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# Rural Water Development in Sub-Saharan Africa: A Comparative Study between Uganda and Tanzania

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RURAL WATER DEVELOPMENT IN SUB-SAHARAN AFRICA:  
A COMPARATIVE STUDY BETWEEN UGANDA AND TANZANIA

A Thesis

Presented to

The Faculty of the Department of Environmental Studies

San José State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Science

by

Paola de Cecco

December 2012

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The Designated Thesis Committee Approves the Thesis Titled  
RURAL WATER DEVELOPMENT IN SUB-SAHARAN AFRICA:  
A COMPARATIVE STUDY BETWEEN UGANDA AND TANZANIA

by

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## ABSTRACT

### RURAL WATER DEVELOPMENT IN SUB-SAHARAN AFRICA: A COMPARATIVE STUDY BETWEEN UGANDA AND TANZANIA

by Paola de Cecco

Global transnational efforts to achieve the Millennium Development Goal of halving the world population lacking access to improved water supplies are failing to address sustainable development in sub-Saharan rural communities. These efforts have been driven largely by water governance strategies centered on the controversial principle that water is an economic good, and as such, the development of water services shall be left to the supply-demand mechanisms regulating commodities' markets. Uganda and Tanzania have embraced these strategies to varying degrees and have made strikingly different progress in developing their rural water sector. Uganda has maintained a steady rate of improvement in rural water coverage, while Tanzania has not. This comparative study between Tanzania's and Uganda's water governance principles and development approaches combined qualitative analysis of semi-structured interviews and water policies with participant observation of two case studies. The results of the study suggest the success of Uganda's approach to water governance stems from the government commitment to retaining its role of providing basic services for the poorest strata of the population, de facto guaranteeing the constitutional right to water for all citizens irrespective of their economic status.

## ACKNOWLEDGEMENTS

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Lastly I would like to acknowledge the work of A. Haysom (2010) whose original research methods pointed me in the right direction and the work of O. Therkildsen (1988) which gave me the historical perspective I needed to see the “white elephants” in international aid to developing countries:

*"[This service] are like so many white elephants, of which nobody can make use, and yet that drain one's gratitude, if indeed one does not feel bankrupt."*

- 1851 G. E. Jewbury's *Letters*, 1892

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## INTRODUCTION

### **Motivation**

Globalization, the integration of economies, societies, and cultures through a global network of political ideas based on communication, trade, and transportation, has profoundly changed the dynamics and stakeholders of environmental governance. The role of each nation's central government has shrunk significantly, while the influences of international consortia, market forces, civil society groups, and communities have steadily increased. In an attempt to eradicate poverty, the members of the United Nations agreed to coordinate efforts toward the achievement of the Millennium Development Goals (MDG), a set of eight interconnected goals each defined by a specific set of time-bound targets. The need to "halve by 2015 the proportion of people without sustainable access to safe drinking water" (United Nations Development Group 2003) is broadly recognized as a prerequisite to the achievement of several other targets. The overall progress toward this achievement at the global level is extremely non-uniform, both geographically and socioeconomically. For example, very little progress has been achieved in rural sub-Saharan regions despite a large influx of funds.

At the core of the problem is the lack of water project sustainability. Assessment reports of water improvement are exposing an extremely high rate of water system failures not followed by rehabilitation. This questions the validity of core principles, accepted sustainability models, and the national water policies they have inspired. Tanzania and Uganda are both examples of how conditionality on the structural readjustment of loans required the introduction of neoliberal decentralized water policies

in the 1990s; as a result, both countries have qualified for international aid funds and debt relief (Harrison 2001). The two countries elaborated an independent approach to water sector development and achieved strikingly different results (see figure 1). Rural Tanzania has failed to show any progress toward the water MDG goal, while neighbor rural Uganda is on track toward MDG.

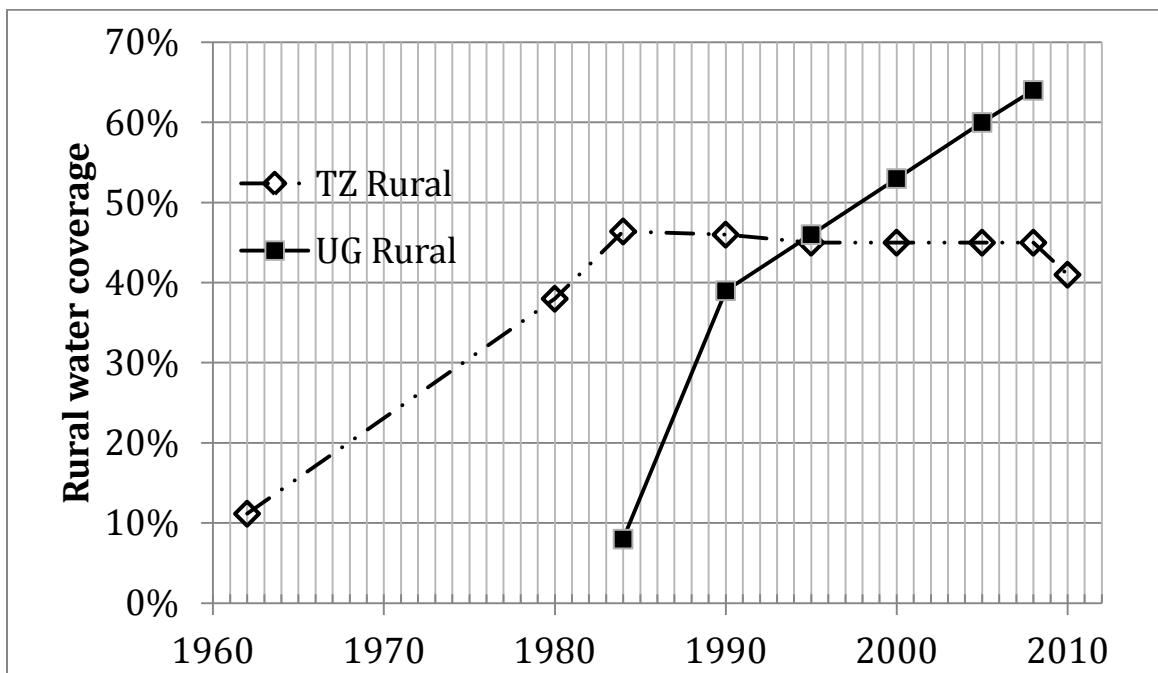


Figure 1. Rural access to clean water; population with access to improved water sources vs. time.

Sources: Data gathered in World Bank Database (n.d.) and The World Bank (1984, 1999).

A notable difference between the two countries is that the right to water is upheld in Uganda's 1995 Constitution. In July 2010, the UN endorsed a declaration that water is a human right, a statement creating tension with the 1992 Dublin principle stating water is an economic good. The resolution passed with 122 votes in favor and 41 abstentions,

and it is expected to stir more controversy. National governments and the international community will need to review the legality of their respective approaches to water development. Both Tanzania and the United States abstained on the vote. The official explanation of the U.S. vote by John F. Sammis, U.S. Deputy Representative to the Economic and Social Council, reads, “It was not drafted in a transparent, inclusive manner, and the legal implications of a declared right to water have not yet been carefully and fully considered in this body or in Geneva. For these reasons, the United States has called for a vote and will abstain on this resolution” (Sammis 2010).

### **Background**

Over the course of the last four decades, the experts’ debate on water policies and water resource management has moved out of national and local settings and transformed itself into a decentralized framework, referred to as Global Water Initiatives (GWI). GWI informs national governments and institutions about global-level principles and governance mechanism suggestions (Varady, Meehan, and McGovern 2009). The size and scope of the GWI has significantly shifted since the 1977 Mar del Plata conference, and several authors have expressed concerns about the scope and effectiveness of these mega-conferences (Gleick and Lane 2005). Whereas the 1977 Mar del Plata agenda focused on strategy to ensure an adequate, safe water supply for an expanding global population (Biswas 2004), the subsequent UN-sponsored meetings progressively shifted their attention to best methods for implementing neoliberal theories linked to the decentralization of water policies, water sector financing, and the introduction of water privatization (Biswas 2001, 2004). This transnational expert debate dominated and



shaped the water policies of several developing countries that have often been forced to adopt these policies through pre-conditionality of World Bank and International Monetary Fund loans (Goldman 2007).

At the core of neo-liberal water policies is a three-tiered approach to privatization, dependent upon socio-economic realities: (1) international consortia contracts to provide water services in urban areas, (2) commercialization of water services in smaller centers, and (3) contracting-out to user committees in rural areas and in neighborhoods connecting large urban areas to the countryside (Jaglin 2002). In the last ten years, attention was dedicated to the first two of these approaches because they led to uprisings in Bolivia (Perreault 2006) and to cholera outbreaks correlated with water shut-offs in South Africa (Goldman 2007; Muller 2007). Critics of water privatization have largely ignored the third approach.

The idea of contracting out rural water supplies to a user committee is based on a prerequisite of community participation in all aspects of a project, from the formulation of the need, to planning, implementation, and operation and management. By assuming control of their own water services, a community becomes financially responsible for “sustainable cost recovery,” i.e., recovery of all the O&M costs including replacement costs (Jimenez and Perez-Foguet 2010). Community participation and sustainable cost recovery are the current mantra of international NGOs. Sustainability assessments of rural water development abound, but they concentrate on the ability of rural communities to successfully comply with the development model prescription. These assessments tend to avoid questioning the assumptions underneath the neo-liberal water resource

governance model and fail to evaluate how alien local community cultures are to some of the concepts embedded in it (Babb 2005).

## RELATED RESEARCH

### **Environmental Governance**

Agrawal and Lemos (2006) define environmental governance as the “set of regulatory processes, mechanisms, and organizations through which political actors influence environmental actions and outcomes” (298). A silent revolution is happening around environmental governance. The role of the state, the sole financier and arbiter in the 1950-1980s, has shrunk significantly. The global nature of environmental issues, neoliberal pressures, and budget cuts has significantly limited the state’s ability to regulate and finance environmental issues. Dissatisfaction with central government economic and institutional regulation opened the environmental governance door to decentralization and reliance on market mechanisms and instruments (Agrawal and Lemos 2007). Agrawal and Lemos propose a description of this new governance structure as a triumvirate of government, markets, and communities whose dynamic interactions define environmental adaptation and mitigation choices. This structure is transnational in nature and manifests itself in a variety of initiatives: from international organizations purchasing land from communities to leave it fallow and prevent land overexploitation, to corporations buying and selling sulfur dioxide emission rights in a government-regulated market, to communities receiving funds from international NGOs to develop the capacity to manage their own water services.

This new form of governance has many supporters who see environmental problems as global in nature, market instruments as most effective in creating sustainable development, and decentralization as able to bring in the voices of local communities. It

also has received a large dose of criticism such as being the vehicle of “commodification of nature” (Liverman 2004), creating a hegemonic expert-consortium for decision making that overrules communities’ concerns (Ford 2003), and allowing “private governance” to become a high-power stakeholder in the process without due process to define its legitimacy in the exertion of power (Falkner 2003).

### **Environmental Governance in the Water Sector**

The incarnation of this new environmental governance structure, in the water governance domain, is the Global Water Initiatives (GWI) the debate of which shapes all levels of environmental governance, including “[i]nternational accords, national policies and legislation, local decision-making structures, transnational institutions, and environmental NGOs” (as cited in Agrawal and Lemos 2006, 3.2). The GWI involves: (1) professional scientific societies such as the International Association of Hydrological Science (IAHS) and the International Water Resource Association (IWRA), (2) designated time periods such as the International Hydrological Decade or the International Water for Life Decade, (3) organized events such as the Dublin International Conference on Water and the Environment and the four Water World Forums, and (4) issue-oriented organizations including the UN-affiliated, intergovernmental International Hydrological Programme, the non-governmental Global Water Partnership, and the Dialogue on Water and Climate.

The formation of professional water expert organizations dates back to the beginning of the 20<sup>th</sup> century, with the incorporation of the International Association of Hydrological Science (1922), and the formation of the International Association for

Hydraulic Research (1935). The role of these associations was to provide an outlet for the scientific discussion on hydrology without any effort to influence the legislative efforts to regulate water management (Varady, Meehan, and McGovern 2009). During the post-war years, the belief that science and technology had the potential to solve all issues and improve the human condition took a prominent role in the water realm. Many engineering activities in the water sector took place during these years in the developed countries, such as the constructions of dams, large irrigation schemes to increase agricultural yields, and hydroelectric power stations.

Until the 1960s, water development was strictly a national state-led effort informed by a positivistic model of socio-economic and environmental behavior. Water policies were legislated by central governments with no effort to reach an international coordination. By the end of the 1960s, the developed world began to focus on the need to address global poverty and develop international cooperation to aid the less developed nations. This strong multinational approach to world problems led to the formation of organizations such as the family of UN agencies tasked with protecting the environment and improving the human condition, both seen as the necessary conditions to avoid future war (Varady, Meehan, and McGovern 2009).

During the 1970s, the United Nations provided a forum for discussion of critical global themes by organizing a series of global mega-conferences at high decision-making levels. The first theme was the environment (Stockholm, 1972), followed by population (Bucharest, 1974), food (Rome, 1974), women (Mexico City, 1975), human settlements (Vancouver, 1976), water (Mar del Plata, 1977), desertification (Nairobi, 1977), and new

and renewable sources of energy (Nairobi, 1979). In the water domain, the years 1965-1974 culminated in the declaration of the period as the International Water Decade, the foundation of the International Water Association (1972), and the Mar del Plata Water World Forum (1977) (Biswas 2004).

The initial efforts experienced exponential growth since the 1980s. Not only did the number of meetings and events increase significantly, but the size of the conferences led to costs exceeding, by a factor of two, the yearly USAID budget for international development of the whole African continent. Salman (2004) retraces the GWI debate from the 1997 Marrakesh meeting to the 2003 Kyoto meeting. He concludes not much has been accomplished by these mega-meetings partly because of competition between agencies and partly because “endless debates on dams, the role of the private sector, trade on water, and the issue of human right to water” have only issued vague and repeated declarations devoid of political will to act in the water sector (17). Interestingly, despite the fact that water scarcity is one of the largest global environmental threats, the GWI is not leading the debate toward an across-boundary agreement to manage water as a global resource, but rather toward a more globalized water resource management model (Varady, Meehan, and McGovern 2009).

Other authors criticized the dispersion of sizeable financial resources that should have been channeled into the aid sector instead (Biswas 2004; Gleick and Lane 2005). Despite all criticisms, the GWI shift of attention to the economic implication of developing and managing water infrastructure has had significant repercussions on the dynamic between water governance stakeholders. Given the large percentage of global

citizens deprived of water services, the large economic opportunity represented by commoditization of water took the center stage of the debates and led to the formulation of new water management principles and aid policies.

