE has developed a procedure to ensure that poor households are prioritized for accessing the credit facilities. All households are required to make a minimum deposit of DH1,000 (US$99), in two installments for their connection. The implementation of these procedures relies on significant investments in community mobilization to accompany populations in this transition toward increased levels of services.

expressing demand for individual facilities are asked to make a substantial deposit toward covering installation costs (see box 4.8).

Technical and financial viability of rural schemes can be enhanced if water demand and demographic trends are adequately assessed and design parameters are tailored to rural conditions. In China, facilities were found to be overdesigned—up to a factor of seven—due to application of urban-biased per capita water demand standards, combined with neglect of a strong demographic trend for rural out-migration. Other factors depressing water demand across countries in rural areas were taste preferences and elderly "left behind" populations not having adopted higher consumption hygiene behaviors. Low tariffs and low consumption, combined with overly costly infrastructure, negatively impacts viability both financially and technically due to low throughput, leading to maintenance and water quality issues.

Where rural electrification is low and reliance on diesel inflicts high operational costs, switching to solar-powered systems may improve the financial sustainability of water schemes. Steps in this direction have been taken in Tanzania, where the World Bank is assisting the government in adopting solar energy at scale to reduce the operational and

maintenance costs of rural water supply schemes. Solar schemes may likely be more sustainable in the long term given fewer opportunities for systems to break down, provided theft and vandalism is adequately prevented.

Finally, to incentivize central and local governments to focus on the sustainability of rural water investments, results-based financing mechanisms are being introduced. Vietnam is implementing a Program for Results World Bank loan, where disbursements are linked to achievements of pre-determined targets, which are proxy measures of sustainability (for example, professionalized management and cost-recovery levels). In Tanzania, the UK's Department for International Development (DfID) is supporting the government with a Payment by Results scheme, with disbursements linked to i) bringing non-functional facilities back into operation, and ii) keeping facilities functioning in a given year. Such approaches require the presence of accurate baseline data and robust monitoring systems (see also section 4.5).

Asset Management

Box 4.9 summarizes the key findings from the asset management building block.

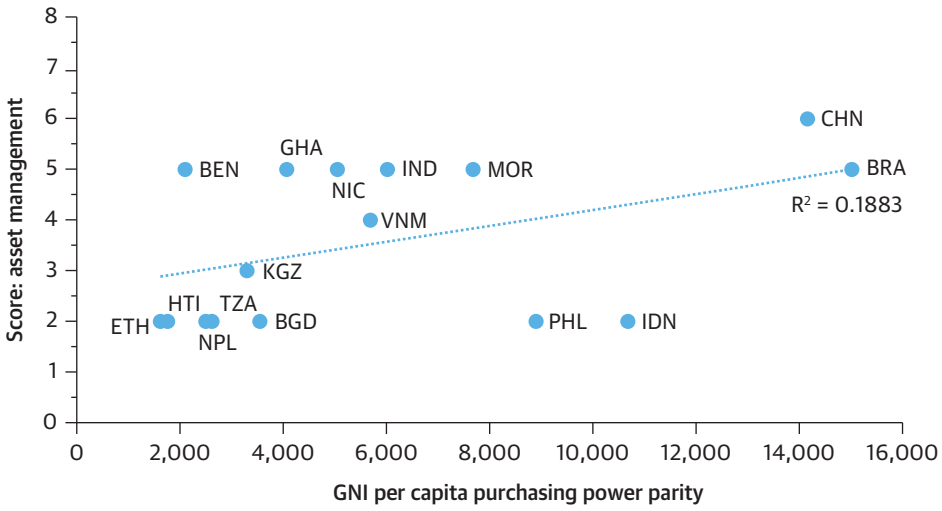
BOX 4.9. Key Findings of Asset Management Building Block

Asset management is a relatively new concept in the rural water sector. Regardless of economic development (see figure 4.5), half of the countries still need to address basic issues, such as clarity around asset ownership, clearly defining responsibilities for capital maintenance and renewal, and carrying out first-time inventories or – as a start water point mapping exercises.

Common challenges are de-facto practices conflicting with incomplete legal frameworks, and overlapping responsibilities at different levels of government that aid to the ambiguity in asset management responsibilities. Asset management of small water schemes, managed by communities or local governments is mostly absent. Better scores for asset management at service provider level are found in contexts with urban/regional utilities, private sector models, or multi-village schemes with aggregated, professionalized management arrangements, such as the case in Benin, China, India, Morocco, Nicaragua and Vietnam (figure 4.6).

Ghana has made good progress to allow assets to be adequately maintained through: i) clear asset ownership, ii) allocation of responsibilities for different asset maintenance categories, iii) financing mechanisms, iv) asset management guidance documents. Some innovative financing mechanisms for capital maintenance of rural schemes are identified, such as through pooled fund arrangements, sourced from tariff revenues and local taxes (China, Ghana).

FIGURE 4.5. Sector Scores for Asset Management, by Country Wealth, 2015



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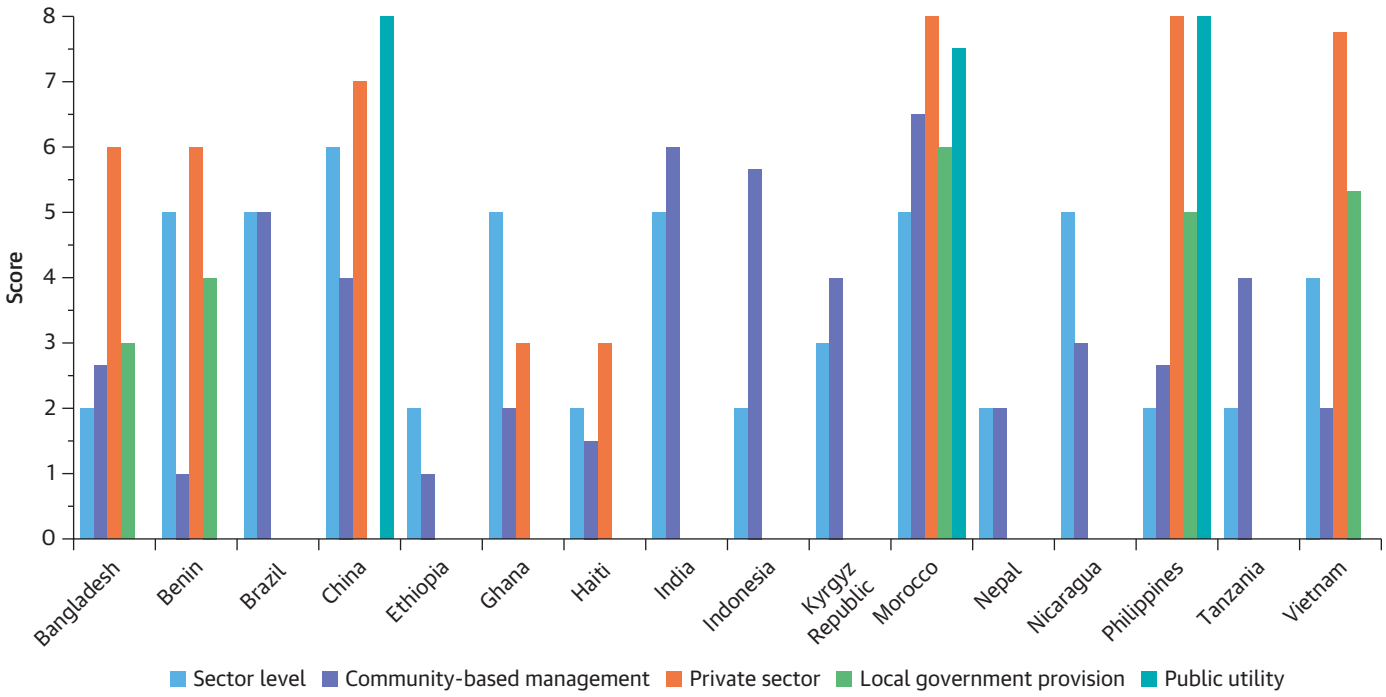
Clarity Over Asset Ownership is the Basic Starting Point, Although This is not Always Well Defined in Legal Frameworks

Asset ownership was found to be well defined in some, but not all countries, with legal documents clearly allocating ownership to a specific entity, in most cases local governments. In Benin, the law on decentralization clearly identifies local governments (*communes*) as owners of rural water assets, as is the case in Ghana and the Kyrgyz Republic, where the *Ayl-Okmotu* legally own water supply assets and may then draw up agreements to

FIGURE 4.6. Asset Management: Sector and Service Delivery Model Scores, by Country



delegate the management and operation of individual schemes to a third-party entity. Similarly, in Brazil, the Federal Constitution allocates the responsibility for water supply to the municipalities and assets are retained under municipal ownership. Similar clarity was found in Ghana. In China, asset ownership is clearly established by national guidelines and is determined by which entities or agencies financed the schemes, allowing four possible scenarios including provisions for asset ownership transfers. Thus, asset ownership normally stays with the service authority, which is responsible and better positioned to provide long-term capital support for infrastructure expansion and major maintenance.

In other countries, however, ambiguities on asset ownership remain. In India, for example, there is no clarity in national guidelines regarding asset ownership, as rural water is a state subject. As a result, asset owners are designated depending on the program or implementing agency through which water schemes are constructed, as per state-level guidelines. Likewise, in Ethiopia there is still lack of clarity around asset ownership, and asset management is not yet established as a commonplace approach in the rural water sub-sector, although there have been recent national-scale efforts to develop inventories of water facilities.

In some cases, ownership has *de facto* been given to community-based management organizations, in contradiction with existing legal frameworks for service provision. This is the case in Indonesia, for example, where communities are made *de facto* owners of the assets, when local governments are service authorities, that is, they are responsible for the provision of water services. In some countries national legislation is conflicting, such as in Tanzania, where the Water Supply and Sanitation Act (2009) state that community-based organizations, so-called COWSOs, own water works, while the local government act designates local governments as service authorities. In Ethiopia, asset ownership is ill-defined, resulting in lack of clarity for responsibilities with regards to asset maintenance and renewal. Communities are *de facto* made responsible for operations, maintenance and asset renewal, although they struggle to obtain any funds for asset maintenance or renewal from their village administrations. In turn, village administrations consider assets to be owned by communities and are reluctant to take on a greater share of the financing burden post construction.

Allocation of Responsibilities for Asset Management Needs Precision, Especially when Several Levels of Governments are Involved

Even when asset ownership is well defined, the absence of formal delegation agreements creates confusion over the allocation of asset maintenance responsibilities between service authorities and service providers. Similarly to tariff setting guidelines, delegation agreements often lack clarity on detailed categories for asset repairs and maintenance, specifically for "minor repairs," which should be financed and carried out by the service providers, and "major repairs," which are to be carried out by the service authority. This lack of detailed allocation of responsibilities is found in situations without formal agreements, for example, between local governments and community-based organizations, but also in cases with formal contractual arrangements, such as poorly drafted lease contracts in Benin or unregulated concession contracts in Vietnam.

Overlapping responsibilities at different levels of government in highly decentralized countries can also aid the ambiguity in asset management responsibilities. In the Philippines and Indonesia, where assets are owned by local governments, there are overlapping functions for the lowest two tiers of government, that is, village administrations and district authorities. Financial responsibility for asset maintenance and renewal has not been well assigned and requires clarification as part of territorial and governance reforms.

Asset Inventory and Asset Management Tools are Key to Better Asset Management Practices

Many countries have taken steps toward a comprehensive inventory of rural water assets, with associated capital value, such as Uttarakhand (India), Nicaragua, the Kyrgyz Republic, Vietnam, and Benin. Since 2016, Benin's government has been scaling up the inventory of all rural and small-town piped water schemes, to optimize the conditions for delegation to professional operators, using a cloud-based platform and service (mWater). Other countries have carried out large-scale water point mapping such as Ethiopia, Tanzania, and Nepal, although such exercises should not be confused with detailed asset inventories. In the context of limited financial capacity and a lack of prioritization for rural water supply, less-resourced governments may face difficulties in prioritizing the asset inventory and introduction of management practices without dedicated development partner support (see figure 4.6).

There is little to no evidence that asset management of small water schemes, either managed by community-based organizations or local governments, has been institutionalized in rural water provision. As previously highlighted, most countries plan for rural water services in an *ad hoc* manner, often only responding as and when service failure occurs. Assets are normally maintained or replaced as "fix on failure."

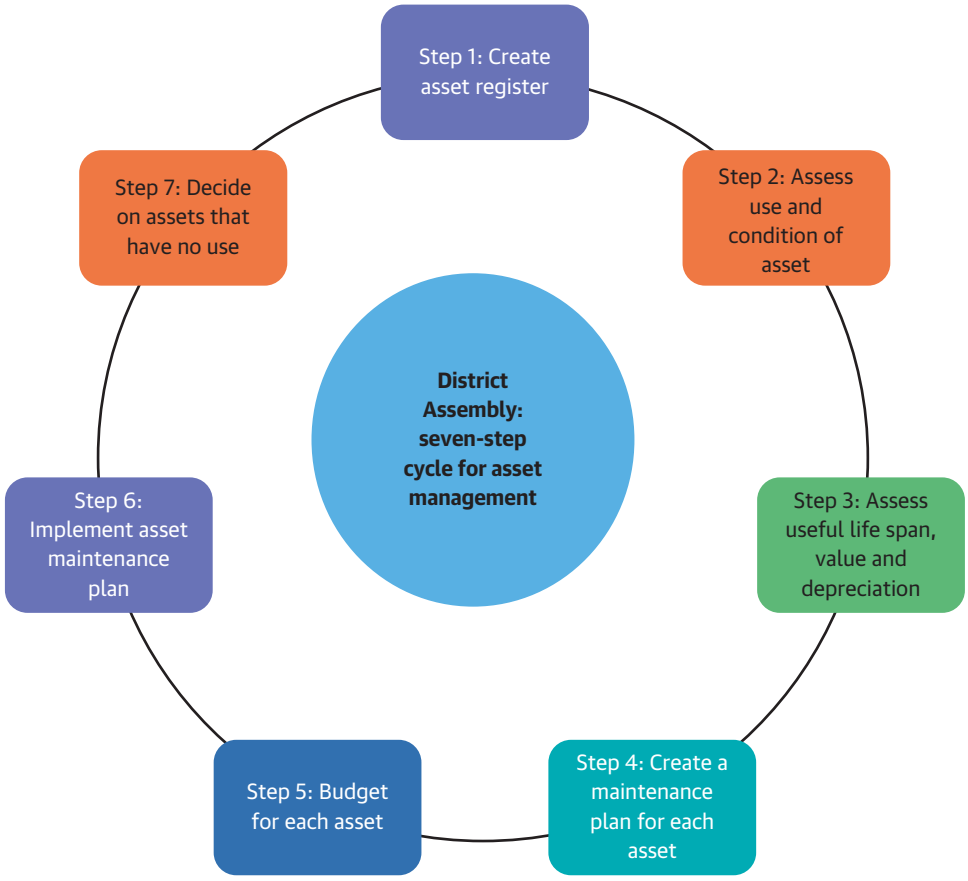
Asset management practices of public utilities and private sector management models are more advanced. Where large national or regional utilities are involved in rural water supply, rural assets are treated similarly to other assets: for example, Morocco's ONEE has a detailed inventory of all assets, including communal stand posts.

Only two countries, China and Ghana, have a comprehensive framework for asset management. In Ghana, the government's Community Water and Sanitation Agency has a well-defined seven-step cycle as part of its guidance on infrastructure asset management (see figure 4.7). In China, large-scale utility urban providers serving rural populations have well established asset management practices. In both countries, there is clear differentiation between major and minor repairs and funding mechanisms are outlined, although due to financial constraints funding is not necessarily available.

Financing of Capital Maintenance and Replacement is Happening through Capital Maintenance Funds, Although the Sustainability of these Funds Remains Challenging

In several countries, part of the revenues feed into a capital maintenance fund. In Benin, service providers, including for manually operated handpumps, pay part of their revenues,

FIGURE 4.7. Seven Step Asset Management Cycle, Ghana



Source: CWSA District Operational Manual (2014).

the *redevance* (royalty or fee), to a fund managed by local governments. In China, Shaanxi provincial government is applying a policy of requiring operators to set aside a minimal proportion of revenues for capital maintenance with a guideline of US$0.015 per cubic meter sold. In addition, county governments have established maintenance funds to support rural water schemes using their own tax revenues. Another innovative example of financing capital maintenance was found in Ghana, where a mutualized fund was created for three regions, although challenges persist with this type of pooled fund arrangement (see box 4.10).

BOX 4.10. The Reserve Fund, Ghana

The three northern regions of Ghana offer an example of the use of pooled funding (sometimes also called mutualization of funds) to address capital maintenance needs. The Association of Water and Sanitation Development Boards (AWSDB) was formed in 1995 when the Canadian International Development Agency (CIDA) supported an intervention to rehabilitate water systems for community management. CIDA requested the communities to make upfront payment of six months' operations and maintenance as commitment fees. The funds were mobilized by the AWSDB and deposited in a reserve fund. In addition, the AWSDB mobilized a 5 percent capital cost contribution from 22 communities that were benefiting from water systems being rehabilitated by the World Bank. The AWSDB advocated for the funds to be deposited in the reserve fund and invested until completion of the rehabilitation works, when

box continues next page

BOX 4.10. The Reserve Fund, Ghana (continued)

the funds were paid. The build-up of the reserve fund was supported through investment in short-term government treasury bills that yielded high returns, as interest rates were high at the time. Other sources of funds for the reserve fund were donations received from individuals and external support agencies. From 1998 to 2003, the reserve fund was in the range of US$100,000 to 330,000 and the average interest rate 24 percent to 39 percent. The board members were obliged to purchase shares (unit trusts) as well as annual subscription fees. The funds that accrue from this fund are issued as loans with moderate interest to members who apply to fix their water systems whenever the cost for repair or replacement is beyond what they can afford on their own. In the event of a breakdown, a formal request is made by writing to the association. Afterwards, a team from the association assesses the situation and makes a recommendation to the executive committee.

Initially, members were made to pay monthly contributions. However, over time, payments became irregular because some WSDBs are in remote areas where there are no rural banks to facilitate the payment of their contributions. As a result, frequency of payment was changed to quarterly. Some WSDBs do not pay on a regular basis, with the consequence that requests for financial assistance by some members who are in dire need may not be honored. A major challenge in administering the pooled funding is the high rate of defaults in payment due to the remote location of some of the water schemes, although the increase in the use of mobile phones for payment could help address this challenge. In addition, the association has not been able to address all the needs of the WSDBs due to limited funds from the contributions and, most importantly, because the fund is mainly used after system breakdowns and not for preventive maintenance.

After implementing the scheme for some time, the AWSDB now faces several financial challenges, making it difficult to achieve its original aim. An NGO is currently providing the AWSDB with financial support to continue its operations.

Source: Fonseca et al. 2013.

Water Resources Management

Box 4.11 summarizes the key findings for the water resources management building block.

Low Income Countries Struggle to Advance on Water Resources Management Practices

Figure 4.8 shows that low-income countries seem to have advanced less in developing adequate water resources management practices conducive for sustaining rural water services, such as legislation frameworks, effective basin agencies, and local water management

BOX 4.11. Key Findings Water Resources Management Building Block

Most countries have legal frameworks for water resources management that prioritize allocation to the domestic water supply. However, water resources management bodies at sub-basin or local levels remain weak in the majority of country studies. Only in a few countries do sub-basin or local WRM bodies have rural drinking water interests represented through rural service providers or service authorities.

Good practices in both policy and operations are seen in water-scarce environments, such as Morocco and Ceará state in Brazil, both of which have a long tradition of water resources management as they are driven by physical water scarcity. Other examples of good practices have emerged, including:

- Proactive measures by the drinking water sector to recharge aquifers and set up aquifer management initiatives, and integrating catchment protection and management in rural water programs (India)
- Development of local-level planning initiatives to enhance collaboration among water users, local governments, communities and water resources management entities (Nepal)

Advanced practices such as water safety programming and vulnerability assessments were only found within the context of urban utilities serving rural areas (see figure 4.9). Adapting such approaches to a rural context with fragmented service providers has thus far been challenging.

FIGURE 4.8. Sector Scores for Water Resources Management, by Country Wealth, 2015

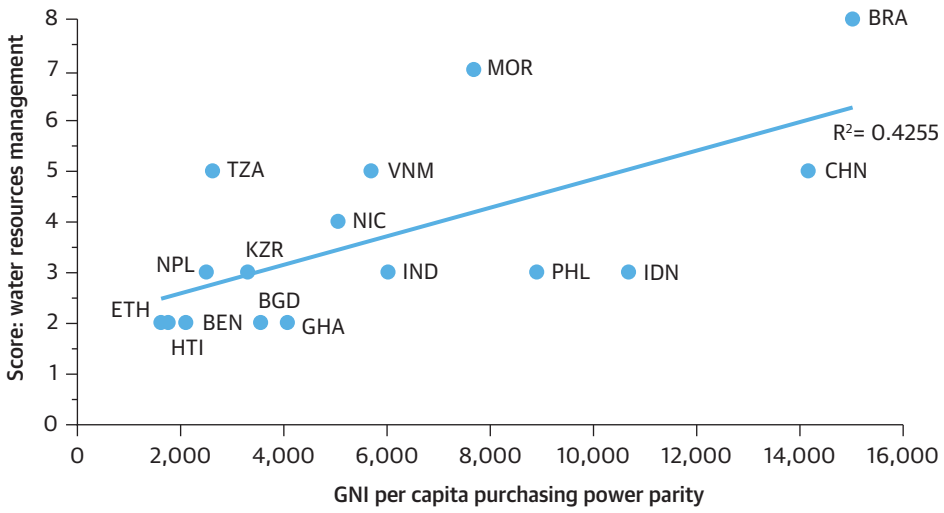


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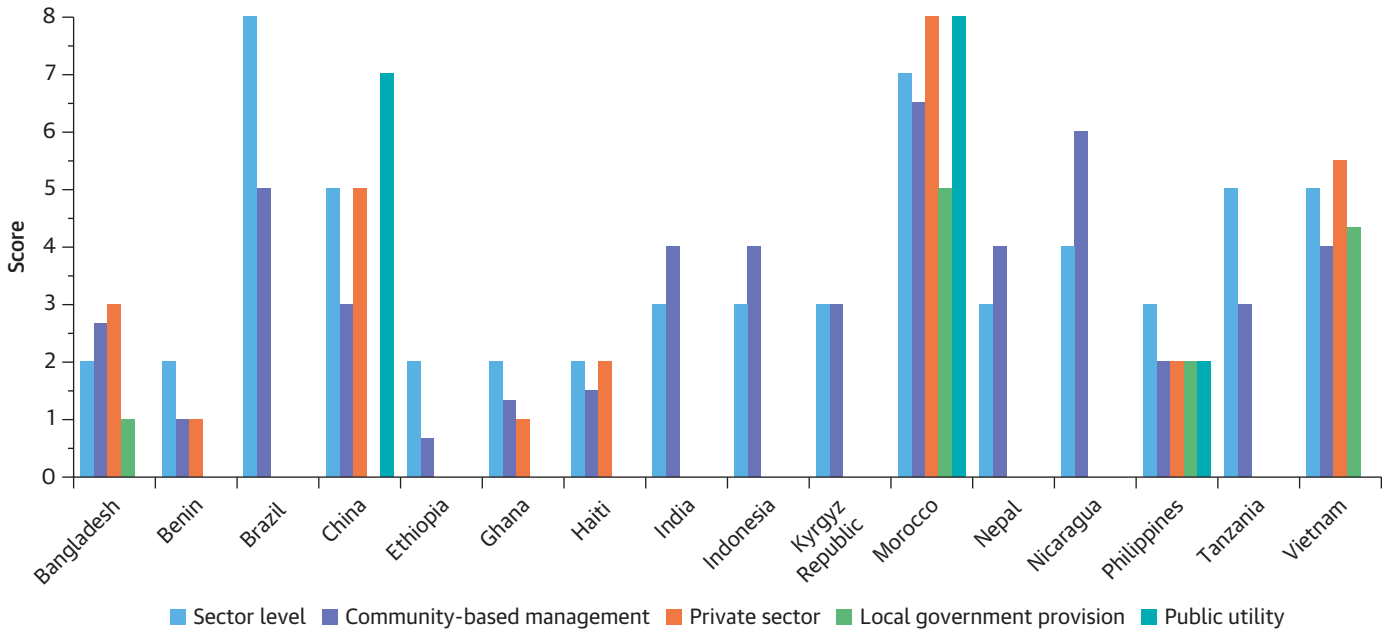
FIGURE 4.9. Water Resources Management: Sector and Service Delivery Model Scores, by Country



bodies, with representation from service authorities and rural service providers as well as sound water quality assessment and monitoring: for example, operationalized through water safety programming. This is no surprise, given their focus on access and infrastructure, in which such practices may be seen as second and third generation priorities. However, not all more advanced economies have managed to address this issue, namely the Philippines, Indonesia, and China, all of which are facing concerns over water quality and resources management.

