www.water-alternatives.org Volume 6 | Issue 3

Moriarty, P.; Smits, S.; Butterworth, J. and Franceys, R. 2013.
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Water Alternatives 6(3): 329-349

Trends in Rural Water Supply: Towards a Service Delivery Approach

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ABSTRACT: Behind headline successes in providing first-time access to water lie a number of pressing challenges to the dominant approach to rural water supply in developing countries, namely community management following a demand-responsive approach. These challenges manifest themselves in poor performance of service providers, high rates of hardware failure, and very low levels of service.
The papers in this special issue argue that tackling these challenges requires a shift in emphasis in rural water supply in developing countries: away from a de-facto focus on the provision of hardware for first-time access towards the proper use of installed hardware as the basis for universal access to rural water services. The outline of the main actions required to achieve this shift are becoming clearer. Chief amongst these are the professionalisation of community management and/or provision of direct support to community service providers; adoption of a wider range of service delivery models than community management alone; and addressing the sustainable financing of all costs with a particular focus on financing capital maintenance (asset management) and direct support costs. This introductory paper provides an overview of these issues and a guide to the other articles, which demonstrate these points.

KEYWORDS: Water service delivery, life-cycle costing, asset management, community management

INTRODUCTION

The call for papers for this special issue contrasted two seemingly contradictory tendencies in the rural water supply sector: on the one hand, the achievement, five years before the target date (WHO/UNICEF, 2012a) of the Millennium Development Goal (MDG) for water supply and, on the other, widely reported high rates of non-functionality of rural water systems.

Drawing on the submissions to this special issue, this paper argues that these two trends are not contradictory. Rather, they represent the beginning of the end of what has been the dominant approach for rural water supply in developing countries for the past two decades: community management under a demand-responsive approach. Not principally because community management has failed, but because it is reaching the limits of what can be realistically achieved in an approach based on informality and voluntarism. While community management has proved to be at least

partially effective in providing some level of first-time access to improved water supply services the quality and reliability of those services are insufficient. The sort of success that traditionally practised community management can provide is no longer in line with the rising expectations of users, their governments or the global community.

Urbanisation, coupled with rising standards of living and education is leading to an inexorable rise in expectations of rural water users, wanting (even where they cannot or are not willing to afford) more than the very basic levels of service provided under much community management. At the same time, these trends reduce the sort of community cohesion and volunteerism that forms an underlying assumption behind community management (Harvey and Reed, 2006). The recognition by the UN General Assembly (2010) of access to clean water and sanitation as human rights has equally created an important benchmark for what the global community considers an acceptable level of service.

These changes provide a profound challenge to the rural water sector in developing countries. This challenge has been understood, to date, predominantly in terms of a need to tackle the sustainability of water supply infrastructure. We will argue that while hardware sustainability (or functionality) is certainly a challenge, we need to go further than this, and to recast our approach to rural water supply in terms of the provision of a lasting service against defined and measurable indicators – what we refer to as a *service delivery approach*. This implies, first and foremost, identifying what level of service is demanded by users, and/or mandated to be provided by governments, and then defining those in (gradually improving) norms or standards. In addition, it implies having a series of formally mandated service delivery models that allow the achievement of these service levels.

In many cases this implies further developing the community management model from its current one-size-fits-all approach towards a wider diversity of models for different contexts. These may still be based on community management principles, but with a stronger degree of professionalisation or external support to community-based service providers; but, equally, other models are also required such as delegated management or self-supply. Finally, it involves the adoption of financing of all the costs of the service over the whole life-cycle – with a particular focus on financing capital maintenance (asset management) and direct support costs – often combining financing from different sources.

In this paper we will provide further examples of these challenges and trends, and will argue that the shift towards a service delivery approach is already underway. Papers in this special issue show many of the necessary actions for implementing it, and report on an increasing number of tools and methods developed to support it. The shift in emphasis that we identify in this paper is both ongoing and, at least in part, evolutionary. The rural water sector needs to change significantly, but this can, and should, happen by building on and continuing existing efforts at reform, whilst respecting local contexts. The risk of a paper such as this that seeks to draw out commonalities across widely differing realities is always that of oversimplification. We are aware that there are big differences between countries in the way rural water is supplied, with countries already having achieved a high level of coverage making the evolution towards a more service-oriented approach, and others still in a phase that is characterised mainly by infrastructure development. Nevertheless, we believe that there are useful high-level conclusions to be drawn regarding the implementation of a service delivery approach.

LOOKING BACK: PAST APPROACHES TO RURAL WATER SUPPLY

The history and development of current approaches to rural water supply in developing countries have been well documented, perhaps most comprehensively by Harvey and Reed (2006), and this brief overview draws heavily on their work.

Most current approaches towards rural water supply in developing countries find their roots in the 1980s and the International Decade for Drinking Water and Sanitation, when a concerted wave of action was undertaken to rapidly increase access to rural water and sanitation. During the decade community management emerged not only as the main management model, largely as a reaction to

the failure of centralised government service delivery, but also as a by-product of the 'project approach' of most NGOs and donors. Under this, infrastructure was provided to communities by external agencies, while it was assumed that operation and maintenance (O&M) would be taken up by communities following 'hand over' of the infrastructure at the end of a project. Community management is based on a set of principles (both explicit and implicit) that include: 1) community participation in the development of the water system; 2) community ownership of the system, and 3) willingness and ability of the community to carry out O&M. Underlying these principles are a set of deep (often implicit) assumptions including community cohesion, 'sense of ownership' being a meaningful proxy for legal ownership, and willingness and ability to form institutions and volunteer time to manage the technical systems. These assumptions have often proved to be myths (RWSN, 2010) and are based on cultural idealisation of rural communities (Harvey and Reed, 2006).

The community management approach was complemented in the late 1990s by the demand-responsive approach (DRA). Championed by the World Bank (and therefore deeply rooted in the neo-liberal thinking of the time), the DRA was intended to underpin community management by ensuring that the type or level of water supply provided was appropriate to, and the demand (in the sense of economic demand or willingness to pay) of, the community – with demand manifested by notions of informed involvement in technology choice, community contribution to the investment costs, and assumption of responsibility for future O&M costs (World Bank, 1998). By the early 2000s, the combination of community management with the DRA became the default approach for rural water supplies in much of the developing world.

HEADLINE SUCCESS: INCREASED COVERAGE IN A RAPIDLY CHANGING WORLD

At a macro level, this approach provides a striking story of success, with the Joint Monitoring Programme (JMP) of World Health Organization/United Nations Children's Fund (WHO/UNICEF) reporting strong global progress on access to rural water services. The target for global access to safe water has been met five years before its due date, and only a relatively small number of countries are expected to fail to make it by 2015 (WHO/UNICEF, 2012a). Globally, the percentage of rural people with access to an improved water source increased from 62% in 1990 to 81% in 2010.

Behind the absolute figures for rise in access, there is also a rise in the level of service being provided to rural people. Over the period from 1990 to 2010, the proportion of rural people with a water supply piped directly onto their premises rose from 17 to 28% (WHO/UNICEF, 2012b). This was driven in part by a series of broader changes in the world, the most important of which are briefly considered in the next paragraphs. These drivers have important implications for the future of rural water supply generally.

A first key driver for changes in rural water is urbanisation. In 1980, both Asia and Africa had urban populations between 25 and 30% (at 65%, Latin America was already much more urban). In 2015, Africa will be at 42, Asia at 48 while Latin America will be close to 80% (UN DESA, 2011). Whilst this is particularly linked to urban growth, it is also impacting rural areas. Urbanisation is not limited to major cities alone, but also includes rapid growth in smaller towns (in 2011 60% of people living in urban areas did so in cities with fewer than 500,000 people and rural growth centres (UN DESA, 2011). As a result, more and more formerly 'rural' areas with dispersed patterns of settlement now exhibit a mix of small towns, rural growth points, villages and hamlets.