### **Decentralization and the Water Privatization Debate**

The 1992 Dublin Conference validated a newly perceived economic space by affirming “Principle no. 4: Water has an economic value in all its competing uses and should be recognized as an economic good” (International Conference on Water and the Environment 1992). The fourth Dublin principle is the cornerstone of neoliberal water policies. Since the early 1990s, these policies spread globally at an impressive speed, permeating all influential parties of the new environmental governance scene. The private sector gained a seat in the decision making regarding water governance and cash-strapped national governments demoted themselves to the role of regulators and facilitators, while the civil society and the NGOs operating in the sector became main actors in demand-responsive water markets.

The private sector’s introduction to the water debate parallels its introduction to the broader international development process. Goldman (2007) makes a compelling case of which mechanism led to such a rapid acceptance of the decentralization and privatization policies of the global water sector, centering on the transformation of the World Bank from a conservative lender to today’s institutionalized vehicle of modern imperialism. Starting with the appointment of Robert McNamara to its lead in 1968, the World Bank is described as re-inventing itself from a conservative financial institution to the global regulator in development investments, leveraging availability to loans in order

to force national resource privatization policies upon borrowing countries in the name of an effort toward natural conservation. “Prices paid by water consumers in developing countries must rise substantially to avoid life threatening shortages and environmental damage, according to an international report [...] supported by the World Bank and the United Nations” (Goldman 2007b, 791).

McNamara’s transformation of the World Bank led to three overlapping but distinguished economic development periods, referred to by Goldman as “green revolution,” “structural readjustment,” and “neoliberal.” During the “green revolution,” the World Bank created a market for Western world technology (dams, irrigation, tractors, fertilizers, pesticides, etc.) in the Southern nations of the world, financing them through conditional loans. The World Bank paralleled these activities with the creation of a very broad infrastructure of “global expertise” on development, to provide advice to national governments and control investment risks. During the “structural readjustment” period, the bank became the global arbiter of debt, saving itself from going bankrupt as borrowing nations defaulted on their loans, but stepping up the conditionality, de facto controlling the borrower’s national economy. During the “neoliberal” period, the World Bank began to increasingly interact with the civil society of the borrower, bypassing their government through the actions of non-profits and the private sector.

The World Bank sponsored the formation of the GWI and drove the international discourse on water. GWI quickly lost its focus on the academic debate around true development and transformed into meetings of people coming from different sectors but all in agreement with the Bank’s push for water privatization. To better expose the



objective of the debates Goldman quoted a passage from “Water for the Poor,” a report resulting from one Bank-sponsored event of GWI:

Providing water services to the poor presents a business opportunity. New pipes, pumps, measurement and monitoring devices, and billing and record keeping systems will be required to modernize and expand water infrastructure. Industry not directly related to the provision of water services will be able to enter new markets because water for production, and to sustain a productive workforce, will be available. Thus this program has the possibility of creating huge employment and sales opportunities for large and small businesses alike. (World Business Council for Sustainable Development 2002, 9)

Claiming central government inefficiently manages the water sector and recognizing the unsustainable role of NGOs creating para-statal water departments (Therkildsen 1988), proponents of this view created a new sustainability model. In this model, the role of the government is to facilitate community initiatives. The NGO approach to sustainable development revolves on community participation, appropriate technology choice, and cost recovery based on water tariffs (Budds and McGranham 2003; Camdessus 2003). As Jaglin eloquently put it:

[a]lthough based on longstanding principles, participation has followed specific patterns in recent scenarios. Closely related to the process of building economically viable water services, participation is invoked above all to circumvent two major difficulties, namely assessing demand from the poor and managing systems intended for unprofitable customers. (Jaglin 2002, 232)

In her analysis of the claims of “democratization” of the new environmental governance, Ford (2003) sharply pointed out that communities and their grassroots organizations are not invited to sit at the negotiating table. Much heralded community participation really boils down to a new form of top-down development; this is the expression of “entrenchment and legitimization of hegemonic global environmental

governance” (Ford 2003, 123). Her views were echoed by Falkner’s (2003) concerns about the legitimacy of private environmental governance; decentralized water policies centered on community-based cost recovery for water were forced on states by loan pre-conditionality, not by a popular referendum. Protests outside the last two World Water Forums and the foundation of the GWI antagonist, the People Water Forum, are an expression of these legitimacy issues (Conant 2010). Yet, the correlation between GWI recommendations and the last 40 years of developing countries’ water policies clearly indicate who the decision makers are (Biswas 2004; Mahauri and Katko 1993).

Decentralization trends also affect the democratic process at the local level, as Muller (2007) established a connection between global recommendations of policies and their effects at the local level in South African politics. To highlight the political challenges introduced by decentralization at the local level, he stated, “there continues to be a need, if not for parish pump politics, at least for a politics that will help communities to keep their parish pumps working” (44).

Central to “keeping the pump working” is financial viability. Achieving sustainable cost recovery sounds necessary and innocuous, but it has profound implications for those voiceless rural populations for which decentralization has removed the central state support and poverty has denied private sector customer rights (Budds and McGranaham 2003). In the GWI model of water service development, communities receive support from NGOs and aid organizations within a sustainability framework based on community participation, local governance capacity, and tariff-generated Operation and Maintenance (O&M) cost recovery. This model appropriately caters to the

NGOs' need of an exit strategy from their programs. The NGO retains responsibility for completing the construction of a water project, leaving the communities with the larger tasks necessary to guarantee a sustainable water service.

The 1992 Dublin declaration that water is an economic good spurred arguments regarding the merits and drawbacks of private vs. public water provision. While both models have the capability to perform well, especially when financially viable (Budds and McGranaham 2003; Jimenez and Perez-Foguet 2010), the introduction of the Dublin declaration as an inspiring principle of national water policies and NGO programs has not been objectively investigated as a potential contributor to the failure in creating sustainable rural water development. The next section contains a review of how effectiveness of development is measured, based on sustainability assessment.

### **Rural Water Development Progress**

According to the World Bank, within the group of fifty countries in which more than 30% of the rural population lacks appropriate water access, fewer than ten are projected to halve the proportion of people living without access to safe water in the rural areas. The majority of these countries are in Africa, and thirteen of them have not experienced any improvement in their rural water sector over the last twenty years (World Bank Database, n.d.).

This grim picture is not due to the absence of targeted international intervention programs funded by philanthropic citizens and taxpayers of the developed world. According to Ned Breslin ("Back to the River" January 27, 2011. *Water For People Blog*. <http://nedbreslin.tap.waterforpeople.org/blog-archives>), \$3.4 billion are spent every

year by the water aid sector, including large international organizations such as the World Bank, a long list of large and small NGOs, and religious charities of every denomination. These sums of money are used to drill wells, install hand pumps, build piped water distribution systems worldwide, and mostly target the underserved rural population.

### **Progress Indicators of Rural Water Development**

Often, progress toward a goal is driven by the metric used to define its success. Access to an improved water source is defined as “the availability of 20 liters of water per person per day from a source within one kilometer of the user’s dwelling,” and only household piped connections, public standpipes, boreholes, protected dug wells, protected springs, and rainwater collection systems qualify as improved water sources, under the assumption that these sources provide safe water. A piped source is considered functional when operating for more than 50% of the time, whereas a hand pump is considered functional when operating for more than 70% of the time with a lag between breakdown and repair not exceeding two weeks. Coverage data are estimated by water providers and by household surveys distributed to the regional WHO and UNICEF offices. Global collection of these data requires a formidable effort and cannot be repeated with a frequency greater than every three years (WHO and UNICEF Joint Monitoring Programme 2000).

The data provide a series of snapshots about water access, but they do not provide any metric on the sustainability of the improved water source. An improved water scheme providing water during a survey administered in 2000 might break and be replaced by another scheme or rehabilitated by a second NGO intervention before the

next survey administered in 2003. Hence, the metric chosen to monitor the progress toward the MDG, that in its current definition implies sustainability, is in question. Furthermore, at the NGO level, non-longitudinal indicators lead to a measure of success in terms of the “number of beneficiaries” reached by a project. That in turn places more emphasis on new installations rather than on the longevity of a given scheme. This is an old, well known, and heavily debated problem (Therkildsen 1988) that continues to stand unresolved (Ned Breslin, “Back to the River” January 27, 2011. *Water For People Blog*. <http://nedbreslin.tap.waterforpeople.org/blog-archives>) mainly because governments and NGOs need to justify to donors the merit of their fund’s allocation.

### **Sustainability Assessments**

The symptomology of a failure to establish durable water services is a well researched topic, and several models have been proposed to create a metric for sustainability and tested on case studies (Carter and Howsom 1999; McConville and Mihelcic 2007; Montgomery, Bartram, and Elimelech 2009; Whittington et al. 2009). Montgomery, Bartram, and Elimelech (2009) suggested a sustainability frame centered on three factors: effective local demand, local financial viability to cover cost recovery, and effective operation and maintenance (O&M). In their paper, they called on the global community to use a more effective metric to assess the sustainability of installed systems, bringing as an example the correlation found between data on rural water access from a WHO/UNICEF 2008 household survey and a 2006 UNDP sustainability score assessment based on surveyed financial and institutional capacity (see figure 2). The figure illustrates a correlation between water sustainability score and the water target

indicator for sub-Saharan Africa. Noting how a poor performer such as Tanzania receives such a high sustainability score underlines how difficult it is to assess sustainability.

According to Abraham (2000), “at one level sustainability is very simple. It is whether or not something continues to work over time.” For water service to work without interruption, all the elements contributing to sustainability must be present: “there must have been money for recurring expenses and for the occasional repair, there must have been acceptance from the consumers of the service, the source supplying the service must have been adequate, the design must have been properly done, and there must have been sound construction.”

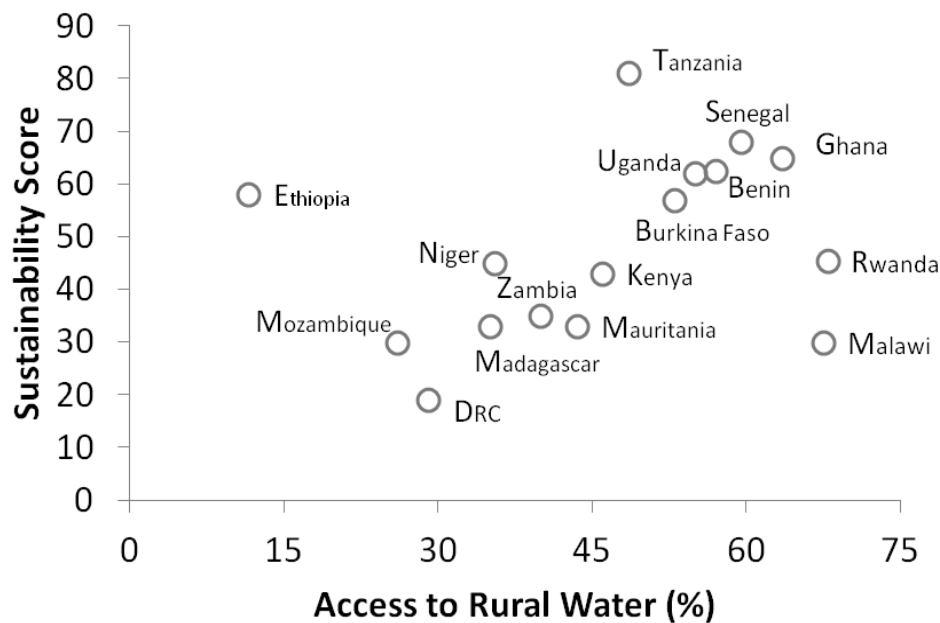


Figure 2. A new sustainability metric.  
*Source:* Data from Montgomery, Bartram, and Elimelech 2009.

Stemming from Abraham’s consideration, Carter (1999) suggests a sustainability chain made of four interrelated elements – motivation, maintenance, cost recovery, and

continuing support – that has been adopted by many authors. It is of interest to note that according to Carter's analysis, these elements shall be guaranteed by the intersection of efforts of the three essential stakeholders in equal amounts: the community, the government, and the involved NGO. Without entering the debate on who shall own cost recovery and who shall retain responsibility for post-construction support, he clearly states, "It is essential that the supporting government or NGO maintains responsibility for [post constructions] follow-up. This is a long term function, with a need to continue until there is such a 'critical mass' of good practice within a district, that there is no going back. [...] Short term projects fail" (Carter 1999, 10).

McConville and Mihelcic (2007) developed a Life Cycle Analysis (LCA) tool to evaluate sustainability and guide project planning. In their suggested Life Cycle Analysis, they identify five stages: (1) needs assessment, (2) conceptual designs and feasibility, (3) design and action planning, (4) implementation, and (5) operation and maintenance. They associate themes to be evaluated at each stage to operationalize these concepts in a sustainability matrix (see table 1).

**Table 1.** Sustainability factors considered during each stage of LCA evaluation

LCA Sustainability factors	
Socio-cultural Respect	A socially acceptable project is built on an understanding of local traditions and core values
Community Participation	A process that fosters empowerment and ownership in community members through direct participation in development decision making affecting the community
Political Cohesion	Involves increasing the alignment of development projects with host country priorities and coordinating aid efforts at all levels (local, national and international) to increase ownership and efficient delivery of services
Economic Sustainability	Implies that sufficient local resources and capacity exist to continue the project in the absence of outside resources
Environmental Sustainability	Implies that non-renewable and other natural resources are not depleted nor destroyed for short term improvements

*Source:* Data from McConville and Mihelcic (2007)

Their matrix mirrors a model of full community responsibility for continued operation and maintenance, as opposed to shared post-construction support with governments or NGOs. The Life Cycle Analysis concept provides an excellent theoretical framework, as it attempts to incorporate variability over the lifetime of each of the steps; communities are not static during the several years usually needed to complete the full life cycle. Edwards quotes Gleick (Edwards 1997, 246) comparing this variability over time to a maze whose walls are rearranged at each step.

### **Barriers to the Sustainability of Rural Water Development**

Assessments of the sustainability of rural water systems are typically carried out with quantitative and qualitative methods involving the operationalization of the elements deemed mandatory for sustainability and correlated with the actual functionality of the



schemes. Overall, the problem described by most authors is that when a water system breaks, it is not rehabilitated (Gine 2008; Haysom 2006; Jimenez and Perz-Foguet 2010; Mashauri and Katko 1993; McConville and Mihelcic 2007; Montgomery, Bartram, and Elimelech 2009; Moon 2006; Mtinda 2006; Nkongo 2009). The results of the McConville and Mihelcic Life Cycle Analysis described above, applied to a post-project evaluation in Mali, shows a telling trend in rural development (McConville and Mihelcic 2007). The overall sustainability indicator decreases throughout the project lifetime and, in particular, the economic sustainability indicator assessed at its highest during the Needs Assessment phase drops to its lowest during the last Operation and Maintenance phase. The summary sustainability score indicates financial sustainability as the weakest component, followed by political cohesion.