Legal Frameworks for Water Resources Management Prioritize the Domestic Drinking Supply, but Operationalizing this Principle for Rural Users Receives Little Attention in Practice

Most countries in the study have legal frameworks for water resources management that prioritize allocation to the domestic water supply. The assessment reviewed the presence of legal frameworks and policies in place for the management of water resources, and the role of the drinking water supply in these. The drinking water supply generally has a priority to ensure water for human consumption, although this is rarely framed in the context of the human right to water.

In most countries, water resources management bodies at sub-basin and at local levels are weak or non-existent. There are no or limited mechanisms for rural service providers or service authorities to influence planning, to represent rural water supply user interests,

and to protect critical sources for their drinking water needs. Although it is beyond the scope of this study to determine if and what type of representational mechanisms would have a positive impact on the sustainability of service delivery, this issue seems relevant in contexts where rural water users are depending on overexploited and scarce groundwater sources. Brazil, specifically the state of Ceará, and Morocco exhibited good practices, both having a long tradition in water resources management as they are driven by physical water scarcity. In Morocco, an integrated and long-term planning framework for water resource allocation has been established, although executing adequate demand management practices remains challenging (for drinking water as well as productive activities). In Ceará (Brazil), water resources management bodies are established at sub-basin level, in which the rural drinking water sector is represented, and which can take decisions on allocation of scarce water resources. However, such bodies and arrangements are not present in all water-scarce countries. For example, despite suffering from groundwater over-abstraction and depletion rates of 145 percent of available water, the state of Punjab in India has not yet set up effective sub-basin and local water management bodies that can address these challenges. The drinking water sector has witnessed a number of pro-active measures though, such as recharge measures and local aquifer management initiatives, recognizing that significant reductions in water withdrawals will need to happen in other sectors, notably irrigation.

In several countries where water scarcity is not acute, less progress has been made in establishing water resources management bodies. Nicaragua is an example, where the national law makes provision for water resources management bodies at regional level. However, no progress has yet been made in actually setting up such bodies.

Water Resources Management and Protection Measures at Local and Service Provider Level are Piloted to Address Water Safety and Security of Rural Populations

Several countries encourage or require drinking water service providers and authorities to take water resources management measures. For example, in Nicaragua, the community-based service providers and municipalities are expected to undertake catchment protection works, such as reforestation of upper catchments, or protecting local springs; these activities are then reflected as a performance indicator in the national monitoring system. In Uttarakhand, the rural water program addresses catchment protection and management to adequately protect local water sources and contribute to their sustainable use. Nepal's experience shows how local level planning initiatives can enhance collaboration among water users, local governments, communities, and water resources management entities to develop multiple use water systems (see box 4.12). Advanced practices of water safety programming, assessment on water resources vulnerability and yields for future expansions were only found within the context of urban utilities serving rural areas, as this would be part of their regular business practices.

BOX 4.12. Local Level Water Resources Management in Nepal

In Nepal, there is considerable institutional fragmentation at the sector and basin level regarding water resources management, especially between governmental entities responsible for irrigation, hydropower, and water supply. Indeed, water allocation plays a considerable role in politics within Nepal and internationally between Nepal and, particularly, India. Despite this fragmentation, good examples of local-level planning and multiple use infrastructure development exist. In the Finnish government-supported Rural Village Water Resources Management Program, Village Development Committees, which are essentially sub-district rather than village level entities, are supported to develop water use master plans. These plans identify how the water resources within their area could be allocated, and how to ensure that water is allocated in an equitable manner—a key consideration in a country with strong ethnic and caste discrimination practices. Once the master plan is developed, flexible, multi-sectoral funding is provided, together with technical support, to assist communities in developing multiple-use water systems, often combining drinking water supply with micro-hydro schemes and, where possible, irrigation. Anecdotal findings from the program indicate communities are more willing to pay for, maintain and protect the source of systems from which they derive multiple benefits.

Monitoring and Regulatory Oversight

Box 4.13 summarizes the key findings for the water resources management building block.

BOX 4.13. Key Findings Monitoring and Regulatory Oversight Building Block

Monitoring is an area that has witnessed significant progress in many countries, although wealthier countries tend to have advanced more, such as China (for utilities and multi-village schemes), Morocco, India, the Philippines, and Nicaragua (see figure 4.10). Monitoring is receiving increasingly attention, with emerging national monitoring systems under development or improvement, for example in Ethiopia, Tanzania, and Ghana. Unsurprisingly, monitoring and regulation tend to be better organized for public utilities, and in some cases for private operators.

A common challenge is to make the transition from a water point/scheme mapping exercise, executed every couple of years, towards a well-functioning and monitoring platform that is regularly updated. Another obstacle is central and local governments allocating sufficient and regular resources for nationwide monitoring. Challenges persist in the proactive use of monitoring outputs to take remedial actions, improve performance and inform programming. Good practices are nation (or state) wide systems, such as Nicaragua's or Uttarkhand's monitoring systems, which include indicators on functionality,

box continues next page

BOX 4.13. Key Findings Monitoring and Regulatory Oversight Building Block (continued)

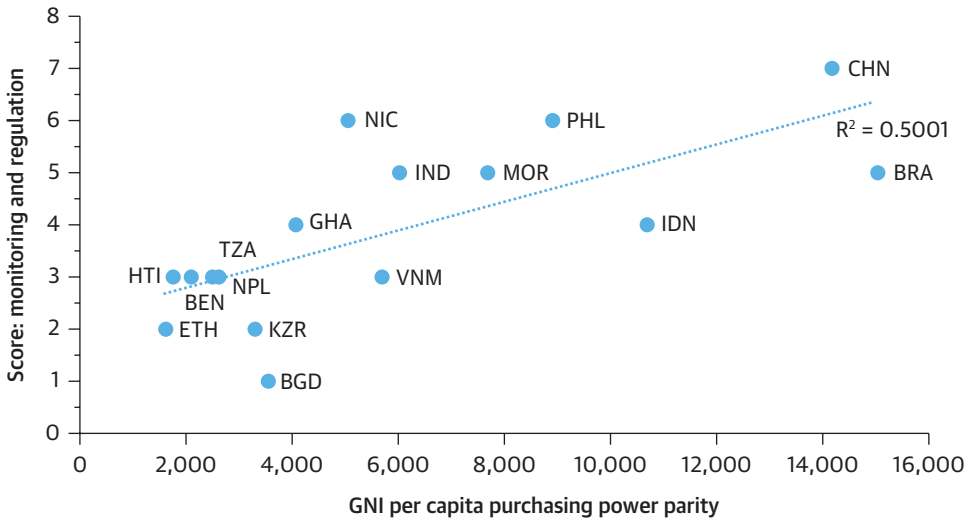
service levels, scheme performance, and sustainability indicators to flag which communities are in need of technical support to prevent (further) scheme failure (for example SIASAR).

Although most countries have defined service standards, regulatory oversight is still nascent in many countries, especially in terms of the development of and adherence to tariff guidelines. Emerging good practices promoting better oversight and accountability for rural services are (figure 4.11):

- Philippines' effort to register all small operators with a designated regulatory agency (NRWB), encouraging gradual compliance combined with capacity building on tariffs
- India's (Punjab, Uttarakhand) social accountability measures, such as social audits in various stages of implementation and operation and grievance redressal mechanisms
- National governments delegating regulatory oversight to specific entities such as in China, Nicaragua, and Kyrgyz Republic, although political interference remains challenging
- Regulation through lease contracts for rural water supply in Benin, with a designated regulatory department and training on tariff calculation methods

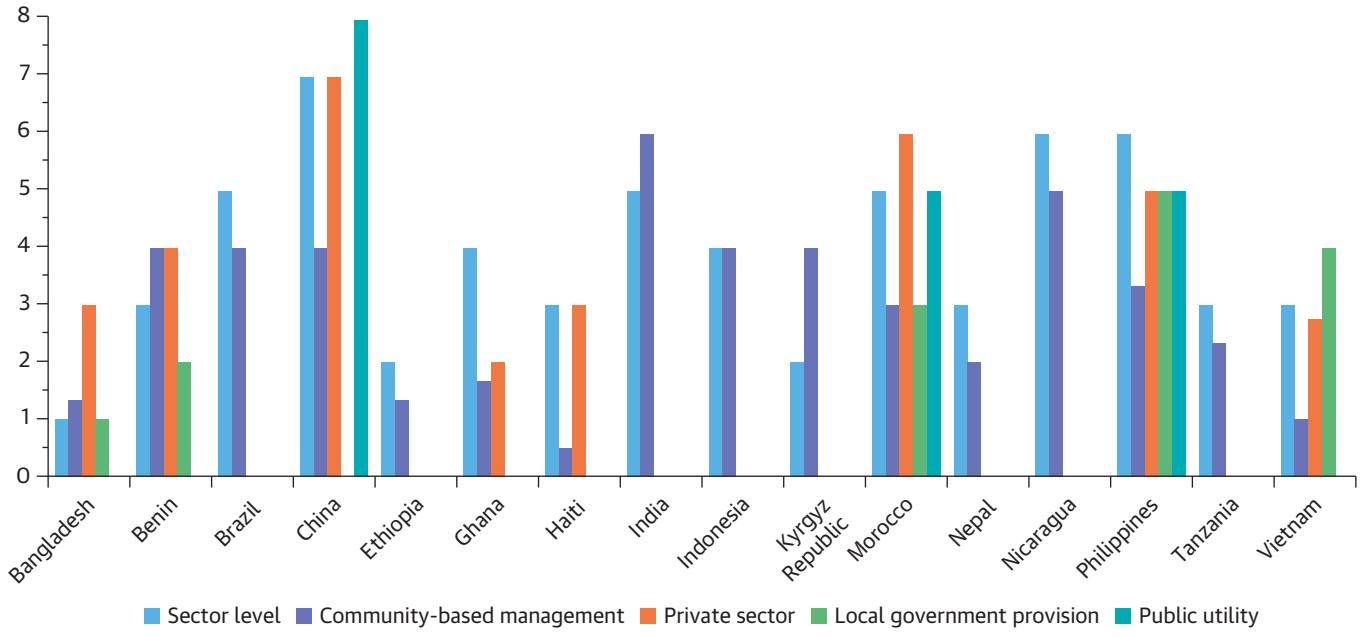
The absence of regulatory oversight for the multitude of rural service providers implies that service authorities often remain unaccountable, unless social accountability mechanisms involving citizens in the monitoring of services are introduced.

FIGURE 4.10. Sector Scores for Monitoring and Regulatory Oversight, by Country Wealth, 2015



Note: for Brazil, China, and India the GNI figures are for the country as a whole, not only the state. BGD = Bangladesh; BEN = Benin; BRA = Brazil; CHN = China; ETH = Ethiopia; GHA = Ghana; GNI = gross national income; HTI = Haiti; IND = India; IDN = Indonesia; KZR = Kyrgyz Republic; MOR = Morocco; NPL = Nepal; NIC = Nicaragua; PHL = Philippines; TZA = Tanzania; VNM = Vietnam

FIGURE 4.11. Monitoring and Regulation: Sector and Service Delivery Model Scores, by Country



National Monitoring Systems are Evolving with Good Examples Including Performance and Sustainability Indicators, Going Beyond Binary Functionality

Efficient monitoring systems are seen where rural water asset management is also well established. This is the case in Morocco and China. In Morocco, the national utility ONEE closely monitors the functionality of water points and other water schemes it has developed throughout the country.

A few monitoring systems are moving beyond the binary concept of functionality to track broader indicators on service quality, including service providers' performance. One notable case is the Rural Water and Sanitation Information System, or SIASAR, which is used in Nicaragua and the State of Ceará, Brazil (box 4.14). While the World Bank has invested in the system's development, national governments have ensured institutional embedding, covering the costs of staff and other recurrent costs. Similarly, Uttarakhand's mechanical and electrical (M&E) system, developed as part of the state's sector-wide approach supported by the World Bank, has a comprehensive scope, and serves both program implementation and ongoing service delivery stages and is under state-wide rollout.

Increasingly, national programs or specific projects include indicators on sustainability, with independent verification to improve national monitoring systems and transparency. The Program for Results in Vietnam, for example, uses indicators related to the management model, achieved connection rates, cost recovery, and non-revenue water. DfID's Payment for Results program in Tanzania includes indicators on functionality to incentivize national and local governments to focus on sustainability of services and improve their

BOX 4.14. The Rural Water and Sanitation Information System or Sistema de Información de Agua y Saneamiento Rural (SIASAR)

SIASAR is a mapping and monitoring system for rural water and sanitation, originally developed and applied in 2011 by the governments of Honduras, Panamá, and Nicaragua with support from the World Bank and other development partners. It was developed to assist water sector policymakers, practitioners, and national planners in monitoring the development and performance of rural water supply and sanitation services. SIASAR consists of a series of predefined parameters, which are used to calculate performance indicators of four elements:

- The community, describing the water and sanitation coverage, including households and schools and health clinics in the community
- The water supply system, describing the functioning of the system and the service levels provided
- The service provider, describing the performance of the provider in its tasks of operation and maintenance
- The technical assistance providers, describing the performance in providing technical assistance to service providers

For each of these four elements, a score from A (very good) to D (very bad) is calculated based on the defined indicators. The data from SIASAR can be uploaded via phone or tablet to a central database, after which a desktop validation is undertaken by the system administrator. The data—both the individual indicator values and the overall scores—are publicly available via the SIASAR website, in the form of a map and underlying databases. In Nicaragua, a complete baseline of all communities, water systems and service providers was made in 2013. Data were collected with support from the New Social Emergency Investment Fund (Nuevo FISE) and municipalities. SIASAR is operational in 10 Latin American countries, including the state of Ceará (Brazil)

monitoring systems, as reporting systems were a condition for local governments to be eligible under the program.

In some cases, monitoring systems that started out as a project system have scaled up and are developing into nationwide government-led monitoring systems. In Indonesia, the monitoring system under the PAMSIMAS program is transitioning toward a national monitoring system for rural water supply. In Uttarakhand (India), the *Swajal* Sector Information System, which was initially set up to track progress in program implementation, evolved into a system to monitor the performance and service delivery of all water supply schemes as part of the state's sector-wide approach.

However, many countries still face significant challenges in establishing a comprehensive national monitoring system. Common bottlenecks are i) a lack of accuracy due to

over-reporting, typically on results and access, and ii) partial reporting, that is, not all parts of the country are covered, data is not being transferred, and service quality and levels are missing. Discrepancies between JMP and government figures are common, due to different definitions, data sources and calculation methods[8]. With the SDGs, efforts to improve national monitoring systems are likely to be stepped up. The costs associated with establishing and, most crucially, the continuity of the monitoring efforts once operational at a national scale, are significant. Financial and human resources from central governments, service authorities, and continuous efforts by service providers are required, while the political value of such expenditures is often deemed low.

Usage of Data from Monitoring Systems is Critical to Enhance Regulatory Oversight and Accountability

Another common challenge is the actual use of data to inform analysis and decision making. In Nicaragua, where SIASAR data is publicly accessible, a recent review found that municipalities were generally aware of the existence of the system, but struggled to use data in their municipal plans, and indicated bottlenecks in mobilizing resources to update the information on an annual basis (ONGAWA 2015).

The limited use of available data to take remedial actions relates to the absence, in most countries, of institutions mandated with regulatory oversight. Evidence suggests that countries have yet to fully institutionalize responsibilities for overseeing service delivery in rural areas beyond the implementation phase. Countries that have assigned regulatory oversight functions for rural service providers include (see also box 4.15):

- The Philippines, where the National Water Resources Board (NWRB) is the regulatory body for the majority of smaller operators (that is, there is no distinction between rural and urban areas, but certain types of operators are assigned to various regulators)
- Benin, which set up a Directorate for Public Drinking Water Services and Regulation in 2016
- Nicaragua, where the Institute for Water Supply and Sewerage carries out administrative checks on the basic documents of water committees, but has little capacity for tariff reviews of rural providers
- China, with its provincial Pricing Bureaus, assigned to execute economic regulation, and Provincial Water Bureaus, overseeing service performance and the administration of incentive schemes
- The Kyrgyz Republic, where the Anti-Monopoly Commission is assigned to endorse tariff proposals, which are then approved by the local governments

Limited capacity, constrained human and financial, of regulatory agencies and entities, as well as political influence to repress tariffs, are ongoing challenges.

National governments often delegate regulatory oversight to service authorities, but *de facto* oversight is limited and service authorities often remain unaccountable. For example,

BOX 4.15. Examples of Regulatory Oversight for Rural Water Service Providers

The Philippines: to increase NWRB's capacity to effectively monitor and regulate service provision, a national survey of service providers was initiated in 2014, and its first results were published in 2015. NWRB developed a *Listahang Tubig*, or Water Register, which is a nationwide database and cloud-based system, where data on the countries' utilities (including CBO-managed schemes) are made available to the public. The implementation of the *Listahang Tubig* was supported by a partnership among the NWRB, the Department for Local Government, and Local Water Utility Agency (LWUA). As of October 2, 2015, data had been collected from 22,844 water service providers in 1,445 cities and municipalities (out of a total of 1,634) nationwide, representing an 88 percent participation rate. The basic profile of all water service providers is self-reported, and key performance indicators (KPIs) are self-rated by water utilities. The survey revealed that community-managed utilities are the most common type, representing 54 percent of water utilities in the country, but because of their small size, they serve only 6 percent of the population.

China: the provincial government in Zhejiang province has set up a well-functioning incentive mechanism: this uses monitoring data and links it to an incentive program that provides small grants as a reward for well-performing operators and likewise penalizes poorly performing ones based on a range of criteria including system and staff management planning, procedures of O&M, and water quality monitoring. From data obtained from one district (Fuyang district, Hangzhou), 92.6 percent of providers were classified as either compliant or excellent and received a cash award (averaging around US$200 per operator), and the remaining 7 percent of providers were given a small fine.

in Ghana the Metropolitan, Municipal, and District Assemblies are tasked with overseeing the performance of the community-based organizations, including auditing of accounts. In practice, few MMDAs have the technical capacity, or incentives, to provide any kind of oversight, so this remains largely a theoretical function. The absence of oversight implies that service authorities remain largely unaccountable for their mandates, unless social accountability mechanisms involving citizens in the monitoring of services are introduced at scale.

Positive examples of improving accountability through complaint redressal exist in India. An example is the Shikayat Nivarn Kendra (or SNK), a centralized complaint redressal system undertaken as part of a good governance initiative in Punjab. Given the large numbers of rural water supply schemes in operation in rural areas of the state, the Water Supply Department found it difficult to monitor functionality and other aspects on a regular basis. To overcome these challenges, the state government introduced various communication options to report complaints (see box 4.16), which has proven successful in both responding to technical faults, but as importantly increasing consumer confidence in service provision.

BOX 4.16. Centralized Complaint Redressal System, Punjab State, India

The Shikayat Nivarn Kendra (SNK) is an accountability mechanism using information technology. It operates on a 24 hour, seven day basis including holidays. The SNK was inaugurated in December 2009 and has been operational for over eight years. At the heart of the SNK is a combination of a toll-free telephone number, email and SMS system that consumers can use to lodge a complaint. Currently, the SNK has a reach in over 14,000 communities and covers a population of approximately 20 million. Complaints registered under the SNK are not closed until they are redressed. The SNK offers multiple language windows including Punjabi, Hindi or English with which to register complaints. On registration of the complaint, the names of officers relating to the complaint village appear on the screen and the complaint is forwarded to them through SMS and email for immediate action. The SNK stipulates set targets for the time it should take to resolve each type of complaint. The concerned officials are then expected to rectify or correct the problem within this period and to report back to SNK through the same phone or SMS platform. This then triggers a message to inform the person who raised the original complaint. In case the complaint is not rectified within the stipulated period, it is escalated to the next level of senior officer for their intervention after every 24 hours (that is, the. Superintending Engineer or Chief Engineer depending on the hierarchy).

A total of 64,426 complaints were registered during 2009–17 and 94 percent (64,057) of these were attended to and resolved. In addition, the SNK has helped to improve employee performance and time-bound delivery of services in rural water supply. Information and awareness campaigns were used (press advertisements, TV channels and wall paintings) to promote the complaint redressal system and thereby improve the delivery of services. One very important consequence is that the SNK has enhanced consumer confidence amongst the rural public in their water supply services; direct accountability for the official responsible for performance has shown positive and quick results in terms of improving response times and fixing service faults.

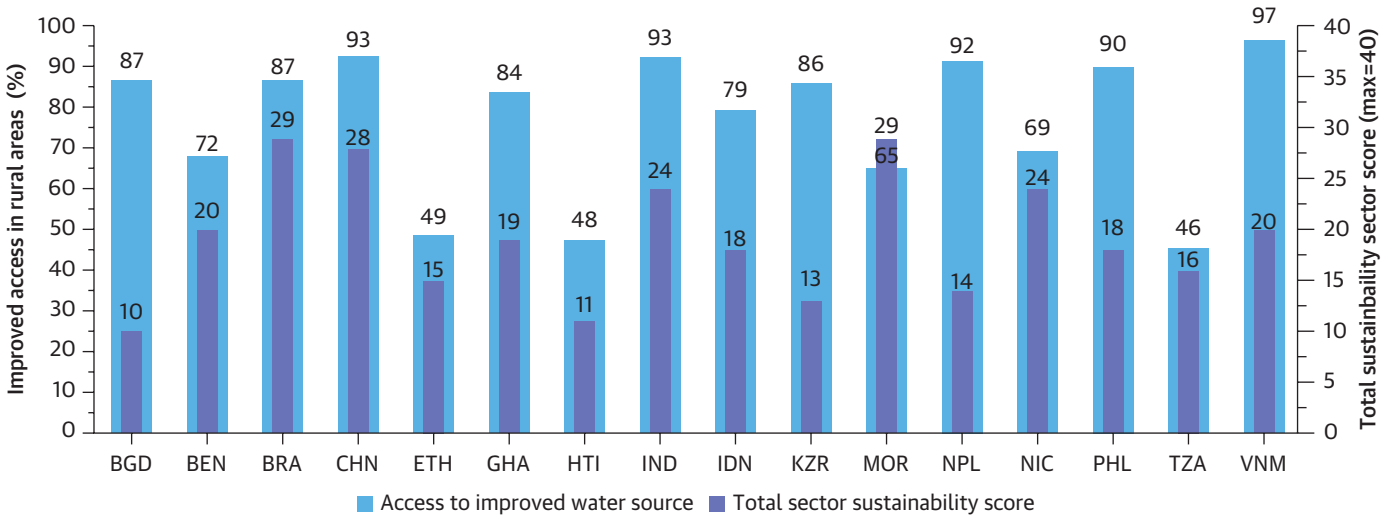
Key Findings and Lessons

Understanding Country Progress

Gains in improved access under the MDGs only tell a partial story of success. Especially in view of the SDGs, rural water supply programs need to shift attention to addressing sustainability conditions at sector level.

Reaching high levels of access to improved water sources is not necessarily associated with having adequate conditions for sustainability at sector level in place (see figure 4.12). This is particularly the case in Bangladesh, Indonesia, the Philippines, Nepal, the Kyrgyz

FIGURE 4.12. Total Sustainability Score and Access to Improved Water, by Country



Note: BGD = Bangladesh; BEN = Benin; BRA = Brazil; CHN = China; ETH = Ethiopia; GHA = Ghana; HTI = Haiti; IND = India; IDN = Indonesia; KZR = Kyrgyz Republic; MOR = Morocco; NPL = Nepal; NIC = Nicaragua; PHL = Philippines; TZA = Tanzania; VNM = Vietnam.

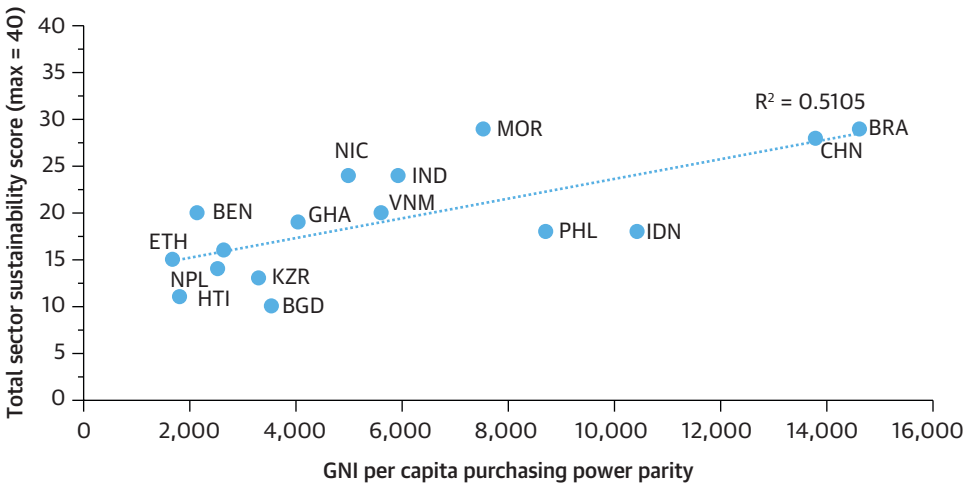
Republic, Ghana, and Vietnam, all of which have improved access levels of over 80 percent, but have moderate or low scores across the building blocks for sustainability at sector level. Bangladesh, for example, has made admirable progress in the provision of first time access for rural populations over the last decade, but faces significant challenges with low levels of service quality, and weak financial and institutional performance and capacity, especially at decentralized levels. Although Bangladesh is a lower-middle income country and resources are increasingly available, there are several structural challenges facing the sector such as clarifying mandates, regulation and governance of service providers, and financing and capacity building to professionalize service provision.