Economic growth and poverty reduction form a second important driver. These three continents have seen strong and sustained economic growth since the start of the new millennium, and poverty has been declining strongly since 1999 in sub-Saharan Africa (58 to 47%), South Asia (45 to 36%) and Latin America (46 to 31%) (World Bank, 2013). This economic growth is leading not only to a drop in overall poverty but also to the rapid emergence of new middle-classes: increasingly well-educated people with disposable incomes and rapidly increasing expectations. There are many indicators of the

change in lifestyle and expectations in the developing world, but none more striking (or well documented) than access to mobile phones. A recent World Bank report identifies access to mobile phones in 2011 of close to 70% in South Asia, 60% in sub-Saharan Africa and essentially 100% in Latin America (World Bank, 2012).

This combination of urbanisation and rise in lifestyle and expectations is being reflected in the rural water sector, where both water users and governments have their sights set on higher levels of service. This demand can be seen in the widespread adoption of self-supply options, where households finance and develop their own water supply (Sutton, 2004) both in areas where there is no service and to augment basic services (see Butterworth et al., and MacCarthy et al., in this issue). It is also reflected in the adoption by governments of higher service levels – most typically in the form of a move away from handpumps and towards piped supplies. As rural settlements grow into bigger villages and small towns it becomes more technically and financially feasible to have piped supplies with higher levels of service. For example, in India's most recent five-year plan, there is an explicit decision to move towards providing rural water services through taps (preferably in homesteads), with handpumps only being used in particularly difficult areas (GoI, 2011).

In their analysis of relative increase in piped supplies in the rural areas of the developing World for the period 1990-2010, Smits and Moriarty (2013) found that piped supplies typically start being put in place from coverage levels of around 50%, subsequently showing fairly steady (though by no means uniform) acceleration. In countries with higher levels of total coverage (of more than 70%), coverage growth comes to rely increasingly on higher levels of service provided by piped systems into homes. Even though many countries in sub-Saharan Africa and South Asia have so far relied on point sources, it is therefore likely that, now that they are reaching coverage rates of about 70%, there will be a shift towards piped supplies at the premises.

In summary, the combination of community management and DRA has enabled many rural people to get access to basic water supplies, whilst urbanisation and increasing wealth are increasing the number of people living in largely rural areas who enjoy higher levels of service (sometimes through community supplies, sometimes through self-supply). Taken together, this provides a broad picture of success.

HEADLINE FAILURES: NON-FUNCTIONALITY AND SUBSTANDARD SERVICES

> *Meanwhile rural water projects, especially those using handpumps to extract water, face a high degree of operational failure (Harvey and Reed, 2006).*

However, behind this encouraging picture of macro success lies a more nuanced and challenging reality. It is well documented that many rural water supplies fail too soon. Already in the early 1990s, Evans (1992) estimated that at any given moment, 30 – 40% of rural water supply systems in developing countries were not working. A more recent compilation of data showed that 30-40% of handpumps in Africa are not working at any given time (RWSN, 2010). In a similar vein, Improve International, an NGO, maintains a list of links to studies on water system failure with examples from around the world (Improve International, 2012): all show similar rates of failure. In this special issue, Butterworth et al., report 21% non-functional handpumps in the study area in Ethiopia.

There is, therefore, a broad consensus that non-functionality of rural water supplies is a problem. Yet this consensus is not uniform. A widely reported and influential study conducted in three countries between 2004 and 2009 found that "to our surprise, the great majority of the village water systems were performing well" (Bakalian and Wakeman, 2009).

What lies behind these differences in perception regarding functionality of rural water services? In practice, the devil is in the detail. The Joint Monitoring Programme, while nominally looking at access to safe water, in practice tracks access to technology type: if people report that their main source of water

is an 'improved' one (from a list of technologies), they are counted as covered. The JMP figures, therefore, say nothing about the quality or level of service implied by that 'coverage'. How much water do people receive from their improved source? How far do they have to walk to get it? How often does it break down and for how long? And what is the quality of the water being provided? These are important features of a water service, reflected in the human right to water and typically mentioned (and then ignored) in national norms and standards for rural water supplies. They go beyond simple measures of access to a technology and define a level of service in terms of quality and quantities to be supplied, and accessibility and reliability of the supplies.

In a similar vein, it is important to understand what Bakalian and Wakeman (2009) understood by 'performing well'. What are the assumptions made about what a functioning rural water service looks like? Taking the example of their Ghana case study (one of three in the report), of all the boreholes with hand-pump systems visited in 200 villages not only were 11-12% completely non-functional, but 57-58% had broken down in the last six months and had taken between (median values) 18-20 days to repair. At the same time, it was reported that the median number of people sharing a borehole ranged from 442 to 583 (Komives et al., 2008).

These figures are, essentially, provided without comment. However, given that in Ghana the national norm for reliability in rural water supply is that it should function at least 95% of the time (i.e. be non-functional for no more than 18 days in a year) (CWSA, 2011) this would seem to imply that, at a minimum, 57-58% of schemes were providing a sub-standard level of service in terms of reliability. This undoubtedly contributed to one of the study's less positive findings: that many people were reverting to unsafe water sources at least some of the time. The same Government guidelines (CWSA, 2011) give an expected norm of 300 people per borehole with handpump, again suggesting that with median values of between 150 and 195% of this number, most sources were seriously overcrowded. These figures are supported by more recent work in Ghana where, in a total survey of water facilities in three districts, Adank et al. (2013) found that only 20% of facilities met the full range of basic service level indicators.

A similar pattern emerges from other papers in this special edition where Smits et al., found that service levels were below national norms and standards in about 50% of cases in Colombia, whilst in Bolivia, Fogelberg report that only 17 out of approximately 90 communities visited in one municipality had water supplies that met national standards.

In summary then, we can see that behind headline figures for increased access to improved water supply technology lie a series of challenges to do with functionality and poor service.

THE CHALLENGE: IS WHAT IS 'DEMANDED' GOOD ENOUGH?

> *The evolution of community management as a pragmatic response to weaknesses in public service provision, and its subsequent promotion as the ideal model of service delivery was a triumph of hope over realism (WaterAid, 2011).*

The gaps between figures on coverage, non-functionality of water systems and more detailed measures of service delivery are, therefore, large. And it is this gap that provides latitude for a range of possible interpretations of success in rural water supply. The important point, therefore, revolves around the sector's expectations of rural water supply or indeed of demand.[1] Is the objective of investments in rural water primarily a pragmatic one of providing something better than nothing: most people get

[1] We use the term demand, essentially, in the economic sense of a willingness to pay for a service – as this is the sense in which it is understood in the Demand Responsive Approach. When speaking of people's expressed wish for a level of service we use the term desire or need.

some of their water from an improved supply at least some of the time? If so, then the findings of the study by Bakalian and Wakeman (2009) are indeed encouraging and, arguably, indeed demonstrate that the demand-responsive approach results in people getting the supplies for which they demonstrate (economic) demand. Or does acceptance of a minimum level of service, as defined in the human right to water, imply the need to provide something better? Something that resembles what is typically described in national norms and standards: a water supply in which an 18-22 day median wait for a handpump to be repaired would be seen as unacceptably long or in which sharing a single handpump with 582 other people too crowded?

These questions go to the heart of what we address in the remainder of this article. If we are to measure the degree of success of rural water supplies in terms of a level of service, an essential step is defining the level of service that users are expected to receive. And, given the adoption of access to water as a human right, it is probably no longer sufficient to define access in terms of something is better than nothing, but rather through minimum acceptable norms for quantity, quality, accessibility and reliability of supply.

Yet, users' demands do not always neatly coincide with the minimum levels of service, as defined in the human right to water or national norms. Sometimes, they demand less; sometimes more. Although there seems to be something wrong with the image of someone talking on a mobile phone while waiting in a queue to manually pump water and then carry it home, this is a common sight and may say something about the nature of demand in rural settings. Bey et al. (2013 in press) found that rural water users in Uganda were typically spending 20 times more on their mobile phones than on water fees. The same work found that level of effective demand for water from improved sources was such that households were only willing to obtain minimal amounts of potable water from the improved sources for drinking and cooking; water for other uses was obtained from traditional sources. As a result, revenue from the water sold at handpumps was so low that it was insufficient to cover the costs of O&M leading to services that were unreliable.