A multi-country research assessment of a large number of rural systems in Bolivia, Peru, and Ghana, commissioned by the Netherland-World Bank, was published in 2009 (Whittington et al. 2009). The aim was to explore the controversial issue of the correlation between high rates of systems not rehabilitated after failures with community financial ability and willingness to pay. Their study compared the functionality of rural water schemes constructed in the last three to twelve years, some of which were part of a designed Post Construction Support (PCS) system while others were not, but still received post-construction support initiated by a community request for assistance. All schemes had been developed following state of the art development models, thus removing the possibility that poor project execution might invalidate results. The authors caution that the relevance of their study is potentially tainted by the fact that all villages

that experienced a failure were actively pursuing PCS by whichever entity, government, NGO, or charity would be willing to help them. Therefore, their study is not comparing projects with the PCS component to projects without the PCS component where the beneficiaries were self-reliant.

The data collection was a combination of interviews with the village-based water management team, a focus group of women of all ages, and a small sample of household surveys. No significant difference between the groups (and an overall continued functionality of 90%) was shown, indicating that proactive and planned PCS is not strictly needed. Although most systems were under the care of effective village-based water committees, the majority lacked sufficient funds to carry on repairs independently, reaffirming the findings of other research that rural local communities cannot financially support their own water systems. These findings contradicted the mainstream development model requirement of sustainable cost recovery.

A 2006 WaterAid assessment analyzed the obstacles to sustainability by comparing thirty rural water schemes in Tanzania (Haysom 2006). Because at the national level it is clear the rate of functionality depends on system age, the analysis compared functioning vs. non-functioning schemes grouped by age: “old” schemes (built prior to 2000) and “new” schemes (built after 2000). All types of technology (hand pumped and gravity pumped) were taken into consideration in the study.

Haysom’s operationalization of sustainability was based on the proven ability of the community to rehabilitate the scheme. Excluding the schemes that never broke down, the only variable that correlated with rehabilitation was the existence of funds to carry out

the repair. No correlation existed between the management option chosen and the existence of a water fund.

A more targeted analysis of the effectiveness of the management options was carried out by WaterAid in 2009 (Nkongo 2009) on thirty schemes distributed across seven districts. Nkongo's qualitative data collection of semi-structured meetings, focus group discussions, and her observation analysis researched how separation of roles, between Provider and Purchaser, Asset Holder Authority and Provider, and Regulation and Participation affects sustainability. Her analysis was based on a very obscure operationalization and construction of indexes, but her raw data and commentary were very useful in pointing the reader toward financial insolvency, due to lack of tariff payment/collection or misappropriation of funds as one of the major causes of sustainability failures.

All assessments point out the fact that cost recovery by community contribution is an elusive goal, and the amount collected hardly stays within the water fund. Even where communities pay for a portion of the water fees, the majority of the money disappears in the absence of checks and balances provided by a regulatory mechanism, either institutionalized as a top-down approach or as a community demand for a transparent bottom-up approach (Haysom 2006; Nkongo 2009).

By far, the greatest problem in planning for sustainable cost recovery, as Haysom (2006) points out, is the fact that even in the ideal scenario in which a community is willing to pay for full-cost recovery of O&M, water tariffs are based on the average lifetime of the most expensive components. But in reality, those components might break

before their time (i.e., before the community had a chance to collect sufficient replacement money). Alternatively, the components might not break when expected, leaving the community operator in charge of a very large sum of money for which he sees no public use and instead invests it to improve his own economic condition.

The departure from the early supply-driven approach toward a demand-responsive approach in service provision requires the very active participation of the community from the initial stage of the process, namely the choice of a technology that leads to O&M cost recovery appropriate to the economic structure of the beneficiaries. Several authors (Cleaver and Toner 2006; Haysom 2006; Mtinda 2006) point out that true participation is just as elusive as cost recovery. The decision is made externally, and community participation is confined to provision of labor, management, and cost recovery. This reinforces a lesson learned, but ignored, in the 1980s by a World Bank project in the north of Tanzania. The World Bank plan called for installation of demonstration wells in some communities and offered to install additional wells in communities that collected 25% of the cost of the hand pump. Lack of interest from the communities led to the construction of more demonstration wells, but by the end of the program, only about 30% of communities agreed to the World Bank terms (Therkildsen 1988). Moreover, as pointed out quite strongly in Therkildsen's analysis, the World Bank acted against the official Tanzanian policy that water is a right and shall be provided to all free of costs.

Abraham (2000) drew the difference between a water construction project and the establishment of a sustainable water service and pointed out that the latter cannot be

achieved by assuming the initial existence of the right combination of factors. If stability cannot be guaranteed by initial conditions, there needs to be a mechanism and an actor that intervenes when the water service is challenged by technical, management, social, or financial issues. Furthermore, he stressed that the roles and responsibilities of all stakeholders are usually defined by national water policies, according to the endorsed principles of water governance each nation chooses to adopt as the basis of their water development programs. Financial sustainability is a requirement to support water services, and assessments in the literature bring evidence that communities are failing to create it, advocating for capacity development to fix the problem. These assessments operationalize sustainability as compliance to the development model parameters, therefore, do not provide an assessment of the effectiveness of the neo-liberal governance.

### **Problem Statement**

In the last twenty years, national water policies, the current model for aid operation, and donors' expectations have transitioned from a supply-driven to a demand-driven development model, which transforms the government role to that of a facilitator and places most responsibility for planning, management, and cost recovery onto the recipient communities. This is reflected in the shifts of national water policies worldwide during the 1990s-2000s. Research and assessments of sustainability have focused at the community level, often neglecting to include an analysis of how water governance strategies support, or fail to support, a vulnerable community's demand for the establishment of a sustainable water service.

In this study, I present a comparative analysis of rural water governance between a poor performer, Tanzania, and a good performer, Uganda, to provide insights into the principles and mechanisms that lead to the successful establishment of sustainable water services. The performance difference between these two countries is quite surprising given the fact that Tanzania is one of the most politically stable countries in Africa, whereas Uganda has a history of regimes, political instability, and questioned legitimacy.

This thesis work contends that the challenge to sustainability of rural water programs, namely the failure of cost recovery and inadequate governance, stems from the idea that water is a commodity to be developed by each community within a free market dynamic and without the leadership and financial support of the government.

Throughout the study, I adopted Agrawal and Lemos's (2006) broader definition of governance as the "set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes" (298).

### **Objectives**

The central objective of this research is to understand similarities and differences in the rural water development sector between Uganda and Tanzania in relation to their water governance strategies. Of particular interest is a comparison between their government policies, development programs, and inspiring principles, as well as aid organizational models of operation, and the challenges and drivers all of these introduce into rural water development.

### **Research Questions and Hypotheses**

1. What are the differences between Uganda's and Tanzania's water sector funding?

Hypothesis 1: The difference in the funds available to the water sector is insufficient to explain the difference in progress.

2. What are the major differences between Uganda's and Tanzania's guiding principles and strategies in rural water governance?

Hypothesis 2: The major differences between the two countries' governance principles resides in the government commitment to uphold the right to water, the clarity and stability of policy guidelines and programs, the degree of government coordination within the sector, the recognition of the limited financial capacity of rural communities, and the equity and affordability of technology solutions enforced by the policy.

3. What are the major differences in the challenges and drivers to the implementation of sustainable rural water development?

Hypothesis 3.1: Both countries face the same internal challenges at the community level.

Hypothesis 3.2: The major differences are the level of national ownership of the development directions and resources and the interference of foreign stakeholders.

## METHODS

### **Site Selection**

For this comparative study, Tanzania and Uganda were chosen to represent extreme cases on the spectrum of rural water development sustainability from the ensemble of sub-Saharan developing countries that adopted decentralization policies in environmental resource management during the 1990s. Since the 1990s, Uganda steadily increased the number of rural communities with improved access to water, whereas Tanzania failed to do so (see figure 1). As documented in the literature review section, the problem is linked to sustainability of water services, not to implementation of water construction projects.

### **Conceptual Framework**

The methods used in this investigation combine extensive primary source research with a series of semi-structured interviews and two case studies. Establishing the link between governance and outcomes is a topic of political science research. Comparative studies are typically used to gather data in situations where real experiments are not possible, and a limited number of cases prevent the application of statistical methods. Mills (1843) introduced systematic analysis based on establishing differences and similarities between policies and outcomes. In cross-national comparative studies, similarities are used as a powerful way of reducing the number of independent variables contributing to an observed situation; reducing variables facilitates the identification of correlations between a challenge or a driver and its perceived outcome. The combination of cross-case and within-case analysis allows identification of cause-effect relationships



and guides ranking of importance between some of the factors (Haverland 2010), leading to the proposal of an explanatory model.

## **Data Collection**

### **Study System**

A significant portion of the national data and indicators used in this comparative analysis was gathered from the World Bank Database (<http://data.worldbank.org/>). The database, inaugurated in 2010, put into the public domain more than 7000 indicators on 209 countries the bank had gathered through their own independent research and from the accredited research of other reputable organization such as UN agencies and the World Health Organization (WHO). With few exceptions, the history notes were gathered from publications and books written by East African nationals.

### **Research Questions**

A timeline of official national policies and programs was reconstructed from independent water policies and legislation. Official government policies and annual sector reviews for the last five to six years are available through the Ugandan and Tanzanian Ministries of Water. An attempt to reconstruct programs and yearly water budget allocations by government and international donors was made by mining the World Bank Database for credit agreements in which nations must submit summaries of their programs.

Thirty-one 30-45-minute interviews with stakeholders were conducted for this study (see table 2). Selected stakeholders were water government officials, private business representatives, and aid organization and NGO workers with direct working

experience in the water development sector. Snowball sampling techniques were used to expand an initial list of government officials met through the case study projects and NGO members of the Tanzanian and Ugandan National Water and Sanitation Networks (TAWASANET and UWASANET). Private sector interviewees were associated with the work done in the projects described by the case studies. To minimize bias and protect confidentiality, the interviews were stored without association to the identity of the person or organization; only a category (Government/Civil society/Private sector) was stored with the interview recording and transcript.

**Table 2.** Number of interviews, by category

<b>Category</b>	<b>Number of Interviews</b>	
	Tanzania	Uganda
<b>Government</b>	6	4
<b>Civil Society</b>	9	8
<b>Private sector</b>	3	1

All interviews were recorded with a digital recorder and conducted in English.

The structure and lead questions of the interview are shown in table 3.

**Table 3.** Interview instrument

<b>Interview leads</b>	<b>Subleads</b>
Can you describe your organization involvement in rural water development?	
What do you see as the guiding principles in Tanzania/Uganda water development?	What are roles and responsibility of government, NGOs, communities, private sector?
How does it work in practice in Uganda/Tanzania?	What are the major challenges/drivers to keep a water service going?
In your view is water a right or a commodity in Uganda/Tanzania?	
Can you suggest other experts that I contact for interviews?	

Additionally, in Uganda, I was invited to participate in two national government monitoring trips and a district-level review; one at a rural trading center, the other one at an extremely underdeveloped island community on Lake Victoria. The participants of these trips were government staff at the district level working in the finance, water, environmental, and health departments, national government engineers, social development and health specialists from a Technical Support Unit; and representatives of NGOs working in that district. In Tanzania, I was invited to observe a workshop of water organizations sponsored by Wind Rock International. Recording was not appropriate for these events, so written notes and meeting minutes were recorded.

The communities' reactions to the roles and responsibilities they were assigned by the national governance are described in the case studies section through participant observations in the two water projects. My main role in the two case studies was to facilitate the implementation of water projects in the communities of Kizzi, Uganda and Ngelenge, Tanzania. In this role, I was an active participant of meetings between government officials (at the village, district, and regional levels), NGOs (both grassroots

and international), private contractors and operators, and community members. During these meetings, I recorded handwritten notes of items discussed, action lists, and agreements. While most of the community discussions occurred in their local dialect and I only have a basic knowledge of African languages, English speaking spokespersons provided an interface with the various stakeholders. Written documents and/or photographic materials were also collected with permission by the various stakeholders. Events observed outside of arranged meetings were recorded daily in a handwritten journal. The Tanzanian materials were summarized, appended, or transcribed in implementation of project reports submitted to the funding organization.

## **Data Analysis**

### **Study System**

A semi-quantitative country-level analysis of socio-economic indicators and physical characteristics of the two countries was performed to reduce the scope of this study to a comparison of water governance. Variables similar between countries were neglected as potential contributors to an explanation of the difference between Ugandan and Tanzanian progress in improving their rural populations' access to clean water. Internal validity of the exclusion of many variables was tested by comparison with the themes emerging from the stakeholders' semi-structured interviews or directly observed in the case studies.

### **Research Questions**

Each country's leadership in the water development process was analyzed by creating a longitudinal governance "landscape" with a method of accumulation and

clustering of instruments (Chappin et al. 2009), grouped by macro-economic intervention, rural water policies and acts, and rural development programs.

Thematic analysis of water policies, programs, and stakeholder interviews was performed to identify emerging categories and group them within broader categories that could be directly compared at the national level. Stakeholder interviews were analyzed with a three-part analysis as suggested by Gibton (2000): (1) identification of recurrent themes and axial coding to reassemble them in arrangement of categories, using a single statement as the unit of analysis; (2) categorization of examples related to a particular theme, using one or more paragraphs as the unit of analysis; and (3) analysis of stakeholder's whole description of a particular challenge or driver. These three steps allowed an analysis both of recurrent themes and recurrent association of themes.

Government reports and other official documents were used as a reference crosscheck when appropriate. Annotations were used throughout the analysis to guide the process, identify patterns, and highlight challenges and drivers, with the final objective of creating a water governance landscape that includes principles, guidelines, and challenges and drivers to its implementation (Birks 2008; Gibton 2000). The main features of the governance landscape are detailed with participant observations narrated in two case studies, the implementation of an eighteen water points, solar powered water distribution system in the villages of Ngelenge (pop. 2300, Tanzania) and a seven water points, 3.2km gravity system extension in the village of Kizzi (pop. 800, Uganda).

The case study narration is organized in such a way as to provide a practical example of some of the mechanisms identified in the interviews and provide a test of the

within-case analysis validity, as observation of a single community cannot be generalized to a country level. Based on personal experience working with local communities, I believed direct observation of these two isolated case studies was the preferred option for outlining the socially complex mechanisms of an African community, providing more value than a set of interviews of community members collected with a more rigorous sampling method in villages where the interviewer was perceived as a stranger.

Only the Tanzanian project fell entirely within the governance of rural water development, especially highlighting the challenges of community cost recovery and appropriate technology. The rural village where the Ugandan project was carried out belonged administratively to the peri-urban belt of the district town of Mpigi and, therefore, abided by urban water development regulation. This case study lent itself to reflection on the implications of private management of water supplies in rural communities.

Methods of network analysis are particularly relevant to a situation in which governance shall be designed to accommodate public, private, and aid agencies' implementations, capturing the structure of the cooperation between state and societal actors and stakeholders (Börzel 1997; Moshitz and Stolze 2010). In network analysis, the predominance of a stakeholder over the process was judged by the number of times it was mentioned during stakeholder interviews. Word counts were used to "size" stakeholders in the policy network, which were identified during interview coding as communities, government, NGOs and official international development partners, such as World Bank, the International Monetary Fund, and International Development Association member

states. This was done separately on the interview transcript and on the 2010 National Sector Reviews publications to gather the different perspectives at the micro-level of people working in the field and at the macro-level of people working at high levels of the national administration.