While delivery of infrastructure will remain critical to expand and improve service levels, and ensuring "quality at entry" in the implementation phase, there is a more important challenge in building the conditions for sustainability, including the provision of recurrent financing for post construction support and monitoring, as well as capacity development for service authorities and service providers. Without such shifts, the global sector may fail to see long-term benefits on investment in infrastructure and sustained progress against the SDGs.

Wealthier countries tend to be more advanced in putting in place building blocks for sustainability, especially for monitoring and regulatory oversight and water resources management

However, positive and negative outliers confirm that sector leadership and political commitment matter a great deal for improving sustainability conditions, particularly for institutional capacities, financing and asset management. The broader political, historical and

FIGURE 4.13. Total Sector Sustainability Score, by Country Wealth, 2015



Note: For Brazil, China and India the GNI figures are for the country as a whole, and not only the state or province in the study. BGD = Bangladesh; BEN = Benin; BRA = Brazil; CHN = China; ETH = Ethiopia; GHA = Ghana; GNI = gross national income; HTI = Haiti; IND = Indonesia; KZR = Kyrgyz Republic; MOR = Morocco; NPL = Nepal; NIC = Nicaragua; PHL = Philippines; TZA = Tanzania; VNM = Vietnam.

natural context needs to be appreciated to understand a country's progress toward a sustainable service delivery approach for rural water.

As evidenced by the individual building block analysis and illustrated in figure 4.13, several low-income countries, such as Benin and Ethiopia, have managed to put in place similar enabling conditions for sustainability as wealthier countries, such Bangladesh, Indonesia and the Philippines. These outliers may be explained by sustained sector leadership and political commitment. For example, Ethiopia has witnessed high political commitment to improving sector capacity and performance. The country's One WASH National Program, launched in 2013, is a government-led, sector-wide initiative to harmonize and align planning, investment and implementation and has a budget envelope of some US$4 billion over a seven-year period to 2020. The program includes improvement to national monitoring, systematic capacity development of local government, and the promotion of greater private sector involvement. Similarly, Benin's sector leadership and sustained efforts since the early 2000s to reform and professionalize the rural water sector are explaining its strong advancement on sustainability conditions. The government has continued to prioritize rural water, is increasing service levels, has decided to phase out community-based management, promotes private sector participation through national capacity building programs and is addressing gaps in regulation.

High scores for provinces in China and the state of Ceará in Brazil are likely aided by the country's general socioeconomic development, greater availability of public funds, better qualified human resources and a more conducive governance environment, including enforcement of laws and regulations. Morocco's score reflects the institutional capacity of public utility ONEE in leading the efforts to increase rural access, based on countrywide master plans, while identifying and supporting service delivery models. Morocco is also improving its sector monitoring and promoting sound water management practices. However, these countries still face substantial challenges, including increasing revenues from tariffs to make schemes more financially viable, which are often resisted by political stakeholders. The full costs of service delivery, including O&M, capital maintenance, and replacement, continue to be partly subsidized.

Bangladesh, the Kyrgyz Republic, Nepal, and Haiti are struggling to put in place conditions for sustainability, which often stem from the broader political and governance context. For example, the Kyrgyz Republic shares a common history with other central Asian states, where due to decades of under investment after the collapse of the Soviet era, services have eroded and institutional capacity and innovation have been limited. In 2016, the Kyrgyz Republic announced a national rural water program, harnessing a high level of political support and intending to improve service levels and address several of the bottlenecks identified in the sustainability assessment. Haiti is witnessing decreasing access rates and its lowest overall sustainability sector score is understandable, given its fragility and socioeconomic challenges, which have been worsened by several recent large-scale natural disasters. Nepal is emerging from a pronounced period of political unrest and transitioning into a federal system. This history has aided fragmentation in the sector, capacity gaps, and uncertainties in institutional mandates. However, there has been considerable progress in harmonisation in the sector in recent years, with the intention to develop 'One WASH' policy and legislation.

Lessons from Service Delivery Models

Box 4.17 summarizes key points for the service delivery models.

BOX 4.17. Key Findings from Service Delivery Models

Table 4.2 illustrates to what extent sustainability conditions are met for various service delivery models across all countries. The public utility provision appears the most robust, with all of the building blocks furthest advanced. Introducing private sector provision provides an opportunity to improve the sustainability of services, despite mixed country experiences and often the modest scale of such models in any country.

There is a wealth of experience with community-based management, present in all countries but Benin, and the sustainability of the model remains to be strengthened overall.

Some countries, such Morocco, India, Indonesia, and Brazil, are leading efforts including various forms of aggregated management, embedding with decentralization, and through nationwide monitoring and systematic post construction support.

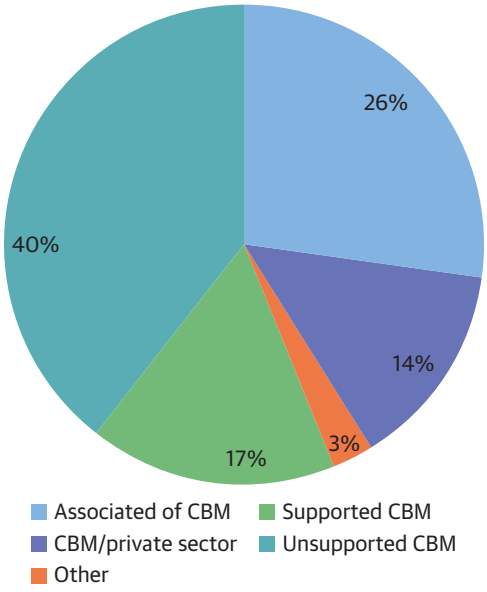
Unsurprisingly, direct local government provision tends to perform poorly, especially in low capacity environments. Despite the various efforts to promote supported self-supply as a formal service delivery model—only present in Ethiopia—there is a remarkable lack of documentation, which would be critical to convince policy makers of the benefits of promoting this model for remote and dispersed communities. Lessons from each service delivery model are presented in the sections below.

TABLE 4.2. Service Delivery Models Sustainability Scores

SDM scores	Community-based management	Local government provision	Public utility	Private sector	Supported self-supply
Bangladesh	13	10		21	
Benin		10		19	
Brazil	21				
China	16		37	29	
Ethiopia	7				8
Ghana	9			13	
Haiti	5			13	
India	28				
Indonesia	23				
Kyrgyz Republic	15				
Morocco	26	21	34	36	
Nepal	14				
Nicaragua	20				
Philippines	14	18	26	25	
Tanzania	17				
Vietnam	8	18		24	
Average all countries	**16**	**15**	**32**	**22**	**8**

Scoring: For each Service Delivery Model present in a country, every building block is scored with '0', '1' or '2' over a series of four questions, with a possible maximum score for each building block of eight points. Scores are then summed across all building blocks to give an SDM aggregate score with a maximum of 40; aggregate scoring thresholds are 0–15 = red; 16–25 = yellow; 26–40 = green.

FIGURE 4.14. Presence of Different CBM Types



Note: CBM = community-based model.

Community-Based Management Model

Although community management is formally recognized in all countries, the assessment showed that the majority of community organizations are neither legally established nor supported, and that asset management is not always clearly defined under this model.

The different types of community management models found across the study countries can be grouped in four categories: i) unsupported community groups; ii) formalized entities with some form of support; iii) community based organizations that contract private sector actors; and iv) community organizations that federate in associations to receive support (see figure 4.14).

Structured support, where it existed, mostly included technical support on O&M, financial support on major

repairs, and access to administrative and institutional assistance and training opportunities.

This support was delivered through i) well capacitated government entities or utilities, ii) associations or federated structures based on membership, or iii) other pooled arrangements aggregating service providers within regions. Financing remains problematic and contributions from tariffs to these services insufficient.

Examples are the "*Uttarakhand Jal Sansthan*," a designated state agency for official backstopping of Water Supply and Sanitation Committees, as well as the SISAR system in Ceará and Tanzania's Water Supply Facility Trust mechanism (see section 4.1). Good conditions, although at a limited scale, for sustainability are also found if support is provided through dedicated externally funded programs, which poses a problem for nationwide replication.

The study found that CBMs responsible for distribution only, with government entities responsible for bulk-supply, were scoring better on dimensions of sustainability.

In Ghana, Water and Sanitation Management Teams (WSMTs) operate piped supplies receiving water from the Ghana Water Company Limited. In Morocco, ONEE provides bulk water to over 600 community-based associations and often provides technical support to those managing distribution systems.

Direct Local Government Provision

Water supply units within local government administrations are not corporatized entities and are neither able to operate along commercial lines nor able to ring fence water revenues from general budgets. Tariff revenues cannot be protected, and incentives for performance are weak as reliance on government subsidies continues.

In some countries, the model is seen as an "interim" solution (for example, in Benin), while in other countries, arrangements are permanent. Service authorities are reluctant to delegate water scheme management to professional operators; they have no technical assistance to set-up corporate municipal enterprises or joint stock companies, or lack incentives and clear guidance or regulations to delegate services to private operators (for example, Vietnam).

Central governments can support direct government provision in several ways, such as technical assistance for i) project preparation to ensure demand-responsive schemes; ii) setting tariffs and improving financing arrangements between water units and other parts of local government; iii) legal support to transition to other management models.

Public Utility Provision

Public utility provision for rural water was found to exhibit the best conditions for sustainability, although it is not widely applied. It is present in only three of the 16 countries: China, Morocco, and the Philippines. Public utilities are involved in the management of large multi-village piped water, in small towns or in growing urban centres, where rural populations have been integrated into the urban utility's service area. They tend to show

professional management of rural water assets, are staffed with more qualified personnel, have better financial capacity and access to funding, and are subject to monitoring and regulation.

The rural water sector does not present attractive commercial revenue opportunities for utilities. Mandatory service mandates in rural areas, combined with access to subsidies to integrate rural areas, are used as incentives for utilities to expand services.

In Morocco, ONEE was officially mandated by the central government to service rural areas and mobilize funds to expand and manage rural water services. In China, city or county public utilities are required by government shareholders to integrate rural populations within their service areas, with governments allocating subsidies for investments and capital maintenance to support the utilities' viability to reach these areas.

Where access to rural water services is a high political priority due to persistent inequalities, considerations of financial returns become secondary compared with the wider economic and social benefits.

As of 2016, ONEE had extended water services through large piped water schemes, supplying public stand posts and small village-level distribution systems in over 400 rural centres. This expansion saw a significant capital investment. US$1.2 billion has been invested in rural and small town water supply since the mid-1990s, including US$346 million mobilized from local commercial banks. However, in 2015, ONEE's revenues from rural water services only covered 41 percent of the full cost of service provision. Similarly, in China, expanding Water Affairs Companies services to rural areas has put a significant strain on the financial viability of their operations.

Integrating rural areas under the expanding service areas of public utilities comes with challenges, such as mobilizing human resources for asset maintenance, and extending billing and collection services and monitoring to remote areas.

In Morocco, ONEE is testing various approaches to address these challenges, including local micro-enterprises for asset maintenance and private sector partnerships for the management of village-level distribution networks, while ONEE retains control of the bulk water supply.

Private Sector Provision

This model holds promising and diverse arrangements for sustainable rural water services, and consistently scores well on financing and to some extent also on asset management and monitoring. Private sector participation was found through a range of contractual mechanisms from build operate and transfer (BOT) (as in Bangladesh), to joint stock companies with public and private shareholders (as in Vietnam) and lease and concession contracts (as in Benin). In China, "community enterprises," operating on a commercial basis are managing multi-village schemes (box 4.18). In addition to improving the financial performance of schemes, private investment and in some cases commercial loans can be mobilized (as in Benin and Vietnam), although in Bangladesh contracts requiring private equity investments proved difficult to implement (box 4.19).

BOX 4.18. Private "Community Enterprise" Model, Bin County, Shaanxi Province, China

Bin County has a total rural population of around 244,000 scattered over 237 villages previously served by very small individual schemes. Over the last 20 years, the government has rationalized these under 14 multi-village schemes operated by so-called Water Management Stations, comprising community enterprise companies established under the auspices of the County Water Resource Bureau (CWRB), but operating along commercial lines. On average, each enterprise employs seven staff who are responsible for all aspects of O&M, minor repairs, and tariff collection.

The county government retains ownership of the physical assets and sets performance and reporting standards for each company, which are expected to cover their operating expenses and to retain a small quota (Y0.20 or US$0.03) on each cubic meter of water sold as a reserve fund to pay for future capital maintenance. In the case of the two water management stations visited for the study, each was generating a small surplus based on a flat rate tariff of Y3.9 (US$0.58 cents) per cubic meter on metered household connections. As it is a relatively dry area relying on deep groundwater, the majority of households pay, although water consumption is still low.

In addition to setting up these community enterprises, the CWRB has also established an umbrella entity, known as the General Water Management Station, with 11 staff who are responsible for supporting and monitoring the work of the 14 multi-village schemes; monitoring their monthly reporting; providing refresher trainings; helping to review and get tariff adjustments approved; and helping with more complicated repairs. The cost of staffing and operating the General Station was put at some Y500,000 (or around US$75,000) per year. Lastly, the county pays the Bin County urban water affairs company Y300,000 (US$44,750) per year to carry out monthly water quality testing for the 14 multi-village schemes using its in-house team of technicians and laboratory.

BOX 4.19. Challenges to Private Equity Investment in Bangladesh

The World Bank-supported Bangladesh Rural Water Supply Project piloted private sector involvement through 21 village piped water schemes, designed to serve over 100,000 people. The project set out to demonstrate that rural piped water supply schemes involving partnerships between community and local private sector could leverage private financing and lead to efficient long-term operations

box continues next page

BOX 4.19. Challenges to Private Equity Investment in Bangladesh (continued)

by local operators. Private sponsors were responsible for designing, building and operating drinking water supply schemes for a period of 18 years under a capital investment sharing ratio of 70:20:10 (70 percent project: 20 percent sponsor: 10 percent community). Following the completion of the project in 2010, annual benchmarking has been supported to understand the performance challenges and the sustainability of these schemes. At the end of 2014, an evaluation found the following results using the benchmarking data:

- 15 schemes were functioning, two were partly functioning and four were shut down
- 11 schemes were operated and maintained in a satisfactory condition
- Eight schemes were operating at a profit but only three were likely to provide a satisfactory return on equity
- No schemes had the potential to offer a return on investment

Lessons from the evaluation include the significant challenges associated with the financial viability of high quality privately operated and maintained water supply schemes; the higher than expected costs for potential investors; challenges with tariff collection; unpredictable local politics, and the lack of professional and entrepreneurial capacity to successfully operate and manage schemes once built. Upstream measures to improve the Bangladesh enabling environment for rural services, and specifically to lift private sector constraints, need to be addressed for the model to mature.

Source: WSP 2016.

Successful experiences with private sector participation emerged from a long-term engagement, funded by governments and development partners.

In several countries, this included i) strengthening the legal and institutional framework for private sector participation; ii) contract design for a careful allocation of risk and ensuring sufficient financial incentives for the private operator; iii) capacity building for service authorities in tendering and contract oversight, and iv) capacity building for private operators on technical and managerial aspects of service delivery.

A blended finance approach was common, ensuring that public subsidies were sufficient to leverage private investment. A good practice in Benin and Morocco was that subsidies were disbursed in a result-based manner after independent verification.

Private sector models still operate at small scale or are in the process of scaling up. Critical barriers and capacity gaps need to be addressed to realize the full potential of this management model.

In December 2016, Benin launched the scaling up of the subsidized concession model, and ONEE in Morocco is launching the tender of several service-type contracts for rural water supply provision. Although the lack of commercial viability in rural areas is indeed a hindering factor for scaling-up private sector models, it is equally important to address upstream legal and policy gaps, support due diligence of investment projects, provide transaction support and technical assistance to national level and service authorities, and build the capacity of private operators.

Supported Self-Supply

Ethiopia was the only country with a formally recognized supported self-supply program. It seeks to standardize approaches and technologies, establishes local providers, reaches households though communications, and facilitates a learning network.

In several other countries, supported self-supply is a *de facto* model, receiving limited support from national entities and service authorities. In Vietnam, self-supply is increasingly recognized as a service delivery model for hard to reach communities, and some local governments carry out communication campaigns for household water treatment and storage. In Brazil, rainwater harvesting programs for individual or small groups of households were active for over a decade but without much documentation. They do reflect a recognition that in dispersed settings, communal water supply systems may not be feasible. In Bangladesh, where some two-thirds of the rural population is using individual supplies, there is not yet a formalized or structured support in place at any scale, despite the pressing need to improve water quality.

Despite the various efforts to promote supported self-supply as a formal service delivery model, there is a remarkable lack of documentation with the experiences of such programs, which would be critical to convince policy makers of the benefits of promoting this for remote and dispersed communities.

Notes

1. This would not indicate a causal relationship in any direction.
2. A high score means that conditions for sustainability are closer to good practices as defined by the set of four questions for each of the five building blocks.
3. At this moment, rural water supply is planned to be mainstreamed in other National Programs, as the dedicated NTP for Rural Water Supply and Sanitation has come to an end.
4. For single village schemes; for multi-village schemes, district authorities remain responsible.
5. The *Sagana at Ligtas na Tubig Para sa Lahat* (SALINTUBIG) Program (2011-16): the program targeted a total of 455 waterless poor municipalities based on the 2010 National Household Targeting System for Poverty The program allocated annual funding to targeted municipalities through the budget of the Departments of Health and Interior and local government.
6. One of the principles of the demand responsive approach stipulate community investment to the initial capital outlay, normally in the range of 5 to 10 percent.

7. In India, for example, “full cost-recovery” refers to cost recovery of operation and minor maintenance only, and assumes that capital maintenance (major repairs) and asset replacement are funded from taxes, paid for by district or state authorities.

8. In Morocco, for example, government estimates that 95 percent of the rural population had access to improved services, compared to 63 percent as per JMP. In Ghana, the national Community Water and Sanitation Agency (CWSA) estimated national rural coverage at 64 percent (CWSA 2015) against 82 percent reported by the JMP.

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Chapter 5 Recommendations and Policy Directions

Building on the analysis of the country cases, and emerging good practices, this chapter sets out a number of practical recommendations for improving the sustainability of rural water services, organized around the five building blocks. It is based on the premise that it is good practice to advance the sector-level building blocks, and that measures are required to support all three institutional levels: national, service authority and service provider level (section 5.1).

At the same time, it is important to recognize that sectors are at different stages of development and that resources and opportunities will vary, sometimes greatly, between countries. Moreover, interventions will need to be tailored to the different segments of the rural water market, in order to improve the sustainability of relevant service delivery models. Section 5.2 thus proposes priority interventions for countries to advance to more mature stages of rural water sector development and concludes with a set of key policy directions for governments to consider.

Recommendations for Each of the Building Blocks of Sustainability

As presented in the analytical framework for this study (section 2.1), the five building blocks for sustainability represent ideal or optimum conditions for services to last beyond the first few years after infrastructure delivery. While some countries have a number of these conditions in place, for others, establishing the building blocks will require adopting lengthy reforms in the sector.

The five building blocks of sustainability can be used as an entry point to carry out a diagnostic of a country's rural water sector, and in doing so to reveal areas that would require intervention. Which specific areas should be addressed with the highest priority, and in what sequencing, will depend on the country context and needs, as well as the willingness and appetite for change of the leading institutions in the sector. Gradual but persistent interventions will be needed, and less wealthy countries may need to prioritize building blocks. Based on the analysis of the individual building blocks, there is evidence to suggest that even low income countries can make substantial progress on institutional capacity, financing, and asset management while, in the face of competing priorities, robust monitoring systems should be emphasized, with more sophisticated regulatory oversight to be developed in later stages. The level of water insecurity is likely to influence the extent to which local water resources management practices can feasibly be prioritized in low resource and capacity countries.

Rooted in the rich experiences that were uncovered through the country case studies, the tables below present possible interventions for each of the building blocks, considering each of the three institutional levels:[1] national enabling environment, service authority, and service provider. Interventions should be identified and designed based on an in-depth diagnostic of service delivery models present in the country.

Strengthening Institutional Capacity in Rural Water Service Delivery

To develop capacities across all levels of the rural water sector, a starting point is creating clarity on institutional mandates as well as the formal recognition—and if relevant the diversification—of management models. Adequate support systems will have to be put in place for service authorities and service providers. If the predominant model is community-based provision, post construction support arrangements can take various shapes, for example, by a public utility, state or provincial level entity, local government if there is capacity to provide such support, or by fostering the federation of community-based management entities so that members can receive adequate support. Diversification of management models can be followed as a deliberate strategy, for example, by considering integrating rural areas within existing urban utility service boundaries (physically connecting villages or subsuming smaller standalone systems under the utility's management). If possible, support for private sector providers to enter the market where this is viable (including with support of targeted subsidies) is recommended. This will require a well-developed enabling environment, and structuring of contracts on a commercially attractive scale. Table 5.1 includes a number of recommendations to strengthen institutional capacities in the rural sector.

Improving the Financial Sustainability of Rural Water Services

A starting point to enhance financial sustainability is to break down the different costs across the life cycle of service delivery and assess which elements can realistically be covered through tariffs, and which will require financing from taxes or transfers. For services to be

TABLE 5.1. Recommendations for Institutional Capacity

Level	Recommendations
National	• If needed, clarify and define institutional mandates for rural service delivery and oversight • Staff and train national institutions to oversee rural water services • Organize the formation of post construction support systems and identify predictable funding streams • Train technical assistance providers and monitor their effectiveness • Regularly update or develop new national planning, policy and legal frameworks, including for rural PPPs
Service authority	• Limit overlaps between service authorities' functions and central government institutions and clarify responsibilities between all tiers of governments • Staff and train service authorities to fulfill their functions, based on assessment of capacity • Explore mechanisms to create economies of scope and scale in the execution of complex tasks, for example, asset management through third party contracts or delegation to public entities
Service provider	• Assist service providers to be organized into legally recognized entities • Roll out ongoing capacity development programs to build adequate technical, financial, and managerial skills • Create access to regular post construction support services

sustainable all costs must eventually be covered, but not necessarily all via tariffs. While the policy position in many countries is "full cost recovery through tariffs" without distinguishing between urban or rural areas, it is recommended that this position is to be revisited and nuanced. Precise language is thus needed in tariff policies and guidelines, and flexibility for cost recovery approaches and pro-poor measures is advisable for different rural contexts (for example, remote villages versus rural small towns). The needed clarity on responsibilities and funding sources for minor and major maintenance, asset renewal, as well as expansion or new schemes would best be reflected in a national financing strategy for the sector that also includes rural areas. Table 5.2 summarizes recommended actions to improve the financial sustainability for rural water services.

Improving Asset Management

Asset management is a complex task that considers the different life spans, maintenance regimes and design requirements of infrastructure, particularly for piped schemes. Recognizing this complexity, the allocation of responsibilities for asset management between service authorities and service providers is a critical first step. Depending on the country context, for systems under community management this task may best be executed at service authority level, be carried out by an aggregated body, or outsourced to a qualified third party. For private sector models, operators may bear responsibility (depending on contractual arrangements) and require adequate oversight by the service authority to ensure asset management is carried out effectively. Table 5.3 provides recommendations for asset management.