At the same time, while often not willing to pay for the very basic levels of service provided by handpumps, there are many users who desire service levels that are much higher than those offered to town dwellers – taps in houses, and if not in houses at least reasonably nearby. People also frequently want services that cater to more than minimal quantities of drinking water, so that they can employ these for multiple uses, including small-scale productive uses. This practice has been observed in all kinds of rural water systems, but particularly in piped supplies with household connections and relatively large water quantities (e.g. Van Koppen et al., 2009; Smits et al., 2010a, 2010b; Noel et al., 2010; Van Houweling et al., 2012). If users cannot get such services communally, they may either opt out entirely or augment these through self-supply approaches (see, for example, Butterworth et al., [this issue] and MacCarthy et al., [this issue]).

Demand, therefore, is complex and not uniform. On the one hand, increasingly well-educated and affluent people expect levels of service that cannot be met by communal handpumps and undertake various forms of self-supply to increase their service levels. At the same time, for poorer households and communities, there is insufficient demand (in the economic sense of being prepared and able to pay for) to maintain the most basic hardware – with the result that the service accessed does not meet the minimum standards. This leaves governments and community-based service providers with a quandary: to supply the water services for which people are willing and able to pay, or to meet international and national norms and standards for the provision of safe water services.

But, wasn't the demand-response approach expected to be the answer to this dilemma? At this point, we should address the rhetoric and the reality of the current approach. The sector glibly refers to community management and the role of the demand-responsive approach as if this constituted a properly defined model which is actually working and effective. The inclusion of the demand-responsive approach within community management was meant to ensure that communities achieved the services

for which they could demonstrate effective (economic) demand such that they were then able to support those services. The presumption was that communities, aware of the challenge of delivering and supporting their own basic services, and with an informed demand for *safe* water would only chose to implement service levels which they believed they could subsequently finance. However, the drive towards the achievement of the MDG and the compliance with the human right to water do not allow for genuine demand-responsiveness as the service level for which demand exists may not meet minimum health- or rights-based criteria. Moreover, in practice, demand-responsiveness has often been narrowly interpreted as communities paying a share of initial capital expenditure for a set of predetermined technology options, and then assuming they develop 'a sense of ownership' of the water system and responsibility for its management. The sector's *realpolitik* means that partnering has itself typically been fairly unequal: the vast majority of funds come from outsiders, like NGOs and donor-funded programmes, with a minimal (typically 5%) required contribution by communities. For example, Jones (this issue) indicates that communities are expected to contribute 3% to capital investments with another 2% required from municipalities; the remainder comes from national government and/or donors. These figures are, in our experience, typical for many countries, and for government and NGO-funded programmes alike. This 5% community contribution is, in our experience, itself commonly transmuted into a 'contribution to labour', paid for by the contractor who wants to get on with implementation or overlooked entirely by the implementing agency who wants to achieve promised targets on time. As Marks and Davis (2012) note, there is a threshold effect in this initial contribution. They found in a study in Kenya that a sense of ownership was only achieved if households contributed more than a certain amount upfront.

In conclusion, community management and the demand-responsive approach are providing services that are often not meeting either the desires of users, or the expectations of governments or other external agencies.

BUILDING ON WHAT WORKS: EVOLUTIONS IN RURAL WATER SUPPLY

Communities have shown that they can deal with many aspects of managing basic supplies (Schouten and Moriarty, 2003; Harvey and Reed, 2006; Bakalian and Wakeman, 2009), but struggle with others – particularly with those related to longer-term sustainability and inevitable asset replacement. Despite assessing most systems as working well, Bakalian and Wakeman (2009) found financial management to be generally poor and most communities only focused on day to day operations (if that) of the schemes. There was little or no systematic accrual for day-to-day repairs or capital maintenance or system expansion – with the previously mentioned, and unsurprising, result that in all schemes many people were reverting to unsafe sources at least some of the time (Bakalian and Wakeman, 2009). These findings are echoed in some of the papers to this special issue. Smits et al. (this issue) report that only about half of the 40 community-based service providers surveyed in Colombia could be classified as having an adequate performance. Fogelberg (this issue) estimates that only about 80% of the water systems in her study area in Bolivia are (highly) likely to be sustainable.

Realising and recognising both the possibilities and potential limitations of community management, three sets of responses have emerged in rural water supply over the last decade or so, each of which is elaborated below, these are:

- Professionalisation of community management
- Support to community-based service providers
- Self-supply

As people become wealthier, and water systems become more complicated, experience shows that more professional management is needed to deal with activities such as water treatment, catchment protection and auditable bookkeeping. For example, Smits et al. (this issue) explain how in Colombia, a

middle-income country with community management of relatively complex piped systems delivering household water supplies, community management regulations allow for the hiring of paid staff, such as plumbers or administrators, and require these to be certified by training institutions. The *Programa de Cultura Empresarial* (business culture programme), run by the Government of Colombia sought to professionalise the community-based service providers, retaining their non-profit status but promoting good business practices (like proper bookkeeping, billing, customer relations, etc) and hiring of paid staff (Tamayo and García, 2006). In some cases professionalisation may go as far as fully outsourcing some or most service provision tasks to private operators (see Kleemeier, 2010) – the difference with full privatisation being that some authority function and asset ownership remain with the community or, more typically, local government.

In essence, professionalisation boils down to the more systematic holding of service providers to account for their work, against predefined performance indicators, and includes the use of regulation. Whereas in urban areas in more and more countries have regulators to enforce good performance and management practices in their utilities, this is still largely lacking in rural areas (Trémolet, 2013). Where it does exist, many community-based service providers fail to meet the performance indicators that have been set. In the absence of a formal regulator for rural water services, regulatory functions need to be embedded in other actors, typically local government in the role of *service authority* (Lockwood and Smits, 2011).

A second set of responses to the limitations of community-based management evolved around the concept of support to service delivery. In the early 2000s, it started to be recognised that the majority of community-based service providers are unable to manage their water supplies without some form of external support (Lockwood, 2002; Lockwood et al., 2003; Schouten and Moriarty, 2003; Harvey and Reed, 2006). In practice, the vast majority of community-based service providers do receive some external support as found by Whittington et al. (2009) in the previously mentioned World Bank study in Bolivia, Ghana and Peru, and echoed by Smits et al. (this issue). While in practice this is often provided in an ad hoc manner, if and when a problem occurs, we refer here to the more formal relations between communities and support agents, who come and provide support on a regular basis, and are thereby able to anticipate problems. Such structured support can be provided by different types of entities, and the past decade has seen different types of institutional mechanisms for setting up this, including: support by local governments as the mandated water service authority (Lockwood and Smits, 2011; Jones, this issue); by specialised entities such as a private company (Gibson, 2010; Jones, this issue) or utility; by national government agencies (Lockwood, 2002; Tamayo and García, 2006; Gibson and Matengu, 2011), by associations of community-based service providers (Glas and Lambrecht, 2010; Fogelberg, this issue); and, by mixes of the above (Meleg, 2011). Jones (this issue) also compares the different packages of support provided by WaterAid in Mali versus what is typically provided by the Government of Mali (at considerably lower costs).

There is increasing evidence that such support impacts, above all, on the performance of the community-based service providers in their O&M and administrative functions (Whittington et al., 2009; Kayser et al., 2010; Schweitzer and Mihelcic, 2012; Smits et al., this issue). At the same time, evidence of impact on actual service delivery has been more limited (e.g. Smits et al., this issue). This is unsurprising, as support is not a simple on-off switch (either there or absent). Indeed, we suspect that direct support, like other aspects of service provision, is subject to threshold effects: below a certain threshold of support, there will be no visible impact and it is only once when the threshold has been met that there will be a correlation between money and effort put into support and improvement in services.