### **Limitations of the Study**

The biggest limitation of this study was the difficulty in reconstructing the actual funds all stakeholders invested in the rural water sector. A large portion of funds came from the independent activities of small international NGOs and religious organizations, which are largely unregulated, unreported, and untracked, especially in Tanzania. In this study, I made the assumption that, if a difference existed, more unreported funds had gone to the Tanzanian water sector than to the Ugandan one. This assumption was based on the fact that in the last 5-6 years, Uganda has implemented much stricter rules requiring NGOs to disclose their budgets through UWASANET, the network of NGOs operating in Uganda, and that Tanzania's political stability has attracted many more foreign visitors than has Uganda.

Another limitation was the relatively small number of interviews conducted in each country, which did not permit a statistical ranking of the importance of the challenges reported by stakeholders. All themes emerging in the interviews have been reported and connected to create a broad picture of rural water development as seen by people directly involved in it. Once no new themes emerged from the interviews, the sampling of interviewees was interrupted. Interestingly, this stopping criteria resulted in the number of interviews conducted in Uganda being relatively small because no new

information was brought up from the interviews. The picture painted of the principles and of the reality of rural development was very similar from interviewee to interviewee.



## RESULTS

### Overview

#### Study System

Tanzania and Uganda are neighboring East African countries. Tanzania covers a significantly wider territory (947,300 km<sup>2</sup>) than Uganda (236,040 km<sup>2</sup>), and it is about three times less densely populated than Uganda. The total populations of the two countries have increased with a similar growth rate, with Tanzania reaching a population of 44 million, and Uganda 33 million. Tanzania has experienced a larger urban population increase than did Uganda. The rural population is about 32 million in Tanzania and 28 million in Uganda, representing 74% and 86% of the total populations, respectively.

According to the United Nations definition of water stress (availability of renewable freshwater resources below 1,700 m<sup>3</sup>/capita/year) and water scarcity (availability of renewable freshwater resources below 1,000 m<sup>3</sup>/capita/year), water stress has not been a limiting factor to rural water development in Tanzania, whereas it represents a significant problem for Uganda (see table 4). Global warming and population increases have led to projections that Tanzania will be classified as water stressed by 2025 (The United Republic of Tanzania 2006). Some regions of Uganda are already water stressed; 75% of the country is expected to be water stressed by 2015.

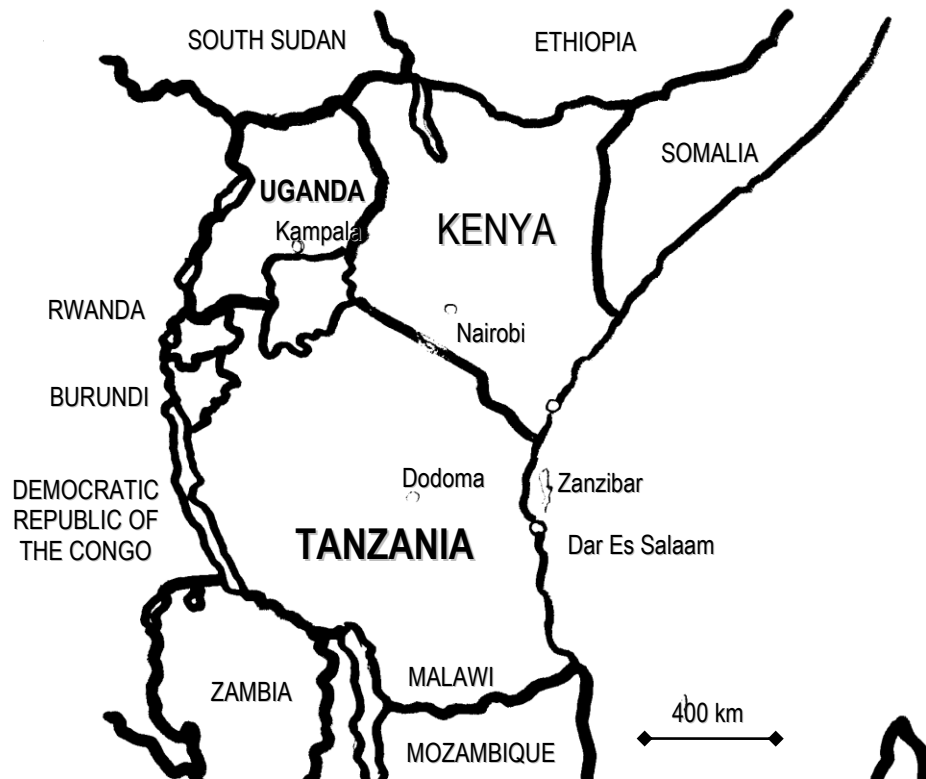


Figure 3. Map of East Africa.  
 Source: adapted from Google Maps.

**Table 4.** Renewable water resources.

	<b>2002</b>	<b>2007</b>	<b>2009</b>
	water resources m <sup>3</sup> /capita/year	water resources m <sup>3</sup> /capita/year	water resources m <sup>3</sup> /capita/year
<b>WORLD</b>	6,945.85	6,547.37	6,307.05
<b>Tanzania</b>	2,344.24	2,045.38	1,929.94
<b>Uganda</b>	1511.96	1,285.44	1,204.90

Source: World Bank Database (n.d.)

National borders were decided by colonial powers and did not reflect the social and cultural boundaries between tribes; the major tribes in both countries include the Guinean, Nilotic, and Semitic-Hamitic (Murdock 1959). Within these broader groups, marked differences between tribes exist within each country as much as across national borders.

### History

Uganda and Tanzania shared a similar colonial history, mainly under British rule. In preparation for its departure, the colonial administration developed strong local government institutions with substantial responsibility for delivering service (Tideman, Steffensen, and Olsen 2008).

#### **Tanzania**

Tanganyika became independent in 1961, and in 1964 formed a union with the Island of Zanzibar, creating the Republic of Tanzania. The Tanganyika African National Union party (TANU) led Tanzania to independence as a bottom-up rural mass movement, receiving the support of an overwhelming majority during the first election. Under Julius K. Nyerere's leadership, Tanzania chose a one-party democratic system, justified as a mass movement based on a national consensus. This would serve to protect the nation from disintegrating due to political parties fueling conflicts of interest arising from tribal or religious differences (Schweigman 2001). Critics contend the party became the supreme authority, giving the parliament only the role of "rubber stamping" its policies. Civil servants had to be party members and adhere to party guidelines (Aseka 2005, 291).

Nyerere created an African branch of socialism, termed Ujamaa that literally translates to “family-hood.” In Nyerere’s words

a society in which all members have equal rights and equal opportunities; in which all can live at peace with their neighbors without suffering or imposing injustice, being exploited, or exploiting; and in which all have gradually increasing basic level of material welfare before any individual lives in luxury. (Nyerere 1968, 234)

Ujamaa was based on three principles deeply rooted in African culture: respect for each other, obligation to work and community property. In the Arusha declaration, Nyerere clearly spelled out the dangers of private ownership as a way that allows men to exploit other men (Nyerere 1968).

He pursued a policy of self-reliance, but kept Tanzanian cash crops in the global market. He focused on developing the strength of an existing agricultural sector instead of venturing large capital in industrial development. Through a “villagization” campaign, Tanzanian peasants were encouraged to concentrate in villages and form “ten-households” cells working together to improve their living conditions. Nyerere believed that if self-reliance could be achieved at all levels of the society, from the ten-households cells to the Regions, it would be achieved also at the national level. Ujamaa’s communities were asked to mobilize and organize to support the social services infrastructures provided by the government – schools, health centers, and water and sanitation services.

Primary school enrollment increased by a factor of three in the decade between 1966 and 1976, and tripled again in the next four years. Adult illiteracy was reduced from 90% to 20% by 1981 through adult education programs. While only forty-two rural

health centers were operating in 1967, more than 8000 centers operated in the rural villages by the end of the 1970s. Water gravity schemes reached 7.7 million rural residents by 1978 (Nugent 2004). A large percentage of the national development budget was provided by non-aligned donors such as China, the Soviet Union, and Scandinavian social democracies supportive of this African socialist experiment. However, the ruling party's socialist ideological approach, and its consequent nationalization of private banks, insurance companies, and foreign corporations, together with its harsh condemnation of the international response to the crises in Rhodesia and Congo, led to a substantial freezing of aid funds received by some of the most influential Western powers, particularly the European Community, Britain, Germany, and the U.S. (Nugent 2004).

In 1977, TANU merged with the Zanzibari AFRO-SHIRAZI party and changed its name to Chama Cha Mapinduzi (CCM) or the Revolutionary Party. Nyerere's strong public statements that outside economic assistance was not worth the price of national sovereignty (Nugent 2004) belied the freedom of operation granted to external forces. Some historians condemn the motivations behind these external actors, describing their actions as the underground efforts of Western powers to economically destabilize a socialist country during the Cold War years (Campbell 1994). Others talk more of a convergence of interest between Ujamaa and free market promoters such as the World Bank; both intended "to integrate the non-monetarized (or so called subsistence sector) within the cash economy. Given the overall neocolonial structures of the territorial economy this means integrations within the world capitalistic system" (Issa Shivji as cited in Campbell 1994, 480-481).

Without entering into the motivation debates, it is undeniable that both external forces and internal forces participated in the demise of Tanzania socialist policies. Nyerere's vision of villagization was that of a bottom-up democracy that would create the necessary foundation of national governing institutions. In the early 1970s, Nyerere hired a U.S. management consulting firm, McKinsely Company, to design a decentralization strategy to transfer powers of planning and implementation of development programs at the district and Regional levels. The recommendation culminated in the 1972 Decentralization of the Government Administration Act. District development teams, with authority over financial matters, planning, personnel, health, water, land development, communication, education, and industries, were formed and given responsibility to work at the village level in the pursuit of development.

In the same years, to accelerate the villagization process, CCM intensified pressure on the population to comply with Ujamaa initiatives. In 1974, taking on a more coercive position, millions of peasants were forced into relocation, the party filled all decision-making roles with its own officials, and then relegated the village-based organizations to a mere advising role (Nugent 2004). This moved the emphasis from a bottom-up democratic participatory development to an administrative top-down execution of programs.

The year 1974 also coincided with the World Bank penetration in all agricultural development programs in Tanzania and the launch of the Regional Integrated Development Programs (RIDEP). RIDEP created a nationwide development program operating independently and in parallel to the efforts of the local government. Each

region was assigned to an international donor agency (see table 5) that created its own plans and structure to administer its programs.

**Table 5.** RIDEP parceling of Tanzania regions

<b>Region</b>	<b>Donor</b>	<b>Region</b>	<b>Donor</b>
Arusha	Sweden, USA	Mbeya	Norway, Denmark, FAO
Coast	Canada	Morogoro	Netherlands
Dar Es Salaam	Canada	Mtwara	Finland United Kingdom
Dodoma	Canada, UNDP	Mwanza	Sweden, World Bank
Iringa	UNDP/FAO	Ruvuma	Yugoslavia, IFAD
Kagera	Denmark, World Bank	Shinyanga	Netherlands, World Bank
Kigoma	World Bank	Singida	India, Australia
Kilimajaro	Japan	Tabora	World Bank
Lindi	Finland, United Kingdom	Tanga	West Germany
Mara	World Bank	Rukwa	Norway

*Source:* Campbell (1994)

Additionally, the World Bank convinced the Tanzanian government to finance some very large industrial ventures. Plans were drawn by World Bank consultants, yet turned out to be complete failures, with high financial consequences for the national debt. The creation of the world's biggest shoe factory in a country where 90% of the population walks barefoot is an ironic example of this. Some historians interpret these fiascos as a deliberate effort on the part of the World Bank to bankrupt the Tanzanian republic, forcing it to drop its socialist tendencies and accept the economic policy desired by Western financial institutions (Campbell 1994).

The final blows to Tanzanian socialist economics were the 1973/74 drought and the 1970s oil crisis. Until the 1970s, the Tanzanian economy was mainly based on the export of cash crops, but within two years, the drought reversed the situation and Tanzania became dependent on food imports and food aid programs. The spikes in the price of petroleum in 1974 and 1978 increased the import/export gap to an unsustainable

point for the economy of a country with large development expenditures. Nugent points out (2004) how the trade imbalance:

was, however, greatly compounded by the poor performance of cash crop production [...] partly a consequence of renewed peasant concern with food security, but it is also attributable to the unattractive prices which were offered to producers. [...] This was due to a conscious policy of taxing the crop very heavily to finance development, but it was also an indirect consequence of maintaining a vastly overvalued exchange rate. (150)

The conditions of the already indebted economy degraded further with the military costs of fighting the invasion of Tanzanian national territories in 1978 by Idi Amin and his Ugandan troops.

By the end of the 1970s, the Tanzanian government ran out of financial capacity to support its development programs (Mashauri and Katko 1993). Foreign loans, by this time requiring IMF approval for all international lenders, came only with conditions that were incompatible with the socialist policies. Nyerere gave his resignation in 1985, but continued to participate in his country's development as the leader of CCM for the next decade.

The economic crises his successor, Ali Hassan Mwinyi, inherited peaked in 1986 when a shortage of petrol was exacerbated by the IMF recommendations to all lending institutions not to extend further credit to Tanzania. This created food shortages in urban centers while un-transportable food supplies piled up in villages, followed by water shortages, and cholera and plague outbreaks. Mwinyi had no choice but to reopen negotiations with the IMF and in 1986, Tanzania embarked on a Structural Adjustment Program (SAP) based on market liberalization, devaluation of the currency, and



denationalization of state enterprises and public services. In 1991, Mwinyi began the process of establishing a western style multiparty democracy, which culminated in the election of CCM candidate Benjamin Mkapa in 1995. CCM remained the undisputed majority party for the next 15 years. Mkapa was re-elected in 2000, and without a political alternative to CCM, government corruption became a serious economic issue.

During Mkapa's presidency, SAP austerity measures reduced the government budget support to public services, imposing cost-sharing measures on middle class citizens already heavily taxed and on working class citizens whose wages continued to fall. Tanzania was eligible for High Indebted Poor Country debt relief in 2000, and in the same year set forth a strategy for poverty reduction to offset the SAP price on the poor, focused on private sector incentives in agriculture and development of secondary education strategy. Portions of the funds were allocated to other sectors through yearly government budgets, including water development, which eventually folded into the sector-wide approach under development in the water sector (IDA 2003).

In 2005, the CCM candidate Jakaya Mrisho Kikwete won the election on a political platform promoting sustained and shared economic growth. He was reconfirmed in the 2010 election, but with a smaller margin of votes. By that time, attempts by the Chama cha Maendeleo na Demokrasia (Party for Democracy and Development; CHADEMA) to question the operation and accountability of CCM government officials were beginning to gain traction with the electorate.

