

The Analytic Conceptual Framework for Comprehending Factors Essential to Realize Sustainability in Rural Communities' Water Supply Systems

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Abstract

This research study is an analytic conceptual framework aiming at understanding factors essential to obtain sustainability in rural communities' water supply systems. The basis of the study is on observations and desk-study or literature reviewing. Its aim is to determine factors necessary for obtaining sustainability in rural communities' water supply systems. The analytic review covers general conclusions in community participation in Rural Water System/RWS, perceptions of communities on underlying issues pertaining to sustainable management of Rural Water Supply System/RWSS and factors towards sustainability of RWSS. Illumination of these intensifies understanding of all aspects that contribute to sustainability in the topic of rural water supply or RWS. The study covers typologies of community participation in rural water supply, perceptions of community and sustainability and conceptual framework for sustainable rural water system services.

Index terms— 1. rural water supply, 2. community participation, 3. sustainable management, 4. sustainability, 5. rural communities.

1 I. General Introduction

his study serves as an analytic conceptual framework with the aim of comprehending factors essential for attaining the aspects of sustainability in rural communities' water supply systems. Theoretical paradigms as this theoretical analytic study also premised on practical observations, reviews and analysis usually provide sufficient enlightenment and comprehension, practical guidance and leadership and implementation skills for successful and sustainable rural community development projects. Proper and effective knowledge normally leads to positive attitudes and acquiring of relevant skills for attaining successfully sufficient and efficient sustainable development.

Water contributes immensely to the notion of sustainable development and poverty reduction. Fresh and safe drinking water is a basic natural and human need, which not only sustains life but also provides for various social and economic needs. Based on this, the past two decades have succeeded in providing new infrastructure for rural water supply where physical systems were build, thus increasing coverage levels for access to water. Despite this positive trend, however, reportedly, between 1990 and 2006 there was an increase from 29 million to 272 million people who go without water, in 19 Sub-Saharan African countries. Attributes which have leveled the ground for such misery include: rural water supply systems that fail prematurely, poor management of water utilities, limitations in institutional capacity as well as centralized planning, operation and maintenance of water supplies (Lockwood and Smits, 2011:24; Marks and Davis, 2012:1569 and Sewando, Shimba and Mndene, 2012:73).

Against this backdrop, the following is a thematic analytic review discussing specific themes in depth. The thematic topics for this review paper are limited to community participation in Rural Water Supply/RWS, perceptions of communities on underlying issues pertaining to sustainable management of Rural Water Supply System/RWSS, and factors towards sustainability of RWSS.

2 II. Community Participation in Rural

Water Supply

The primacy of citizen participation has become an essential idea within contemporary development theory and practice. It has further informed much of the development practice and analysis. The notion of participation has been hailed for its immense contribution to sustainability of development interventions since it promotes, among other factors, ownership of the development process by locals, hence the zeal for efficiency and effectiveness in the use of resources (Peltz, 2008:22). The inclusion of people in development anchors in the Participatory Development (PD) approach, whose scholars maintain that, no development programme can succeed unless the local people are willing to accept it and make an effort to participate. The involvement of the local people makes it possible to utilize their knowledge about local conditions to solve local problems more efficiently and effectively (Botes, 2013).

People participation relates to collective efforts within an organized framework by the citizens with the aim of realizing goals they set themselves. It is thus an active process within which due action is based on thinking and considerations of the people and these become harmonized with those of government authorities. With the aim still remaining as to improve the economic and social conditions of the community at large. Essentially, therefore, community participation promotes greater chances of success for development initiatives, efficiency in the use of resources, effectiveness, self-reliance, empowerment, sustainability and ownership of development initiatives (Botes, 2013; Avids, et al, 2009:124-125; Umar, 2002: 27-28 and Peltz, 2008:24-25). A process that entails public influence and shared control over decisions, development interventions and resources that directly affect them.

3 Blackburn, et al 2000

Participation means creating conditions for people to realize their rights to participate in and access information for the decision-making process.

Source: Adopted from Umar, 2002: 24. The above table demonstrates the evolution of participation to a point where active involvement of people in the process enhances greater chances of success as well as higher levels of effectiveness. These scholars generally uphold that participation entails some measure of influence, contribution, control, benefits, redistribution of decision-making powers and empowerment attained from beneficiary involvement in all phases of the development process.