Yet professionalisation of, and support to, community management is not the whole solution to the challenges of rural water supply. While the world is becoming richer, for several more generations there will continue to be pockets of extreme rural poverty. These people are not likely to be either willing or able to pay for even the most basic levels of services. There will also always be highly

scattered communities who are prohibitively expensive to serve through piped networks or indeed with boreholes and handpumps. As the bulk of the rural population comes to be covered, these last pockets will present an increasingly difficult and expensive group of people to service in the drive to achieve universal coverage. For them, it is difficult to see any viable medium-term solution other than self-supply, but self-supply that is recognised and supported by the state and its agencies, or what Butterworth et al. (this issue) call self-supply acceleration. At the other end of the scale, fast-growing small towns and rural growth points are too large and heterogeneous and their demands for water services too technically complex to be met by a model of community management based on voluntarism and ad-hoc money collection to address repairs or breakdowns. This is the other area where more formal models of delegated supply to private providers becomes relevant – in the absence of which self-supply by users who (partially) opt out from communal systems is observed (MacCarthy et al., this issue).

These three evolutions in rural water point to the need for a flexible and pragmatic approach that meets the rights, demands, desires and needs of diverse groups of rural citizens, in a broad range of rural contexts and livelihoods – one that takes the real progress and experiences of the last 20 years of community management and demand responsiveness as a starting point, and that builds on it.

MOVING FORWARD: TOWARDS A SERVICE DELIVERY APPROACH TO RURAL WATER SUPPLY

> *There should be shift in focus from construction of water supply systems to service delivery (GoI, 2011)*
>
> *Adopting a service delivery approach to ensure that facilities continue to deliver a basic level of service for all people and the benefits of these services endure over time through provision [of an] adequate budget for post construction support, capital repairs and maintenance (GoG, 2012)*

In spite of the evolutions and developments reviewed in the previous section, we believe that for the past decades rural water supply in the poorer countries of the world has not, in practice, really been about service delivery, but rather about providing hardware for first-time access. We emphasise the de facto nature of this focus. It is not that people have not been aware of a range of service delivery issues – discussions on sustainability (albeit typically of individual pieces of hardware such as handpumps rather than the service itself), in particular, have been going on for years.[2] It is rather that a combination of the pressure to expand coverage, and the mandates and behaviours of the individuals, organisations and institutions created to meet this pressure have resulted in a focus on building new systems (as illustrated by the experience of an NGO in the work by Fogelberg (this issue), often ignoring the implied realities of a genuinely demand-responsive approach. It is very difficult for either politicians or technocrats to focus on sustainability and level of service being provided when absolute need for first-time access is so high – or indeed when the challenge focusing the sector is so clearly framed in terms of access to hardware. Donors, international finance corporations and international non-governmental organisations all have internal systems that are heavily structured around the ability to spend budget and show impacts. It is far easier to spend money accountably on hardware – the Adopt-A-Project approach that Fogelberg (this issue) refers to than to do so on the softer and more difficult elements of good management and service delivery. The political economy of the rural WASH sector, particularly where heavily aid-dependent, is therefore strongly skewed towards building hardware and it is therefore not surprising that most of the successful experiences with professionalisation and

[2] A search on the term sustainability in the IRC International Water and Sanitation Centre's digital library (www.washdoc.info) returned over 2000 hits spanning from 1985 to today.

support to service providers are found in middle-income countries, like South Africa (Gibson, 2010) and Latin America (Smits et al., this issue), where coverage levels are higher, the focus on first-time access is arguably less, and the availability of public finance to pay for support activities is much greater.

As more and more countries come close to achieving universal first-time coverage, however, the time is ripe for change: from the emergent de facto focus on hardware delivery towards a service delivery approach, where we understand a service delivery approach to imply that rural water services should be provided to users by clearly identified *service providers* (which can include legally recognised community organisations), with the aid of *support agents*, and against accepted and enforceable norms and standards.

We also believe that a service delivery approach implies a mature understanding of, and explicit efforts to address, the need for financing to cover all aspects of the service including the repair, upgrading and eventual replacement of all hardware elements. This understanding must move beyond simplistic assumptions of full 'cost recovery', as understood in the demand-responsive approach, from users and clearly identify the role of and need for other sources of – particularly public – finance. It is an inescapable reality that, where the aim is to provide service levels that meet the minimum levels commensurate with the human right to water, there will be a need for ongoing subsidy (from government – public finance, donors or other users – cross subsidy).

Over the last five to ten years, the authors have been involved in a range of initiatives with different partners (working in parallel to other initiatives in the sector) to identify and flesh out the elements of a service delivery approach to rural water supply. Based on these experiences, and combined with a 13-country study of trends in rural water supply Lockwood and Smits (2011) identify the following 'building blocks' for service delivery: an empirical selection of those areas seen as essential for the sustainable delivery of rural water services (see Table 1).

Other authors and organisations have identified similar sets of elements and also consolidated them into frameworks of principles or building blocks (e.g. WaterAid, 2011; WASH Sustainability Charter, 2011) – all building on existing frameworks in the sector (e.g. Hodgkin, 1994; Sara and Katz, 1997; Scaling Up Group, 2005). What these more recent frameworks have in common is a gradual move away from identifying factors at community level, and within the project cycle, to drawing out factors at other institutional levels or that are not linked to a specific project implementation framework.

In the following sections we look at three broad areas (each related to one or more building blocks) where promising examples exist of the sort of change required, with a focus on experiences presented in this special edition. The areas are:

- Adoption of a range of contextually appropriate service delivery models
- Life-cycle costing and asset management
- Strengthening of the enabling environment

Adoption of a range of contextually appropriate service models and levels

As we have seen, there is much heterogeneity in what is understood to be rural: from scattered and dispersed households to small- and medium-sized towns. As much as rural communities differ within and between countries, so do their capacities to manage a service. A water committee in a typical rural village in Colombia may use a computerised billing system, whereas its counterpart in a village in Ghana may have no literate members. Yet, both are expected to follow and implement a very similar set of community management approaches. All of these different contexts and user groups have widely differing needs from a water supply, a reality that, as we have seen, is often poorly recognised in current approaches to rural water. In order to deal with this heterogeneity we see two areas where greater clarity is needed if a service delivery approach is to be applied for rural water. The first is the

Table 1. Building blocks for sustainable service delivery.

1. Professionalisation of community management	Community management entities supported to move away from voluntary arrangements towards more professional service provision embedded in local and national policy, legal, and regulatory frameworks.
2. Recognition and promotion of alternative service provider options	A range of management options beyond community management, such as self-supply and public-private partnerships, formally recognised and supported in sector policy.
3. Monitoring service delivery and sustainability	Monitoring systems track indicators of infrastructure functionality, service provider performance, and levels of service delivered against nationally agreed norms and standards.
4. Harmonisation and coordination	Improved harmonisation and coordination among donors and government, and alignment of all actors (both government and nongovernment) with national policies and systems.
5. Support to service providers	Structured system of direct (post-construction) support provided to back up and monitor community management entities and other service providers.
6. Capacity support to local government	Ongoing capacity support provided to service authorities (typically local government) to enable them to fulfil their role (planning, monitoring, regulation, etc) in sustaining rural water services.
7. Learning and adaptive management	Learning and knowledge management supported at national and decentralised levels to enable the sector to adapt based on experience.
8. Asset management	Systematic planning, inventory updates, and financial forecasting for assets carried out, and asset ownership clearly defined.
9. Regulation of rural services and service providers	Regulation of the service delivered and service provider performance through mechanisms appropriate for small rural operators.
10. Financing to cover all life-cycle costs	Financial frameworks account for all life-cycle costs, especially major capital maintenance, support to service authorities and service providers, monitoring and regulation.

development and application *within a country* of a range of clearly defined *service delivery models* for rural water supply; the second, contained within the first, the definition and monitoring of the *levels of service* to be provided.