## **Uganda**

Uganda reached independence in 1962, following a multiparty election about which a Ugandan author wrote, “more accurately represented an abortion than the birth of multiparty democracy” (Mugaju 2000, 9). The central issue was how to reconcile the federal aspiration of the large Buganda Kingdom with the rest of the constituents, which were more divided by religious rather than political issues. A compromise was reached with the monarchy occupying the figurehead posts of presidency and vice-presidency, and the Ugandan Party of Congress (UPC) representative Apolo Milton Obote became prime minister. The first Obote administration was market-oriented and pluralistic in nature, pursuing an economic policy based on increasing the production of cash crops with support from international investors (Nugent 2004). In 1966, sectarian fighting intensified, and eventually led to the establishment of the first non-democratic regime, headed by Apolo Milton Obote and backed by the military. In an attempt to create cohesiveness in a very factional country, Obote adopted Nyerere’s Ujamaa brand of socialism in its internal policy while keeping aligned with the West in its foreign policy. The Ugandan economy during Obote’s first regime (1966-1971) was in the lead of the newly independent sub-Saharan nations (Muhumuza 2007). Ujamaa participation practices failed to curb the power struggle between different regional and religious interests at the national level; and eventually the factions penetrated the military.

In 1971, Idi Amin staged a military coup, dissolved the parliament, and assumed all executive powers. Amin’s regimes reversed Obote’s foreign and internal policies, the latter socialist and the former an alignment with Western capitalism, by attempting to

create an indigenous capitalistic economy within Uganda, while aligning with the Soviet Union on its foreign policy (Mazrui 2000). Within two years under Amin's regime the official economy collapsed in favor of a "magendo" (smuggling) black market economy, with a consequent loss of tax revenues. State-provided services were almost completely unavailable after the second half of the 1970s. In 1972, Amin expelled the entire Asian community and expropriated the commercial sector, which they controlled. Political adversaries were routinely murdered. In an attempt to divert his people's attention to the outside, Amin invaded Tanzania in 1978. Tanzania pushed Amin back and marched toward the Ugandan capital of Kampala, supported by an army of Ugandans led by Ugandan exiles who had found refuge in Tanzania. After a chaotic negotiation brokered by Nyerere in Moshi, the leader of the newly formed Ugandan National Liberation Front, Yusuf Lule took power. After only 68 days, he was replaced by Joseph Binaida, and eventually Obote regained power. Once again, Obote was unable to find a compromise between the various factions, which continued to fight in an escalation of violence that plunged the country into a civil war.

From 1971 to 1985, Uganda was transformed from the "Pearl of Africa" to a land where human rights violations became the law, with an estimated 800,000 people killed, a devastated economy, and a nationwide failure in providing any public services such as health, education, or water (Aseka 2005; Mugaju 2000). The National Resistance Movement (NRM) and its leader Yoseweri Museveni fought a five-year-long bush war before gaining power in 1985 on the firm commitment to bring fundamental change to Uganda. Museveni, now President, and a scholar of Nyerere's African Socialism at Dar

Es Salaam university, rejected the Western model of multiparty democracy on the basis that it was unfit to create unity in the fragmented regional and religious landscape of Uganda. He pursued the creation of a participatory, grassroots democracy, the Movement, re-introducing Nyerere's ten-households cells concept.

The ten-households system was implemented gradually in the areas liberated by NRM, originally as a security committee, then as the state administrative cell at the village level, Revolutionary Committee 1 (RC1). Later it was institutionalized in the 1995 constitution as the Local Committee 1 (LC1), the lowest administrative cell, which is still central to the current institutional arrangement. The NRM considered the formation of the RCI as its best contribution to a participatory democracy. The RC1 became "the main institutional vehicle for democracy" (Aseka 2005, 64) and received both the right and the responsibility to represent the community, protecting it from the abuses of power to which Ugandans had become accustomed. Free local elections in 1989 created RC1s in all communities of Uganda. As political parties were not allowed to participate in the elections, candidates represented themselves and were elected on the basis of personal capacity, not affiliation with one ideology, religion, or tribe. According to Aseka (2005), everyone in the country was pleased with these developments and regarded them as changes in a positive direction. Still, today the LC1 is given the strength to defend itself against the abuses characterizing village life in the past. For instance, neither the police nor the military could arrest anybody without authorization from the LC1. Even today, the LC1 members can be dismissed only by the community members eligible to elect them, fostering accountability. This was a major departure

from the previous twenty years, when people could be arrested and disappear forever at a whim of a local politician or warlord.

NRM set a limit of four years for its rule and organized parliamentary elections in 1989, after which it extended its rule for another five years to give itself time to re-build the administrative sector. In 1992, election of administrative officials from the LC1 at the village level to the district counsels occurred in a democratic way, praised by international observers. All Ugandans could nominate themselves for posts, but on an individual basis, not on a party platform. The Ugandan constitution was ratified in 1995, containing the provision that Uganda remain a “movement” democracy unless its citizens decided otherwise in a referendum. The “movement” has not been the idealistic entity envisioned during the bush war, but it has undeniably contributed to the construction of a national unity (Aseka 2005).

Museveni’s ten-point program, elaborated during the bush war but published in 1986, formed the basis for a nationwide coalition committed to: 1) restoration of democracy and security; 2) consolidation and elimination of all forms of sectarianism; 3) defense and consolidation of national independence, especially from officials interested only in self-enrichment; 4) building of an integrated and self-sustained national economy that does not rely only on the export of one or two cash crops but diversifies agriculture substituting imports with locally manufactured goods and creating a local industry; 5) restoration and improvement of social services; 6) rehabilitation of war-ravaged areas; 7) elimination of corruption and misuse of power; 8) redressing errors that have resulted in

some dislocation of the population; 9) cooperation with other African countries; and 10) an economic strategy of a mixed economy. In President Museveni's (2000) words:

This strategy means that most economic activity will be carried out by private entrepreneurs, with the government taking part in crucial sectors, while steering the economy to the set goal of an independent, integrated, and self sustaining national economy (Point no 5.) These methods will avoid laissez-faire capitalism, as well as the over-nationalization that burdens the state at microeconomic level. A mixed economy thus combines the best of both worlds. (261)

The Ugandan economy needed an urgent influx of funds to restart, but the IMF and World Bank would not allow any lending outside the pre-conditionality of structural readjustment programs. Initially, the NMR was against the structural readjustment program because it was clear from observation of other African countries that such measures produced relatively quick improvements of macro-economic indicators, but lead to a marked worsening of the peoples' living conditions. Tanzania, for example, recorded an annual GDP growth of 4% during 1986-1994, correcting the drop to a growth rate of 2%, which started after the oil crisis. But this improvement came at a marked decline in social welfare, especially in the health sector and with particular reference to the condition of women and children (Muhumuza 2007).

Uganda had always been heavily dependent on the foreign influx of funds and could not survive without it. In 1987, Uganda started a structural adjustments program to restore macro-economic stability based on devaluation of the exchange rate, improving tax collection, reducing government expenses, liberalizing trade and foreign exchange, and passing legislation allowing privatization of all public services, including water. Museveni was elected for a second term in 1996 with 76% of the electoral votes,

undisputed by international and national observers. Uganda was the first country eligible for the High Indebted Poor Country Initiative (HIPC) in 1998, which the government chose to devote to financing a large portion of the 1997 Poverty Eradication Action Plan (PEAP) – a social shock absorber designed to focus public expenditures to provide access to basic social services, such as primary education, health care, water and sanitation, rural roads and agricultural tools (WHO 2007). In 2001 Museveni was re-elected for an additional five years. In 2005, Ugandans voted on a referendum to transition the country to a multi-party democracy, enabling candidates from outside the Movement to run for offices. Despite the presence of opposition in the following two elections (2006, 2011), Museveni has maintained power but not without accusations of rigging, intimidation, and suppression of urban demonstrations, which are outside this research context.

#### Economic Considerations and Indicators

Despite the first fifteen years since independence being significantly more traumatic in Uganda than in Tanzania, the two countries' economic development has trended to go a similar way since the 1990s. In the last ten years, the GNI percent difference has been well below 20% as can be seen in the graph displayed in figure 4. GNI is gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States.

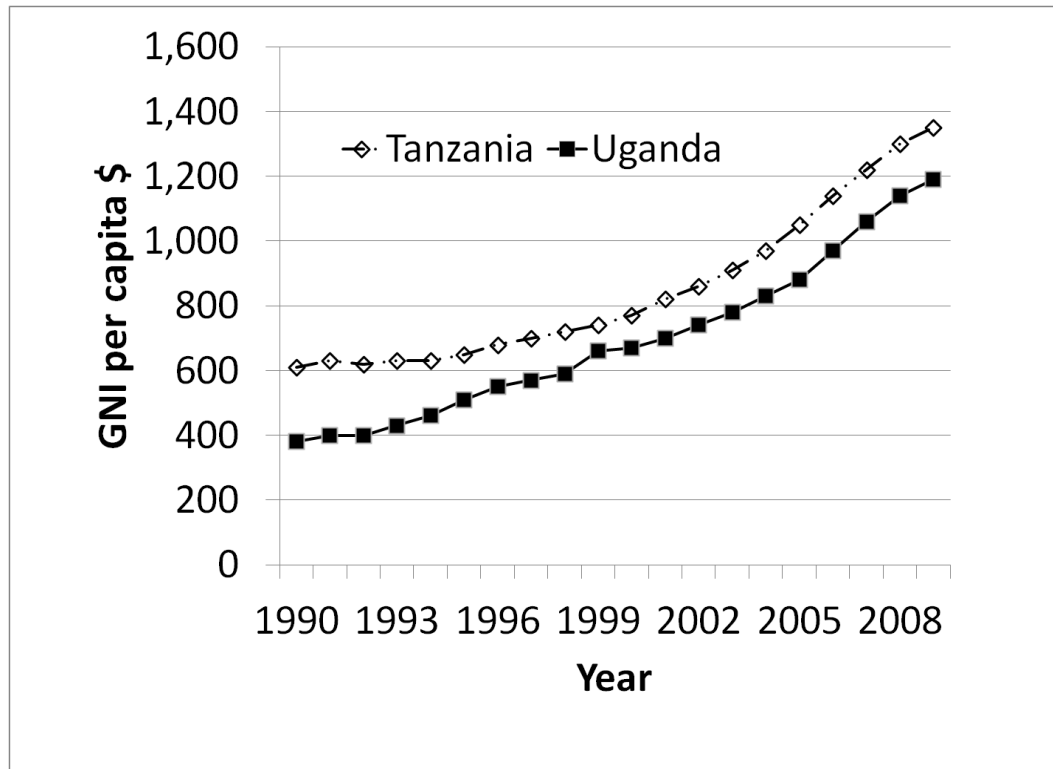


Figure 4. Gross National Income per capita.  
*Source:* Data gathered from World Bank Database (n.d.)

Despite similarities in the trends of Tanzanian and Ugandan economic development, 89% of Tanzanians live below the international poverty line, defined as \$1.25 a day at purchasing-power parity existing in 2005, compared to only 57% in Uganda. The relatively lower GINI index for Tanzania (35%) than Uganda (46%) indicates Uganda has a smaller, but richer middle class. Post-independence political emphasis on agricultural production is quite apparent in the GDP/sector data shown in figure 5. Tanzanian agricultural contribution to the total economy exceeds that of Uganda by about 20%, compensated by Uganda’s larger service provisions and industry development, both about 10% larger than Tanzanian ones. Service includes government services in addition to wholesale and retail trade, tourism, transport, and financial,



professional, and personal services such as education, health care, and real estate services. It is interesting to note the services category includes government services.

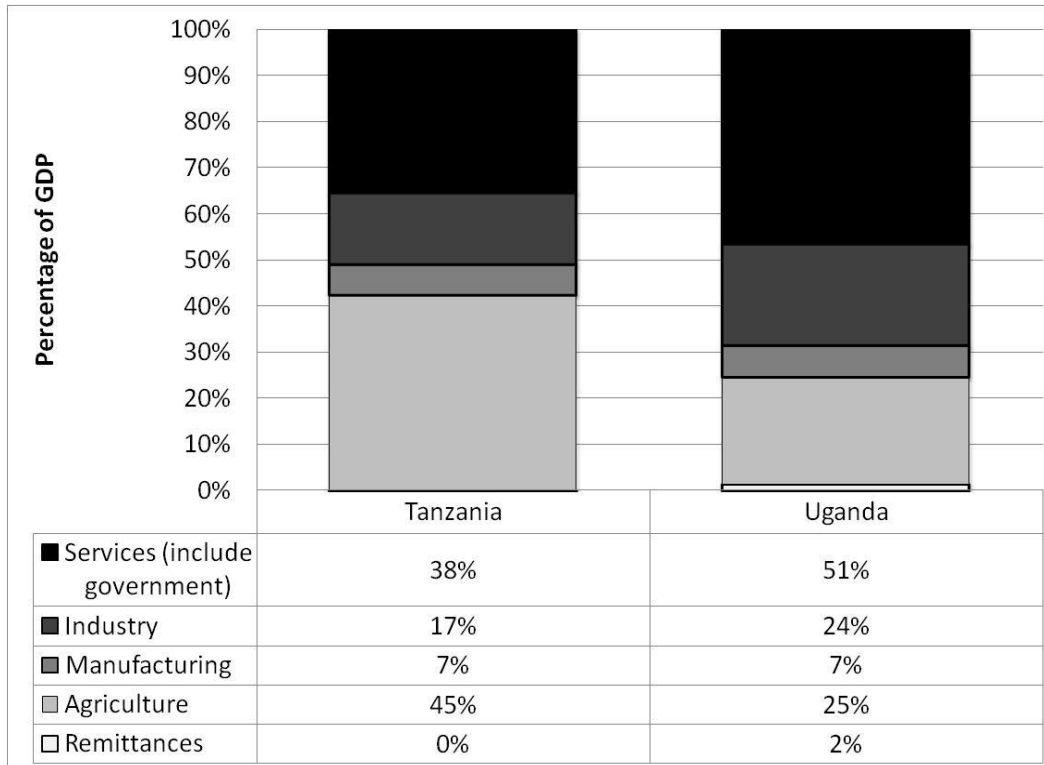


Figure 5. GDP per sector.  
*Source:* World Bank Database (n.d.)

Government expenditures and aid flows are shown in figure 6. It is interesting to note that aid flow is about the same magnitude as government expenses for both countries. Tanzania appeared to have received a significantly larger aid flow per capita in the years prior to the 1990s, which resulted in a significantly larger national debt (see figure 7).