In the light of RWS sector, there are attempts to address the sustainability challenge through incorporating community participation in the planning and construction of projects. Community participation is crucial for promoting consumer appreciation for water investments. Acknowledging local demands and conditions into planning, cost contributions, implementation as well as operation and maintenance of water supply systems encourage a sense of ownership and willingness to contribute towards capital and operational costs. These increase sustainability of the infrastructure. If local communities are not involved in the RWS project cycles, policies that seek to realize sustainable management of these water resources will hardly succeed (Moriarty, Smits, Butterworth and Franceys, 2013:331; Nwankwoala, 2011:297 and Marks and Davis, 2012:1569).

The above assertions are attested to by several studies in the RWS field thus: Narayan (1995) made an analysis of lessons from 121 RWS projects in 49 developing countries whose funding was by 18 different donor agencies. The study discovered that participation of beneficiary communities is an important factor for project effectiveness, community empowerment and strengthening of local organizations.

Katz and Sara (1998) analyzed the performance of RWSSs in six countries (Benin, Bolivia, Honduras, Indonesia, Pakistan and Uganda). Here they found a strong link between sustainability of projects and participation of community members. Outstanding factors that contribute to success pertain to access to information by households, capacity building at all levels, technical training on operation and maintenance/O&M, control over funds and quality construction of infrastructure.

In 2002, a study in Sri Lanka and India as well as a study for 18 rural water projects in two Bolivian regions reveal that it is important to involve households in pre-construction and post-construction phases of the project to attain sustainability. Capacity building at community level on post-construction activities for management such as cleaning water tanks, conducting minor repairs and managing maintenance fund raised by households; are crucial for improving water quality (Sun, Asante and Birner, 2010:3).

In Nigeria, Nwankwoala (2011:300) reveals that "there is no doubt that efficient and sustainable water resources management in Nigeria requires the participation of local communities". The researcher further identifies the need for strengthening community Understanding households' perceptions is a precondition for effective water resources management. Further, there has to be consideration that public perceptions have significant influence in shaping or reshaping people's behaviours and responses towards development interventions and their impacts (Hall, 1995:3). The idea around appreciating and understanding community perceptions in the RWS realm is guided by the following principles:

- "Firstly, as outsiders cannot necessarily identify local needs and priorities or figure out how best to meet them. External assistance on appropriate resource management may be in vain if it does not consider involving and cooperating with local people such that valuable local experiences and detailed understanding of their environment." -Secondly, understanding local perceptions facilitates identification of the processes that enable

villagers to respond not only to external interventions in their environment, but to their water-related problems as well.

-Third, appreciating resource users' perceptions helps to uncover reasons for cooperation or resistance by stakeholders during the implementation of certain policy interventions. It further avails suggestions for future planning. Without grasping these perceptions and upholding the local context, water professionals run the risk of imposing locally inappropriate programs that are unlikely to work (Yu, Lora-Wainwright, Edmunds and Thomas, 2013:14).

A 205 household's survey in Nepal revealed that water users in rural Nepal prefer water quantity, sufficient flow pressure, conveniently placed water-tap locations as well as good operation and maintenance/O&M and system reliability as priorities (Bhandari and Grant, 2007:19).

In Bolivia, a study uncovered some perceptions to be centered on the importance of water committees as drivers towards sustainability. Moreover, community members felt that the project responded to their demands because they were actively involved in the project cycle, hence satisfaction and willingness to pay for maintenance and management (Katz and Sara, 1998: A-1).

A Tanzanian research illuminates on positive perceptions of the community towards ownership of water supply infrastructure. The community expressed enthusiasm towards prohibiting any form of pollution around their project, contribute funds for construction of taps (Sewando, et al, 2012:73).

In 2010 (un, et al (2010:23) reported that households exhibited high satisfaction on the reliability of their water supply system. This is due to the presence of the water committee whose role includes encouraging users to draw safe water and to be trustworthy towards contributions of the maintenance fund.