Service levels

By service level we mean a defined (and measurable) set of indicators that, taken together, allow qualitatively different types of service to be defined and monitored. Based on national norms and standards from around the world, Moriarty et al. (2011) developed and tested a generic service delivery ladder (see Table 2) that categorised different levels of service using four key indicators (quantity, quality, reliability, accessibility) creating five distinct service levels. Such a ladder is first and foremost an expression of the level of service to which users are entitled, according to their national norms and standards.

Table 2. Generic water supply service level (Moriarty et al., 2011).

Service level	Quantity (l/pers/day)	Quality	Accessibility*	Reliability	Status per JMP definitions
High	>= 60	Good	< 10	Very reliable	Improved
Intermediate	40-60	Acceptable	10-30	Reliable/secure	
Basic (normative)	20-40		30-60		
Sub-standard	5-20	Problematic	>=60	Problematic	Unimproved
No service	< 5	Unacceptable		Unreliable/ insecure	

* Minutes spent on fetching water per person per day

A clear definition of service levels becomes a frame of reference against which to monitor the degree to which services comply with these standards, as done for example in Ghana (Adank et al., 2013), or in Colombia (Smits et al., this issue). Indeed, shifting monitoring of rural water outcomes from hardware delivery to service delivery may be the single most important step in creating more effective service delivery. Whilst many countries define national norms and standards for service delivery, often in significant detail, these are equally often overlooked or ignored in the practice of monitoring. Water quality is perhaps the most striking omission, with most countries subscribing to either national or UN defined norms, whilst in practice seldom if ever systematically monitoring for quality (especially from point sources such as handpumps). Onda et al. (2012) estimate that if water quality issues are factored in, 28% of the global population used unsafe water in 2010, nearly three times the JMP estimate of 11% using unimproved sources.

Service delivery models

Increasingly, countries also define the range of permissible models for delivering services and the diversity of contexts to which they apply. For example, under Ghana's national community water and sanitation programme, management of point sources is delegated to the community whilst a range of different management models are identified for small towns based on size of population. In addition to these formal models, a number of informal models developed either independently through local action or brought in by external agents can be identified, leading to a range of different possibilities all with their own requirements for oversight and regulation (Adank and Tuffuor, 2013 in press)).

As seen in the previous sections, a number of different experiences are emerging that talk of these different realities including:

- Professionalisation and support to community management (see Smits et al., and Jones in this issue)
- Involvement of private operators in a range of modalities and variations (see Kleemeier, 2010)
- Self-supply, both in scattered communities and households as well as complementary to formal supplies in small towns (Butterworth et al., and MacCarthy et al., this issue)

Life-cycle costing for sustainable services

Equally central to the emerging outline of a service delivery approach are the related issues of financing the full life-cycle costs of the service and the related area of asset management: under a service delivery approach, it is not only the costs of installing or indeed managing a single handpump or piped

network, but rather the total costs of providing services at a defined level to a defined user population over time. Fonseca et al. (2011) identify the following cost components (Table 3).

Table 3. Cost components of water services (Fonseca et al., 2011).

Capital expenditure – hardware and software (CapEx)	Expenditure on fixed assets such as physical infrastructure (for initial construction or system extension), and the accompanying 'software' such as capacity building.
Operating and minor maintenance expenditure (OpEx)	Expenditure on labour and materials needed for routine maintenance which is needed to keep systems running, but does not include major repairs.
Capital maintenance expenditure (CapManEx)	Renewal, replacement and rehabilitation costs which go beyond routine maintenance.
Expenditure on direct support (ExpDS)	Costs of ongoing support to users and local stakeholders, for example on local government or district support staff.
Expenditure on indirect support (ExpIDS)	Costs of higher-level support, such as government planning, policy-making and regulation.
Cost of capital (CoC)	Costs of servicing capital such as repayment of loans

Table 4 below summarises cost ranges for these cost components for different types of service as found by the WASHCost project in Ghana, Uganda, Mozambique and Andhra Pradesh (India) (Burr et al., 2012). Data on expenditure on indirect support were not collected, and cost of capital is often not included in rural water supply which tends to be directly grant-funded.

It is important to note that the life-cycle costing framework makes no explicit assumptions about how to source financing for them – other than to identify that for a service to be sustainable they must be covered from somewhere. The OECD (2009) divides sources of finance between three large alliterative groups namely Tariffs (user fees), Taxes (internal public finance) and Transfers (external development aid). However, we do believe that by making this breakdown of costs more explicit, a clearer dialogue can be held on who pays which costs, and in fact concluding that several of these often need to come from public finances, as will be elaborated further below.

Table 4. Ranges for expenditure on different costs components, in $US 2011 (Burr et al., 2012).

	Primary formal water source in area of intervention		
Cost component	Borehole and handpump	Small schemes (less than 500 people) or medium schemes (500-5000 people)	Intermediate (5001-15,000) or larger (> 15,000 people) schemes
Total CapEx (per person)	20-61	30-131	20-152
Total recurrent expenditure (per person, per year)	3-6	3-15	
OpEx	0.5-1	0.5-5	
CapManEx	1.5-2	1.5-7	
ExpDS	1-3	1-3	

* Cost ranges given in all tables are based on inter-quartile values from the data: [min-max], in US$ 2011

Under community management in poor countries it is typically assumed that agencies external to the community (either government or donors) pay the bulk of initial capital investment, with a contribution from users that is high enough to create a 'sense of ownership' (Marks and Davis, 2012). Self-supply presents a special case, in that typically all investments are made by users. Much self-supply is, in practice, additional to formal systems – community-managed or otherwise. In this issue, both Butterworth et al., and MacCarthy et al., look at the issues surrounding self-supply, considering among others the drivers that make families invest often quite substantial amounts of money in upgrading their service levels – including considerations such as increased convenience, reliability, greater storage or greater quantity.

One of the central tenets of community management has been an assumption that tariffs paid by users should cover at least O&M. As can be seen from the WASHCost data, the total expenditure on recurrent costs is about 10% of the capital investment costs. But of the recurrent costs, operation and minor maintenance are only a relatively small part. Capital maintenance and direct support make up a significant part of the recurrent costs. Proper asset management, not least clarification of formal, legal, asset ownership is critical to this area, as it provides the basis for identifying financing needs for capital maintenance. Yet assumptions about major asset maintenance, renewal and replacement are seldom addressed directly (Burr et al., 2012).

Direct support – if addressed – is typically seen as coming from 'taxes' in the form of government funding for sector agencies. Experience shows that this is typically severely underfunded in the least developed countries, but often receives significant public investment in middle-income ones – for example in Latin America and South Africa (Smits et al., 2011).

The global analysis and assessment of sanitation and drinking-water (WHO, 2012) found that, in 2011, 69% of government's funds to the water sector went to new services, and only 31% went to operation and capital maintenance. The same report also showed that 57% of aid to the water sector went to new systems, 36% went to increasing service levels and only 7% went to capital maintenance.

Le Gouais and Wach (this issue) in their analysis of the policies of a range of development partners have shown that there is little or no consensus about – and little awareness of – the need to finance either capital maintenance or the provision of support to community service providers. Jones (this issue) discusses the ambiguity in responsibilities for funding these costs in Mali.

Financing capital maintenance for rural water requires more thought and experimentation (Fonseca et al., 2013), as there is little evidence that any but the largest small-town schemes are able to do this by themselves from user fees, and hence new finance mechanisms are required that will in many cases likely require some form of state (or other external to the system) subsidy. That this issue is not new is evidenced by this quote from a 1987 paper by WHO/GTZ (1987) which aimed to guide improvements in rural water, following observed failures during the International Decade for Drinking Water and Sanitation:

> In some special cases, particularly in Africa, a transition period may be necessary, during which operation and maintenance costs are co-funded by external support agencies. However, the objective should be that beneficiaries should gradually assume responsibility for the full costs of operation and maintenance. Financial contributions for replacement of equipment are a longer term objective.

A longer-term objective that, 26 years later, we seem little closer to getting to grips with.