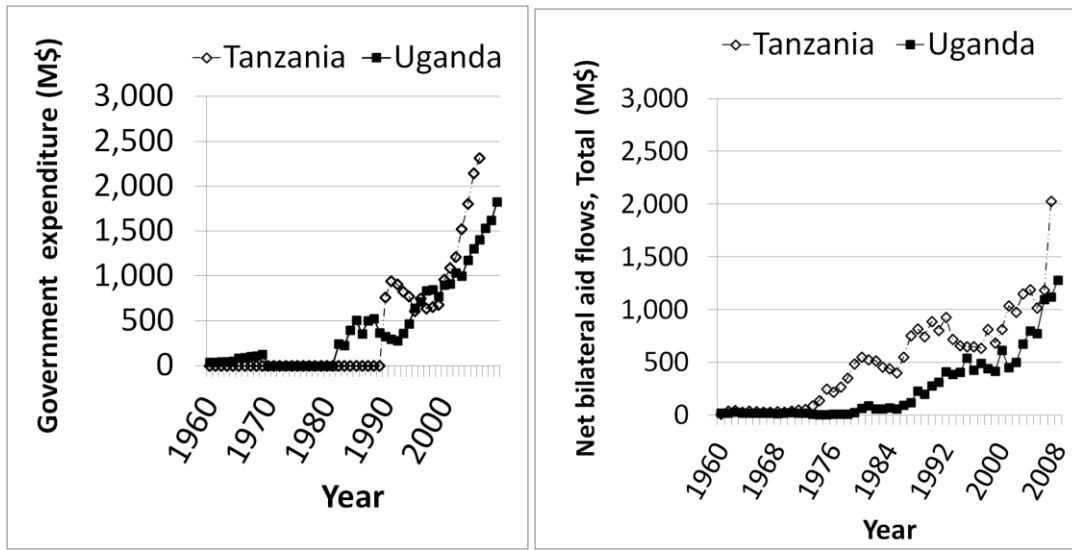


Figure 6. Expenditures and aid flow. National government expenditures (*above left*) and aid flows (*above right*). *Source:* World Bank Database (n.d.)

Debt cancellations and rescheduling in the late 1980s have reduced the gap between the two countries, possibly at the cost of higher foreign dependence in decision making for Tanzania.

Net bilateral aid flows from DAC donors are the net disbursements of official development assistance (ODA) or official aid from the members of the Development Assistance Committee (DAC). Net disbursements are gross disbursements of grants and loans minus repayments of principal on earlier loans. ODA consists of loans made on concessional terms (with a grant element of at least 25%, calculated at a rate of discount of 10%) and grants made to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. Official aid is provided under terms and conditions similar to those for ODA. Data are in current U.S. dollars.

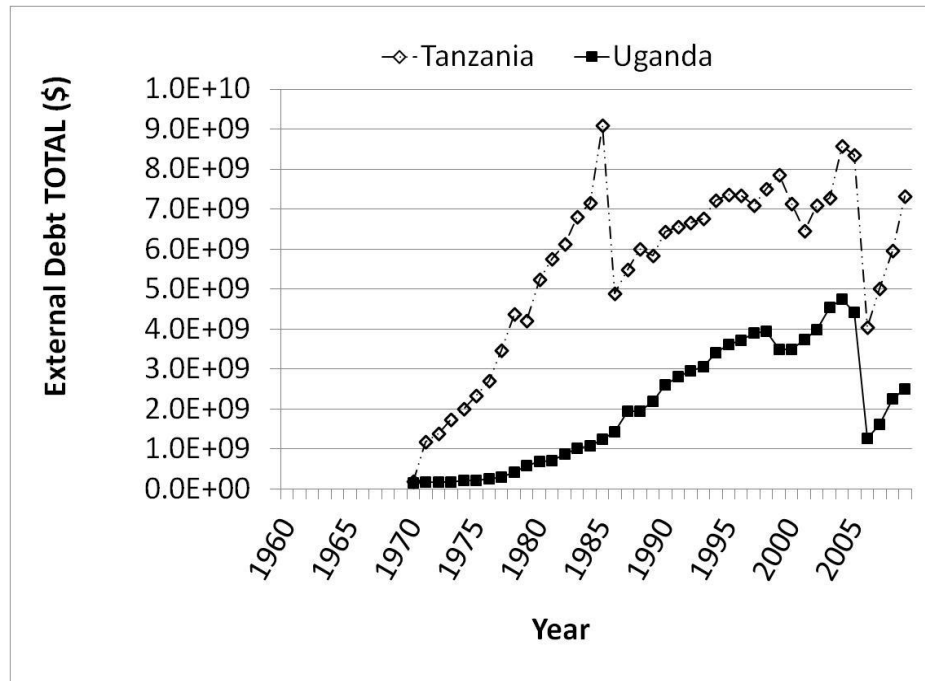


Figure 7. National debt.

Source: Data gathered from World Bank Database (n.d.)

Tanzania's and Uganda's figures for export and import of goods and services, measured in trade volume (\$), differ by less than 6%. Foreign investment flow has steadily increased in both countries since the 1990s to \$650 million for Tanzania and \$800 million for Uganda (United Nations Conference on Trade and Development 2010). Data on breakout of investments by infrastructure sector available from the World Bank database indicate a very small private investment in the Tanzania water sector (\$850 million) and none in Uganda.

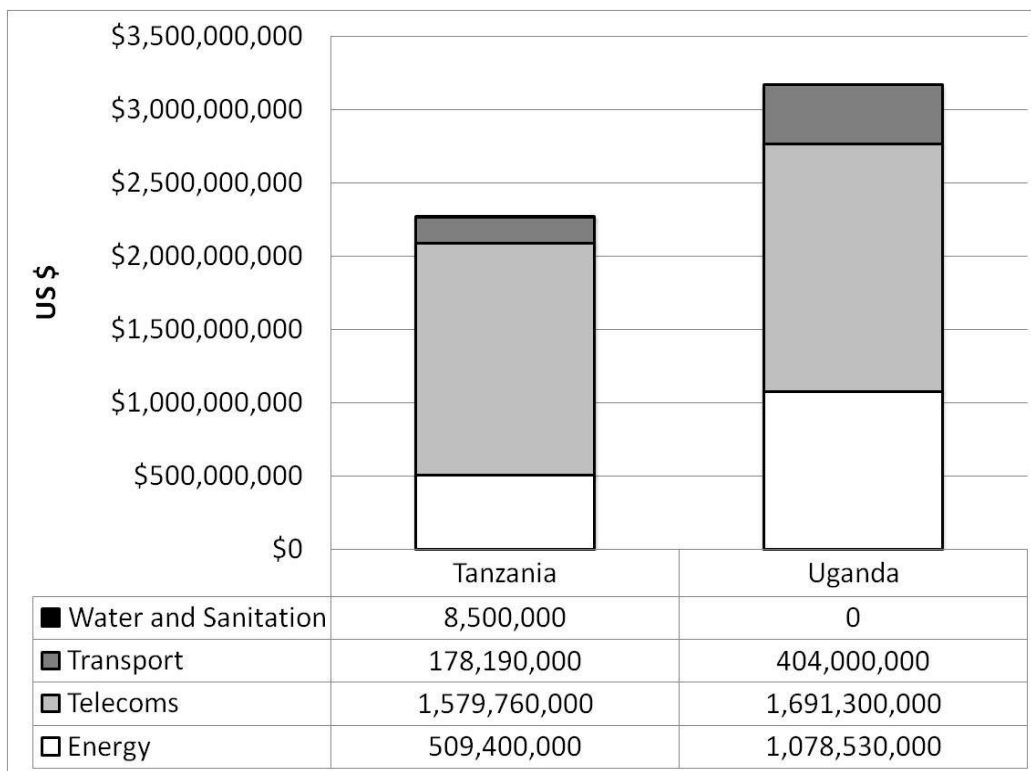


Figure 8. Private sector Investments with private participation in Uganda and Tanzania. (Above left) foreign direct investments' flow (United Nations Conference on Trade and Development), (Above right) investments with private participation in public infrastructure by sector.

Source: Data gathered from World Bank Database (n.d.)

### Government and Corruption

The World Bank Country Policy and Institutional Assessments (CPIA) is a set of indices that measures how conducive a country's policies and institutions are to development. It is one of the criteria the bank uses to evaluate the risks of loaning money to a given country. Uganda and Tanzania are assessed at about the same risk level for all 12 indicators. Tanzania performed slightly better, including in the government corruption index, which measures "[i]nformal payments to public officials and the

percentage of firms expected to make informal payments to public officials to ‘get things done’ with regard to customs, taxes, licenses, regulations, services, and the like,” measuring 49.7% in Tanzania compared to 51.7% in Uganda (World Database, n.d.). For reference, most Latin American and Central American countries have corruption indices below 20%, and the Russian Federation is at 39.6%.

#### Education and Water-related Health Indicators

Despite a significant difference in population density, both countries overall have very similar demographic and workforce compositions, as shown in figure 9. The age dependency ratio is defined as the ratio of dependents to the working-age population, displayed as the proportion of dependents per one hundred working-age people. Young defines the dependent as individuals younger than fifteen, old defines dependents older than sixty-four. Both Young and Old dependents are combined in the unspecified Age Dependency Ratio.

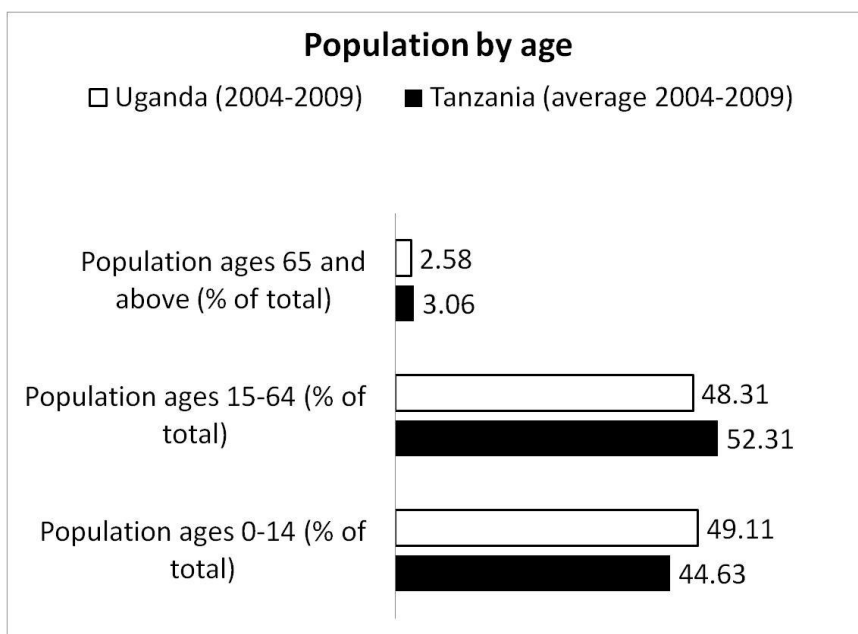


Figure 9. Population by age.  
 Source: Data gathered from World Bank Database (n.d.)

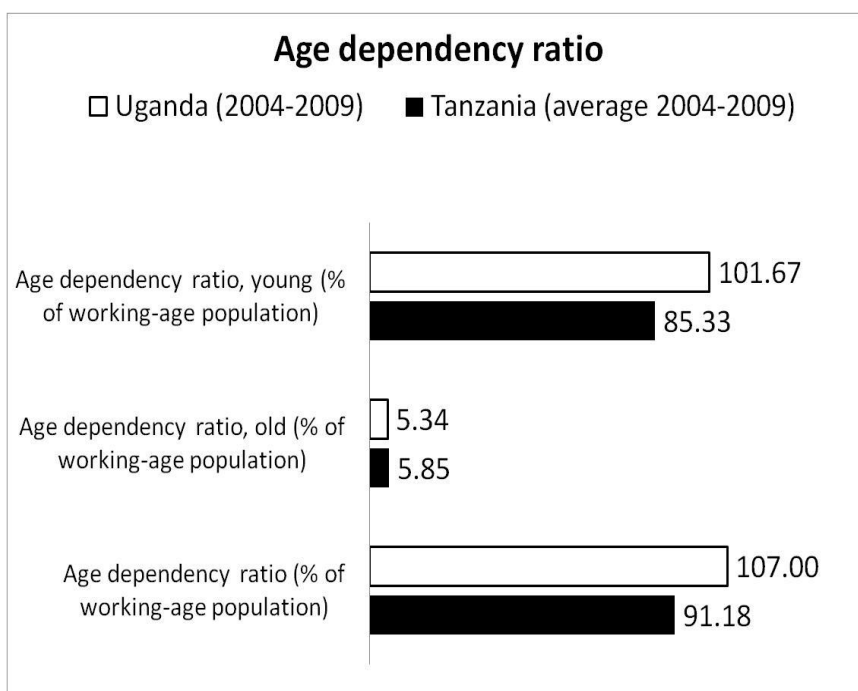


Figure 10. Age dependency ratio.  
 Source: Data gathered from World Bank Database (n.d.)

Literacy rate and school enrollments are almost identical for both countries (see table 6). Both countries' mortality rates of children under five years old are assessed around 10-15%, while Tanzania has about 10% more children suffering from diarrheal diseases than Uganda. Public health expenditures are nearly twice as large in Tanzania as in Uganda (World Bank Database, n.d.).

**Table 6.** Literacy rates disaggregated by age and gender

<b>Youth literacy rate</b>	<b>2002</b>	<b>2002</b>	<b>2008</b>	<b>2008</b>
	<b>Tanzania</b>	<b>Uganda</b>	<b>Tanzania</b>	<b>Uganda</b>
Literacy rate, youth female (% of females ages 15-24)	76	76	76	86
Literacy rate, youth male (% of males ages 15-24)	81	86	79	89
Literacy rate, youth total (% of people ages 15-24)	78	81	78	87
<b>Adult literacy rate</b>				
Literacy rate, adult female (% of females ages 15 and above)	62	59	66	67
Literacy rate, adult male (% of males ages 15 and above)	78	78	79	82
Literacy rate, adult total (% of people ages 15 and above)	69	68	73	75

*Source:* Data from World Bank Database (n.d.)

## **Analysis of Tanzanian and Ugandan National Water Policies**

### **Overview of Rural Water Policies and Development Programs**

#### **Tanzania**

The transition of water and economic policies from the socialist conception of free water for all, to the neoliberal view, is shown with a graph of the progress in the sector in figure 10. It illustrates how the onset of structural adjustment policies coincides with a decreasing rate of expanding rural services. In Uganda, where austerity measures

have been associated with strong social shock absorber policies, rural water development progress continues; in Tanzania, where these measures have not been pursued with the same vigor, it came to a complete stall, despite the fact that construction of new systems continues.

The evolution of water governance instruments in Tanzania since independence (see figure 10) precipitated a 180-degree shift in policy direction after the first twenty years of independence and socialist policies (Ujamaa). After Independence in 1962, Tanzania's government assumed the responsibility to provide free water for all its citizens (Rugumamu 1999) through the 1967 Policy of Self-Reliance and Socialism. The Government of Tanzania launched the Universal Rural Water Supply Program with the goal of providing clean water services to all by 1991.

A 1977 World Bank Report (Acharya 1977), deeming the effort unachievable given the available budget, proposed to revise plans which would achieve 49% and 47% coverage, respectively, and noted that not enough money for O&M was allocated (less than 50%) for the already implemented facilities. The report suggested that in line with the self-reliance policies, villages take on responsibility for O&M. The Government efforts were complemented by the independent activities of various development partners, such as DHV (Nederland), FINIDA (Finland), DANIDA (Denmark), SIDA (Sweden), and NORAD (Norway) (Therkildseen 1988).



