

SUSTAINABILITY ISSUES OF MDG-FOCUSSED PROGRAMMES IN THE RURAL WATER SECTOR

Ricard Giné Garriga

Agustí Pérez-Foguet

1. Abstract

By 2015, to halve the population without sustainable access to safe drinking water and basic sanitation has become a top priority in many developing countries (Goal 7 of the Millennium Development Goals -MDGs-). International concern towards water sector is rapidly increasing and significant investments are envisaged for the next decade. Sector-related policies and strategies aspire to increase prevalent low water supply coverage, particularly in rural areas.

Nevertheless, rural water supply programs in developing countries frequently fail to deliver benefits to society in the long run. There is thus a strong need to focus on sustainability issues to prevent new water infrastructure which has to be built from breaking down.

In this study we evaluate the rural water sector along this dimension. Its particular aim is twofold. The research first seeks to deepen into the analysis of all key factors which affect long-term functionality of rural water interventions. Second, the authors highlight the need to foster academic debate around relative influence of all these interrelated aspects on sustainability of community water supplies. Aimed at identifying the most cost-effective alternative, debate should focus on differentiating the essential aspects required to guarantee functionality of water supplies from those which are important but not indispensable.

2. Introduction

There is evidence that the focus of the water discourse in recent years has been shifting toward water as a human rights issue, and water and sanitation needs should thus be assessed in terms of its contribution to poverty reduction and to various Millennium Development Goals (MDGs). In particular, to Target 10 of Goal 7 which reads: "Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation" (UN, 2000). As a result, to improve accessibility to safe water and sanitation has become a top priority in many low-income countries. In brief, achieving the sector target requires simultaneously the building of the infrastructure to provide drinking water services to 1.1 billion people and appropriate sanitation to 1.6 billion people (Joint Monitoring Programme, 2000) as well as to maintain the gains already made during the past 15 years.

In this respect, rural water supply programmes in developing countries have frequently failed to deliver benefits to society over the long term, mainly because of the approach used. The emphasis has been on the fast production of new schemes prioritizing the engineering component, while sidestepping social and participatory issues. There is thus a strong need to focus on sustainability, if long-term functionality of future interventions is pretended to be achieved.

Nevertheless, the drive behind attempts to meet previous sector-related targets is still drawing attention towards increased coverage through fast production of new schemes, which can potentially divert attention from the need for getting beneficiaries involved, institutional capacity building and ongoing maintenance of water facilities, all of them being critical for sustained service provision. It is much easier, faster and controllable to construct schemes than it is to build up recipient capacity to manage them. Therefore, the dilemma that must be confronted is a choice between a faster immediate improvement of the rural water supply situation, focussing on specific targets but where villagers do not play any significant role and thus where sustainability in the long run is questionable; or a slower pace of production of schemes but the promotion of more sustained facilities as a result of community participation and local capacity building to plan and implement.

3. Objectives and Method

This research arises from major shortcomings which should be tackled by the water sector in order to overcome previous dilemma and thus be properly developed and sustained. In brief, it is aimed at adding a new perspective into the academic debate regarding to what enables a water scheme to remain operational over a long period of time. It is not only to identify key factors which undermine long-term functionality of water services in low-income rural areas, since relevant related studies have already been undertaken. This paper also attempts to raise the need of determining how all these aspects influence overall sustainability.

In particular, the specific purposes of this research can be described as follows:

- Which are the main components that affect sustainability? Which are major constraints that threaten it?
- Which is their real influence to overall functionality of the service? How should they be assessed? Is pertinent to measure the degree of sustainability in a water scheme?

First discussion, in section 4, seeks to deepen into the analysis of major factors which affect long-term functionality of rural water interventions. The findings of a recent research project on the sustainability of rural water supplies in Tanzania are presented as a case study, aimed at highlighting major constraints when it comes to put these sustainability issues into a functional framework. Second, in section 5, the authors set out the need to assess relative influence of all these related aspects on sustainability of community water supplies. In last section, key aspects are highlighted to conclude the study.

4. The challenge of sustainability in the rural water sector

In many developing countries, it has been the poor performance of the schemes one of the main driving forces behind the shift to new national policies and sector-related strategies, since to set up an appropriate policy framework is essential to providing a supportive environment that promotes long-term sustainability. Whilst the existence of a well-formulated policy per se can not guarantee that projects are more sustainable, it can at least provide the basis for a common understanding and focus amongst all the stakeholders (Government, NGOs, Communities, and External Support Agencies). In its absence, different actors often employ different implementation approaches and different technologies, which can lead to a fragmented and unsustainable water supply sector.