Based on a review of experiences with support to service providers in 10 countries, Smits et al. (2011) estimate the costs of providing support and regulatory functions (typically seen as a remit of local government in the role of service authority) to be somewhere in the range US$1-3person/year to be effective. In this issue, Jones reports direct support costs under WaterAid's programme in Mali of US$0.5-1.5 person/year as compared to the Government of Mali's programme of US$0.34 person/year, whilst Fogelberg reports a range of between US$0.07 and 0.73 person/year in Bolivia (average US$0.15

person/year). Smits et al. (2011) suggest that where less than about US$1 /person/year was spent on direct support, this function was not fulfilled adequately, mainly in countries in Africa. Where it was, it resulted in improved service provider functioning.

In summary, a first crucial step to ensuring financial sustainability of services lies in identifying the full life-cycle costs of service provision. However, without clearly identifying matching sources of finance (taxes, transfers or tariffs), little improvement can be expected from costing exercises alone as both Jones and Fogelberg (this issue) discuss for the cases of Mali and Bolivia.

Creating an enabling environment for rural water service delivery

Most of the building blocks to service delivery discussed in this paper require, in order to be widely applied, shifts in the legislative, policy and regulatory environment for rural water service delivery. In essence, frameworks that have been typically developed to support the provision of hardware to be managed by communities need to be broadened to recognise and support a wider range of options for service provision – and to allow for provision of support to community managers. Policy and legislation in many countries do recognise a role for alternative models of service provision to community management, such as Ethiopia's acknowledgement of self-supply (Butterworth et al., this issue).

Of particular importance, if rural water supply is to become more professional and service delivery oriented, is the need to clarify roles and functions under different service delivery models, especially an appropriate balance between local government (as service authority) and communities. Separation and definition of roles and responsibilities at different institutional levels – and definition of lines of accountability and oversight between these levels are key to a service delivery approach. Of particular importance is the separation between the roles and functions of what we refer to as the *service authority* and the *service provider*. The former, often in the form of local government, has the formal responsibility for ensuring that services are provided – and is often the owner of rural water assets. The latter, is responsible for the day-to-day operation of those assets, and for actual service provision (for more details see Lockwood and Smits, 2011).

Under decentralisation policies being implemented in most countries, the bulk of service authority functions (and where defined, the formal role of service authority) sit with the local government. Given the recognised weak capacity of many local governments, they are typically supported in these functions by specialist agencies of national government, as for example the Technical Support Units in Uganda; in other places, local governments form associations at regional or provincial level to achieve economies of scale in, for example, procurement or contracting of specialist capacity (see Lockwood and Smits, 2011, for a further overview of such capacity support mechanisms). In spite of the efforts to strengthen local government capacity in fulfilling the service authority function, and with much decentralisation of an ongoing process there are often areas devoid of clarity and sometimes tension in the relationships between these different arms of government. Achieving correct balance between ensuring that accountability for service delivery remains close to those being served (the main rationale for decentralisation) and the sorts of economies of scale are highly context-specific.

In the past, a tendency of NGO-supported community management, driven in part by the perceived failure of centralised service delivery, has been to ignore even local government and go straight to the community – with the results discussed earlier. In part this is because, by delegating all responsibility for community management to community institutions – often with no basis in either customary or formal law, an essential degree of separation of responsibilities is lost – leading to lack of oversight. Both Jones and Fogelberg discuss in this issue how NGOs like WaterAid and Water For People have sought to redress such by-passes and strengthen the role of local government as service authority.

There continue to be many instances where the oversight role of the service authority is left vague or unfilled, meaning that when things go wrong there are few avenues for redress. Regulation is a related element of professionalisation, as many regulatory functions are often performed by service

authorities. Until now, there is little real experience with regulation of rural services (as opposed to urban where there has been varying levels of success; see Franceys and Gerlach, 2008). We believe that while essential, regulation in the rural sector should be applied with a light touch, and does not necessarily imply the establishment of a formal regulator: regulatory functions can be undertaken by other entities such as service authorities or line ministries (Trémolet, 2013).

MOVING FORWARD ON SERVICE DELIVERY

Community management as practised for the last two decades under a purported demand responsive approach has delivered much, but is arguably at the end of what it can do. The pressing need to reach the remaining pockets of the un-served; to improve the service being provided to the already served; and to end the grotesque waste of resources found in high levels of non-functionality and poorly performing services calls for new approaches. The NGO Water for People has developed a slogan that effectively captures the challenge for the next decades of rural water supply: Everyone Forever (Fogelberg, this issue). What Water for People means by this is that, at the main institutional unit of water service delivery (be it in the municipality, district, county or any other recognisable unit of institutional – service authority – scale) the aim must be to provide every person and every communal institution, with a reliable service that lasts indefinitely. Fogelberg (this issue) explains what the practical implications of adopting this slogan have been for Water for People's work in Bolivia.

With a handful of exceptions in post-conflict and extremely fragile states, there are neither technical nor economic reasons why this vision cannot be achieved. Indeed within the process of defining the Post-2015 indicators, 2030 is proposed as the target year for universal coverage in water services (WHO/UNICEF, 2012c). We believe, however, that it is critical that the 2030 target be seen in terms of service delivery rather than in terms of hardware provision.

We also believe that there are good reasons to be optimistic that this can be the case. The concept of adopting a service delivery approach to rural water supply is gaining traction. Governments, NGOs and development partners are all starting to use the language and concepts explicitly in their policy – some more than others (see le Gouais and Watch, this issue).

A framework of areas of required change is emerging, and includes such diverse areas as recognition of alternative service delivery models (including private management, multiple-use services and self-supply), professionalistion of community management, especially through provision of direct support and light-touch regulation, adoption of life-cycle costing – with a focus on addressing the need for mechanisms to finance capital maintenance and support to service providers.

Several of the papers in this special issue speak the language of rural water service delivery explicitly. They talk of *service levels* and *life-cycle costs*, *service authorities* and *service providers*. They apply a service delivery analysis to the policies and practices of rural water service actors – in many cases with mixed results. Jones (this issue) reports on efforts to define mechanisms to fund capital maintenance, but with ambiguities in the policy framework; MacCarthy et al. (this issue) not only show the important contribution of self-supply but also point to the poor oversight over water quality; and, Fogelberg (this issue) highlights not only how an NGO moved from an adopt-a-project approach to service delivery, but also the difficulties encountered on that path.

Papers in this special issue also highlight the need for rural water supplies to become more like urban ones – to be more service-oriented, whilst by the same logic catering to the different needs of rural communities – such as water for productive needs. They highlight the potential of self-supply to achieve the vision of serving everyone – bringing a service that is at least 'good enough' to those who will otherwise have nothing.

In some ways, none of the findings or conclusions presented in this paper represents a radical departure from the sector orthodoxy – at least as expressed on paper – of the last decades. The list of

issues mentioned in the 1987 WHO/GTZ paper quoted earlier is startlingly familiar 26 years later. There is, therefore, no or little overt resistance to adopting a service delivery approach in rural water: many would claim that this is what they are already doing. Yet, as the introductory pages of this paper set out, something is clearly not working. Between rising expectations and the limits of current approaches lies a yawning gap in both the quality and absolutely functionality of rural water services.

We believe that the problems of non-functionality and poor services in the rural water sector are emergent in the sense of the inevitable result of the political economy of the rural water sector. The current 'rules of the game' of the rural water sector – particularly the way finance is allocated and success measured – reward rapid creation of new infrastructure above all else. While the individual symptoms (e.g. poor functionality) have been well recognised and the subject of much discussion over the decades the institutional, political and economic structures of the sector, and specifically its rewards mechanisms all drive towards a pattern of macro-level behaviour that contributes to the problem. Specifically, the drive to meet the needs of the un-served, coupled with the rise in demand for clearly identifiable metrics for delivery (including outcomes or results based aid), has created an almost irresistible pressure to focus primarily on delivering new hardware.