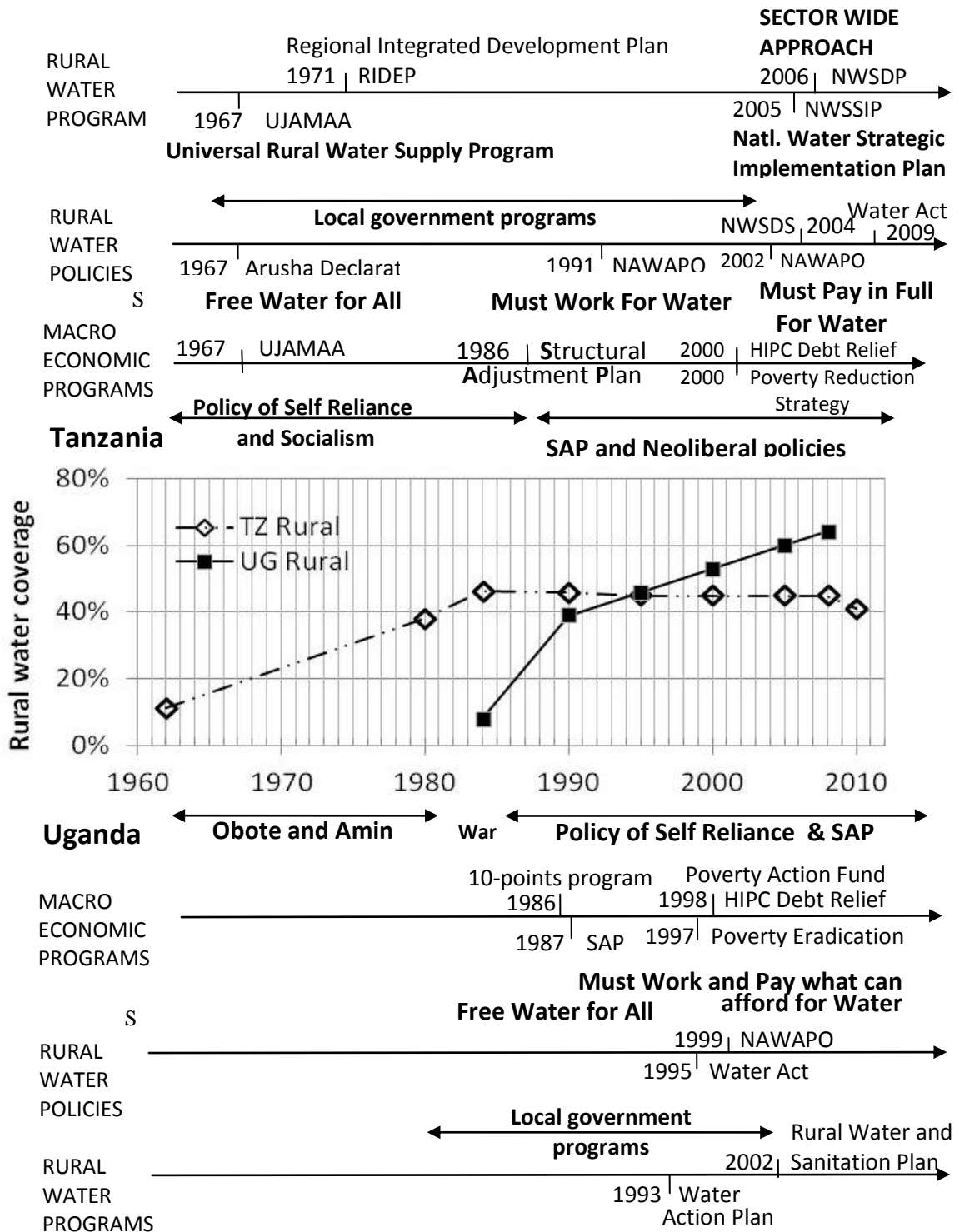


Figure 11. Summary of accumulation of instruments analysis.

Despite a sharp increase in rural water coverage from 1970 to 1990 (from 10% to 45%), the government did not have sufficient funds or the managing capacity to continue expanding services while providing operation and maintenance on the existing ones. Already in expenditure reviews in 1989 (Stevens 1989), it is clearly stated the only way to reduce government expenditures in the water sector would be to have the O&M of facilities become a responsibility of the communities. Additionally, with the government unable to take over responsibility for O&M, the donors' agencies that had constructed water systems found themselves without a sustainable exit strategy. Under the pressure of structural adjustment policy packages, the provision of free water for all was declared a poor economic and political choice, and replaced by a transitional market-based model in which services were provided by the government and part of the costs recovered through a tariff-based model. This major shift was captured in the 1991 national water policy, which introduced the concept that some of the costs of construction and O&M should be contributed by the beneficiaries with whatever means affordable, such as in kind, labor, or monetary means. It also required participation of the beneficiaries during all phases of development or rehabilitation of water projects through the formation of village water Committees and the creation of village water Funds.

According to the Ministry of Water and Livestock Development, "the main shortfall in the national water policy of 1991 can be identified in the implementation strategies, which emphasized that the central government is the sole investor, implementer and manager of the projects, both in rural and urban areas" (The United Republic of Tanzania 2002, 4-5). The national water policy was revised in 2002, to

“develop a comprehensive framework for sustainable development and management of the Nation’s water resources, in which an effective legal and institutional framework for its implementation can be put in place” (The United Republic of Tanzania 2002, 5). In the rural water supply section, the policy defines a development model in which beneficiaries participate in the decision making process, own and manage the water system constructed by the private sector and co-financed by the government, donors and communities, and assigns full O&M cost recovery to the communities, preferably through private service providers. The Tanzanian 2002 national water policy falls short of providing guidelines for implementing the new ideas it contains. “A plan for action detailing the implementation of the policy strategies will be prepared and presented separately” (The United Republic of Tanzania 2002, 7).

In 2004 and 2005 the Tanzanian Government designed a National Water Sector Development Strategy (2005),

a blueprint for prioritized, timely and appropriate interventions to address the water sector challenges in the process of achieving all the targets narrated in the National Strategy for Growth and Reduction of Poverty by 2010, the Millennium Development Goals by 2015, and contribute toward achieving the Tanzania Development Vision 2025. Furthermore, the strategy lead to reshaping and increasing sector financing through a smooth and manageable institutional arrangement. (The United Republic of Tanzania 2010, 28)

The National Sector Wide Development Strategy was needed in part to complement, and in part to correct, omission and duplication of roles and responsibilities in the national water policy of 2002. To achieve the objectives set by the National Sector Wide Development Strategy, a National Water Sector Strategic Implementation Plan (The United Republic of Tanzania 2010) was prepared, funded by doubling the

Tanzanian government budget resource allocations to water development initiatives, and by several international donors' independent contributions to projects.

The National Water Sector Strategic Implementation Plan was overshadowed (The United Republic of Tanzania 2010) in 2006 by the National Water Sector Development Program, a ten-year program attempting to address water resource development with a Sector Wide Approach, requiring a single institutional and regulatory framework supporting three subprogram components: Water Resource Management, Urban Water Development, and Rural Water Development.

The NWSDP was funded by a \$1.2 billion budget, provided for the most part by development partners through a basket fund managed by the Tanzanian government according to a strict set of requirements overseen by the World Bank Tanzanian offices. The dialogue and coordination between the Ministry of Water, the Development Partners, the local government authorities, the local and international NGOs, community owned water supply organizations (COWSO), and private sectors were organized through the formation of four Thematic Working Groups (Finance and Planning, Performance Monitoring, Institutional Development and Capacity Building, Sanitation and Hygiene).

At the 2.5-year checkpoint, the set targets were not achieved, and that triggered a restructuring of the program to align the four working groups to the four thematic areas defined in the 2002 National Water Policy: water resource management, rural water supply, urban water supply, and institutional capacity building. Additionally, the mechanism of dialogue between the groups working in the four thematic areas was also restructured, creating an almost entirely new management structure and reporting

mechanism for the program. According to the proceedings of the Joint Water Sector Review (JWSR), held annually and facilitated by an external consultant, and to various stakeholders interviewed, the WSDP has spent most of its resources on creating and sustaining its own bureaucracy and has failed to increase water access proportionally to the program funds expended, in particular to the most vulnerable sector of the population.

## **Uganda**

The development of Ugandan water sector strategies has followed a path similar to the Tanzanian one, yet it has been significantly more stable. Since 1972, urban areas had water services managed, with major funding from the government, by the para-statal National Water and Sanitation Corporation. The government provided free water to rural populations in areas not served by the NWSC (The World Bank 1984). Since the end of the war that ousted the second Obote regime in 1986, the Government of Uganda has shown a strong commitment to poverty alleviation, formalized in the Poverty Eradication Action Plan of 1997. PEAP was prepared in consultation with a broad spectrum of national stakeholders, and qualified Uganda for debt relief under the World Bank and IMF Heavily Indebted Poor Countries (HIPC) Initiative. A sizeable portion of the HIPC funds were allocated from the Ugandan government to the water and sanitation sector and triggered reforms of the water sector. The 1993-1995 Water Action Plan (WWAP 2006), a nation-wide assessment of the state of the sector, culminated in the formulation of the first national water policy (1999). The policy complemented the Water Statute (1995), providing a framework for development and management of the national water resources, led by the Ugandan government through its existing institutional channels.

Recognizing the duplication and waste of resources in a project-by-project approach, a Sector Wide Approach to planning was adopted in 2002. Under its provisions, the government and development partners began collaborating under a single policy and expenditure program controlled by the Ugandan government. The implementation of a rural development program was ratified in the Rural Water and Sanitation Plan of 2002, and financed, in large part by internal resources, by a 15-year Strategic Investment Plan. To close the loop between central government policy and actual program implementation, the Directorate of Water Development created Technical Support Units for each of the regions to provide support and advice to local government and communities, while monitoring and providing feedback for further planning and policymaking. While revisions of the Strategic Action Plans have been made, the overall direction of water sector development has not changed over time.

#### Comparisons of Expenditure in the Rural Water Sector

As already mentioned, a limitation of this study is the lack of a satisfactory method to calculate the total expenditures in the rural sector. The major problem is the size of the off-budget funds, which include expenses made directly by water authorities with locally raised funds, and donor-funded projects not registered in the government budget. This is what van der Berg (2009) called “the miracle premium” that skews the statistic on progress of the Tanzanian rural development sector. A calculation on the contribution of these miracle premiums to improved water access, assuming that each water point serves 250 people and conservatively normalizing to the total population of

these district in 2010, shows that implementation of the off-budget projects masks a 22% decrease in water access.

Given the unquantifiable existence of these off-budget funds, comparable to the on-budget government spending in the rural sector, a comparison of the government expenditure in the water sector prior to the onset of the Sector Wide Approach, in 2002 for Uganda and 2005 for Tanzania, since very large international donor contributions to projects are not accounted for in the national budget. Figure 11 compares government expenditures; a data point for 1998 is inserted to show the magnitude of a single off-budget contribution, proving that a direct comparison of government expenditures prior to the Sector Wide Approach cannot be made. Based on these considerations, we can only conclude that expenditures in the water sector have been larger for Tanzania than they have been for Uganda since 2005.

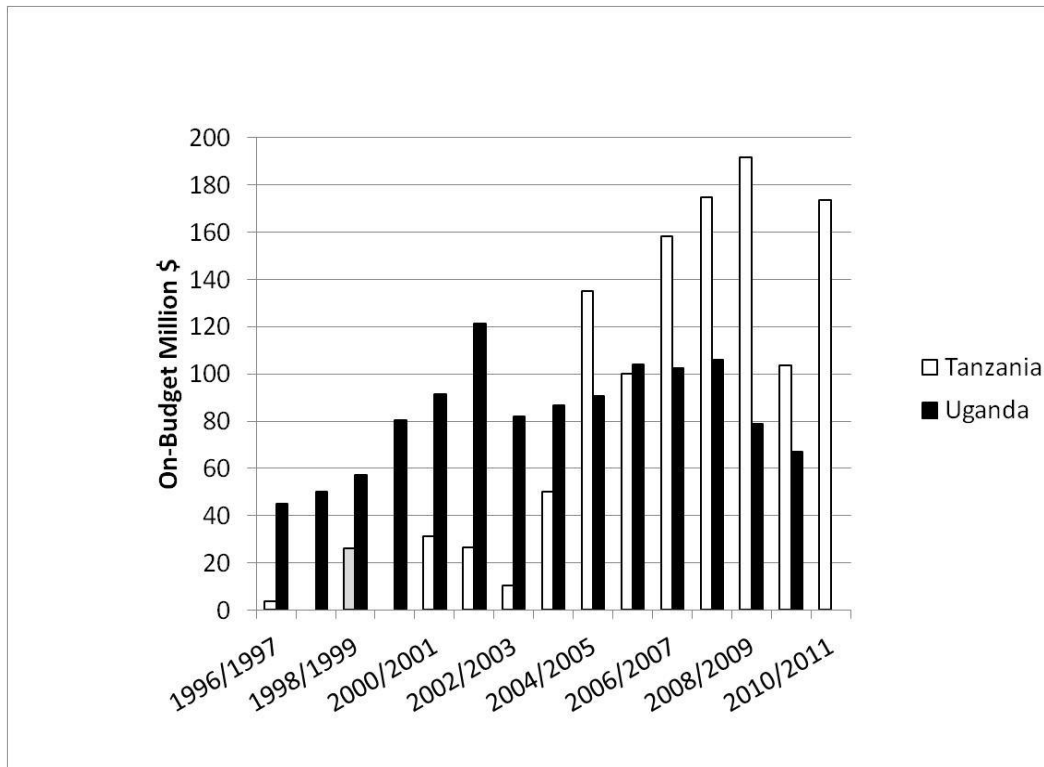


Figure 12. Government expenditures in the water sector.

The data point in grey is a single off-budget project financed by the World Bank, which is not included in the government budget.

*Sources:* Data gathered from Government of Uganda (2006, 2007, 2008, 2009, 2010), The United Republic of Tanzania (2009, 2010), Van den Berg (2009), and The World Bank (1997, 2004).

The adoption of the Sector Wide Approach in Uganda does not coincide with such a large increase, showing that the Ugandan government commitment to fund the water sector has been consistent since the mid-1990s. The breakout of budget allocations, for the last few years, between recurrent and development expenses is shown in table 7 for Tanzania and table 8 for Uganda. A significant difference to be noted is how more funds are allocated to rehabilitation, O&M, and monitoring in Uganda than in Tanzania. Additionally, a growing portion of the budget is allocated for transfer to urban and basin authority, which service metered paying customers and water for production



and to feasibility studies, justified by the need of creating a quick “pipeline” of projects that can be implemented as soon as funds are disbursed into the Water Sector Development Program recipients.