4 IV. Sustainability

Having been used loosely to cover a range of topics, sustainability in the RWS context has been defined as "the maintenance of an acceptable level of services throughout the design life of the water supply system (Katz and Sara, 1998: 30)".

Sustainability in rural water supply also refers to maintenance of water supply facilities such that they remain in a condition that guarantees a reliability and adequacy of potable water supply. Further, benefits of water supply continue to be realised over a prolonged period of time (Musonda, 2004:36).

Key components relating to sustainability of rural water projects, therefore, have been hailed to include understanding of the current problems faced by communities that relate to water, identification of prospective benefits that culminate from improved water supply infrastructure, observation of actual gains that water users experience and quantification of the level of impact that benefits has. It is against these components that sustainability is deemed achievable when systems operate effectively with financial contribution by community members as well as availability of mechanisms put in place to hinder possibilities of lacking access to water over extended periods (Peltz, 2008:21).

Over time, there has been development of conceptual frameworks to capture the essence of sustainability in RWS. Among these, Figure 1 below mirrors a conceptual framework that has been shared by many researchers. It depicts dimensions of sustainability in the water sector as: institutional aspects which pertain to institutional arrangements for management, social dimensions (which include issues such as providing necessary time and labour to keep the system functioning), environmental dimension relationship between the natural environment and the service provided by the built infrastructure, technical dimension which entails aspects of quality design, construction and post-construction activities; finally, financial dimension for issues such as willingness to make contributions towards capital and recurrent costs. This clearly reflects that lasting sustainability is dependent on interaction between community participation; collaboration with external actors (Non-Governmental Organizations, private sector and governmental offices) and technical backstopping for effective O&M. To attain the sought sustainability interdependence of all the above listed factors has to be seen (Tadesse, Bosona and Gebresenbet, 2013:209-210; Katz and Sara, 1998:30). This model illuminates on the fact that at the heart of sustainability lays aspects of: participation and support by all groups within the community, control of O&M by the community, ownership over the infrastructure, and cost sharing (Schweitzer, 2009:32). The 14 factors above are essential for realizing sustainability. They convey that without an actual expression of demand by households, sustainability may be compromised since water users, at a particular point in time, may still be satisfied with the current water source, and hence may not appreciate the need for a new one. This will contribute to insufficient contribution to maintenance as users will not prioritize and value the resource that does not meet their needs and interests. Moreover, contribution towards capital costs by households is an indicator for commitment to the project. Alongside the issue of capital costs ought to be, water tariffs that must be set based on the financial abilities within the community (Jansz, 2011:8-9).

As opposed to being mere receivers of project benefits, participation promotes a proactive process where households influence the development and management of initiatives. Community participation -Year 2015 (H) levels the ground for sustainability by enabling water users to decide and select the level of services that are in line with what they are willing to pay. They further make choices to commit resources that support their choices. Erecting technology that does not accommodate the interests of beneficiaries, negatively affects sustainability of water supply projects. It is therefore imperative to put in place technology that has been chosen by water users and complements the environment in which it is build. These are in agreement with the position that maintains

that "water supply programs consist of three essential components: technology, people and institutions. The interface of these facets determines whether a particular scheme is sustainable (Department of Rural Water Supply: 2011:8 and Bhandari and Grant, 2007:13)".

5 V. The Summary

This theoretical review paper discussed the following specific themes in-depth: community participation in RWS, perceptions of communities on underlying issues pertaining to sustainable management of RWSS and factors towards sustainability of RWSS. These have been illuminated on to intensify understanding of all aspects that contribute to sustainability in the topic of RWS.

The theme on rural water supply reflects on rates of access to water globally and in South-Saharan Africa. Community participation illuminated on the importance of active participation by rural dwellers in RWS and findings from other studies in relation to community participation. Perceptions of communities were described in the light of being a precondition for effective RWS resources management and as having an effect on the extent to which the people support and respond to public policies. Finally, conceptualization of sustainability was anchored to a framework for sustainable RWS services.

As a way forward, there is need for conducting studies providing proper and effective knowledge leading to positive attitudes and acquiring of relevant skills for attaining successfully sufficient and efficient sustainable development in rural water supply.