Therefore, there is evidence that both policies and strategies have significant impact on sustainability, and the key appears to be identifying what enables a water scheme to remain operational over a long period of time. In practice, relevant scientific literature (Harvey and Reed, 2004; Mukherjee and Wijk, 2002; Sugden, 2003; Vishnudas et al., 2008; WELL, 1988) state that to keep a waterpoint functioning depends on a complex mix of managerial, environmental, social, technical, and financial issues. All these different aspects should be considered simultaneously through an integrated approach, since sustainability depends on all of them and a weakness in any aspect can lead to the failure of the scheme. The following five different but interrelated dimensions of sustainability have been identified and briefly analyzed:

- The water service has to be successfully installed, operated, maintained and repaired, ensuring a continued flow of benefits in the long term. It is a decentralized approach, and it thus entails at least that each stakeholder is committed to its specific role.
- Communities have to be involved throughout the project cycle and need to establish representative water entities as effective decision-making bodies. Institutional support is required to expand the delivery of the service to all (including the most vulnerable and the poor).
- The service has to be cost-effective and desirably financed (at least operation and maintenance costs) by the users.
- The water consumed is not over-exploited but naturally replenished.
- The technology chosen has not only to provide a reliable and adequate water supply of an acceptable quality, but to be appropriate to the physical and social environment, as well as financially affordable.

As a case study, this section also presents major findings of a study carried out in 2007 in Tanzania (Giné and Pérez-Foguet, 2008), where the Government has developed a comprehensive national program to achieve the sector service targets set by the MDGs. There is evidence that it is promoting sustained facilities, and all these previously identified aspects have been taken into consideration. Tanzania's program is briefly revised along this dimension, aimed at highlighting major shortcomings in the light of its imple-

mentation. They clearly threaten the long-term functionality of the infrastructure that has to be built.

4.1. Sector development and an appropriate institutional framework

Neo-liberal policies of the 1990s shifted attention from centrally managed rural water supply programs implemented in the past to local governance (Khanal, 2003). The new strategy is based on decentralization of basic services, and this process has been seen as key to ensuring local participation, representation of felt needs, the equitable distribution of resources, and sustainability. The focus is not on the technical considerations relating to water schemes but on how to ensure that systems are adequately managed and thus remain functional once installed.

Clearly, implementation of this decentralization process entails a range of institutional arrangements. The Government's new role is one of policy and guideline formulation, monitoring and regulation. The management and coordination of the day-to-day activities moves to the local authorities, which undertake the primary responsibility for implementation of rural water supply schemes and sanitation infrastructure. Communities are expected to initiate demand for improvements of facilities since it is to be a demand-driven approach, and their participation throughout the project cycle has to be promoted. At the same time, a management alternative to be considered is the private sector participation model, which is receiving growing attention in rural areas. As a rule nonetheless it is currently under-developed, lacking skills and experience to satisfactorily deliver public services.

The water policy in Tanzania (URT, 2002) differentiates between diverse management alternatives (such as a Water User Group, a Water User Association, a Cooperative Society and others); aiming to create an entity able to work independently of village government structures. However, there is an issue of scale with regard to the population that these bodies should cover, and Cleaver & Toner (2006) emphasize the dilemma between representative bodies on the one hand and efficient management on the other. In this respect, water entities performing at village or larger scale instead of at waterpoint level appear to be more appropriate, and should thus be strengthened. Another major challenge lies within local authorities themselves to assume the leadership during the project implementation, particularly the District Water Department. It is committed among others (i) to manage the available resources, (ii) to implement water facilities, (iii) to mediate (if required) in conflict over sources between communities, (iv) to foster a demand-driven approach within beneficiaries, and (v) to monitor the performance of the schemes to ensure their functionality once the project is completed. In general, districts are not properly prepared to efficiently fulfill their responsibilities and they lack strategic oversight. Thus, building up capacities of the recipient organizations should be a priority, and institutional support from the Government is essential. At present, capacity building is receiving a small fraction of the interest and resources allocated through the program.