TABLE 5.2. Recommendations for Financing

Level	Recommendations
National	• Identify investment needs and develop investment plan for the rural water sector • Dedicate national funds (taxes, transfers) in support of service authorities • Set up a national tariff policy for rural water supply, with cost recovery provisions for different contexts and pro-poor measures • Explore innovative mechanisms to finance capital maintenance, for example, options such as pooled funding and insurance schemes • Improve public-private partnership (PPP) framework to attract private actors in the rural water sector
Service authority	• Support service authorities in preparing realistic plans, budgets, with multiple funding sources for capital costs, recurrent costs, asset maintenance (if the latter is assigned) • Where possible introduce earmarking for financing major repairs and asset maintenance - and if necessary in extremely poor contexts for operation and maintenance (O&M), to ensure predictability
Service provider	• Ensure that tariffs at local level are set based on relevant policy and guidelines, taking into account operational costs and requirements for asset maintenance and renewal • Where feasible, support service providers to access commercial finance by strengthening their technical, financial and commercial capacity, support project preparation including due diligence

TABLE 5.3. Recommendations for Asset Management

Level	Recommendations
National	• Ensure that national legislation and policies assign ownership of rural water assets to specific entities • Carry out nationwide asset inventories, under leadership of national agencies, as a pre-condition for asset management, to inform evidence-based investment planning • Define the costs for the regular updating of water asset inventories and assign responsibilities to do so • Provide national guidelines and template agreements between service providers and service authorities that clarify responsibilities for asset operations and maintenance

Service authority	• Ensure that asset ownership is clear for service authorities through communications on national policy
	• Ensure that service authorities have a good knowledge of the water assets (by supporting the development of inventories and maps)
	• Support service authorities to sign agreements or contracts with service providers that:
	  • specify asset ownership
	  • define responsibilities for maintenance and replacement regimes (distinguishing between minor and major repairs)
	  • identify the source of financing for asset maintenance (as per tariff guidelines)
	• Roll out adequate planning tools, guidance, and training for service authorities

Service provider	• Reinforce service providers' technical capacity to operate and maintain assets and develop O&M and asset management plans • Build capacity of service providers to implement agreements and execute their asset management plan. This is to make sure that revenues and subsidies (if available) for capital maintenance cover all O&M costs including major repairs (and generate profits for private operators).

Strengthening Water Resources Management Practices

The development of integrated water resources management is a long-term and political process in many countries. Neither national drinking water agencies, nor service authorities and rural service providers may have much influence on this trajectory. However, a stronger focus on local level water management initiatives to address water security for rural water supplies, especially in groundwater reliant areas, is thus recommended. Table 5.4 indicates practical recommendations.

Establishing Monitoring and Regulatory Oversight

It should be stressed that regulatory oversight can only be phased in once robust monitoring systems are in place. As a first step, regulatory oversight can be achieved through monitoring of compliance to service level standards, including water quality standards, and issuing tariff guidelines for rural water. This needs to be accompanied by capacity building to ensure that tariff levels are following rural water tariff guidelines. More formalized oversight for rural services can be achieved in the long term through assigning economic regulatory functions to (sub-) national entities, or through expanding the mandate of national regulators, when feasible. Table 5.5 includes recommendations.

TABLE 5.4. Recommendations for Water Resources Management

Level	Recommendations
National	• Ensure that water allocation policy and legal frameworks are in place, defining priority for domestic drinking supplies • Support water resources management institutions with licensing and permitting instruments and monitoring tools • Improve compliance of rural water sector actors with water abstraction and licensing requirements
Service authority	• Strengthen representation of the interests of rural water supply users in sub-basin or local water management bodies • Support the coordination between local stakeholders responsible for rural water supply, agriculture, livestock, and other relevant water using sectors as part of water catchment management plans and local water management initiatives • Involve service authorities (and service providers) in these platforms to improve planning, allocation, and management for different competing water uses, especially in water-scarce areas with groundwater supplies
Service provider	• Provide technical support to service providers and service authorities to obtain water permits and participate in local water management initiatives • Train service providers in undertaking catchment protection measures and water safety planning

TABLE 5.5. Recommendations for Monitoring and Regulatory Oversight

Level	Recommendations

National	• Designate a national entity in charge of monitoring and regulatory oversight for rural water services
	• Merge or aggregate project-based information systems into one comprehensive system at national level, allowing for resources and capacity development over time to progressively include:
	  • Service levels, functionality, and water system performance parameters
	  • All service delivery models, even lower complexity schemes, for example, point sources
	  • Sustainability indicators on the effectiveness of technical assistance providers and service authorities
	• Implement a national system of benchmarking the performance of all service providers, and set and review performance targets in planning documents
	• Adapt regulatory requirements to the rural context, so they are not too onerous for rural providers, at least initially, as this can act as a disincentive

Service authority	• Ensure that service authorities are mandated to monitor and oversee rural services • Allocate sufficient resources, provide tools and capacity building for monitoring functions of service authorities, linked to planning of post construction support • Capacity building to support authorities in implementing rural tariff guidelines, or oversee contractual arrangements with private sector (when relevant)
Service provider	• Provide reporting templates and schedules to service providers and include monitoring assistance as part of post construction support • Capacity building on tariff determination as per rural tariff guidelines

Future Policy Directions

Interventions Must Vary Based on Sector Development Stage and Population Segment

As the speed and appetite for reform and sector capacity vary from a country to another, the pathway toward sustainability must likewise be flexible and adopted in an incremental manner. Figure 5.1 shows a "ladder" of three levels, illustrating how incremental progress can be achieved from basic, to intermediate, to an advanced stage of the development of the rural water sector in a given country.

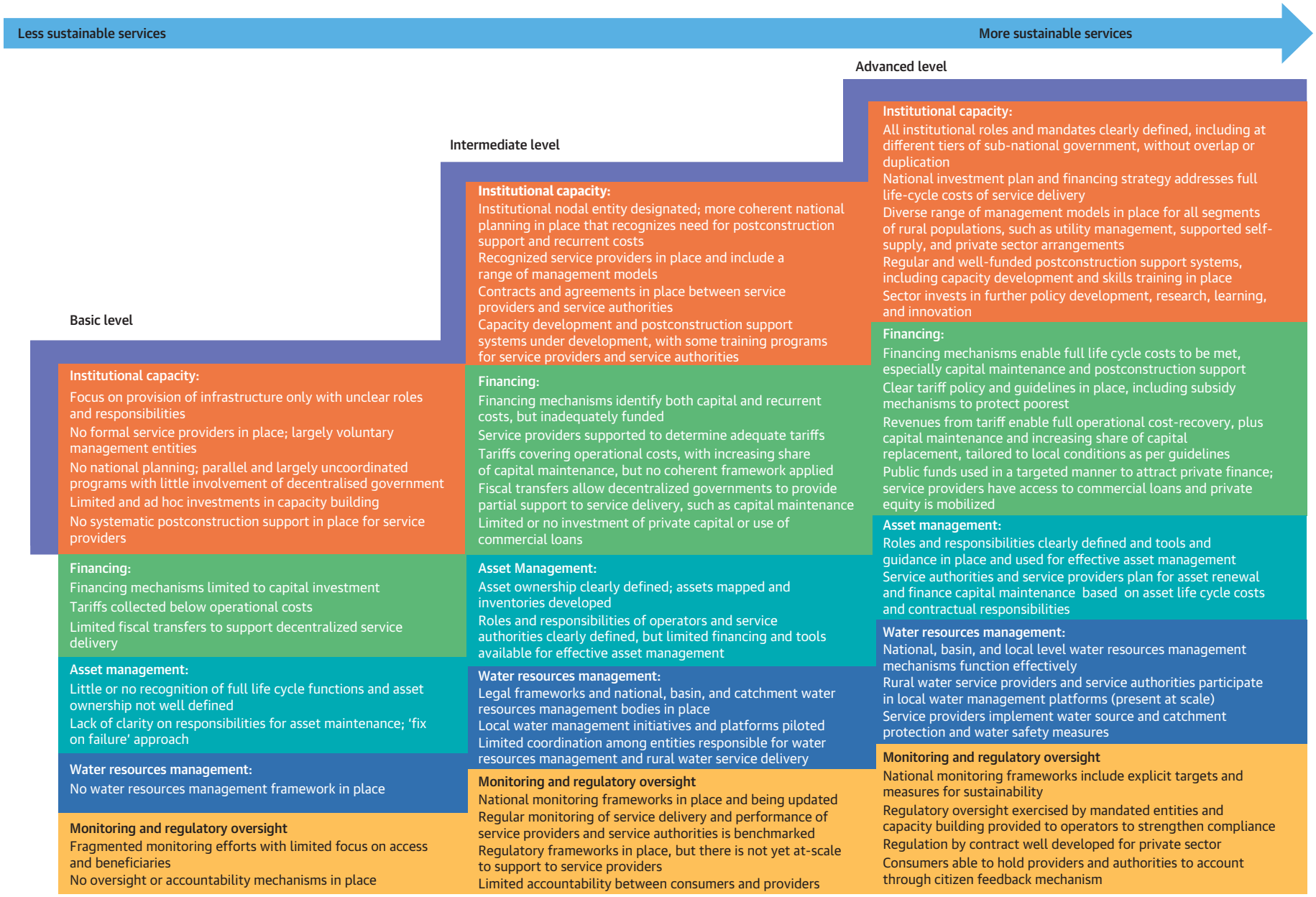
This overall sector development trajectory needs to be put in the context of a changing landscape of rural service delivery, as elaborated in section 3.3 (figure 3.2). Countries will see different population segments develop at different paces, namely i) remote dispersed populations, ii) rural villages and growth centers, and iii) peri-urban and small towns. With the adoption of the SDGs and the focus on equity and universal access, country governments have committed themselves to simultaneously address the challenges across all segments and leave no-one behind.

Nevertheless, the biggest leap for many lower and lower-middle income country governments will be to respond to the demand for higher service levels from a growing middle class, and transition to metered household connections. The country cases showed that aggregation of rural service delivery can result in economies of scale, scope, and more professional provision, either through public utilities, private sector operators, or federated community-based service providers. Of equal importance is the aggregation of technical support functions to service providers, especially for complex tasks such as major repairs and rehabilitation. Case studies showed that these aggregated service delivery models often were facilitated by an increase in public funds, for both capital maintenance and institutional support.

The country cases indicate that for improving sustainability, future policies will require that a range of rural providers will be more effectively supported and monitored. This needs to entail increasing financing for technical support functions, through tariffs and more predictable public funding, and by providing incentives and guidelines for local governments. Service authorities may also delegate services in such contexts to the private sector, provided that public funds are available to make such contracts attractive.

However, a challenge for all countries, including for upper-middle economies, is to develop adequate service delivery models for remote and dispersed rural populations, who continue to rely on either poorly supported community-based management or self-supply. Without new approaches to respond to the changing nature of rural water service delivery, there is a danger that remote and dispersed rural populations will be left with stagnating service levels, whilst denser agglomerations will benefit from professionalized service provision models, through expanding utilities or aggregated management models serving multi-village schemes or multiple standalone schemes. While self-supply is a *de-facto* model in all countries, governments could formally adopt supported self-supply for remote and dispersed populations with a focus on improving water quality aspects. This could entail direct

FIGURE 5.1. Basic, Intermediate, and Advanced Stage of Sector Development toward Sustainable Rural Water Services



household support or financing mechanisms for accredited self-supply solutions, accompanied by promotion, technical advisory services, water quality monitoring, and research and development for low-cost technologies. However, the promotion of self-supply should not be seen as a route for governments to abdicate their obligation to ensure the human right to water, but rather as a way to support a management model to reach the most remote and marginalized households and communities.

What interventions to prioritize for which segment of the rural population will clearly depend on which stage of sector development a country has reached. Table 5.6 includes key interventions that country governments could prioritize for each of the segments in order to transition from basic to intermediate and from intermediate to an advanced stage.

TABLE 5.6. Overview of Key Interventions for Different Service Delivery Contexts

Stage of sector development	Highly dispersed rural hamlets	Rural villages and growth centers	Peri-urban and small towns
From basic to intermediate	• Allocate public funding for maintenance support • Develop policies for supported self-supply in well-defined areas • Develop monitoring system for functionality and density of access	• Register and legally recognize service providers, with clear asset ownership • Professionalize service providers for transition to metering through postconstruction support • Promote regular tariff payments for higher level services and metering • Conduct asset inventories and build capacity of local governments on asset management • Develop financing policy and tariff guidelines	• Define policies and targets for integration of peri-urban and rural areas under utility management • Support utilities in rural asset inventories, adjustment of business plans, and customer communication • Develop incentives and financing strategy to integrate peri-urban and rural towns • Optimize public-private partnerships (PPP) • Establish regulatory oversight with regular tariff adjustments • Develop technical assistance facilities
From intermediate to advanced	• Develop a policy for self-supply, including accreditation of suppliers, and targeted household subsidies • Allocate public funds for improving water quality and communications • Establish pooled support and financing mechanisms for major maintenance by local governments • Expand monitoring system for all providers	• Initiate service provider performance benchmarking, linked to structured postconstruction support • Prepare local government annual maintenance and medium-term asset management plans and ring-fence budgets • Define regulatory oversight and introduce clustering for attractive PPP contracts • Introduce service contracts with service providers to strengthen oversight • Execute local water resources management initiatives	• Improve customer orientation of service providers (small-town and larger utilities) • Implement business and performance improvement plans (financial, commercial, and technical issues) • Support service authorities in project preparation, tendering, and supervision of PPP contracts • Increase access to commercial financing • Use targeted subsidies to attract private sector • Mainstream water resources management and protection practices

Key Policy Directions

Returning to the importance of the five building blocks for rural water sustainability, box 5.1 summarizes a number of policy directions that governments—with the support of development partners—are encouraged to take on to improve the sustainability of rural services. A key message underpinning these policy recommendations is that national governments need to continue to play a major role and cannot discharge state responsibilities for essential services to rural-based citizens, communities, and weakly funded, low-capacity local governments. National governments are required to step up their engagement in policy,

BOX 5.1. Policy Priorities to Improve the Sustainability of Rural Service Provision

Institutional capacity

1. ***Develop enabling policy and define institutional arrangements and functions for service authorities and rural service providers***. Specifically:
   - Assign functions for postconstruction support to and monitoring of rural service providers and technical support to local governments, in line with decentralization policy
   - Define clearly the roles and responsibilities of different tiers of sub-national government
   - Formalize (a wider range of) management models in policies and develop policies for integration of rural areas under service areas of existing utility companies
2. ***Develop systems with sustainable funding flows for postconstruction support and technical assistance to rural service providers***, including:
   - Technical and financial support, especially with respect to major repairs of rural water assets
   - Management and institutional support to ensure that (community-based) service providers keep functioning
   - Monitoring mechanisms to ensure that postconstruction support is effectively delivered by designated technical assistance providers or local governments

Financing

3. ***Adopt a financing policy and implement a tariff guideline for rural water that distinguishes the different life cycle cost elements of the full cost of service provision***, with:
   - Different segments (geography, management model) having a different level of cost recovery through tariffs—that is, the full costs are funded through a different mix of taxes, transfers, and tariffs
   - Identification of sources of funds and responsibility for major repairs, capital maintenance, and asset replacement, combined with ring-fencing mechanisms (for example, maintenance funds, earmarking taxes)
   - Social pricing for the most vulnerable groups to ensure affordability

box continues next page

BOX 5.1. Policy Priorities to Improve the Sustainability of Rural Service Provision (continued)

Asset management

4. ***Formalize asset ownership through legal frameworks and support service authorities—when assigned as asset holders—in the management of assets***, through:
   - Asset inventories and asset condition assessments on a regular basis
   - Capacity building measures using asset management tools, and the gradual introduction of medium-term asset management plans

Water resources management

5. ***Strengthen representation of rural drinking water users' interests in catchment and local water management platforms, especially in water scarce areas***, through:
   - Participation of service authorities and service providers in local water management bodies
   - Programs to support service providers to engage in catchment protection and water safety planning

Monitoring and regulatory oversight

6. ***Develop a comprehensive monitoring system for rural water services, and allocate resources for its operation and usage to inform planning and strengthen regulatory oversight.*** Such a system would:
   - Include a basic set of indicators to monitor service levels, functionality and water facility condition
   - Be gradually expanded to monitor service provider performance and effectiveness of service authority or technical assistance providers
   - Be used to strengthen regulatory oversight in terms of adherence to service level standards, compliance with drinking water, and tariff-setting in line with guidelines

financing, and technical support domains, to make a dent in the triple challenge of rural service provision: i) serve the unserved, ii) improve service levels, and iii) sustain existing and future services

Knowledge Gaps

As documented in the case studies, solutions do exist for improving the sustainability of rural water services. However, the following knowledge gaps remain:

- Developing a better understanding on how to monitor sustainability of rural water services, what metrics and measurement to deploy and at what level: functionality and performance of the water facility, service levels received, as well as the performance of service providers and service authorities.

- Generating rigorous evidence through primary data collection on which determinants and conditions have the most critical impact on long-term service outcomes.
- Understanding the cost of failing services; for example, what are the avoided damages by having well-functioning post construction support services, combined with monitoring and effective regulatory oversight?
- Research and experimentation with innovative mechanisms to finance capital maintenance and replacement costs, including pooled funding arrangements and insurance schemes to cover major repairs and capital maintenance. A first step would be to carry out an in-depth documentation of successful experiences in both developed as well as developing countries.
- Further research into the effectiveness of supported self-supply models, understanding the costs and benefits and the extent to which water quality concerns can be minimized.
- Better understanding what local or (sub-) basin integrated water resources management policies and practices can have a demonstrable positive impact on long-term sustainability of water supply.
- Further research into cost-effective and sustainable fecal sludge management and wastewater treatment solutions in small towns and peri-urban areas, drawing on the experience of upper middle-income and European countries.

Note

1. The assessment indicated that national level capacities may well be ahead of local level, and vice versa shortcomings at the local level can be the result of gaps in legislation or policy at national level.

Appendix A Overview of Study Protocol

Entry point for analysis	Purpose and scope	Procedures and methods	Sources
Sector overview	• Capture of factual information and data about RWS sector • Description of actual sector arrangements, service delivery models and roles in service delivery cycle • Sector KPIs • Assessment of key donors and support provided to RWSD (outside of government)	• Qualitative assessment • Data collection and summary	Sector documentation: policies, guidelines, normative documents Monitoring data Recent sector reports from development partners (for example, WSP SDAs or WASHBat and so on)
World Bank operations	• Capture of factual information and data • World Bank KPIs • Analysis of Bank operations, scale, objectives and relative balance in funding support • Assessment of findings and lesson learning	• Qualitative assessment • Review of loan profile and funding allocation • Data collection and summary • Data analysis	Bank project design and completion reports Monitoring data Relevant third-party review or evaluation documents
Country context factors	• Capture of factual information and data • Summary narrative to highlight important actual or potential influences on RWSD	• Qualitative assessment • Data collection and summary	General documentation Political analysis reports Specialized agency reports (UN, World Bank and so on)
Sector governance	• Capture of factual information and data • Summary narrative to highlight trends and influences for RWSD	• Qualitative assessment • Data collection and summary	Sector documentation: policies, guidelines, normative documents; Recent sector reports from development partners (for example, WSP SDAs or WASHBat and so on) Political analysis reports
Building blocks	• Capture of factual information and data • Narrative to highlight relative development and effectiveness of the five building blocks • Narrative of the strengths and weaknesses of the actual and potential service delivery models	• Qualitative assessment • Data collection and summary • Data analysis • Spot check or verification via email or telephone • Follow-up with STCs • In-country visits	Sector documentation: policies, guidelines, normative documents Monitoring data Recent sector reports from development partners (for example, WSP SDAs or WASHBat and so on) Desk study countries: Bank staff TTLs Full study countries: interviews with sector stakeholders, direct observation, and secondary data collection

Appendix B Questions for Scoring of Building Blocks

Building block	Sector level questions			
Institutional capacity	Are institutional roles at national and decentralized levels clearly defined and without duplication or gaps in responsibility (for financing, implementation, support, monitoring and regulation and so on)?	Do national and decentralized sector institutions have full (or mostly full) complement of qualified staff as per organizational requirements?	Are there professional or vocational institutionalized programs of training available for sector staff?	Are there programs to support service providers and private sector capacity building at national or decentralized levels for rural water?
Financing	Is there a significant (>20 percent) financing gap between stated investment targets and actual or planned commitments for rural water across all funding sources for the known planning horizon?	Is there sufficient funding to support the direct (long-term support to rural service providers) and indirect costs of the sector (for example, institutional reforms, policy development, training, monitoring and so on)?	Does the government have (and apply) a pro-poor tariff policy (including cross-subsidy, OBA or other)?	Do service authorities (local governments or other) contribute to funding rural water supply via inter-governmental fiscal transfers or their own revenues?
Asset management	Is asset ownership and delegation defined in legislation or sector policy?	Is there a clear differentiation between categories of minor and major repairs and allocated responsibilities for central or local government and service providers in sector policy?	Is asset management practice regularized within different institutions and are tools, guidelines, templates, training, and so on, available?	Is there adequate financing in place to cover the costs of capital maintenance (through different public, commercial sources, or tariffs)?
Water resources management and security	Is there legislation or policy in place that clearly defines priorities and processes relating to water allocation, regulation, and water rights?	Are there national and sub-national water resources management institutions in place and able to undertake their mandated functions for water resources management (basin management)?	Are there mechanisms or platforms in place to allow representation of service authorities or service providers in WRM bodies?	Are there mechanisms and institutional capacity to support water quality monitoring and assessment, including remedial action?
Monitoring and regulation	Is there a comprehensive national monitoring framework in place that is used or relied on regularly by most stakeholders?	Does the national monitoring framework include sustainability, service level indicators, or performance indicators for service providers?	Are the outputs of the monitoring system analyzed, disseminated, and used for sector learning and planning?	Is there a regulator for rural water services, or are regulatory functions delegated to sub-national institutions?
Institutional capacity	Are there programs and initiatives of technical assistance to train and support service providers on business development and technical capacity?	Do service providers receive external support and backstopping on a regular basis?	Do service providers have the technical and managerial capacity to operate water schemes effectively?	Are incentives in place for service providers to improve their performance?
Financing	Do tariffs provide full cost recovery (operational and capital maintenance and depreciation costs)?	Do tariffs meet operating costs (excluding capital maintenance and depreciation costs)?	Do service providers have access to a source of financing to cover capital maintenance and depreciation costs (for example, public funding, repayable finance or other)?	Are subsidy mechanisms in place to remove affordability constraints (for example, tariff cross-subsidies)?
Asset management	Is the ownership of the asset clearly understood by service providers?	Are responsibilities for asset management tasks (if any) clearly defined in performance contracts or lease agreements of service providers?	Is asset replacement planned and budgeting for based on understanding of the life cycle of the assets (and main components)?	Do service providers have access to supply chain for spare parts and maintenance services?

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APPENDIX B. continued

Building block	Sector level questions			
Water resources management and security	Do service providers plan for and carry out source protection and preservation activities, such as water safety or water security plans?	Are service providers able to engage with water resources management decision-making at catchment or basin level?	Do service provides and or authorities develop and expand the water supply infrastructure, taking into account water resource availability and variability, including vulnerability to extreme events?	Are conflicts between users of water for drinking and other sources (agriculture and livestock) that affect the performance of schemes minimized or managed well?
Monitoring and regulation	Are service delivery levels and operational performance monitored by service providers?	Do service providers regularly report monitoring data to service authorities or other entities?	Do consumers have (reasonable) access to information about water services and performance?	Is economic regulation in place (by agency or by contract) at the service level?

Appendix C Overview of Rural Demographics in Study Countries

Country	Definition of rural areas according to statistical agency	Rural population (percentage of total population)	Rural population in absolute numbers	Population growth in rural areas (%)	Formally recognized sub-divisions in rural areas
Bangladesh	Rural population refers to people living in a rural area. It is calculated as the difference between total population and urban population.	65.7	105 million	0	In rural administrations, there are three tiers of local government councils: Zila Parishad (district councils); Upazila Parishad (sub-district councils) and Union Parishad.
Benin	Agglomerations with a population of 10,000 or under, in many small towns, legislation and policies for water pertain to rural water supply.	56.1	5.9 million	1.8	Villages
Brazil (Ceará)	The urban population in Brazil is defined as the population living in the administrative seat of a municipality, whereas the population of all other settlements inside the municipal area but outside the administrative seat is classified as rural.	14.3 (Brazil) 25 (Ceará)	30 million in Brazil 2.2 million in Ceará	−0.90	Four main types of rural settlements, some with further sub-divisions, based on factors such as the proximity to the urban core, the presence of urban characteristics, the degree of concentration, the population size and whether it is an indigenous settlement.
China (Zhejiang and Shaanxi)	The definition of urban and rural population has evolved over the years, a single definition is not possible as this varies according to physical location and registration status.	43.9 35.1 (Zheijang) 47.4 (Shaanxi)	1,367 million 54 million (Zheijang) 37 million (Shaanxi)	−2.2	Townships are mostly rural (except townships included within the urban district of a prefecture-level city). Villages constitute an informal fourth level of administrative divisions, which is not explicitly recognized in the constitution. They are administratively embedded in the higher township level. Villages do not have formal government organs, and they are effectively governed by villager committees, which are autonomous grassroots organizations.
Ethiopia	Rural populations are defined as being localities with 2,000 inhabitants or fewer and exclude any settlement of any size where the Woreda, or local government, administration offices are located.	80.5	80 million estimated	1.9	No detail available.
Ghana	Localities with 5,000 or more persons are classified as urban while localities with less than 5,000 persons are classified as rural.	46	12.7 million	0.9	The region remains an important level of coordination and provision of some deconcentrated support from national ministries.
Haiti	Urban areas are defined as administrative centers of communes. Settlements outside that are considered rural.	41.1	4.42 million	−1.6	No detail available.