It is because of the deep-seated, institutionalised and emergent nature of this focus on delivering new hardware that we believe improved sector performance must be driven in the first instance by a vision-level change. It is only when everyone in the sector agrees that their purpose is to reach full coverage with reliable *services* that new hardware will be seen as simply a first step in service delivery, and that sufficient attention and resources will be allocated to the building blocks we have set out in this paper. This should not be something new for the sector – but it is. To use a metaphor, if the education sector functioned as the rural water supply sector currently functions, the bulk of money and effort would be spent on building schools – and success would be measured in terms of how many schools were built – not on the educational achievements of pupils. Until this fundamental miss-framing of objectives is addressed, progress will be difficult. As a sector, we have to realise that true success can be measured only in terms of all people using good-quality water every day. With clearly defined service levels and service delivery indicators we have a tool for doing this. To the old adage 'what can't be measured can't be managed' we have to add 'what can't be managed can't be (and isn't) delivered'.

Achieving a basic, and eventually an above-basic, level of services for all rural citizens within the next generation is entirely achievable financially and technically. As the papers in this special issue demonstrate, the outlines of what needs to be done, the language concepts and many of the tools to do it are either already available or under development. And many organisations are making the shift. Fogelberg (this issue) describes how an NGO like Water For People (Fogelberg, this issue) is making such a shift from an adopt-a-project approach to a service delivery approach. WaterAid (Jones, this issue) has been following a similar shift. But also governments are making important changes, such as seeking ways to improve support to service providers by the Government of Colombia (Smits et al., this issue), or recognising self-supply as an alternative service delivery model (Butterworth et al., this issue). Policy documents of international development partners also align on various elements with what we considered important building blocks for a service delivery approach (Le Gouais and Wach, this issue).

Nevertheless, many challenges remain, not least the inertia of a global system for providing rural water that has for so long relied on the assumption that as long as we provided the hardware, the services would take care of themselves (or be taken care of by the community). Challenging this inertia and bringing about required transformational change in rural water services will require great effort and commitment on behalf of many different actors.

ACKNOWLEDGEMENTS

This special issue has been supported by Triple-S (Sustainable Services at Scale), an initiative to promote 'water services that last' by encouraging a shift in approach to rural water supply – from one that

focuses on implementing infrastructure projects to one that aims at delivering a reliable and lasting service. The initiative is managed by IRC International Water and Sanitation Centre in the Netherlands in collaboration with agencies in different countries and with funding from the Bill & Melinda Gates Foundation.

REFERENCES

Adank, M.; Kumasi, T.; Abbey, E.; Dickinson, N.; Dzansi, P.; Atengdem, J.; Laari Chimbar, T. and Effah, E. 2013. *The status of rural water supply services in Ghana, A synthesis of findings from 3 districts*. Triple-S Working Paper. Accra, Ghana: CWSA (Community Water and Sanitation Agency)/IRC International Water and Sanitation Centre.

Adank, M. and Tuffuor, B.; 2013 in press. *Management models for the delivery of water supply services to the urban poor in Ghana*. Accra, Ghana: TPP (Tri-Partite Partnership) Project/RCN (Resource Centre Network) Ghana

Bakalian, A. and Wakeman, W. 2009. *Post-construction support and sustainability in community-managed rural water supply: Case studies in Peru, Bolivia and Ghana.* Working Paper Report, No. 48731, 1 (1), Water Sector Board discussion paper series, No. 14. Washington, DC, US: Bank-Netherlands Water Partnership (BNWP) and World Bank.

Bey, V.; Abisa, J. and Magara, P. 2013 in press. *Performance analysis of the water user committee (WUC) service delivery model for point sources in Uganda*. Triple-S Working Paper. Kampala, Uganda: IRC.

Burr, P.; Fonseca, C.; Moriarty, P. and McIntyre, P. 2012. *The recurrent expenditure gap: Failing to meet and sustain basic water services; executive summary*. WASHCost Working Paper No. 8. The Hague, the Netherlands: IRC International Water and Sanitation Centre.

Butterworth, J.; Sutton, S. and Mekonta, L. 2013. Self-supply as a complementary water services delivery model in Ethiopia. *This issue.*

CWSA (Community Water and Sanitation Agency). 2011. *Regulations Legislative Instrument (L.I. 2007*). Accra, Ghana: CWSA.

Evans, P. 1992. *Paying the piper: An overview of community financing of water and sanitation.* Delft: IRC International Water and Sanitation Centre.

Fogelberg, K. 2013. From adopt-a-project to permanent services: The evolution of Water For People's approach to rural water supply in Bolivia. *This issue.*

Fonseca, C.; Franceys, R.; Batchelor, C.; McIntyre, P.; Klutse, A.; Komives, K.; Moriarty, P.; Naafs, A.; Nyarko, K.; Pezon, C.; Potter, A.; Reddy, R. and Snehalatha, M. 2011. *Life-cycle costs approach: Costing sustainable services*. WASHCost Briefing Note 1a. The Hague, Netherlands: IRC International Water and Sanitation Centre.

Fonseca, C.; Smits, S.; Nyarko, K.; Naafs, A. and Franceys, R. 2013. *Financing capital maintenance of rural water supply systems: Current practices and future options*. WASHCost Working Paper No. 9. The Hague, the Netherlands: IRC International Water and Sanitation Centre.

Franceys, R. and Gerlach, E. 2008. *Regulating water and sanitation for the poor: Economic regulation for public and private partnership*s. London, UK: Earthscan.

Gibson, J. 2010. Operation and maintenance costs of rural water supply schemes in South Africa. Paper presented at IRC Symposium 2010, *Pumps, Pipes and Promises*, 16-18 Nov 2010, The Hague, the Netherlands.

Gibson, J. and Matengu K. 2010. Challenges of maintaining rural water supply scheme Kavango and Caprivi regions *(Republic of Namibia)*. In *Proceedings of the International Symposium on Rural Water Services, Providing Sustainable Water Services at Scale, pp. 22-25, 13-15 April 2010, Kampala, Uganda.*

Glas, D. and Lambrecht, S. 2010. *Coopérer pour pérenniser. Mettre à l'échelle la gestion locale du service d'eau potable*. Gent, Belgium: PROTOS.

GoG (Government of Ghana). 2012. Ghana statement of commitments. Presented by Hon. Dr Kwabena Duffuor Minister for Finance and Economic Planning, Republic of Ghana, at SWA High Level Meeting Theme: Economics of Sanitation and Water, April 20, 2012, Washington, DC, USA.

GoI (Government of India). (2011) *Twelfth five year plan – 2012-2017 Report of the working group on rural domestic water and sanitation*. Delhi, India: Ministry of Drinking Water and Sanitation.

Harvey, P.A. and Reed R.A. 2006. Community-managed water supplies in Africa: Sustainable or dispensable? *Community Development Journal* 42(3): 365-378.

Hodgkin, J. 1994. *The sustainability of rural water supply projects*. WASH Technical Report No. 94. Washington, DC: United States Agency for International Development (USAID).

Improve International. 2012. *Statistics on water & sanitation system failures.* http://improveinternational.wordpress.com/handy-resources/sad-stats/ (accessed September 2013)

Jones, S. 2013. How can INGOs help promote sustainable rural water services? An analysis of WaterAid's approach to supporting local governments in Mali. *This issue.*

Kayser, G.; Griffiths, J.; Moomaw, W.; Schaffner, J. and Rogers, B. 2010. Assessing the impact of post-construction support – the Circuit Rider Model – on system performance and sustainability in community managed water supply: Evidence from El Salvador. In *Proceedings of the International Symposium on Rural Water Services, Providing Sustainable Water Services at Scale,* pp. 33-35, 13-15 April 2010, Kampala, Uganda.

Kleemeier, E. 2010. *Private operators and rural water supplies: A desk review of experience*. World Bank Water Papers. Washington, DC, USA: The World Bank.

Komives, K.; Akanbang, B.; Thorsten, R.; Tuffuor, B.; Wakeman, W.; Larbi, E.; Bakalian, A. and Whittington, D. 2008. Post-construction support and the sustainability of rural water projects in Ghana. In Jones, H. (Ed), *Access to sanitation and safe water: Global partnerships and local actions: 33rd WEDC conference, Accra, Ghana, 13-17 November 2006*. Loughborough, UK: Water, Engineering and Development Centre (WEDC), Loughborough University of Technology, WEDC.