4.2. Community aspects and the issue of equity

There is a need to distinguish between 'community participation', which is aimed at establishing communities as effective decision-making entities; and 'community manage-

ment', a bottom-up development approach whereby the beneficiaries of the water supply assume full responsibility, authority and control over it (McCommon et al., 1990). Based on the the low rural water supply sustainability levels which remain throughout developing countries, community participation has gained widespread acceptance to be a prerequisite for sustainability (Narayan, 1995; Katz and Sara, 1998; Gleitsmann 2007). Community management has not (Harvey and Reed, 2007), highlighting the need for appropriate institutional support to any alternative of management at the "lowest appropriate level" (McCommon et al, 1990; Carter et al., 1999; Harvey and Reed, 2007). In fact, the misconception that services can be managed autonomously by communities has been the major reason for the breakdown of management systems in Tanzania. There is thus consensus on stating that governments can not be side-stepped in the process of service delivery by external support agencies (McCommon et al., 1990; Harvey and Reed, 2007). At least, a qualified district or regional organization (government agency or NGO) will be needed to ensure the long-term functionality of the schemes and to support the programs which they promote (Giné and Pérez-Foguet, 2008). It will be needed both as a source of trained technicians, encouraging and motivating the community, periodically monitoring the service performance, and guaranteeing an efficient and an appropriate spare parts supply chain; among others.

Equally important, the assumption often made in policy concerning the capacity of communities to manage services to meet the goal of equity appears to be over-optimistic (House, 2003; Cleaver et al, 2005). Unless there is external intervention which commit institutions to considering equity in their work, progress on these issues tends to be poor. This raises questions about which organizations are best placed to provide such ongoing facilitation: the central Government, a strengthened local government, NGOs, or donor agencies (Cleaver and Toner, 2006). In Tanzania, the approach used is unlikely to tackle gender and poverty issues (Giné and Pérez-Foguet, 2008). The policy states that equitable service provision is a responsibility of the community. Despite being assisted by external agencies, no clear role for local authorities or the Government has been defined, which considerably hampers their involvement in the process.

4.3. The principle of cost recovery

It is widely accepted that operation and maintenance of the facility is enhanced by financing mechanisms whereby users contribute towards the cost of running their own water supply. In particular, the Tanzanian policy (URT, 2002) aims to have full cost recovery on operation and maintenance costs.

First step in developing sustainable financing strategies is determination of real costs of service provision (Fonseca and Njiru, 2003; Mehta et al, 2005). It is needed to ensure that communities are aware of ongoing costs and the financial commitment required to sustain their water systems, to allow them to select the most appropriate technology and system for them, and to determine the level of external financial support that may be required (Harvey, 2007). Therefore, costing O&M would prevent water entities from collecting insufficient funds to run the facility if an efficient revenue collection is in place.

With regard to community initial contributions, there is no clear consensus on whether users should pay for capital costs and if so, what percentage is reasonable and how

might it be paid (Fonseca and Njiru, 2003). The water policy (URT, 2002) specifies a contribution, in cash and kind, of 5% of the total capital cost. It can be seen as an indicator to measure the community's willingness to pay. It is also a contradiction in terms of equity since all communities appear to be homogeneous in government policy, and it lays out no specific means for addressing the needs of the poorest communities (Cleaver and Toner, 2006). Therefore, amendments to the policy should be advocated if the targeted contribution represents a big burden for the sustainability of the project.

Last but not least, it is essential that the most vulnerable members within a community are not priced out of the opportunity to access to safe water. In this respect, issues of affordability and cost-recovery are vital, since formal systems require operation and maintenance charges to be met. At present, the water policy in Tanzania (URT, 2002) pays little attention to how communities should achieve full cost-recovery on operation and maintenance while they guarantee the access of all potential users. Since 'free provision' is not considered in Tanzania, the poor are expected to be assisted to meet the charges through coupons or subsidies.

4.4. The need of an integrated water resources management

Environmental and water resources management issues emerges to ensure sustainable sources for the water supply systems, since to access safe water entails at least a sustainable water source of sufficient quantity and quality. As distinct from the supply-side focus of public policy in water sector on developing the "water resource" by investing in infrastructure, Integrated Water Resources Management (IWRM) emphasize the need to embrace demand-side management. It provides a holistic approach-based framework that implies the integration in a sustainable way of the needs of all users while maintaining a healthy environment. In brief, IWRM basically includes among others (Shah and van Koppen, 2006) (i) a national water policy to guide all players in the sector; (ii) a regulatory framework for coordinated action; (iii) recognition of river basin as the unit of water and land planning and management; (iv) treating water as an economic good by pricing water resource as well as services; (v) creation of water rights by instituting a system of water withdrawal permits; and (vi) participatory water resource management with involvement of women.

On the whole nonetheless, the ability of low-income countries to make headway towards IWRM with its own resources is limited. The chief reason is that in predominantly informal water economies, majority of water users depend either on self-provision of water or local informal vendors (Shah and van Koppen, 2006). Making direct demand management work in such conditions is close to infeasible, and the development of water infrastructure is thus a priority to prevent villagers from utilising not improved water sources.

The last 'Population and Housing Census' carried out in mainland Tanzania (excluding Zanzibar) in 2002 reported that only 42% of rural households and 85% of urban households have access to improved¹ water supply, so there is room for improvement in terms of coverage.