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APPENDIX C. continued

Country	Definition of rural areas according to statistical agency	Rural population (percentage of total population)	Rural population in absolute numbers	Population growth in rural areas (%)	Formally recognized sub-divisions in rural areas
India (Punjab and Uttarakhand)	These are defined as the areas outside statutory places with a municipality, corporation, cantonment board or notified town area committee, and places not satisfying the following three criteria simultaneously: (a) a minimum population of 5,000 inhabitants; (b) at least 75 percent of male working population engaged in non-agricultural pursuits; and (c) a density of population of at least 400 per square kilometer.	67.3	881.7 million	0.6	None
Indonesia	Administrative territories at village level, which have not yet fulfilled the criteria for being urban, are considered rural.	46.3	120 million	−0.4	No detail available.
Kyrgyz Republic	Rural settlements can be under the urban municipality of nearby town, but still considered as having "rural settlement" status.	64.3	1.4 million	1.9	*Ayl-Okmotus* are the lowest level of political decentralization and each one consists of a representative body, the *Ayl-Kenesh*, executive body, and AO chairman.
Morocco	No detail available.	39.8	13.56 million	0.1	The *communes rurales,* which are themselves divided into villages (*douars*).
Nepal	There are no clear population thresholds or definitions provided (although 19060s legislation defines centers above 10,000 as a town); some VDC are quite built up. There is often reference to towns and small-towns and rural, without consistent definition in sector document	81.4	23 million	0.7	Ongoing territorial reform is happening in Nepal; Before, administratively, the definition is that urban is anywhere defined as within a municipal boundary, of which there were 58 in the 2011 census, and rural anywhere within the Village Development Committee boundary.
Nicaragua	Communities other than departmental, regional, or municipal headquarters being smaller than 1,000 people with no or minimal urban conditions, such as street patterns or electricity service.	41.2	2.5 million	0.4	Two types of rural settlements exist, concentrated and dispersed rural settlements. The former is characterized as being more stable, with higher population growth, a focus on agricultural commerce, and some basic services; the latter refers to spread-out houses on mountains and valleys, where subsistence is predominant.

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APPENDIX C. continued

Country	Definition of rural areas according to statistical agency	Rural population (percentage of total population)	Rural population in absolute numbers	Population growth in rural areas (%)	Formally recognized sub-divisions in rural areas
Philippines	Considered "rural" by international standards (agglomerations of 5,000 or under), municipalities and barangays are service authorities. Based on the country's definition of urban, agglomerations as small as 1,000 inhabitants can be considered urban.	55.6	53.37 million	1.8	They oversee municipalities and barrios or barangays, that is, villages or small towns, which are the smallest political units.
Tanzania	Groups of population under 10,000 people.	68.4	37.42 million	2.1	No detail available.
Vietnam	No detail available.	66.4	60.7 million	0.1	No detail available.

Appendix D National Level Functions by Institution

Country	Policy-making body	Body responsible for capital investments	Independent regulator	Body responsible for technical assistance	Body in charge of water quality	Water resources management
Bangladesh	Ministry of Local Government, Rural Development and Cooperatives	Department of Public Health and Engineering	Not present	Department of Public Health and Engineering	Department of Public Health and Engineering	Upazila
Benin	DG-Eau	Ministry of Finance	Unit under the DG-Eau	Services de l'Eau (DG-Eau's regional offices)	Ministry of Health	DG-Eau
Brazil (Ceará)	Ministry of Cities	National Health Foundation (Fundação Nacional de Saúde)	Delegated Public Service Regulatory Body of the State of Ceará (Agência Reguladora de Serviços Públicos Delegados do Estado do Ceará)	Water and Sewerage Company of Ceará	Ministry of Health	Water Resources Management Company (Companhia de Gestão dos Recursos Hídricos)
China (Zhejiang and Shaanxi)	Ministry of Housing and Urban-Rural Development	Ministry of Water Resources; National Development Reform Commission	Not present	Provincial and country water resource	Ministry of Health	Ministry of Water Resources
Ethiopia	the Ministry of Water, Irrigation and Electricity	Ministry of Finance and Economic Cooperation	Not present	National WASH technical team	Ministry of Health	Ministry of Water Resources
Ghana	The Ministry of Water Resources Works and Housing	Ministry of Finance and Economic	Community Water and Sanitation Agency	DWDs	Public Utility Regulatory Committee	Water Resources Commission
Haiti	DINEPA	DINEPA	Not present	DINEPA	DINEPA	Several
India (Punjab and Uttarakhand)	Ministry of Drinking Water and Sanitation	Department of Water Supply and Sanitation at state level	Not present	Department of Water Supply and Sanitation (Punjab) Uttarakhand Jal Sansthan (Uttarakhand)		None
Indonesia	Ministry of Public Works and Housing	National Development Planning Agency	Not present	Pokja AMPL chaired by the province	Ministry of Health	Water council
Kyrgyz Republic	Gastroy, Department of Drinking Water Supply and Wastewater Disposal	Department of Drinking Water Supply and Wastewater Disposal	Anti-Monopoly Commission (tariffs only)	Ayl-Omakut	Ministry of Health	Department of Water Resources and Melioration
Morocco	Ministry of Energy, Mining, Water and Environment	ONEE, Ministry of Water, Ministry of Finance	Not present	Directorate of Water and Sanitation	Ministry of Public Health	Ministry of Energy, Mining, Water and Environment

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APPENDIX D. continued

Country	Policy-making body	Body responsible for capital investments	Independent regulator	Body responsible for technical assistance	Body in charge of water quality	Water resources management
Nepal	Ministry of Water	National Planning Commission (NPC), Ministry of Finance and Ministry of Water	Not present	Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR)	Ministry of Health	District Water Resources Coordinating Committee
Nicaragua	New Social Emergency Investment Fund (Nuevo Fondo de Inversión Social de Emergencia or Nuevo FISE)	New Social Emergency Investment Fund (Nuevo Fondo de Inversión Social de Emergencia or Nuevo FISE)	Nicaraguan Institute for Water Supply and Sewerage, or El Instituto Nicaragüense de Acueductos y Alcantarillado Sanitario	Municipal Water and Sanitation Unit	Ministry of Public Health	National Water Authority
Philippines	National Economic Development Agency (NEDA)	Several	National Water Resources Board (NWRB) and Local Water Utilities Administration (LWUA)	LWUA and Department of Interior and Local Government (DILG)	Department of Health	National Water Resources Board
Tanzania	Rural Water Supply Department	Ministry of Finance	EWURA (at present, only for urban utilities)	President's Office, Regional Administration and Local Government	Ministry of Health	National Water Board
Vietnam	National Centre for Rural Water Supply and Sanitation	Ministries of Planning and Investment	Not present	National Centre for Rural Water Supply and Sanitation	Ministry of Health	Ministry of Environment and Natural Resources

Appendix E Typologies of Service Delivery Models and Sub-Variants

Service provider typology	Main variants	Description	Country examples
Community-based management	**Informal community organizations**	Community organizations taking care of daily operation, maintenance, and administration. But these are not legally recognized as service providers, because organizations have not taken the due legalization steps or government has not applied its policy.	All countries
	Formal community service providers	Community organizations taking care of daily operation, maintenance, and administration, and these are legally recognized as service providers. This implies that the support is integral to the model, though in reality they may not get support. The details of how they are set up and structured may vary according to type of technology (for example, In Nicaragua for hand pumps or piped systems) and who established them (government or NGO). Communities may contract out certain tasks of O&M to individuals (plumber or scheme attendant) or even to small companies.	All countries
	Community delegation to private provider	Community organizations delegate through contract the entire O&M to private operators over medium to long periods. The operator gets its remuneration through the sale of water. The community organizations provides oversight. It is essentially a double delegation from the authority to the community organization to the private operator.	Ghana, Tanzania, Haiti
	Federated community service providers	Community organizations take care of daily operation, maintenance, and administration, and these are legally recognized as service providers. There is a federation of individual community service providers, where the federation does some of the major works, and the individual members some of the minor works (also known as a Trust in Tanzania).	Brazil, Tanzania
	Cooperatives	Community organization not only established for water, typically agricultural organization. Often fall under a different legal regime from other community service providers.	Indonesia, Bangladesh, Philippines
Direct local government provision	**Provision by the municipality**	The local government is the service provider in the main settlement of its jurisdiction, and also serves nearby rural populations. The provider function is placed within the municipal administration (non-corporatized).	Morocco, Brazil, Vietnam, Nicaragua, Philippines, Benin, Bangladesh, China
Public utility provision	**Municipal utility**	The local government is the service provider in the main settlement of its jurisdiction and also serves nearby rural populations. The provider function is established within an entity that is autonomous from the municipal administration and may act along commercial lines.	Philippines, Brazil, Nicaragua, Morocco
		Autonomous utilities, that are fully controlled by the public sector at other levels of scale than local government (for example, province or state), but may act along commercial lines.	Brazil, Nicaragua, China, Morocco, Philippines
Delegated private sector	**Community enterprises**	Commercial enterprises set up by county government, whereby the county retains the assets and establishes a concession service contract with community enterprises. The private operator is remunerated through the sale of water.	China
	Mixed utilities	The community and the local government jointly establish a company and jointly own the assets.	Vietnam, Indonesia
	Lease contract	The service authority delegates operation and maintenance to a private service provider. The private operator is remunerated through the sale of water, and pays a lease fee to the authority.	Benin, Haiti

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APPENDIX E. continued

Service provider typology	Main variants	Description	Country examples
	Concession	Similar to lease but with investment obligations and contracts over longer time to recoup investments. Some of the expansions are subsidized through output-based aid.	Morocco, Benin, Vietnam
	BO(O)T (Build Operate (Own) Transfer) contract	The service provider is contracted to invest into a water system, based on a long-term contract for remuneration based on the sale of water.	Bangladesh, Vietnam
	Kiosk or public stand post operators	Operator purchases water in bulk and ensures the retail sale of water, typically through a kiosk or public stand post. Operation and maintenance of the scheme is done by the service authority or utility, through the revenue from the operators.	Morocco, Ghana
Supported self-supply	**Unsupported self-supply**	Households invest in their own supplies and in their maintenance. Typically these are wells and rainwater harvesting. There is no formal financial support available from the government for those investments, nor any technical assistance or quality monitoring.	All countries
	Supported self-supply	Households invest in their own supplies and in their maintenance. Typically these are wells and rainwater harvesting. There are varying degrees of support, in the form of partial subsidies for the capital investments, technical assistance to the construction works, or quality monitoring.	Ethiopia

Appendix F Overview of Tariff Guidelines, Levels, and Affordability

Country	National policy or guidelines account for full cost recovery	Tariffs at service level set by	Tariffs levels (range in US$)[a]	Affordability
Benin	The national strategy recognizes full cost-recovery as a principle. However, there is no detailed guideline on tariffs setting.	Not based on full or partial cost-recovery but considerations of affordability.	Varies by operator; ranges of US$0.68/$m^3$ at stand post and US$1.30/$m^3$ for household connections	Between 0.7% and 4.5% of a poor household income
Bangladesh	Strategy is based for cost recovery is set out in major policy documents (MLGRDC's cost recovery strategy, 2010), which is to gradually increase the levels of revenue generated by scheme, including for all operation and maintenance costs and over time seek to recover capital maintenance costs, starting with piped schemes.	Tariff calculation structures are based on sound principles, but are not systematic, rather interpreted differently and not regulated. Initial tariff calculations are determined by the implementing agencies based on considerations of costs and affordability of the users. However, all service providers, particularly in case of piped water schemes, should consult with UP about any tariff adjustment process.	US$0.25/$m^3$ (for shared stand post) to over US$4.00/$m^3$ (for multiple tap connection at the premises)	Lowest service level is less than 1% of average poor household income
Brazil	No	Under the SISAR model, a clear tariff framework has been established. This establishes that tariffs should cover all operation and minor maintenance costs, the costs of minor expansion works the replacement costs of assets and periodic maintenance of major assets. The tariff that users pay has two components: a component to cover the costs of the SISAR Federation's operations and a component to cover the costs of the local association.	US$6.00/month (for a consumption of 10 m^3/month)	US$6–11 per household per month; or 2–3.8% of poor household income

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APPENDIX F. continued

Country	National policy or guidelines account for full cost recovery	Tariffs at service level set by	Tariffs levels (range in US$)[a]	Affordability
China	Provincial authorities provide guidelines for tariff setting which are then applied by county authorities, but can be adjusted depending on how water supply schemes have been built and financed. For larger centralized systems tariffs are generally set at a fixed cost per cubic meter, and have been set at a flat rate for many years. However, now block tariffs are being introduced, as well as differentiated tariffs for residential, industrial and commercial users.	The tariffs are set by each city or local council depending on size and complexity of system and distribution of users. Application for increases in tariffs must be backed up by a plan showing the required O&M costs, anticipated investment program, financial model and cost-effectiveness analysis. Proposals are then subject to review by the County Price Bureau, which is not independent from the county government (and political leadership). Tariffs for community managed schemes are proposed by the community based on internal discussions and agreement, without much consideration of the true O&M costs.	Tariffs are most commonly set at US$ 0.075–US$0.21/$m^3$ for water consumption. In Shaanxi, tariffs are generally higher in rural areas reflecting the costs of pumping for deep groundwater.	In Zhejiang below 0.8% of a poor household income and in Shaanxi between 2.5% and 2.8% of income
Ethiopia	Yes, and the MoWIE has also prepared guidelines moving toward full cost recovery for urban schemes and recovery of operation and maintenance cost for rural schemes	No detail available; various practices reported	No detail available	
Ghana	Under CWSA Legislative Instrument 2007 (GoG 2011), the methods of tariff collection should be pay-as-you-fetch at standpipes or pumps, or monthly billing. District Assemblies are supposed to establish capital maintenance funds for major repairs and rehabilitation	Community management entities are to set tariffs and receive support/approval by the DA, but in practice this often does not happen. Other methods include monthly tariffs or only when there is a breakdown. In many cases, no tariffs are charged. DAs commonly do not fulfil their tariff review and regulatory functions.	Price per cubic meter in range from US$0.23–0.57 under community management models	Between 1.7% and 5.3% of a poor household income

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APPENDIX F. continued

Country	National policy or guidelines account for full cost recovery	Tariffs at service level set by	Tariffs levels (range in US$)[a]	Affordability
Haiti	No	Set by consensus with little to no regard for actual operating costs.	Contributions ranging from US$1.00–2.00 per household per month	Less than 0.7% of a poor household income
India	Punjab state water policy states DWSS should support GPs in setting tariffs on a volumetric basis. But no specific levels or ranges are given. The World Bank (2014) indicates that in 20% of the supported schemes, volumetric tariffs are charged.	Tariffs are likely to be adequate to cover costs of operation and minor maintenance only, and not expenditure on major repairs and replacements.	Punjab: up to US$2.69 household per month Uttarakhand: up to US$0.53 per household per month	Less than 1% of poor household income
Indonesia	Yes, Regulation No.122/2015 provides guidelines for tariffs setting, taking into account full cost recovery.	Tariff are generally set by village consensus	Between US$0.18 and US$0.77 per cubic meter	Between 0.8% and 2.6% of a poor household income
Kyrgyz Republic	New sector state policy based on the principles of tariffs being adequate to meet cost recovery of operational expenses. A methodological guidance resource was developed in 2012, this has not yet been widely applied.	The *Ayl Okmotus* set tariffs, but these are often low. Moreover, tariff setting is subject to political interference at the local level, although there are reforms that are intended to ameliorate this situation.	Between US$0.1 and 0.4 per cubic meter. US$1-4 per household per month	Up to 1.5% of a poor household income
Morocco	No	Municipalities and ONEE approved tariffs by government	1ONEE sells US$0.6 to 1.00 per cubic meter for those on the first tariff band; beyond that villages agree on the tariff	Between 1.2% and 2.1% of a poor household income
Nepal	Limited documentation or guidance that WSUCs receive for setting tariffs at adequate levels, despite such guidelines being mentioned as being required in the 2004 rural WASH policy.	No reliable data; various approaches exist	2010 study by WaterAid found high variability in fees charged, from US$ 0.05–0.9 fixed rate per household per month for public taps	At least 1.4% of a poor household income

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APPENDIX F. continued

Country	National policy or guidelines account for full cost recovery	Tariffs at service level set by	Tariffs levels (range in US$)[a]	Affordability
Nicaragua	Yes, but the regulations and guidelines for covering recurrent costs through tariffs in rural areas are inadequate to establish financially sustainable and affordable services.	The tariffs can be set by the *Comités de Agua Potable y Saneamiento* (CAPS) themselves, but need to be based on calculation guidelines, issued by INAA. CAPS can decide on whether the tariff is a fixed rate tariff, or volumetric in the case they have household metering.	US$0.70–US$2.5 per household per month	Around 1% of poor household income
Philippines	Yes, tariffs guidelines are provided by the National Water Resources Board (NWRB) and the Local Water Utilities Administration (LWUA)	Tariffs are not cost based. They were determined in the general assembly, without any guidance on how much revenue is needed to properly maintain the system. There is no tariff formula or parameters for adjustment.	Between US$0.24 and US$0.53 per cubic meter	Between 0.8% and 1.8% of a poor household income
Tanzania	National Water Policy states that communities are to determine their own tariffs.	In practice, communities often lack knowledge to define cost-reflective tariffs, and there is limited external support provided on this topic, nor are tariffs effectively regulated by Local Government Administrations.	Ranges from US$0.4 to 0.80 per cubic meter (sold in 20 litre buckets)	Between 0.6% and 1.6% of a poor household income
Vietnam	Yes, the Ministry of Construction, the Ministry of Finance and the Ministry of Agriculture and Rural Development provide guidelines for calculating full cost-recovery tariffs, the process for tariff validation by PPCs is cumbersome and may not be exempt from political considerations.	Full cost-recovery tariffs in rural areas are often calculated based on low consumption levels	Range of US$0.08 to 0.5 per cubic meter	About 1% to 2.8% of a poor household income

Note: The figures provided here come from a range of different sources and surveys of different scale. These should be read in conjunction with each country working paper and taken as indicative for rural tariff levels and affordability ranges only. To develop nationally representative data, national household and expenditure surveys would need to be analysed for rural population segments in the bottom 40 percent. Country working papers are available upon request.

a. Figures are derived from a range of different sources and surveys of different scale. Data sources are detailed in the Country Working Papers. Tariff levels and affordability ranges are taken as indicative.

Appendix G.1 Bangladesh

Population	160,995,142	**Rural population**	105,811,166
GNI per capita purchasing power parity (current US$)	3,560	**Rural population (%)**	65.7
Economic status	Lower-middle	**Rural population growth (%)**	0.0
Access to rural water services (%)	87 (JMP 2015)	**Total renewable water resources (cubic meters per year)**	7,621
Access to piped water onto premises in rural areas (%)	1 (JMP 2015)	**Average size of service authority by population**	21,000
Tariff levels	Range US$0.25 per household per month (standpipe) to >US$4.00 (multi-tap domestic connection)	**Rural water strategy**	National Strategy 2014; Sector Development Plan 2011-2025
Functionality	83.9% of installed tubewells	**Rural water policy**	National Policy 1998 (Arsenic Mitigation 2004)

Sources: World Bank data; JMP 2015; World Bank 2016; IWMI 2007; FAO Aquastat, MLGRDC 2012.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National Authority: local government division (LGD) within Ministry of Local Government, Rural Development and Cooperatives (responsible for policy and strategic planning); Department for Public Health Engineering (DPHE) (planning and technical support, but still involved in direct service delivery)
- Service authority: Union Parishad (UP, local government)
- Service providers: community management through committees and farmers cooperatives; direct public provision in some medium-sized schemes by the UP; private sector through build-operate-transfer (BOT).

Sustainability Assessment

		Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level		4	1	2	2	1	10
Community management	Point sources (group of households)	1	1	2	3	0	7
	Piped sources	3	3	2	3	2	13
	Farmers Cooperatives	5	5	4	2	2	18
Local government provision		2	3	3	1	1	10
Private operator (BOT)		4	5	6	3	3	21

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- Clear institutional mandates for different tiers of government exist, but are not implemented; in particular, DPHE continues to mix roles in both technical support to UPs and direct service provision. This contradicts decentralization policy and negatively affects long-term capacity building of UPs as service authorities.
- Challenges remain in terms of accountability and capacity to carry out some functions, particularly for long-term support and monitoring of service delivery and standards.
- DPHE faces challenges in staffing capacity and lack of budget for mobilization; likewise, UPs, as service authorities, have limited capacity and struggle in the role of coordination and planning at local levels.
- Service providers have the capacity to operate simple handpump systems, but struggle with more complex schemes and management requirements such as piped systems and alternative technologies.

Financing

- A phased sector development plan exists, but suffers from shortfalls in capital investment budget.
- Considerable private investment largely through household self-supply.
- Tariff calculation structures are based on sound principles for piped schemes, but are not systematically implemented, are interpreted differently and not regulated, allowing political influence to keep levels down; tariffs seldom include capital maintenance provisions (aside from public-private partnership (PPP) examples).
- Tariffs charged vary widely, and are estimated to range from 0.32 percent to 5.19 percent of poor household income. There are considerations for the poor, through tariff categories and cross subsidies under a few models.

Asset management

- Although the UP has the right to transfer assets or delegate management of water facility assets, actual legal ownership of rural water schemes is still unclear in legislation.
- DPHE has no special provision for emergency repairs of point source supplies, but some for piped systems; piped systems have no provisions for capital maintenance and replacement (depreciation fund).
- There is no systematic or institutionalized approach to asset management established, many schemes adopt a "fix on failure" approach, and lack tools, capacity, and knowledge to carry out asset management.
- There is very strong private sector capacity for supply chains, although skilled maintenance service providers are not as common, or can be prohibitively expensive for complex repairs.

Water resources management and security

- Bangladesh has considerable water resources, but has challenges with groundwater quality (including widespread arsenic and saline intrusion); infrastructure is vulnerable to frequent natural hazards.
- Institutional arrangements for water resources management (WRM) are complex, especially in legal frameworks for abstraction, which leads to uncontrolled abstraction for multiple uses.
- There are limited linkages between macro-level WRM planning and local government institutions.
- Water safety planning at local level has been established for some time and is being scaled up; a new Water Safety Framework was established in 2011.

Monitoring and regulation

- There is weak and fragmented sector monitoring, leading to poor distribution of water points and planning.
- There is no comprehensive functional monitoring system for rural water, despite efforts to establish MIS in DPHE.
- There is no systematic monitoring of the huge number of households using self-supply schemes (one off tube-well mapping); local capacity for data collection of UPs and DPHE is limited. There is no systematic use of data at a local level.
- There is inadequate water quality monitoring considering the absolute number of sources and high risks to quality.
- Currently there is no independent regulator or economic (tariff) regulator, but legislation has been drafted to address this. UP capacity constraints limit their ability to undertake the proposed regulatory functions.

Key Evidence Points from the Assessment at Service Provider Level

- Community management scores poorly, facing challenges including low tariff revenue and disintegration of committees over time. However, farmer cooperatives fare relatively better, partly due to diversification of income (agriculture). Self-supply—although most prevalent—is unsupported.
- The UP management model suffers from poor willingness to pay for local government services, variable technical capacities, political influence, and challenges to ring fencing revenues for O&M.
- The PPP model scores highest, but is at pilot scale and faces challenges: political influence on tariffs, low willingness to pay, variable technical capacities, poor cost recovery, a lack of interest from the private sector.

Lessons Learned from Country Experience

- There is an interesting example of multiple use systems through the Farmers' Cooperative, in which individual scheme management benefits from external training and capacity building initiatives, the availability of a micro credit fund, and technical back-up support.
- The PPP model involved co-financing private capital, and resulted in mixed success in the pilot by the government and World Bank; however, some schemes were well performing and show promise, especially those located nearer to urban areas and in areas with poor water quality, where there is strong demand for piped water services and strong technical performance among operators.

Appendix G.2 Benin

Population	10.5 million	**Rural population**	6 million
GNI per capita PPP (current US$)	2,050 (2015)	**Rural population (%)**	57
Economic status	Low-income	**Rural population growth (%)**	1.8
Access to rural water services (%)	72	**Total renewable water resources (cubic meters per year)**	2,426
Access to piped water onto premises in rural areas (%)	4.8	**Average size of service authority by population**	77,000 residents
Tariff levels	US$0.68 to US$2 per cubic meter	**Rural water strategy**	Strategy toward 2030 validated in April 2017
Functionality	82% of piped water schemes	**Rural water policy**	Rural water policy adopted in 2009

Sources: JMP 2015; DG-Eau, Aquastat, UNDP and World Bank data.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Directorate of Drinking Water Supply (Direction Générale de l'Eau) within the Ministry of Energy, Water and Mines and Water Supply National Agency created for accelerated asset development purpose by Decree # 2017-093 of January 25, 2017.
- Service authority: decentralized municipal government or *communes* (currently 74 rural municipalities).
- Service providers: private operators (through lease and subsidized concession contracts) and in rare cases municipalities. Community-based management is gradually being phased out.