Le Gouais, A. and Wach, E. 2013. A qualitative analysis of rural water sector policy documents. *This issue.*

Lockwood H. 2002. *Institutional support mechanisms for community-managed rural water supply & sanitation systems in Latin America*. Strategic Report No. 6. Environmental Health Project (EHP). Washington, DC, US: USAID.

Lockwood, H.; Bakalian, A. and Wakeman, W. 2003. *Assessing sustainability in rural water supply: The role of follow-up support to communities. Literature review and desk review of rural water supply and sanitation project documents*. Washington, DC: World Bank.

Lockwood, H. and Smits, S. 2011. S*upporting rural water supply: Moving towards a service delivery approach.* UK: Practical Action Publishing.

MacCarthy, M.F.; Annis, J.E. and Mihelcic, J.R. 2013. Assessing unsubsidized self-supply groundwater systems in Eastern Madagascar. *This issue.*

Marks, S.J. and Davis, J. 2012. Does user participation lead to sense of ownership for rural water systems? Evidence from Kenya. *World Development* 40(8): 1569-1576.

Meleg, A. 2011. SISAR: A sustainable management model for small rural decentralized water and wastewater systems in developing countries. *Journal of Water, Sanitation and Hygiene for Development* 2(4): 291-300.

Moriarty, P.; Batchelor, C.; Fonseca, C.; Klutse, A.; Naafs, A.; Nyarko, A.; Pezon, K.; Potter, A.; Reddy, R. and Snehalata, M. 2011. *Ladders and levels for assessing and costing water service delivery*. WASHCost Working Paper No. 2. The Hague, the Netherlands: IRC International Water and Sanitation Centre.

Noel, S.; Phuong, H.T.; Soussan, J. and Lovett, J. 2010. The impact of domestic water on household enterprises: Evidence from Vietnam. *Water Policy* 12(2): 237-247.

OECD (Organisation for Economic Co-operation and Development). 2009. Managing water for all. An OECD perspective on pricing and financing. London, UK: IWA and OECD.

Onda, K.; LoBuglio, J. and Bartram, J. 2012. Global access to safe water: accounting for water quality and the resulting impact on MDG progress. *International Journal of Environmental Research and Public Health* 9(3): 880-894.

RWSN (Rural Water Supply Network). 2010. *Myths of the rural water supply sector*. Perspectives Paper No. 4. RWSN Executive Steering Committee. St Gallen: RWSN.

Sara, J. and Katz, T. 1997. *Making rural water supply sustainable: Report on the impact of project rules*. Washington, DC, USA: Water and Sanitation Program.

Scaling Up Group. 2005. *Scaling up rural water supply: A framework for achieving sustainable universal coverage through community management*. Delft, the Netherlands: Thematic Group Scaling Up Rural Water Services.

Schouten, T. and Moriarty, P. 2003. *Community water, community management: From system to service in rural areas*. London, UK: ITDG Publishing.

Schweitzer, R.W. and Mihelcic, J.R. 2012. Assessing sustainability of community management of rural water systems in the developing world. *Journal of Water, Sanitation and Hygiene for Development* 2(1): 20-30.

Smits, S.; Mejía, T.; Rodríguez, S. and Suazo, D. 2010a. Effects of multiple-use of water on users' livelihoods and sustainability of rural water supply services in Honduras. *Waterlines* 29(1): 37-51.

Smits, S.; van Koppen, B.; Moriarty, P. and Butterworth, J. 2010b. Multiple-use services as an alternative to rural water supply services: A characterisation of the approach. *Water Alternatives* 3(1): 102-121.

Smits, S.; Verhoeven, J.; Moriarty, P.; Fonseca, C. and Lockwood, H. 2011. *Arrangements and costs of support to rural water service providers*. WASHCost Working Paper No. 5. The Hague, the Netherlands: IRC International Water and Sanitation Centre.

Smits, S.; Rojas, J. and Tamayo, P. 2013. The impact of support to community-based rural water service providers: Evidence from Colombia. *This issue.*

Smits, S. and Moriarty, P. 2013. *Through the danger zone: Rates of change in the expansion of water and sanitation coverage.* Think Piece. The Hague, the Netherlands: IRC International Water and Sanitation Centre.

Sutton, S. 2004. *Self supply: A fresh approach to water for rural populations*. RWSN Field Note. St Gallen, Switzerland: Rural Water Supply Network.

Tamayo, S.P. and García, M. 2006. Estrategia estatal para el fortalecimiento de entes prestadores de servicios públicos en el pequeño municipio y la zona rural. El programa cultura empresarial adelantado en Colombia. In Quiroz, F.; Faysse, N. and Ampuero, R. (Eds), *Apoyo a la gestión de Comités de Agua Potable; experiencias de fortalecimiento a comités de agua potable con gestión comunitaria en Bolivia y Colombia*. Cochabamba, Bolivia: Centro Agua – Universidad Mayor de San Simón.

Trémolet, S. 2013. *Regulation in rural areas*. Briefing Note No. 7. The Hague, the Netherlands: IRC International Water and Sanitation Centre.

UN DESA. 2011. *World urbanization prospects – The 2011 revision*. New York: United Nations Department of Economic and Social Affairs, Population Division.

UN General Assembly. 2010. *The human right to water and sanitation*. UN Resolution 64/292. New York: United Nations.

Van Houweling, E.; Hall, R.P.; Sakho Diop, A.; Davis, J. and Seiss, M. 2012. The role of productive water use in women's livelihoods: Evidence from rural Senegal. *Water Alternatives* 5(3): 658-677.

van Koppen, B.; Smits, S.; Moriarty, P.; Penning de Vries, F.; Mikhail, M. and Boelee, E. 2009. *Climbing the water ladder: Multiple-use water services for poverty reduction.* Technical Paper Series No. 52. The Hague, the Netherlands: IRC International Water and Sanitation Centre, International Water Management.

WASH Sustainability Charter. 2011. *The WASH sustainability charter; Improving wash service delivery*. http://washcharter.wordpress.com/charter/ (accessed September 2013)

WaterAid. 2011. *Sustainability framework*. www.wateraid.org/~/media/Publications/sustainability-framework.pdf (accessed September 2013)

Whittington, D.; Davis, J.; Prokopy, L.; Komives, K.; Thorsten, R.; Lukacs, H.; Bakalian, A. and Wakeman, W. 2009. How well is the demand-driven, community management model for rural water supply systems doing? Evidence from Bolivia, Peru and Ghana. *Water Policy* 11(6): 696-718.

WHO (World Health Organization). 2012. *UN-water global annual assessment of sanitation and drinking-water (GlAAS) 2012 report: The challenge of extending and sustaining services*. Geneva, Switzerland: World Health Organization.

WHO/GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit). 1987. *International drinking water supply and sanitation decade: Global sector concepts for water supply and sanitation*. Geneva, Switzerland: World Health Organization.

WHO/UNICEF (United Nations Children's Fund). 2012a. *Progress on drinking water and sanitation: 2012 upd*ate. Geneva: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation.

WHO/UNICEF. 2012b. *Joint monitoring programme (JMP) for water supply and sanitation. Data and estimates*. www.wssinfo.org/data-estimates (accessed September 2013)

WHO/UNICEF. 2012c. *Report of the second consultation on post-2015 monitoring of drinking-water, sanitation and hygiene, The Hague, 3-5 December 2012*. Geneva: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation.

World Bank. 1998. *Demand responsive approaches to community water supply: Moving from policy to practice, East and Southern Africa*. Washington, DC: World Bank.

World Bank. 2012. *Information and communications for development 2012: Maximizing mobil*e. Washington, DC: World Bank.

World Bank. 2013. *Poverty and equity data*. http://povertydata.worldbank.org/poverty/region/SSA (accessed September 2013)