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Figure 1: Global

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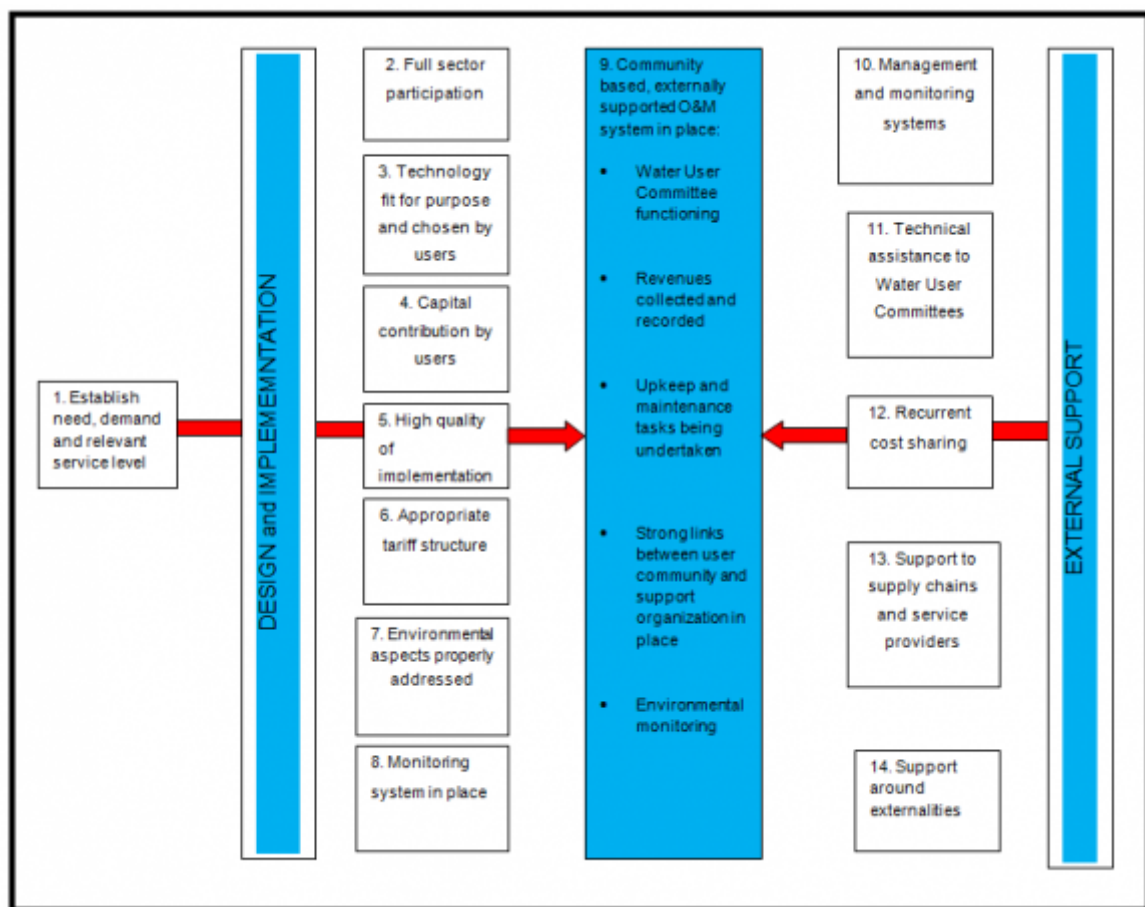


Figure 2: Figure 1 :

1

Citation	Definition of Participation
Cohen and Uphoff, 1977	Involving people in decision-making processes, program implementation, benefit sharing as well as evaluation of development interventions.
Conyers, 1981: 103	Means for getting information about not only local conditions, but needs and attitudes as well. It involves eliciting beneficiary commitment to the process.
Paul, 1982	A process in which beneficiaries are actively involved in influencing the direction and effecting of a development project. This is done with a view to enhance people's well-being with regard to income, personal growth and self-reliance.
Narayan, 1995	A voluntary process in which people of all groups, including those marginalized in income, education, ethnicity, gender and decision-making; exercise voice and choice.
World Bank, 1996	

Figure 3: Table 1 :

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Figure 4: -

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