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	6	4	5	2	3	21
Private operator (lease)	1	2	5	1	3	12
Private operator (subsidized concession)	5	7	7	1	5	25

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- The strategy for rural water services clearly defines responsibilities for all actors in the sector.
- The establishment of a Directorate for Public Drinking Water and Regulation in 2016 marked a collective recognition of the need to organize and regulate rural water services.
- Sustained efforts to decentralize responsibilities for water services and to build the capacity of municipalities are ongoing to enable these *communes* to fulfil their role as a service authority.

Financing

- Public funds for rural water are allocated based on a sector-wide programmatic approach, which prioritizes investments.
- Up until 2016, most public funds allocated to rural water supply came from donor grant funding; the country contracted a US$68 million concessional loan with the World Bank for 2017–22, of which US$33 million will be allocated to the rural water sub-sector.
- Subsidies and results-based financing have been introduced to incentivize operators to connect households to small-scale piped water schemes under concession-type contracts.
- Reported tariffs applied by operators vary between FCFA 420–800 per cubic meter (US$0.68– 1.3 per cubic meter). Based on the national standard of 20 liters per capita per day, and the US$1.90 per day PPP international poverty line, this represents between 0.7 percent and 1.4 percent of a poor family's income.; however, tariffs applied at communal water points (which are mostly used by poor households) are much higher and poorly regulated.

Asset management

- The 1999 law on decentralization clearly identifies communes as owners of rural water assets.
- The country has started a major initiative to map all small-scale piped water schemes.
- The *redevance* (lease or concession charge) system ensures that a proportion of funds remain available to invest in capital maintenance; however, there is little clarity on how communes use these funds.

Water resources management

- Benin has only started setting up institutions and a mandate to implement integrated water resources management; the sector currently lacks the financial and human resources to make integrated water resources management a reality.
- There is no mechanism in place to issue water abstraction permits.

Monitoring and regulation

- The sector has taken the initiative to create a regulatory authority within the Direction Générale de l'Eau; however, this regulatory unit is yet to be effective and none of the water scheme operators are adequately regulated.
- Several tools have been tested to monitor access levels and piped water scheme management; the mWater platform appears to be the most efficient of these and its application by communes is currently in the scaling-up phase, although operators can be reluctant to share performance reports.
- Despite national standards, water quality is not adequately monitored or controlled by *communes*.

Key Evidence Points from the Assessment at Service Provider Level

- Private management under lease contracts is affected by poor capacity (translated into limited technical and managerial knowledge, as well as inadequate support systems to reinforce these capacities) and unsuitable financing arrangements (mainly poor revenues due to low consumption and lack of clarity on responsibilities for financing repairs).

- Inadequate water resources management practices are a common feature across all service delivery models (that is, lack of representation at basin level, watershed protection).
- The subsidized-concession model introduced with support from World Bank clarifies institutional responsibilities for operation and maintenance. It incentivizes private operators to contribute to capital investments. The successful tender of these contracts was the result of long-term capacity building delivered both to private operators and to public institutions.

Lessons Learned from Country Experience

- Clarity on asset ownership facilitates the delegation of water schemes.
- Asset inventories (mapping and capital value) are essential for the sustainable management of water schemes and for successful delegation arrangements.
- Designing contracts that balance the risk between the private sector and public authorities requires sound project preparation with due diligence on financial viability, technical feasibility and legal requirements, all of which require adequate time and funding support.
- Building the capacity of operators should be integrated into programs for the rural water sector.
- As the sector professionalizes and local governments delegate the management of water supply schemes, viable solutions for regulating operator performance should be introduced.
- There is potential to increase the coverage of piped water supply onto premises in rural areas (including in low income contexts) through results-based financing that incentivizes private operators and reduces connection costs for households.

Appendix G.3 Brazil (Ceará)

Population	204 million	**Rural population**	30 million
GNI per capita PPP (current US$)	15,020 (2015)	**Rural population (%)**	16
Economic status	Upper middle income	**Rural population growth (%)**	0.91
Access to rural water services (%)	87	**Total renewable water resources (cubic meters per year)**	41,603
Access to piped water onto premises in rural areas (%)	70	**Average size of service authority by population**	12,000 persons
Tariff levels	US$0.60 to US$1.0 per cubic meter	**Rural water strategy**	Rural water falls under PLANSAB, the main sector plan to 2033
Functionality	59% of the Brazilian population has an adequate service	**Rural water policy**	

Sources: Instituto de Pesquisa e Estratégia Econômica do Ceará 2011; Instituto Brasileiro de Geografia e Estatística 2015, 2010; World Bank 2016; Garrido et al. 2016.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authorities: Ministry of Cities; Ministry of Health, through the National Health Foundation (FUNASA), the Special Secretariat for Indigenous Health and the Environmental Health Control Secretariat National Water Agency; and Ministry of National Integration
- Service authority: municipalities
- Service providers: municipality direct provision, delegated public, private or mixed utility service providers, or community-based cooperative or associations, including *Sistema Integrado de Saneamento Rural* (SISAR - Integrated Rural Sanitation System); individual self-supply

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	6	5	5	8	5	29
SISAR	6	7	7	4	5	29
Isolated community organizations	1	1	3	4	1	8

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- The institutional framework for rural water supply is well defined, with clear separation of roles and functions between different levels, both at federal and state levels.
- SISAR represents an important innovation in the institutional capacity for community management: the model builds on the strengths of community management, complemented by the possibility to professionalize through a federation and the technical assistance of CAGECE, the state water supply company, resulting in performance improvements.
- However, there is no institutional framework for the isolated community organizations or any structured form of support for them. The limited data available shows that these associations operate largely informally and do not have capacity or access to financial resources and technical support.

Financing

- PLANSAB presents detailed estimates for investment requirements for expansion and replacement of rural water schemes and necessary support measures; this also contains specifications for the various states, including Ceará.
- Current spending on capital investments for rural water is in line with those estimates for investment; however, rural water supply receives a relatively small share of total water sector investments.
- Self-supply makes up a large share of total capital investments in the sector nationally. Although there are no specific figures for Ceará, it can be expected that the proportion is relatively high, as the northeastern states are the focus of various programs of support to self-supply.
- Little data exists to assess adequacy of tariffs to cover operation and maintenance costs, but SISAR tariff data are available, showing these are between US$6 to 11 per household per month, which would be well within affordability ranges, compared to a US$1.90 PPP poverty line level.

Asset management

- Asset ownership and the possibility to delegate O&M operation and maintenance tasks to delegated service providers is clearly defined.
- There is no specific framework for establishing or updating asset inventories, but in most service delivery models, much of the data on rural assets should be available.

Water resources management

- The institutional model water for water resources management in Ceará is seen as a strong example in following Integrated Water Resources Management (IWRM) principles.
- Despite the strong development of IWRM practices, different types of water systems have a fragile water security situation due to climatic variability and demand.

Monitoring and regulation

- There is a clear regulatory framework, whereby municipalities can identify a regulating body, which is the state-level regulator in most cases. The regulatory body differs per type of service provider, with community-based service providers often remaining unregulated.
- Monitoring performance of service providers is done at federal level through SNIS, but this covers only part of rural areas.
- In absence of a national rural water supply monitoring system, Ceará has started using its own rural water monitoring system, by adopting the (Rural Water and Sanitation Information System (*Sistema de Información de Agua y Saneamiento Rural* or SIASAR) developed by the World Bank in Central America.

Key Evidence Points from the Assessment at Service Provider Level

- The SISAR model represents an important innovation to improve institutional capacity of community management, by complementing community management with the possibility to professionalize through a federation, and to provide technical assistance via CAGECE, the state water supply company, resulting in performance improvements.
- Isolated community organizations are probably the most common form of rural service provision, however little data exist on their performance. The little data available shows that these organizations lack capacity or frameworks to address issues such as asset management, financing, support and monitoring.

Lessons Learned from Country Experience

- SISAR has achieved significant scale in Ceará (and other states). Recent policy changes should provide the basis for expanding it further, by providing a stronger institutional backing and mandate for scale up; SISAR also shows good potential for asset management, whereby responsibilities (including for funding of works) are very well detailed and defined between local associations, the Federation of associations and the state government in the case of SISAR.
- As a monitoring system, SIASAR holds great potential for rural water supply, as it includes parameters on service delivery as well as service provider performance and is a means to create an asset registry, which can be readily updated.

Appendix G.4 China: Zhejiang and Shaanxi

Population (total)	Zhejiang: 54,430,000, Shaanxi: 37,330,000	**Rural population**	608,629,709 (national)
GNI per capita PPP (current US$)	14,160 (National)	**Rural population (%)**	Zhejiang: 35.1 Shaanxi: 47.4
Economic status	Upper-middle income	**Rural population growth (%)**	–2.2 (national)
Access to rural water services (%)	93 (National)	**Total renewable water resources (cubic meters per year)**	2,018 (national)
Access to piped water onto premises in rural areas (%)	55 (National)	**Average size of service authority by population**	579,000 and 233,000 (Zhejiang and Shaanxi county averages)
Tariff levels	US$0.075 to US$0.21 per cubic meter	**Rural water strategy**	Set out as part of each Five-Year Plan (13th)
Functionality	10% (Zhejiang)	**Rural water policy**	Rural Water Supply Management Act (Zhejiang) 2013

Sources: IWMI 2007 and FAO Aquastat, World Bank Data, JMP, provincial government of Zhejiang and Shaanxi, and Anji county government. May 2016.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Ministry of Water Resources and Ministry Housing and Urban-Rural Development
- Provincial authority: Provincial Development and Reform Commission (coordinating); Water Resources Department; Provincial Bureau for Housing, Urban and Rural Development
- Service authority: county, county-city or district government; the local Water Resources Bureau; County Price Bureaus (tariff regulation)
- Service providers: public utilities (water affairs companies); private sector (community enterprises); local government providers; community management

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level (for both provinces)	5	5	6	5	7	28
Community-based management	1	4	4	3	4	16
Public utility	7	7	8	7	8	37
Private sector (delegated)	4	6	7	5	7	29

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- There are clear institutional roles and technical capacity for developing new water supply infrastructure.
- The capacity to operate, administer and maintain larger networks (public utility) and multi-village schemes (community enterprises or direct county provision) is well developed.
- There are technical and financial management weaknesses in the community management entities; capacity is further weakened by gaps in institutional responsibilities support to these schemes, lack of assigned resources for dispersed rural areas, and poorly defined mandates across different agencies.

Financing

- The majority of investment is from public financing (taxes) provided at central, provincial and local (service authority) level; larger utilities are able to access repayable financing using assets as collateral; local governments invest directly in water supply assets.
- Tariffs for larger utility managed and multi-village schemes cover operating costs and generate (some) surplus for capital maintenance; large capital improvement projects are still financed from public sources.
- There are major challenges for cost recovery for smaller schemes, which suffer from over-design, low user demand, and a low revenue base, as well as poor economies of scale. Tariff increases to even cover O&M faces (political and popular) resistance, even though tariffs are generally affordable at between 0.36 percent and 0.51 percent of average rural household income in Zhejiang and within acceptable levels for Shaanxi (2.5 percent to 2.8 percent).

Asset management

- Asset ownership is clearly defined and adhered to; ownership is determined by source of investment.
- Ongoing management of assets, updating inventories, and replacement is carried out effectively for larger-scale schemes, which are professionally managed and can meet on-going O&M costs.
- Community-managed schemes commonly have no proactive asset management planning, often "fixing on failure"; in these cases, public finance is the last resort for system replacement, upgrading or extension.

Water resources management and security

- Water resources management and safety planning guidelines are well defined in regulations and fall under the same agency as drinking water. However, there is some fragmentation between the Ministry of Water Resources and Ministry of Land and Resources.
- There is limited technical support and oversight for catchment management in more remote rural areas and for the small isolated schemes.
- Due to excessive pollution and contamination by industrial and agricultural practices, as well as lack of wastewater treatment in some areas, water quality remains a major concern for all populations.

Monitoring and regulation

- Performance evaluations are increasingly being used to assess rural water schemes to allow for decision-making and resource allocation by provincial and lower levels of government.
- Larger schemes carry out daily monitoring for proactive maintenance and operational decision making.
- Water quality monitoring is often not done for smaller rural schemes, although recent investment programs to boost county-level rural drinking water surveillance and build water safety centers should improve this situation in the medium term.
- There is no independent regulator, but larger utilities have established customer complaints mechanisms.
- The process for tariff setting and review is well regulated for larger networked systems, although political influences can make it difficult to raise tariffs, especially for smaller community enterprises.

Key Evidence Points from the Assessment at Service Provider Level

- China is making proactive efforts to aggregate individual rural schemes into multi-village networks and expand urban utility networks to serve rural peripheries. These economies of scale allow for more professionalized management and reduce the number of individual schemes and service providers that the service authorities need to support, visit and monitor.
- Smaller-scale community-managed schemes struggle with changing rural demographics (negative growth), low revenue streams, and lack of long-term support to resolve technical issues; water quality monitoring is of particular concern.

Lessons Learned from Country Experience

- Establishment of multi-village schemes, with support from the World Bank, has provided evidence that it is possible to generate small surpluses and cover full operating costs when schemes are placed under one management entity and run on commercial lines.
- City or county utilities can be incentivized to integrate rural populations within their service areas, even where rural consumers are more costly to reach and may generate less tariff income, with government allocating funds for investments and capital maintenance to support commercial viability.
- The provincial government in Zhejiang province has set up a well-functioning incentive mechanism: it uses monitoring data and links this to an incentive program that provides small grants as a reward for well-performing operators, and likewise penalizes poorly performing ones based on a range of criteria including system and staff management planning, procedures of O&M, and water quality monitoring.

Appendix G.5 Ethiopia

Population	99.4 million	**Rural population**	80 million
GNI per capita PPP (current US$)	590.00 (2015)	**Rural population (%)**	80.5
Economic status	Low income	**Rural population growth (%)**	1.9
Access to rural water services (%)	49	**Total renewable water resources (cubic meters per year)**	1,227
Access to piped water onto premises in rural areas (%)	1	**Average size of service authority by population**	120,000
Tariff levels	No reliable data	**Rural water strategy**	One Wash National Programme Phase II 2015-20
Functionality (%)	Rural water schemes: 74	**Rural water policy**	The National Water Resource Management Policy 1998

Sources: World Bank 2015; JMP 2015; Federal Democratic Republic of Ethiopia 2013; IRC 2015.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Ministry of Water, Irrigation and Electricity (MoWIE), The National WASH Steering Committee (NWSC), Ministry of Finance and Economic Cooperation (MoFEC), Ministry of Education, Ministry of Health
- Service authority: The *Woreda* (local government)
- Service providers: *Woreda* manage provision, community management, and individual household self-supply

Sustainability Assessment

		Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level		5	4	2	2	2	15
Community management	Woreda-managed	1	0	1	0	0	2
	Community-managed	4	3	1	1	2	11
	NGO projects	3	2	1	1	2	9
Supported self-supply		1	2	4	1	0	8

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- There is a well-structured institutional setup for rural water spanning federal, regional and *Woreda* levels, with clear leadership role for the Ministry of Water, Irrigation and Electricity (MoWIE).
- The National WASH Coordination Office provides a framework to link water, health, education, and finance sectors in WASH.
- WASH coordination structures at regional and national levels have been established under the One WASH National Program, but remain "young" institutions.
- There are inter-ministerial coordination challenges; the national steering committee was dormant until early 2016.
- The Consolidated WASH Account financing and interventions provide substantial capacity building support through a range of interventions to *Woreda* WASH teams; however, these have been largely one-off events rather than a systematic program support.

Financing

- There is a large gap between available financing and what is required to meet the goals (so far standing at only 62 percent funded in its first phase), including for rural water.
- Budget utilization rates are low in rural water (61 percent) compared to other sub-sectors such as urban water (88 percent) and institutional WASH (70 percent).
- Sector financing remains complex, but well delineated, with four possible funding channels and different financing modalities associated with four different service delivery models.
- There is limited attention to financing other, non-capital investment cost components or life cycle costs.
- Efforts to scale up and implement self-supply acceleration approaches to build supply and demand for such investments have begun recently, but are poorly understood.

Asset management

- National and regional WASH inventories have been undertaken, but these are one-off exercises and are not regularly updated except in Tigray.
- Asset management and ownership is not yet established as an approach in the rural water sub-sector.
- A new strategic framework for O&M of rural water schemes has been developed and is supported by extensive new manuals and training materials, but does not include a systematic approach to planned asset management.

Water resources management

- Water resources management initiatives are small scale and focused on local surface water issues; agriculture and the rural water supply sector are not integrated.
- Industrialization and rising agricultural water demands and pollution can be expected to increasingly impact on rural water supplies, but there is a lack of practical tools and experience in dealing with water resources conflicts.
- Water safety planning is a recognized approach in key policies, but it needs to be integrated and scaled up to become effective.

Monitoring and regulation

- Monitoring is largely limited to tracking access or usage of rural water supplies, with complementary data also available from regular nationally representative household surveys.
- The national database is not effectively updated and used, although there is a planned rollout of the WASH M&E MIS, and a repeat of the national inventory.
- There is a gap in regular service delivery monitoring to assess performance (going beyond access) with respect to issues like the quantity and quality of water supplied, as well as functionality.
- Significant efforts have been made to pilot sustainability assessments of rural water interventions recently, but these have not been institutionalized to date.
- There is no independent regulator of rural water services, which is a barrier to consumer and service provider accountability; regulatory functions provided by local government are weak at best.

Key Evidence Points from the Assessment at Service Provider Level

- Human resource capacity at the *Woreda* level and below is a critical constraint to sustaining rural water services, in both public and private sectors (there is a shortfall of some 40 percent in technical cadres).
- Community management structures are weak and there is a lack of capacity to provide post construction support to service providers, except in the case of specific donor-funded programs.
- Despite all regions having issued proclamations related to WASHCO legislation, most WASHCOs are not yet legally recognized, limiting their powers, although this is expected to improve in coming years.

Lessons Learned from Country Experience

- Strong political leadership and commitment has been key to establishing the OWNP, which provides a strategic framework for coordination and harmonization of investments and approaches; this progress now needs to be pushed down to lower levels of government.
- The Community Managed Projects, funded by Finnish donor support, have demonstrated effective ways of decentralizing funds for project implementation to communities and include a very strong capacity building component for community management. This model has strong results, with functionality rates reported at or above around 90 percent; but there are questions about the costs of scaling up this approach, which currently only serves around 10 percent of *Woredas* in Ethiopia.

Appendix G.6 Ghana

Population	27.4 million	**Rural population**	12.604
GNI per capita PPP (current US$)	1,590 (2015)	**Rural population (%)**	46
Economic status	Lower middle income	**Rural population growth (%)**	0.9
Access to rural water services (%)	81	**Total renewable water resources (cubic meters per year)**	2,050
Access to piped water onto premises in rural areas (%)	3	**Average size of service authority by population**	80,000
Tariffs levels	Wide range depending on service level and provider; from US$0.20 to US$2.9 per cubic meter	**Rural water strategy**	National Water Sector Strategic Development Plan (2014)
Functionality (%)	74	**Rural water policy**	The National Water Policy (2008)

Sources: World Bank 2015; JMP 2015; Aguastat 2016; IRC 2012.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Ministry of Water Resources, Works and Housing (MWRWH), Ministry of Local Government and Rural Development (MLGRD); in 2017, the Ministry of Sanitation and Water Resources was established as the WSS mandate had earlier been split between MWRWH and MLGRD.
- Community Water and Sanitation Agency (CWSA); Water Resources Commission; and Ghana Water Company Ltd, the state agencies that were initially under the MWRWH, have now moved to the new Ministry. The Water Directorate under the MWRWH and the Environmental Health and Sanitation Directorate under the MLGRD have been relocated to the new Ministry.
- Regional level: CWSA regional offices and Regional Coordinating Councils.
- Service authority: Metropolitan, Municipal and District Assemblies (MMDAs; local government).
- Service providers: Water and Sanitation Management Teams (WSMTs); private sector operators.

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	2	5	5	2	4	18
WSMT hand pumps and boreholes	3	1	2	2	1	9
WSMT managed small piped schemes	3	3	2	1	2	11
WSMT private sector delegation	4	3	2	1	2	12
Private sector operators	3	4	3	1	2	13

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- Government has established and developed frameworks and institutions for the rural water sector, but there is still a gap between *de jure* and *de facto* situations; a national strategy exists, and most stakeholders are now adopting this and aligning accordingly.
- National and regional capacity in the CWSA is strong; however, it requires a change management process to address its role and to clarify the interface engagement with MMDAs.
- The capacity of MMDAs is improving; nevertheless, gaps remain in systematic follow-up for community management providers.
- Tensions often exist between CWSA and MMDAs over mandate and roles, and the decentralization policy for rural water functions may need to be revisited to assign asset management responsibility to an entity with higher level capacities, as found with the MMDAs.

Financing

- Channels for funding flows are relatively well defined, but sector financing for rural water continues to be erratic and unpredictable, although funding has diversified and there is likely sufficient to cover capital investment requirements in the short term.
- Financing for the long-term recurrent costs of rural water supply, including for direct service delivery support and capital maintenance, are much less certain and are not properly defined.
- Tariffs are mostly linked to consumption, but for a significant number of hand pumps, no tariff is paid (49 percent); rates are generally set at affordable levels for most rural households (at between 1.7–3.5 percent of average income (all but the most extreme poor are between about 2.7–5.3 percent).

Asset management

- Asset ownership is clearly identified in policy as resting with the MMDAs (local government); however, this is not always translated in practice to district government "ownership," as MMDAs do not have rural and small town water supply assets registered in their books.
- Asset management in the rural water sector is recognized as an important process and is referred to in key sector documents and guidelines.
- Management capacity of small rural schemes lacks the necessary skills and economies of scale to perform asset management effectively; in larger more complex schemes (small towns) there is no clear focal point or host to manage a decision-making framework for asset management.

Water resources management

- Policy and institutional frameworks are in place, but government leadership is weak and integrated planning is largely absent at the decentralised level; integrated management and river basin management is in place, but has not effectively addressed local level water resources management.
- The CWSA has developed guidelines for water safety planning and has included water safety planning indicators, but operationalization is lacking; water quality remains as a key concern in rural areas.

Monitoring and regulation

- The sector has strong policies for monitoring and regulation, however, application of these in practice is still in the early stages, and monitoring is not applied systematically.
- There is movement toward putting in place a monitoring system at national and district level for the rural sub-sector; this large-scale pilot needs to be aligned with the new Sector Information System installed in 2016.
- Regulatory responsibility for rural water supply has been clarified and is divided between MMDAs and CWSA, with the latter responsible for standards and design of systems, with MMDAs responsible for oversight. A change program within CWSA has started; most MMDAs lack the capacity or will to provide oversight and regulate services.

Key Evidence Points from the Assessment at Service Provider Level

- Service delivery models are well defined, but the capacity of WSMTs remains weak, with limited capacity for follow-up by MMDAs, particularly for point source schemes.
- The community management model has not been very effective in ensuring adequate reinvestment of operating revenues into financing capital maintenance and replacement.
- All service delivery models score low on asset management, water resources management and monitoring, all of which have frameworks in place but lack operationalization.

Lessons Learned from Country Experience

- Construction of more complex, large-scale rural piped schemes (including multi-village schemes) has successfully increased service levels, but these are managed by WSMTs that lack professionalized management and face challenges with financing, cost recovery, and operation and maintenance and governance issues.
- The Community Water and Sanitation Agency has a well-defined and practical seven-step cycle as part of its guidance to local government on infrastructure asset management.
- There has been positive, albeit limited, experience with private operators managing franchised schemes based on the kiosk model; 65 so-called “safe water stations” currently serve over 200,000 people. Although water quality is high, the unit cost of water sold is far higher than other community or urban utility managed models (being some two to four times more expensive per cubic meter.