¹ Access to improved water supply means that the main source of drinking water is either from a piped supply, protected well or spring, or rainwater collection (Joint Monitoring Programme, 2000).

Other major weaknesses are related to (Giné and Pérez-Foguet, 2008): (i) poor institutional framework, so better cooperation between key stakeholders should be encouraged; and (ii) lack of an appropriate monitoring system, which is needed to ensure that the information required to make decisions at each level and to prepare realistic basin management plans is available. At a local level, although communities' involvement in allocation decisions is desired, the goal is to obtain an optimal use of resources, ensuring that local activities do not adversely affect the quality or quantity of water available to downstream users. At the same time, because of patchy availability of water resources, communities are often in conflict over sources. Local authorities should be capable to mediate if required, which highlights once more that not only technical training is required but also capacity building on social issues.

4.5. The choice of the appropriate technology

The selection of the technology in order to provide the required level of service² has a major impact on sustainability, especially on ongoing O&M needs. To involve water users' entities in the choice of service level and the selection of a water supply system should be promoted. It needs to be both technologically appropriate to their physical and social environment, and financially affordable both in the investment and during the operation and maintenance phases (Gleitsmann et al., 2007; Harvey and Reed, 2004).

At the same time, the problem of supplying spare parts in rural areas for water schemes and the availability of technicians have often been highlighted. The simplest solution is to use only technologies which do not require specialist spare parts and components or trained technicians. Nevertheless, at least more than 40% of all rural water supply schemes have to rely on hand pump technology in Tanzania (URT, 2007), and a reliable supply chain is required to be implemented. A major strength is that most of equipments and technology have been standardized. On the other hand, spare parts are not available at the local level (main capitals -Dodoma and Dar- are the only possibilities). Therefore, reliable outlets need to be established to ensure spare parts availability when the need arises, minimize the time required to repair the scheme, and thus improve its effectiveness. Likewise, training should be lengthened while capacity building fostered for the more complex breakdowns, as well as to establish preventive maintenance schedules (which are currently neglected) and leak detection programs should be promoted (Giné and Pérez-Foguet, 2008).

5. Assessing sustainability of rural water programs

As discussed in previous section, relevant studies conducted elsewhere have already identified many interrelated components that somehow affect sustainability of water facilities. Beyond this, nonetheless, no accurate research to determine how all these aspects influence long-term functionality of schemes has been carried out up to date, and while it seems intuitively that all of them are equally relevant, there are significant issues with regard to their relative importance unsolved.

² In Tanzania, the policy (URT, 2002) establishes as the minimum service level in rural areas a water point serving no more than 250 people with water of acceptable quality, at a distance of not more than 400 meters from their homestead, and at the rate of 25 liters per person per day.

Are there benefits to be derived from appropriate institutional framework if local water entities are not capable to manage the service? Is the demand-driven approach enhancing a sense of community ownership over the water facility? Is it enough to ensure cost-recovery? Which institutions are best placed to ensure equity at local scale? Does IWRM produce desired impacts on local water supplies? Which technologies appear to be appropriate in rural areas?

It is believed that tackling financing issues, dealing with poor local capacities to manage water schemes, addressing equitability of service provision, promoting the private sector, adopting an integrated water resources management approach or ensuring appropriate O&M programmes are different alternatives with their own cost implications. Therefore, identifying the most cost-effective of these opportunities entails differentiating the essential aspects required to guarantee sustainability of water scheme from those which are important but not indispensable. Sector policies should focus on the former, and institutional framework should promote their accomplishment.

An accurate assessment of all these aspects is something that will be further addressed in future research. In this respect, field work is planned to be carried out:

- (i) in Tanzania, through the evaluation of water facilities implemented by WaterAid;
- (ii) in Ethiopia, by monitoring the intervention of Intermon Oxfam; and
- (iii) in Peru, to compare achieved results with conclusions of a study developed by the World Bank in 2001 in which sustainability of 70 rural water schemes was assessed (MVCS et al., 2001).

Based on comprehensive interviews to be carried out in a defined sample at waterpoint level, the goal is to rank a list of all different factors that affect long-term functionality of water services.

As a first stage, in order to both promote debate and to start focusing the framework of future studies, we raise the following five questions:

5.1. Sector Development

Many developing countries have embarked on a process of 'decentralisation by devolution', with control over water service delivery moving to local government. It has entailed development of proper institutional frameworks and adequate sector-related policies. Nevertheless, a gap between formal and state-centred initiatives and reality on the ground (which proceeds at a different pace) has become evident in many cases. The statement made in policy concerning the capacity of local communities to assume responsibility for their water supply appears to be over-optimistic. There is thus a need to fit reforms to local context and to better understand suitability of the decentralisation process and its major strengths.