Appendix G.7 Haiti

Population	10.5 million	**Rural population**	4.4 million
GNI per capita PPP (current US$)	1,740	**Rural population (%)**	42
Economic status	Low income	**Rural population growth (%)**	–1.6
Access to rural water services (%)	48	**Total renewable water resources (cubic meters per year)**	1,310
Access to piped water onto premises in rural areas (%)	5	**Average size of service authority by population**	31,500
Tariff levels	Between US$1 and US$2 per household per month	**Rural water strategy**	*Plan Stratégique Sectoriel* 2017–2025
Functionality	86% (based on sample 184 small piped water schemes)	**Rural water policy**	Yet to be drafted (2009 *Loi Cadre* is the guiding policy)

Sources: World Bank 2015; JMP 2015; UNDP and Aquastat.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: *Direction Nationale de l'Eau Potable et de l'Assainissement* (DINEPA) or the National Water and Sanitation Directorate
- Service authorities: 140 *communes* (municipalities) as per the constitution, but in practice, the role falls to DINEPA's regional and departmental offices (OREPAs and URDs) due to ineffective decentralization
- Service providers: Informal and formal community-based organizations (CAEPAs); emerging private operators under lease contracts

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	3	1	2	2	3	11
CAEPA	2	1	2	2	1	8
Private operator (Lease)	3	2	3	2	3	13

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- Significant progress has been achieved in establishing institutions to oversee rural water supply. However, DINEPA's planning capacity remains weak; there is currently no baseline of water services, limiting the capacity to plan, set objectives, and coordinate interventions.
- The establishment of local technicians (known as TEPACs) at departmental level has greatly improved DINEPA's capacity to oversee services and support service providers. However, the TEPACs have no legal status (as of September 2016).
- *Communes* have no established functions with relation to water services, which diminishes their status of service authorities.

Financing

- The sector is almost completely dependent on aid financing through international transfers, which is largely carried out on a project-based approach, with little donor harmonization.
- DINEPA and development partners have stepped up efforts to prepare a consolidated budget for the water sector and provide a common financing framework.
- Willingness to pay for water services is very low due to mistrust and perceptions that services should be free of charge; willingness to charge also reflects these attitudes and is generally low.
- There is no tariff policy, rather tariffs are usually agreed between operators and *communes*, with little to no consideration for cost recovery. Most operators charge a flat monthly fee, regardless of consumption levels. Contributions were found to range between US$1 and US$2 per household per month, representing 1.8 percent and 3.5 percent of a poor household's income (as per the US$1.9 per day poverty line).

Asset management

- The *Loi Cadre* specifies that all water assets belong to the state (represented by DINEPA); in practice, this ownership is not well known by all actors and conflicts can result from this confusion.
- DINEPA's regional representations have no asset inventory.
- Water assets are particularly vulnerable in the context of Haiti's topographic, climatic and environmental conditions.

Water resources management

- The Ministry of Environment is the lead institution according to the law, but it is not currently fulfilling its functions; there is no mechanism to regulate water abstraction.
- There are no approaches in place for integrated water resources management and watershed management. Activities are initiated locally, with no guidance or monitoring from institutions responsible for water resources.

Monitoring and regulation

- DINEPA has set up a performance monitoring system for rural piped water schemes that gathers operational and financial data (the so-called *Système des Indicateurs de Performance* (SIP). The SIP enables data collection, but no remedial action, nor is there data verification.
- Despite the cholera epidemic, the Ministry of Health is not monitoring drinking water quality, which is a major gap.
- DINEPA has set up a distribution system for free water treatment equipment (so-called Hypo-Klor 24). However, the system is not efficient as many remote rural areas are not reached and the service is irregular.
- DINEPA has set up a water quality control system, the so-called "SIS-KLOR" system; lack of funds (and ownership within DINEPA) is threatening to derail these activities.

Key Evidence Points from the Assessment at Service Provider Level

- CAEPAs receive little support from DINEPA, whether upstream (prior to the delegation of the scheme) or downstream throughout their operations: for example, CAEPAs are not provided with tools for managing schemes, whether operational toolkits or tools for commercial management (customer database, billing templates, and so on).
- Private operators appear to perform better, mainly because pilots in which they are introduced include substantial training and monitoring components; the World Bank is supporting private operators in introducing metered connections for improved operational and financial management.
- The lack of willingness to pay affects water service viability across all service delivery models.

Lessons Learned from Country Experience

- Despite significant challenges, Haiti exhibits certain innovations in approaches to rural water services. The SIP monitoring system is a good example of a tool to track and monitor operator performance and can provide the basis for better regulation.
- DINEPA has also introduced innovative systems for water treatment and water quality control; making these systems work more efficiently will require strong buy-in and greater harmonization among donors.
- The World Bank program initiated in 2015 includes several interventions to strengthen sustainability in the rural water sector, including the training of service providers, strengthening DINEPA's capacity to oversee services at local level, and the development of a sector-wide approach to funding interventions.

Appendix G.8 India: Uttarakhand and Punjab

Population	1,314 million	**Rural population**	881 million
GNI per capita PPP (current US$)	6,020	**Rural population (%)**	67
Economic status	Lower middle income	**Rural population growth (%)**	0.6 per year
Access to rural water services (%)	93	**Total renewable water resources (cubic meters per year)**	1,581
Access to piped water onto premises in rural areas (%)	16	**Average size of service authority by population**	3,524 persons per *Gram Panchayat*
Tariffs levels	US$0.53–2.69 per household per month	**Rural water strategy**	Strategic Plan 2011–22 "Ensuring Drinking Water Security in Rural India"
Functionality	76% of habitations are considered fully covered	**Rural water policy**	

Sources: Census of India 2011; World Bank 2016; MDWS 2011.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Ministry of Drinking Water and Sanitation
- State level: Public Health Engineering Departments, Water and Sanitation Support Organizations and State Water and Sanitation Missions
- Service authority: *Gram Panchayats* (village level)
- Service providers: at village level, village water and sanitation committees; state-level agencies are responsible for bulk water supply and large multi-village schemes

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	6	5	5	3	5	24
GPWSC in Punjab	6	6	6	3	6	27
UWSSC in Uttarakhand	7	5	6	5	6	29

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- Through a number of World Bank-supported programs carried out within the framework of a sector-wide approach, functional decentralization of rural water supply took place in both states, reaching furthest in Uttarakhand. The sustainability evaluation exercise in Uttarakhand shows evidence of institutional capacity.
- This has resulted in GPs and GPWSCs responsible for service delivery, supported by a cascading tier of institutions at block, district, and state level, primarily during project implementation, but increasingly in the long-term service delivery phase (including for post construction support).
- This has been accompanied by a capacity building program, as well as a reform process of the state Departments of Water Supply and Sanitation, to change them from implementers to facilitators.
- The institutional capacity of the GPWSCs in Punjab is fairly well developed, as 74 percent of the PRWSSP funds were managed by GPWSCs; UWSSC have well-developed capacity, supported by state-level agency.
- Concerns still exist regarding the staffing for the technical assistance role, particularly in Punjab.

Financing

- There is a well-established financial framework that defines contributions of the national government and states for the rural water supply sector, breaking this down by expenditure item.
- Reasonably good insight exists into current investments both at national and state level, but not for the need to reach government-set targets for the recent higher levels of services.
- Capital costs are generally funded through public funds from central and state government, without provision for GPs to make contributions. Communities usually contribute through a small fixed amount, with provisions for specified vulnerable groups, as a contribution to the assets.
- States define the overall tariff structure and VWSC defines the specifics at scheme level. These are generally to cover operation and minor maintenance costs. Even though tariffs are generally insufficient for full depreciation and replacement costs, these levels of cost recovery mark an important step forward compared to the previously provision of free water under centralized arrangements.
- The NRDWP guidelines state that affordability for vulnerable groups needs to be considered. This is firstly defined in terms of contribution to capital costs, which is lower for specific vulnerable groups. In Uttarakhand, provision is made for state subsidies to O&M costs in schemes where O&M costs are deemed unaffordable.

Asset management

- There is no explicit clarity on asset ownership in national guidelines, though it is generally assumed that it lies with GP or VWSC; in Uttarakhand and Punjab, this the GP due to the decentralization program.
- Asset inventories are incipient across India; whereas Punjab has made some advances, Uttarakhand has developed a sector MIS system that includes an inventory of assets and their costs.
- Asset management is assumed in the first instance to entail minor maintenance by VWSCs, for which specific manuals and guidelines exist, both from the NRDWP and at state level.
- For major maintenance, repairs and replacements, state governments are expected to contribute financially under the assumption that there is capacity for asset management at state level; In Uttarakhand, UJS – a separate entity - has been assigned as professional back-up support.

Water resources management

- Water resources management is a state responsibility guided by national policy and with monitoring and technical support.
- The institutional framework for water resources management at state level is weak, particularly for the regulation of groundwater use.
- Improving source sustainability is a key part of rural water supply programs, particularly through measures such as local groundwater recharge and catchment protection works.
- In the states most affected by overuse of groundwater, the impact of such measures will remain limited, as addressing root causes must be done in other sectors (for example, agriculture).

Monitoring and regulation

- The national monitoring system mainly focuses on coverage and tracking progress in the increase of coverage, and not on service delivery monitoring.
- In Punjab, there are several monitoring and information systems that, taken together, provide a good basis for service delivery monitoring; the information system in Uttarakhand is geared toward monitoring project cycle implementation of the SWAp, and is intended to also be used for monitoring ongoing service delivery.
- Social accountability mechanisms are effectively implemented during project implementation; oversight of ongoing service provision is clear, with sufficient separation between the GP and UWSSC or GPWSC.

Key Evidence Points from the Assessment at Service Provider Level

- The main model is village-based management models, which are employed in similar ways in both states (PWSC in Punjab and the UWSSC in Uttarakhand); in both states, conditions and capacities are in place at the level of the VWSCs, although to a greater extent in Uttarakhand, by building up capacities at the State, District and local (GP/Village) levels.
- Gaps exist mainly regarding monitoring and oversight of ongoing service delivery and the effectiveness of local water resources management measures.

Lessons Learned from Country Experience

- The Sector Wide Approach has provided a useful and relevant framework for decentralization of service delivery, as it ensures the same set of roles and responsibilities and the same approach toward institutional capacity building irrespective of the funding source.
- The financial framework makes it clear that recovery of all the life cycle costs through tariffs is not feasible, particularly the costs of major repairs and replacements; maintenance funds are set-up with state and GP funds.
- The Swajal Sector Information System in Uttarakhand provides an example that includes both data on project implementation progress as well as monitoring service delivery, with the latter in scale-up.

Appendix G.9 Indonesia

Population	250 million	**Rural population**	119 million
GNI per capita PPP (current US$)	10,680	**Rural population (%)**	46.3
Economic status	Lower-middle-income	**Rural population growth (%)**	−0.4
Access to rural water services (%)	79	**Total renewable water resources (cubic meters per year)**	7,839
Access to piped water onto premises in rural areas (%)	9	**Average size of service authority by population**	234,000
Tariff levels	US$0.18 to US$0.77 per cubic meter	**Rural water strategy**	Formulated in mid-term economic development plans
Functionality	80% of schemes constructed under rural water national program	**Rural water policy**	Based on several regulations

Sources: World Bank 2015; JMP 2015; UNDP and Aquastat.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Ministry of Public Works and Housing or MPWH (lead institution) and National Development Planning Agency (*Bappenas,* for planning and monitoring)
- Service authority: districts (second level of local government after provinces) and village governments since the Village Law (passed in 2014)
- Service providers: village-level community-based organizations (CBOs) predominant; referred to as BPSPAMs under the national program to accelerate rural water supply access (or PAMSIMAS)

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	5	4	2	3	4	18
CBOs	5	3	5	4	4	21

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- Decentralization has allocated clear responsibilities for rural water services in terms of policy formulation, planning, monitoring, technical support, and services oversight, especially between central government institutions, provinces, and districts. As a result, local governments are increasingly taking ownership of rural water services, especially for planning and implementing infrastructure development.
- Further decentralization and allocation of roles and responsibilities between district and village governments is still not clearly defined, particularly for covering capital maintenance costs.
- Successive government-led programs have included substantial funds for building the capacity of rural water service providers: PAMSIMAS has allocated between 19 percent and 28 percent of overall funds to software activities (excluding implementation support) since 2006.
- Many CBOs still lack the technical capacity to manage schemes adequately.

Financing

- The national program for rural water supply, or PAMSIMAS, is financed through a mix of domestic funds (including from local governments) and international transfers; the program has proven successful in leveraging funds needed to develop rural water supply infrastructure.
- Local government expenditure on rural water supply remains below expected levels, although there is an increasing trend; this includes recurring costs related to support activities and monitoring.
- For most CBOs, the tariffs in place can just about cover operating costs; only a small percentage are able to apply full cost-recovering tariffs (only 10 percent of schemes developed under PAMSIMAS apply full cost-recovery tariffs).
- Tariff charges represent 0.4 percent and 1.6 percent of a poor household's income (40 liters per capita per day consumed by a household with six members on average); this remains within the affordability bracket (based on a US$1.90 per day income).

Asset management

- There is no national framework or law to clearly ascribe asset ownership: in practice, asset ownership varies depending on the source of funds or the project that has supported construction of the assets.
- The handover process is not necessarily accompanied by an inventory or registry of assets.
- In a context where most CBOs are unable to plan and carry out investments, districts are stepping in to finance large repairs and rehabilitations, but on a "fix on failure" basis.
- As these activities are not considered to be part of core district functions, they are not planned and budgeted by district institutions based on assets lifecycle, but rather only on an *ad hoc* basis.
- The formation of village enterprises, whereby the village government and the CBO jointly own assets (in a joint stock company model), presents one approach for ensuring continuous funding for asset maintenance; another option under discussion is to further professionalize CBOs (formal BPSPAMs) to take on this role.

Water resources management

- National and basin-level institutions have been established to ensure integrated water resources management (IWRM), but there is overlap of institutional responsibilities. While several institutions are mandated for water resources management, few have adequate monitoring and enforcement tools.
- The scrapping in 2015 of the Water Act (2004) coincided with a period of rising water insecurity due to groundwater over-abstraction and pollution, droughts and floods. Despite these challenges, the sector lacks coordination, monitoring and enforcement mechanisms.
- At local level, some programs are incentivizing service providers to protect water catchments.

Monitoring and regulation

- A national monitoring system for the sector was developed (NAWASIS Info), but has not been effectively adopted by government agencies and local governments.
- The monitoring system for the PAMSIMAS program includes sustainability indicators, such as institutional capacity to manage water schemes and the financial performance of service providers; it is now being scaled up nationally.
- In practice, districts have limited capacity to monitor and enforce service level standards for all water schemes, due to lack of resources allocated to these activities.

Key Evidence Points from the Assessment at Service Provider Level

- The CBO model, when monitored and supported by targeted interventions, has generally performed well, as demonstrated by the fact that at least 10 percent of villages that benefited from the PAMSIMAS program apply full cost-recovery tariffs and 80 percent are able to maintain functional water schemes.
- The challenge, however, is to address the limited financial capacity of CBOs to manage schemes for capital maintenance and extending rural water infrastructure to respond to increasing demand.
- Unclear asset ownership and an over-reliance on CBOs for service delivery has resulted in local governments making little to no provision for capital maintenance over time.

Lessons Learned from Country Experience

- Community-based management can be transformed into a sustainable service delivery model, if adequately supported.
- The country has developed a comprehensive support system for CBOs, in the form of PAMSIMAS, based on an assessment of CBO capacity and level of competency. Where local governments have been active in providing guidance and support, CBOs' performance has improved.
- Clear arrangements, including through a formal delegation process, between CBOs and service authorities are needed to ensure that funds are allocated to capital maintenance and monitoring. Some new models are emerging, such as village enterprises.

Appendix G.10 The Kyrgyz Republic

Population	6,200,000	**Rural population**	3,986,600
GNI per capita PPP (current US$)	3,220.0	**Rural population (%)**	64.3
Economic status	Lower-middle income	**Rural population growth (%)**	1.9
Access to rural water services (%)	86	**Total renewable water resources (cubic meters per year)**	3,976
Access to piped water onto premises in rural areas (%)	42	**Average size of service authority by population**	9,000
Tariff levels	National average in 2012 reported to be US$1.30 per household per month.	**Rural water strategy**	Existing water and sanitation strategy (2013)
Functionality (%)	61.6	**Rural water policy**	New state policy drafted in 2016

Sources: JMP 2015; World Bank data; IWMI 2007; FAO Aquastat, Government of Kyrgyz Republic DDWSWD/GOSSTROY (2013 and 2016).
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Department of Drinking Water Supply and Wastewater Disposal (DDWSWD); part of State Agency for Architecture, Construction and Communal Services (GOSSTROY) responsible for policy and planning.
- Service authority: local government, or *Ayl-Okmotus* (AOs), responsible for ensuring services; there are currently 453 AOs.
- Service provider: community-based management through the "community drinking water users unions" (CDWUUs), which in theory should be contracted and overseen by the AOs, but frequently are not due to lack of resources. There are 633 registered CDWUUs nationwide (although potentially more non-registered).

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	2	3	3	3	2	13
Community based management	1	3	4	3	4	15

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- Strong legal frameworks for decentralization; however, there are many practical challenges especially around capacity of local government to support service providers.
- A new national program on rural water was recently launched, attracting support from various development partners.
- DDWSWD and other sector institutions are chronically underfunded and have shortfalls in staffing.
- The majority of CDWUUs lack both management and technical capacity and are often financially unviable.
- There are limited vocational training opportunities, or incentives, causing challenges in retaining skilled staff.

Financing

- There are high capital costs due to low population densities and the cold climate requiring engineering measures.
- DDWSWD has virtually no operational budget apart from salaries and overheads to fulfil its functions.
- Public sector financing for capital investment has increased from a very low base in recent years. Major IFIs (World Bank, Islamic Development Bank (IsDB)) were brought into the sector under the National Rural Water program with a focus on capital investment, capacity building, monitoring and sector reforms.
- Despite a clear fiscal decentralization policy, fiscal transfers to AOs are very limited and local government suffers from considerable resource constraints.
- Tariffs are commonly low and collection rates are challenging; only around one quarter of CDWUUs are able to meet the recurrent costs of operating schemes.
- Tariff setting can be politicized at the local level, though there are reforms under way intended to improve this situation. Mechanisms are in place to protect poorer consumers, but these could be strengthened.
- The national average tariff level was reported to be US$1.30 per household in 2012 ($0.32 per capita) per month. The share of household expenditure was on average only 0.3 percent for the poorest deciles (UNDP 2014).

Asset management

- Asset ownership is clearly defined and sits with the AOs, which have authority to delegate operation and administration of schemes. However, few service providers or authorities practice any form of planned asset management. Around one third of facilities require rebuilding completely, and a further 26 percent need major rehabilitation; much infrastructure is antiquated and poorly performing, with relatively high losses.
- In practice, preventative maintenance practices are limited, with no institutionalized systems for asset management in place. Service agreements do not routinely specify the division of responsibility between service providers and authorities for minor and major repairs.
- Rural areas often lack access to professionally skilled people, engineers or specialized equipment.

Water resources management and security

- There is good availability and quality of water resources despite some local issues of quality and security.
- There is a clear legislative framework, but procedures are not always followed due to financing constraints; water governance is weak, and planned reforms put in place several years ago have yet to be realized.

Monitoring and regulation

- A nationwide inventory of water supply schemes was carried out in 2013, but has not been updated since.
- Whilst decentralized offices of DDWSWD have knowledge of the general status of schemes, there is no consolidated data available on service quality or performance of service providers.
- An established system for water quality monitoring exists, but is not applied regularly due to a lack of financing;
- There is no regular analysis or sharing of data (through Joint Sector Review processes or similar) to inform sector or local level decision making.
- There is no formal regulator. Tariff setting is the responsibility of the Anti-Monopoly Commission. Consumers and service providers can appeal to the AO for arbitration if needed, although the process is often politicized.

Key Evidence Points from the Assessment at Service Provider Level

- The community management model in the Kyrgyz Republic is often inadequate to provide the level of service required and receives limited support; this is reflected in relatively poor scoring.
- The CDWUU model suffers from weak capacity and poor financial viability, without structured support, and tariff regulation.
- Physical dispersion of communities and high costs of pipe laying mean interconnecting schemes are not viable; however, aggregation under one overall management model (combining multiple CDWUUs) could allow for more professionalized management with economies of scale.

Lessons Learned from Country Experience

- Frameworks for decentralization without the associated fiscal transfer present challenges; however, users are willing to pay based on historically high service standards. The area-based aggregation model is a promising solution to improve services, but is yet to be fully tested.
- In contexts where there is a strong history of free services, and political interference in tariff setting, considerable efforts are needed to build users' willingness to pay, as well as service provider and authorities' willingness to charge and protect tariff decisions from political influence.

Appendix G.11 Morocco

Population	33,921,203	**Rural population**	13.6 million
GNI per capita PPP (current US$)	7,680	**Rural population (%)**	40
Economic status	Lower-middle-income	**Rural population growth (%)**	0.1
Access to rural water services (%)	65.3	**Total renewable water resources (cubic meters per year)**	843
Access to piped water onto premises in rural areas (%)	22.8	**Average size of service authority by population**	10,500
Tariff levels	Around US$1 per cubic meter	**Rural water strategy**	*Généralisation de l'Eau Potable* (GEP)
Functionality	Not available	**Rural water policy**	Water Act (1995)

Sources: World Bank 2015; JMP 2015; UNDP and Aquastat, ONEE 2016.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Ministry of Energy, Mines, Water and Environment and Ministry of Interior (through its Directorate of Water and Sanitation)
- Service authority: municipalities (*communes*) and the national utility, Office National de L'Electricité et de l'Eau (ONEE), though delegation contracts with municipalities
- Service providers: municipalities (*gestion communale* or non-corporatized local government provision), *Office National de Electricité et l'Eau Potable* (ONEE), community-based organizations (CBOs, including those managing point sources and piped networks in ONEE-funded schemes under "*projets structurants*") and private operators (through service and concession-type contracts)

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	7	5	5	7	5	29
Municipalities (*gestion communale*)	3	4	6	5	3	21
ONEE	8	6	8	8	6	36
CBOs (managing point sources)	2	4	5	5	1	17
CBOs in *projets structurants*	7	6	8	8	5	34
Private operators	8	6	8	8	6	36

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- Responsibilities between sector actors (including national and local level institutions) are well defined, especially for project implementation; where municipalities have limited capacity to increase access to services and ensure provision, they can delegate these responsibilities to the public utility ONEE.
- ONEE is mandated to increase access to rural water supplies and places a strong focus on sustainability, having created specific internal units and at local levels to address the challenges of rural water supply; for example, ONEE is piloting contract modalities with private operators to maintain rural water infrastructure and ensure service standards in villages.
- Although there is limited data on rural municipalities that manage water schemes directly, informal reports indicate they often lack capacity to manage schemes sustainably and lack technical support.

Financing

- Investments in the rural water sector are based on a national planning process, which identifies investment needs and priority areas in coordination with local governments.
- Funding for sector investments is predominantly via domestic financing (including local commercial banks) and international transfers, mainly loans from development partners, including the World Bank).
- Local governments are also contributing to financing infrastructure development, especially where there is demand for household connections (which require distribution networks).
- Tariff setting in rural areas is not based on cost recovery and is subject to political interference; as a result, they are affordable, including for the poorest, representing some 2 percent of a poor household's income

Asset management

- There is clarity over asset ownership and responsibility for asset maintenance.
- Where ONEE is the service provider or the service authority (through delegation), the utility applies asset management practices as in urban areas: assets are inventoried, mapped, and investments planned based on their life cycle.
- Data on asset management carried out by municipal service providers is scarce, but informal reports indicate that it is not always adequate.

Water resources management

- As a water scarce country, Morocco has put in place strong legal instruments and national institutions to enable integrated water resources management.
- Rural areas have been particularly affected by the depletion of water resources. ONEE's model of a regional production and distribution infrastructure addresses the issue of scarce water resources, although it comes with high capital costs.

Monitoring and regulation

- There is a discrepancy between the national figures as suggested by ONEE (over 90 percent) and the JMP (65 percent) for access levels. This suggests that some rural populations may be using alternative (unimproved) sources of drinking water despite access to infrastructure for improved water supplies.
- Although ONEE's activities are well monitored and regulated (through a contract with the government), other service providers—municipalities, in particular—are poorly regulated.

Key Evidence Points from the Assessment at Service Provider Level

- Non-corporatized municipal provision appears to suffer from inadequate financing (particularly for recurrent costs and asset maintenance) and lack of monitoring and regulation.

- ONEE's "*project structurant*" model, whereby investments are carried out as part of large-scale regional water production and distribution infrastructure, limits CBOs' responsibilities to managing small village-level distribution networks. ONEE also provides technical assistance to improve CBO management skills, although the utility has not always been able to offer this assistance at scale.
- Where ONEE ensures direct service provision, services are professionalized with adequate billing and collection practices.
- Private sector provision is only at a pilot stage, except where caretakers are in charge of communal water points (*bornes-fontaines*). Service contracts appear to be working well. However, concession-type contracts have proven more difficult to implement, especially in contexts where municipalities are expected to contribute to capital investments but delay disbursements.