In this respect, to thoroughly evaluate roles and commitments at all levels of all sector stakeholders could be of interest. In particular, greater emphasis should be placed on determining efficient alternatives to build up capacities of and to support the recipient organizations. It is also believed that more effort is needed to identify issues that need to be raised if private sector involvement is to be seriously considered as an alternative.

Finally, with regard to local water entities, an issue of scale needs to be solved in terms of which is the appropriate population that these bodies should cover.

5.2. Community Aspects

Both terms of 'community participation' and 'community management' are often misunderstood. There is a need to clearly identify if both approaches are required to ensure sustainability. Likewise, there is no consensus on whether a developed sense of ownership over the waterpoint is a prerequisite for adequate local management. It also should be clarified if community ownership assists in fostering a sense of responsibility for financing the upkeep of the facility.

There are other important aspects that should also be further understood: (i) to identify which institutions should play a key role to promote equity regarding to service delivery; (ii) to assess the real benefits to be achieved for women of improved water supplies; and (iii) to determine which attitudes and behaviours within the community can diminish proper water use even if the scheme appears to be working (e.g. with regard to hygienic practices).

5.3. Sustainable Financing

There is evidence that sustainable financing mechanisms need to consider at least operation and maintenance and longer term rehabilitation needs. However, and even if appropriate mechanisms for revenue collection are in place, no guideline exists to accurately determining real costs of service provision, which may result in water entities collecting insufficient funds to run the facility.

Major issues to be solved are related to (i) costing O&M, (ii) increasing awareness within communities of their financial commitment required to sustain their water systems, (iii) measures to improve willingness to pay and its relation to performance in revenue collection, (iv) mechanisms to promote access to service by vulnerable groups, and (v) monitoring whether the principle of cost-recovery proves to be affordable and practicable at local level (without external financial support).

At the same time, a comprehensive analysis of suitability of initial capital contribution by communities is desired, aimed at determining how might it be paid (in cash or in kind) and what percentage is reasonable.

5.4. Integrated Water Resources Management

In predominantly informal water economies, whereby majority of water users depend either on self-provision of water or local informal vendors, reforms proposed by IWRM touches only a small formalised segment of the water economy and a tiny proportion of water use and users. As a result, its impacts on the water sector are neither deep nor broad; and there is a need to assess which is relative influence of regional water resources management (at basin scale) over local rural water supplies.

Similarly, to deepen into the analysis of how conflicts over sources (either for different water uses or within communities) should be confronted is another aspect which could be of interest.

5.5. Appropriate Technology

Research conducted elsewhere shows not only suitability of different technologies depending on local context (i.e. appropriate technology) but also states the need to involve water entities in the choice of the water supply system (in terms of technology and financial affordability).

In contrast, real impact of O&M programmes (availability of local technicians, easy accessibility of spare parts and replacements ...) linked to the choice of technology has not been thoroughly assessed, though proper maintenance is believed to be a prerequisite on a sustained basis. Similarly, an accurate check to see how levels of service (both quality and quantity) influence the prevalence of water-related diseases is to be undertaken, to revise whether coverage definition of safe access to water proposed by WHO³ is realistic in the rural context.

6. Conclusions

Sustainability of rural water supply programs in developing countries is still an elusive goal. Main issues which affect long-term functionality of water schemes have been already identified in sector-related literature, but many of them remain unsolved, confirmed by the prevalent high rate of non-functionality of existing water infrastructure.

At the same time, no accurate research to determine how all these aspects influence overall sustainability has been carried out up to date, and significant issues with regard to their relative importance arise. There is a need to define roles and commitments of all sector stakeholders in a decentralised context in rural areas, overcoming simplistic theories where beneficiaries assume full responsibility over their water supplies. Issues of community ownership and gender equity in water services have to be further studied, aimed at understanding their real influence on sustainability of the schemes. To deepen into the impact of cost-recovery policies on the poor with regard to their access to safe water is another critical aspect which clearly demands more research, in order to establish proper sustainable financing mechanisms. Water resources management at basin level appears to be a coherent approach, though its advantages at community scale have not been assessed up to date. Finally, a thorough analysis of the linkages between appropriate technologies and maintenance programmes could be of interest in terms of sustainability.

This study should be viewed as a first step on the path to better understanding of sustainability issues of MDG-focussed programmes in the rural water sector. More research is planned to identify and rank the essential aspects required to guarantee long-term functionality of water schemes.

7. References

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³ Joint Monitoring Programme, 2000

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