Lessons Learned from Country Experience

- The clear mandate given to a well-performing national utility (ONEE) to extend access to rural areas has resulted in improved service levels and sustainability of investments.
- The supported community management model, where CBOs are limited to managing distribution networks only and ONEE retains water production responsibilities, has proven an adequate solution for low capacity CBOs.

Appendix G.12 Nepal

Population	28,513,700	**Rural population**	23,205,875
GNI per capita PPP (current US$)	2500	**Rural population (%)**	81
Economic status	Low-income	**Rural population growth (%)**	0.74
Access to rural water services (%)	92	**Total renewable water resources (cubic meters per year)**	7,372
Access to piped water onto premises in rural areas (%)	18	**Average size of service authority by population**	312,000
Tariff levels	Highly variable and poorly documented.	**Rural water strategy**	Sector Development Plan to 2030 drafted
Functionality (%)	61.5	**Rural water policy**	Rural WASH policy adopted in 2004

Sources: World Bank data; JMP 2015; IWMI 2007; FAO Aquastat, MoUD 2014.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup[1]

- National authority: Department of Water Supply and Sewerage (DWSS) within Ministry of Water Supply and Sanitation; Department of Local Infrastructure Development Agriculture and Roads (DoLIDAR) within Ministry of Federal Affairs and Local Development
- Service authority: varying roles between the District Development Committees (DDCs), of which there are 75 nationally, and the DWSS's Sub-Division Offices (WSSDOs)
- Service provider: community management; water and sanitation user committees (WSUCs)

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	3	3	2	3	3	14
Community-based management	3	3	2	4	2	14

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- This is a historically fragmented sector with various modalities for implementing initial capital works; roles for monitoring and training and post construction support to WSUCs are poorly defined and not done.
- There have been significant sector level efforts to strengthen harmonization; for example, drafting a sector development plan, joint sector reviews and strengthening coordination platforms.
- There are shortfalls in DDC and DoLIDAR capacity for rural water supply activities, although efforts are under way to address these.

Financing

- Overall sector funding is increasing, and the new sector development plan aims to strengthen budget tracking and investigate alternative financing options, including maximizing domestic investments.
- Timeliness, predictability and adequacy of funding to DDCs and WSSDOs leads to delayed, rushed, or (most commonly) drawn-out implementation of capital works.
- Actual allocation of sector budgets for maintenance is well below the 20 percent level stipulated in policy.
- WSUCs are rarely provided with guidance on tariff setting, and levels charged vary widely and are poorly documented.

Asset management

- Asset management is a new concept; it is referenced in the strategic plan but not operationalized.
- The national database of water schemes developed under the National Mapping Information project is a potential first step toward an asset inventory, but the process of updating needs improvement.
- Asset ownership and thresholds of responsibility for financing maintenance costs are poorly defined between the service authority and WSUCs. WSUCs rarely develop maintenance plans.

Water resources management

- Institutional silos prevent operationalizing integrated water resources management, particularly at national level. District WRM committees have limited capacity and data on which to make allocations.
- Hydrological monitoring and water quality surveillance is relatively limited and sporadic.
- Good examples of local level planning and multiple-use programming exist (for example, the Rural Village Water Resource Management project).
- Only 68 percent of schemes provide year-round water supply; many are operated with intermittent supply, risking water quality. Despite this, there is a drive to upgrade gravity systems for domestic connections, which may increase per capita demand.

Monitoring and regulation

- Nepal now has joint sector reviews and sector performance reports, and is increasing budget tracking.
- Aside from the NMIP system inventory, there is no sector-wide M&E or MIS system, nor sector indicator framework being used currently. In 2011–12 there were efforts to establish a Rural Water Supply and Sanitation Monitoring and Evaluation Unit and operationalize the RWSS sector M&E system. The draft sector development plan addresses this, and some work has started to improve the situation.
- Roles and responsibilities are unclear for monitoring and regulation of WSUCs, with limited systematic monitoring activities. Monitoring of capital works varies considerably, leading to some quality issues.

Key Evidence Points from the Assessment at Service Provider Level

- There are numerous modalities and approaches for undertaking initial capital works and training for rural water operators, but only one model of ongoing service management

(community management). Despite challenges to sustainability in this model, testing alternative models in rural areas appears limited to non-existent.

- The CBM model is even applied in towns to operate relatively large and complex schemes. While the WSUCs employ maintenance workers, contracting out maintenance or management to the private sector is uncommon. No examples were found of alternative CBM models, such as aggregation or multi-village schemes. The role of the Federation of WSUCs (FEDWASUN) in strengthening its member's capacity is under-utilized.
- Various models for district-level support to WSUCs are being piloted, including World Bank-funded programs, however there is currently no single model ready for scaling.

Lessons Learned from Country Experience

- Even where sector silos exist between national and regional agencies, community-based water resources planning and support for multiple-use programming can bring positive results.
- Targets and objectives for upgrading piped systems from stand posts to domestic connections needs to be implemented pragmatically, considering projections of source yields, avoiding intermittent supply in the network, and ensuring this does not compromise access for the poorest to at least a basic level of service.
- Bottom-up planning and demand-driven processes can unlock significant levels of community financing for capital works; this trend is reflected in Nepal's impressive progress in expanding first time access.

Appendix G.13 Nicaragua

Population	6.3 million	**Rural population**	2.5 million
GNI per capita PPP (current US$)	4,790 (2014)	**Rural population (%)**	42
Economic status	Lower middle income	**Rural population growth (%)**	42
Access to rural water services (%)	69	**Total renewable water resources (cubic meters per year)**	27,047
Access to piped water onto premises in rural areas (%)	31	**Average size of service authority by population**	17,000
Tariff levels	US$0.70 to US$2.51	**Rural water strategy**	PISASH Integrated Sector Program for Human Water and Sanitation is main sector guidance document
Functionality (%)	94	**Rural water policy**	Non-existent

Sources: World Bank 2015; JMP 2015; UNDP and Aquastat; government of Nicaragua 2012; SIASAR 2016; ONGAWA 2015.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: the Social Emergency Investment Fund or FISE (Water supply infrastructure development), National Drinking Water and Sewerage Commission (policy making), the Nicaraguan Institute for Water Supply and Sewerage (regulation), and the National Water Authority (protecting and managing water resources)
- Service authority: municipal governments with designated water and sanitation units (UMAS)
- Service provider: the Nicaraguan Water and Sewerage Company (ENACAL), municipal providers, drinking water and sanitation committees (CAPS), other community organizations, and management by families.

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	5	4	5	4	6	24
CAPS (community management)	4	2	3	6	5	20

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- The lead national entity for rural water service delivery is FISE, which has a well-elaborated project cycle approach for infrastructure development and capacity building of CAPS.
- Municipalities are designated as service authorities, with responsibilities in planning and co-financing of infrastructure, as well as providing technical assistance and registration support to CAPS through designated UMAS. Their capacity is limited but growing, with significant effort having gone into strengthening their capacity in recent years.

Financing

- There is only partial insight into the investment needs to reach coverage targets and strengthen sector capacity; as a result, the sector cannot fully assess financing gaps for rural water supply.
- The regulations and guidelines for covering recurrent costs through tariffs in rural areas are inadequate to establish financially sustainable services. CAPS can set their own tariffs, but these are generally too low to meet all life cycle costs such as operation, minor maintenance costs, replacement and upgrading.
- Median tariffs fall well within generally agreed affordability bandwidths. But the fact that each CAPS can set its own tariff does not allow for any cross-subsidies between urban and rural areas, or within rural communities; indirect subsidies exist, but only through tax exemptions.

Asset management

- There are adequate legal frameworks for asset ownership; however, clearer roles for CAPS and the government concerning responsibility for asset management need to be defined. Efforts are under way to specify the responsibilities for financing major replacements and rehabilitation in particular.
- The national information system for water and sanitation (SIASAR) contains a detailed inventory of the assets at the level of each CAPS.
- Given the generally low to moderate capacity of CAPS, actual asset management practice is limited and inadequate.

Water resources management

- The importance of water resources management for sustainable water supplies is recognised in legal frameworks and the institutional setup, but efforts for management of water resources at basin level are limited.
- Municipalities and CAPS also have mandates for local water resources protection, and these are generally fulfilled.

Monitoring and regulation

- The country has a strong monitoring system in the form of SIASAR, which is based on service delivery indicators, and covers the entire country.
- There is growing institutional capacity at UMAS level to update SIASAR and use it for planning, technical assistance and other purposes.
- Regulation of CAPS is very weak, due to lack of clear tariff regulations, performance indicators, and formal accountability mechanisms.

Key Evidence Points from the Assessment at Service Provider Level

- Of the various service delivery models in rural Nicaragua, community management is by far the most common. The law on CAPS has given an important impetus to formalizing community management.
- The service delivery model explicitly considers the need for municipal and national government to increasingly provide CAPS with financial support.

- The actual capacity for community management is low to moderate, with very limited degrees of professionalization (for example, around asset management practices or regulation of the CAPS).
- Applying the current CAPS model as a blanket approach across all rural areas of the country is not likely to lead to sustainable service delivery at scale, as it does not account for the different needs and capacities required to manage different types of water supply systems, ranging from hand pumps to motorized pumping schemes.

Lessons Learned from Country Experience

- The law on CAPS has been a very important legal framework, as it establishes a legal mandate to the CAPS, but also specifies the role of municipalities in supporting them.
- Having dedicated UMAs as units at municipal level for providing technical assistance has proved to be important.
- The SIASAR monitoring system is a very important innovation, not only in terms of how it monitors service delivery indicators, but, also in providing a *de facto* inventory of all water supply assets in the country.
- CAPS are encouraged and requested to undertake local water resources management activities, such as catchment protection, which is happening across a reasonable percentage of the CAPS.

Appendix G.14 The Philippines

Population	100.7 million	**Rural population**	56 million
GNI per capita PPP (current US$)	8,900	**Rural population (%)**	55.6
Economic status	Lower-middle-income	**Rural population growth (%)**	1.8
Access to rural water services (%)	90	**Total renewable water resources (cubic meters per year)**	4,757
Access to piped water onto premises in rural areas (%)	30	**Average size of service authority by population**	35,600
Tariff levels	US$0.24 to US$0.53 per cubic meter	**Rural water strategy**	Formulated in the national program so-called *Salintubig*
Functionality	No data	**Rural water policy**	Formulated in Medium-Term Philippines Development Plan

Sources: World Bank 2015; JMP 2015; UNDP and Aquastat.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: National Economic Development Authority (NEDA, in charge of policy formulation and planning); Department of Public Works and Highways (DPWH, implementation responsibilities); National Water Resources Board (NWRB); the Local Water Utilities Administration (LWUA, the major national regulator); and Department of Interior and Local Government (DILG, managing investment grants and supporting local governments)
- Service authority: municipalities and *barangays* (village governments), referred to as local government units (LGUs)
- Service providers: LGUs (local government direct provision), water districts (local public utilities) and community-based organizations (CBOs), including rural water and sanitation associations (RWSAs), *barangay* water and sanitation associations (BWSAs), and private operators

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	4	3	2	4	4	20
RWSAs and BWSAs	3	1	1	4	3	12
LGUs	3	3	5	4	5	20
Water districts	5	6	8	4	5	28
Private sector	4	6	8	4	5	27

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- The absence of a lead agency for the water sector hampers provision of targeted and coordinated support to LGUs and service providers, but reforms are under way.
- Since the start of the *Salintubig* national program for water supply in 2011, LGUs have been given a greater role in planning, financing and monitoring rural water services. However, mechanisms to hold LGUs accountable for rural water services are still required to ensure that LGUs' involvement extends beyond the lifetime of centrally led programs.
- Responsibility for water services has been decentralized to *barangays*, although in practice municipal governments retain oversight over services, especially at construction stage. These overlaps in responsibilities may cause *barangays* to neglect their responsibilities for water services.

Financing

- Public funds are channeled to the rural water sector through a national program (*Salintubig*). However, investment requirements to reach universal access by 2025 far outstrip current levels of investment.
- *Salintubig* has incentivized municipalities' contribution to financing infrastructure.
- Despite regulatory guidelines, tariffs do not cover full cost recovery across all service providers.
- Tariffs are generally low due to unwillingness to charge (and to pay); only a few schemes operate in a financially sustainable manner.
- Tariff expenditure represents between 0.5 percent and 1 percent of a poor household's income (based on the US$1.90 per day income per capita, a consumption of 40 liters per capita per day in a household of six).

Asset management

- Assets ownership is not clearly defined and the hand-over is not accompanied by adequate inventories.
- There are no specific agreements between municipalities, *barangays* and service providers on financing responsibilities toward maintenance and repairs (minor or major).
- Provision of funds for asset rehabilitation and repair is *ad hoc*, leading to disruptions in services.
- For most schemes, tariffs do not include depreciation costs, and financing arrangements do not include specific provision for asset renewal or expansion.

Water resources management

- The country recognizes the importance of integrated water resources management; however, the fragmented institutional framework is a constraint for sustainable water resource development.
- Service authorities and users are not represented in water resources management coordination platforms.
- There has been (slow) progress in setting up participatory approaches to watershed management.

Monitoring and regulation

- Several central government agencies are involved in monitoring and regulation, creating some overlaps.
- Municipal governments do not seem to monitor service provision on a routine basis and do not hold *barangays* accountable for service quality and financial decisions (including tariffs and operational subsidies).
- A national monitoring and regulatory framework for service provision in rural areas and small towns is established. A water registry is compiled for all types of service providers, with performance indicators. This initiative supports the "light-touch" regulation tailored to various providers, encouraging gradual compliance.
- The NWRB (the regulator for smaller piped systems) hosts a program of accredited technical assistance providers to support smaller service providers to improve capacity and comply with regulatory requirements; despite self-contributions from providers, financing for scale-up remains a bottleneck.

Key Evidence Points from the Assessment at Service Provider Level

- BWSAs and RWSAs are generally ill-equipped to ensure continuous services or manage network extensions. There are no systems in place to systematically train service providers in operation of schemes. *Barangays* provide funds for repairs and capital maintenance on a "fix on failure" basis.
- LGU-run schemes apply low tariffs (close to CBO-managed schemes) and receive less technical support from central institutions.
- Water districts have stronger technical capacity than LGUs and CBOs, but few are involved in rural water supply services; better incentives are needed for water districts to extend their services into less densely populated areas.
- More data is needed to better assess the private operator service delivery model. However, some reports indicate good performance on financing and asset management aspects.
- Lessons Learned from Country Experience
- The *Listahang Tubig* (a national survey of water operators' performance) provides a good example for countries looking to strengthen their regulatory framework for rural water services.
- A promising and emerging service delivery model is the association of small rural service providers with larger, urban utilities.
- The accredited technical service provider program, which connects small water utilities with technical experts to give them advice toward professionalization of operations for improved services, has produced encouraging results.

Appendix G.15 Tanzania

Population	53,470,420	**Rural population**	36,569,490
GNI per capita PPP (current US$)	2620	**Rural population (%)**	68.4
Economic status	Low-income	**Rural population growth (%)**	2.1
Access to rural water services (%)	46	**Total renewable water resources (cubic meters per year)**	1,800
Access to piped water onto premises in rural areas (%)	3	**Average size of service authority by population**	203,500
Tariff levels (rural)	Widely variable: US$0.45 to US$2.2 per cubic meter	**Rural water strategy**	Water Sector Development Program (WSDP) structured in five year phases
Functionality (%)	60.4	**Rural water policy**	National Water Policy 2002

Sources: World Bank data; JMP 2015; IWMI 2007; FAO Aquastat, Nathan Inc 2016; wpm.maji.go.tz (May 2016 data).
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Rural Water Supply Department, Ministry of Water and Irrigation (MoWI)
- Service authority: local government authorities (LGAs)
- Service providers: community owned water supply organization (COWSO), a generic term for community based management structures. Examples of COWSO arrangements include direct management; management through a wider association (the Water Facility Service Trust [WSFT]); COWSO delegating aspects of operation, maintenance, or management to the private sector

Sustainability Assessment

		Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level		3	3	2	3	3	14
COWSO management-	Direct management	3	2	3	3	2	13
	As part of WSFT	5	4	5	3	4	21
	Delegated to private sector	5	3	4	3	2	17

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- LGAs suffer from widespread gaps in staffing, technical and operational capacities. National and regional structures are oriented to provide LGAs support, and water sector development programs include efforts to address these, with the exception of LGA recurrent budgets to achieve mandates.
- The COWSOs' capacity is a widespread challenge, including the quality of initial training and ongoing support, which negatively impacts sustainability. Private sector participation is promoted by policy; however, capacity can be weak with limited initiatives in practice.

Financing

- A sectorwide basket fund is in place and sector funding absorption capacity has improved over recent years.
- The major increase in sector funding is not matched by proportional increases in allocation for LGA recurrent budgets or maintenance. There are uncertainties in responsibility for financing capital maintenance and expansion; tariffs are inadequate and LGAs do not consistently budget for these investments.
- Guidance to COWSOs regarding tariff setting is not widespread, but is improving.
- Tariffs are highly variable. Based on 40 liters per capita per day for a household size of six persons it represents 1–4.6 percent of a poor household's income at US$1.90 per capita per day. However, studies state it can be as high as 28 percent for certain schemes (Fonseca 2016), and in contrast is often too low to cover operation and maintenance (O&M) costs (Nathan Inc. 2016).

Asset management

- Asset management is a relatively new concept in Tanzania. The Sustainability Strategy (2015) mentions the need to develop an asset management strategy, but this is yet to be realized.
- The water point mapping exercise has mapped nearly all rural water points in the country and is a first step toward developing a nationwide asset registry, and there are measures in place to develop operation and maintenance plans at COWSO and district levels.
- The planned Centres of Excellences are envisioned as bringing maintenance services closer to communities, but are yet to be established and business models and financial sustainability are undecided.

Water resources management

- Water resource availability per capita is rapidly reducing, and around 15 percent of water sources are seasonal.
- WRM institutions have been established from national to local level, but experience capacity challenges.
- Improvements in national hydrological monitoring is not matched with systematic hydrological and water quality surveillance at the water supply level.

Monitoring and regulation

- The sector has developed a management information system, uses results based monitoring and reporting, and together with the financial reporting software this has helped to improve transparency.
- There have been uncertainties regarding the roles and responsibilities of LGAs for monitoring of COWSOs, and no formal protocols have been established. The monitoring and accountability framework arguably promotes upwards accountability, with less emphasis on ensuring community monitoring.

Key Evidence Points from the Assessment at Service Provider Level

- The example of the Water Service Facility Trust managing multiple COWSOs brings economies of scale, with anecdotal evidence of professionalized community management.

- Shifting from the traditional village water committees to more legally autonomous COWSOs helps improve the ability to ring fence funds for the water schemes and contract the private sector for specific services.
- Private sector participation (PSP) is promoted in policy, but is relatively limited to date; the main focus is on management, with few examples of private capital investment in infrastructure. There are plans to educate communities in the benefits of PSP and advice on contract stipulations.

Lessons Learned from Country Experience

- DfID's piloting of Payment by Results for reimbursing government activities in rural water requires and incentivizes the government to strengthen its own monitoring, reporting, and data processes.
- Helping service providers transition from diesel and grid to solar power pumping reduces O&M costs, hence improving the affordability and financial viability of schemes. However, promotion of solar needs to be matched with the development of maintenance services and supply chains.
- Local planning of WASH investments does not necessarily equate to equitable planning. Improving sector data (such as water point mapping) could allow objective decision making and involvement of civil society in the local planning process.
- The COWSO competency checklist developed by the World Bank provides a good opportunity for more structured monitoring, capacity assessment, and support to community management structures. It also allows benchmarking of service providers, creating healthy competition to excel.

Appendix G.16 Vietnam

Population	90.7 million	**Rural population**	60.8 million
GNI per capita PPP (current US$)	5,690	**Rural population (%)**	66.4
Economic status	Lower-middle income	**Rural population growth (%)**	0.1
Access to rural water services (%)	97	**Total renewable water resources (cubic meters per year)**	9,461
Access to piped water onto premises in rural areas (%)	10	**Average size of service authority by population**	115,000 (District)
Tariff levels	Variable from D800 to D5,000 per cubic meter (US$ 0.04-0.22)	**Rural water strategy**	National Rural Water Supply and Sanitation Strategy to 2020
Functionality	75% of 16,000 water schemes constructed under national program	**Rural water policy**	Sector is governed by several decrees

Sources: World Bank 2015; JMP 2015; UNDP 2015.
Note: GNI = gross national income; PPP = purchasing power parity.

Institutional Setup

- National authority: Water Resources Directorate under Ministry of Agriculture and Rural Development (MARD), with National Centre for Rural Water Supply and Sanitation (NCERWASS) within the Ministry for Agriculture and Rural Development
- Service authority: decentralized provincial people's committees (PPC)
- Service providers: village associations; Provincial Centre for Rural Water Supply and Sanitation (PCERWASS); private operators (under concession-type and BOO contracts); in some cases District Department for Agriculture and Rural Development

Sustainability Assessment

	Institutional capacity	Financing	Asset management	Water resources management	Monitoring and regulation	Score
Sector level	3	5	4	5	3	20
Village associations	1	0	2	4	1	9
PCERWASS	4	3	6	5	4	22
Private operators	1	6	8	6	2	23

Key Evidence Points from the Assessment at Sector Level

Institutional capacity

- The country has developed a robust institutional system to implement the National Target Program for rural water (so-called NTP), with strong support systems at different institutional levels of project implementation. However, NTP3 for Rural Water has ended, and rural water will be integrated with wider poverty reduction and rural development programs.
- This above change will require a redefinition of institutional responsibilities to ensure the sustainability of progress achieved, particularly to monitor and support service providers.
- Although PCERWASS are mandated to build community capacity, due to the lack of capacity in these provincial centers, many communities receive little or no assistance.

Financing

- The NTP made rural water supply a development priority and provided an efficient instrument to attract, increase and channel funds to a sector that had previously been neglected.
- Local planning processes do not take into account support or capacity building activities and the need to involve communities in a bottom-up approach to ensure the uptake of improved services.
- There is an over-reliance on public funds, especially central government funds, with little revenues generated from tariffs or funding allocated from locally generated sources.
- There is a clearly defined tariff policy, which takes into account full cost recovery and optional subsidies to service providers. However, PPCs fail to implement the policy (and channel subsidies to service providers) when required to ensure financial viability.
- Tariffs levels are affordable but often below operational cost recovery. Tariffs were found to be around D5,000 per cubic meter (US$0.22 per cubic meter). Based on a consumption of 40 liters per capita per day, a household of six would pay US$1.5 per month or 2.8 percent of income of a household living on US$1.90 per day.

Asset management

- The country is in the process of establishing an asset management framework, with the Ministry of Finance leading efforts to register and estimate the capital value of publicly funded water assets.
- The current system in place for financing capital maintenance is not effective, increasing the risk that water schemes will degrade and fall into disrepair through lack of planned (capital) maintenance.

Water resources management

- Good progress has been made in establishing the legal and policy frameworks for water resources management to address issues of water availability and quality.
- However, there is a lack of coordination between government agencies and inadequate information sharing, particularly regarding monitoring of water quality.

Monitoring and regulation

- A national monitoring system is in place to track access to water services and functionality, operating under NTP3; the future transition of the monitoring system is unclear.
- Data is not always updated or accurate: some PPCs fail to allocate budgets for monitoring.
- The current monitoring framework is inadequate for monitoring service levels and operator performance.

Key Evidence Points from the Assessment at Service Provider Level

- NCERWASS estimates that 25 percent of community-managed schemes are not functional, or functioning below capacity. Some training is provided to communities before handing over, but ongoing post construction support is non-existent. Service levels are not monitored. Most community-managed schemes do not apply tariffs, or apply very low ones.

- PCERWASS are generally equipped with well-trained staff, but staffing numbers are limited for monitoring, post construction support, and carrying out communication campaigns. In their role as service provider, they raise limited revenue from tariffs and are not well able to ring fence tariff income. Tariffs are usually below operating cost recovery, and far from full cost recovery.
- Privately managed schemes exhibit better financial performance. However, the enabling environment remains unattractive for scaling up private sector participation. In particular, PPCs do not always implement the national policy with regard to tariff subsidies, which creates uncertainty on revenue streams. Regulatory oversight for adequate PPP procurement and performance monitoring is absent.

Lessons Learned from Country Experience

- Funding for the sector has been channeled through a national investment plan combining financing from national government, local government, and donors (NTP3).
- The national tariff policy takes into account full cost recovery and includes subsidy mechanisms to be provided to operators where full cost recovery tariffs cannot be applied; implementation, however, does not follow policy.
- A results-based financing program (supported by the World Bank) is incentivizing provincial governments to focus more on financial sustainability and operational efficiency.

Note

1. With the new federal structure in place, this institutional set-up is expected to change, with more devolution of authority and responsibility for providing water supply services to the provincial and local government (municipalities and village council) levels.

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