**Table 7.** Breakout of allocations of the Tanzania Water Budget.

<b>TANZANIA</b>	<b>2006/2007</b>	<b>2007/2008</b>	<b>2008/2009</b>
Personnel Expenditure	6.1%	3.8%	5.8%
Other Charges	9.9%	6.4%	4.1%
<b>Total Recurrent Expenditure</b>	16.0%	10.2%	10%
New Infrastructure investments	69.6%	51.2%	24.3%
Rehabilitation	5.03%	2.69%	2.7%
Capital transfer to Authorities (Urban and Basin)	0.0%	26.04%	40.5%
Feasibility Studies	1.68%	6.29%	10.8%
Maintenance	0.0%	0.0%	0.0%
Others	7.55%	1.8%	11.7%
<b>Total Development Expenditures</b>	83.9%	89.9%	90%

*Source:* Van Den Berg (2009)

**Table 8.** Breakout of allocations of the Uganda Water Budget.

<b>UGANDA</b>	<b>Guidelines</b>	<b>2006/2007</b>	<b>2007/2008</b>	<b>2008/2009</b>
Software Activities	<12%	7%	7%	9%
Operations and Monitoring		16%	3%	11%
Wages and Salaries	<4%	1%	1%	1%
Rehabilitation and O&M	<8%	4%	4%	6%
Sanitation	<6%	2%	2%	3%
Water supply	>70%	70%	72%	70%

*Source:* Government of Uganda (2006, 2007, 2008, 2009, 2010)

#### Constitutional Right to Water

The Ugandan Constitution (1995) specifically recognizes the people's right to water.

The State shall endeavour to fulfill the fundamental rights of all Ugandans to social justice and economic development and shall, in particular, ensure that

- (a) all developmental efforts are directed at ensuring the maximum social and cultural well-being of the people; and
- (b) all Ugandans enjoy rights and opportunities and access to education, health services, *clean and safe water*, work, decent shelter, adequate clothing, food security and pension and retirement benefits.

There is no explicit mention of the right to water in the Tanzanian Constitution (1977). Additionally, Tanzania is one of the forty-one countries that abstained July 28, 2010 from voting on the United Nations' resolution to recognize access to clean water and sanitation as a basic human right. Uganda was not represented at the session.

#### National Water Policies: Principles and Objectives

Both Ugandan and Tanzanian national water policies endorse the declarations and guiding principles adopted by the 1992 UN conference on Environment and Development held in Rio de Janeiro prescribing:

an integrated, multi-sectoral approach in the prevailing socio-economic context, including (a) treating water as a social and economic good; (b) relying on markets and pricing to determine water allocation among various sectors and user groups; (c) involving the beneficiaries and the private sector in managing water at the lowest appropriate level; and (d) recognizing that water is a finite resource that contributes to economic development and supports natural ecosystems. (Government of Uganda 1999, 5)

Despite this common endorsement, the two policies set quite a different tone in stating the principles inspiring the water development sector. The Ugandan water policy explicitly states,

[i]n addition to the various guiding principles adopted from the international experience [...] a number of policy initiatives at the national level have been fundamental in shaping the water sector policy as presented in this document. The cornerstones in this process are (a) the new constitution, (b) the decentralization and privatization policies, and (c) the Environmental Management Policy and Statute. (Government of Uganda 1999, 6)

In particular, the policy invokes the constitutional right to clean and safe water, the state obligation to promote a good water management system at all levels and to promote sustainable development and public awareness of the need to manage land, air, and water resources in a balanced and sustainable manner for the present and future generations. Regarding the domestic water supply, the policy adopts the principles of the “New Delhi Statement” under the main theme “SOME FOR ALL RATHER THAN MORE FOR SOME” (Government of Uganda 1999, 16).

The six principles are:

(i) Protection of the environment and safe-guarding of health through the integrated management of water resources and liquid and solid waste.

(ii) Institutional reforms promoting an integrated approach, including changes in procedures, attitudes and behavior and the full participation of women at all levels in sector institutions and in institution making.

(iii) Community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programmes.

(iv) Financial viability of public utilities should be assured through sound financial practices, achieved through better management of existing assets, and widespread use of appropriate technologies.

(v) Provision of services through demand driven approaches in which users are fully involved and contribute to the cost of facilities and services to promote ownership and sustainability.

(vi) Allocation of public funds for water supply development activities will take into account that priority is given to those segments of the population who are presently inadequately served or not served at all, and who are willing to participate in planning, implementation and maintenance of the facilities.

The policy aims at finding a compromise between promoting efforts to attract investments to privatize public enterprise and restructuring the public service to increase its efficiency. With a pragmatic approach, the policy requires that beneficiaries contribute toward capital costs or the technology selected, and cover the operation and maintenance costs in full, but clearly states that “as an interim measure, the Government

will provide conditional grants for maintenance of services beyond the capacity of the community and local pump mechanics” (Government of Uganda 1999, 20).

The Tanzanian policy recognizes the basic need and right to water for domestic consumption and emphasizes the link between water, economic development, and poverty alleviation. It sets its goal to create an institutional framework to achieve best development and management practices. With particular reference to water for domestic use, the 2002 Tanzanian water policy objectives are “to provide adequate, affordable and sustainable water supply services to the rural population,” and “to emphasize on community paying for part of the capital costs, and full costs recovery for operation and maintenance of services as opposed to the previous concept of cost sharing,” and “to promote the participation of the private sector in the delivery of goods and services” (The United Republic of Tanzania 2002, 30). The “underestimation of the role that could be played by the private sector” (The United Republic of Tanzania 2002, 30), one of the shortfalls of the 1991 national water policy, is addressed by developing “economic instruments includ[ing] water pricing, charges, penalties and incentives to be used to stimulate marketing mechanisms” (The United Republic of Tanzania 2002, 7).

#### Stakeholders’ Roles and Responsibilities

Roles and responsibilities of all stakeholders are clearly outlined in the 1999 Ugandan national water policy (see figure 12). At the national government level, the Ministry, through the Directorate for Water Development, is responsible for national policies, guidelines, standards, and priorities for water resource management in the country and for monitoring all activities, in addition to formulating all international water

resources policy. The district councils have responsibility for water supply services and for the integrated management of extension staff and sub-county level government staff. They work directly with communities on the provision of water, sanitation, health, agriculture, fisheries, livestock, and community development. Urban water systems are under the responsibility of the district, but are operated by town councils.

Community-based Water User Groups are responsible for managing and operating point water sources, such as wells and protected springs under the supervision of Local councils. Village elders and the local government chief systems are responsible for arbitration and mediation. The role of NGOs is determined by the communities in which they work, and their activities are harmonized by regular information exchange and coordinated operations. While the policy promotes an “integrated and sustainable, development, management and use of national water resources,” it clearly states that “[i]n the present Ugandan context, it has not been found necessary – and therefore it has not been elaborated on further in this policy document – to create river/lake basin management authorities, catchment boards or similar bodies” (Government of Uganda 1999, 14).

The institutional framework relies on the existing district council and Water Department, and on the LC1-3 Local council level as it creates continuity in the line of responsibility while proposing new committees at the district level for communication, liaison, and services. Implementation of new systems and major rehabilitations and repairs are tendered to the local private sector, which is also encouraged to take over water service management in urban centers and channel private funds in Build Own

Operate or Build Operate and Transfer projects. The Tanzania national water policy (2002) does not contain a prescription for an institutional framework defining the roles and responsibilities of all stakeholders. It contains a commitment to review “the existing structure in line with the new roles and responsibilities” (The United Republic of Tanzania 2002, 38).

The 2005 National Water Sector Development Strategy outlines a transitional and final framework for water supply and sanitation, with the functions and responsibilities of each stakeholder defined. However, the final legislative act containing the detailed institutional framework appeared only in the 2009 Water Act, possibly failing to create continuity in stakeholder roles and responsibilities over the last ten years. Roles and responsibilities are assigned in a way very similar to the Ugandan arrangement, namely policy, regulation, and monitoring at the national level, program implementation at the local government level, and operation and maintenance at the community level, but the institutional arrangement in Tanzania was not created based on the existing apparatus.

A comparison between Tanzanian and Ugandan institutional arrangements requires two considerations. The first is that the Tanzanian arrangement is depicted in a much more complicated way relative to the straightforward Ugandan flowchart. The Tanzanian chart contains eleven items in the legend, which can cause much confusion between colors and different types of dotted lines. The Tanzanian chart also has twenty boxes in six different colors, requiring constant attention to the legend (adapted from The United Republic of Tanzania, 2005, 42). There are many directions to follow to find all the information, which does not facilitate visual understanding. The Ugandan flow chart

is much more straightforward with three horizontal levels and three distinctly labeled vertical levels (The Republic of Uganda, 1999, 13). Everything is one color and the direction of the arrows is clear. The second one is the fact that the use of the word CONSUMER implies the policymakers see water as a commodity, rather than a social issue.

Additionally, the adoption of the Integrated Water Resource Management required an institutional structure organized by water basins instead of regional or district boundaries. The National Water Sector Development Strategy (2005) outlines the creation of the basin and catchment level water resource management offices and functions. While not directly involved in the responsibility for rural water sector development, it requires the involvement of resources from the Regional and district level. The Tanzanian policy assigns the implementation of new systems and rehabilitation to the private sector and a plan to promote actively contracting out water schemes to service providers, including efforts to educate communities on the advantages of private management of water services.

The 2009 Water Act Legal introduces registration of the rural water entities (COWSO) to acquire legal ownership status and disengage from reporting to the village government. A total of six entities' management structures are possibly recognized; three of them are based on committees elected by a village, Water User Group, Water User Association for multi-village schemes, and a Board of Trustees that direct a delegated management structure, separating the decision makers from the implementers. The other

three are private sector management options, namely a Company, Cooperative Society, or a Corporation.

### Choice of Technology

The Ugandan national water policy (1999) is very detailed regarding the choice of technology. Low-cost technologies, such as hand pumps and protected springs, are mandated for rural areas. To support standardization of operation and maintenance networks, only U2/U3 hand pumps should be used for deep boreholes. At the time the policy was written, different models of pumps were field tested and monitored to select the two best types for shallow wells. Motorized pumps are to be considered only for urban centers. The local government actively fosters the development of a spare part network by creating and training an indigenous private sector of local hand pump technicians who can be hired to make repairs. Sanitation improvement and health and hygiene education are disseminated in conjunction with water improvement projects.

The Tanzanian policy and strategy recognizes the need for appropriate low-cost technology, which can be maintained and afforded at the community level, but stops short of defining what this technology should be.

Service Providers will provide [water] services using the most cost effective technology available which is suitable to the area and the socio-economic circumstances of the users. In rural areas, where communities will be responsible for operation and maintenance, they will be empowered and facilitated to make appropriate technology choices that will suit their own capabilities, particularly in those which require low investment costs and are operated and maintained at least cost. (The Government of Tanzania 2005, 53).

It is unclear who has the responsibility for empowering the community so they can make the right choice, which is critical in this case, as the best interest of the community might



not coincide with the best interest of all service providers, especially if the construction is handled by the private sector and paid for mainly by the government or donors.

#### Basic Service Level

Ugandan basic service levels in rural areas are set at 20-25 l/person/day, for a maximum of 300 persons served per water point, a maximum distance of 1.5 km, and no more than 100 m of elevation difference. The policy states the level of service must be chosen with a demand-driven negotiation between local government and communities, based on consideration of the site characteristics, access to alternative sources, and affordability. Communities requesting a service level higher than the basic are required to meet the higher cost of service.

Tanzanian basic service levels are set to 25 liters/person/day, at less than 400m from the household, and serving fewer than 250 people, but higher service levels will be encouraged where affordable. Both the national water policy and the National Water and Sanitation Strategic Plans prescribe community participation in planning, achieved by training communities on making appropriate technology choices and supervision of design, construction, and service provision contracts. “Environmentally friendly technologies including gravity, solar and wind pumping will be promoted” (The United Republic of Tanzania 2002, 33). Again, the stakeholder responsible for community capacity development is not specified. Furthermore, the recommendation for environmentally friendly technology is in contrast with the appropriate technology recommendation, as hand pumps and protected springs are by far more affordable at the community level.

Integration of sanitation services and hygiene education within water supply development programs is promoted by both countries' policies. Both countries' policies state that equity shall drive water development, with priorities set based on needs. The Ugandan policy adds that areas where installation is neglected will be assigned a lower priority.

### Financing Water Development

The Ugandan policy clearly states subsidies will be available to cover both capital costs and repairs beyond what a rural community can afford to assure the financial viability of water installation. Communities are required to collect a small contribution toward capital costs before any implementation can begin. Communities are responsible for collection of O&M and repair funds, but with a pragmatic approach, the policy balances communities' financial responsibilities and local government backing of unaffordable repairs and rehabilitations. Communities manage the water facilities through a village Water Committee. According to the 2002 water policy, Tanzanian communities are expected to "establish mechanisms to pay the full costs of O&M" (The United Republic of Tanzania 2002, 37). In addition, they were expected to contribute a small percentage of the capital costs. The 2009 Water Act (Part VIII, sections 36-37) establishes financial provision of community owned water sources (COWSO). COWSO sources of finances are community contributions into the water funds, augmented by government funds upon request. It is unclear if the financial support offered by the Act is available for both capital and recurring costs of a new water point.

## **Stakeholders' Interview Analysis: Tanzania Rural Water Development**

### Awareness of Governance

The emerging picture for Tanzania is that the new policy has not been effectively disseminated to communities; as a result, communities expect the government to be responsible for the provision of water services, as it was during the post-independence period. This is exacerbated by politicians who, during their electoral campaigns, promised water projects free of costs and responsibilities to the communities, in open contradiction with the current national water policy.

Rural water development in the new policy is centered on community demanding services, participating in the planning, collecting a financial buy-in contribution, and taking on the responsibility for operating and managing water supplies through Community Owned Water Supply Organization (COWSO); therefore, the fact the community does not understand or accept the new rules of engagement represents a huge challenge to the practical implementation of the policy. One obstacle reported in a few interviews was that the policy is too complex to be understood at the community level, and it is entirely written in English, which is not the national language. Some NGOs created a Swahili simplified version of the policy, which is now being disseminated at the pace allowed by the limited resources allocated to software activities.

Some of the stakeholders complained that even national, district, and local government employees and NGO personnel are not familiar with the 2002 water policy. This is substantiated by the analysis, not only because of the frequency of the reporting, but from the fact that different stakeholders provide vague and sometime contradictory

statements about critical parts of the policy. One of the questions asked of all the interviewees was how rural water sector development worked in principle, based on roles and responsibilities assigned to each stakeholder by the national policies. The responses to this question often mixed the governance principles with what actually happens. All interviewees were able to provide a general description mirroring the national water policy and National Water Sector Development Strategy, but the details provided on two key items, the demand-driven planning and the “backstopping” mechanism available to the government to support rehabilitation of water services, were not as uniformly described, leaving some doubts about uniformity of the implementation of the policies.

#### Demand-driven Approach

In a demand-driven approach, it is fundamental that water improvements are a high enough priority for a community to request water services and assume all the responsibilities that come with it. To assume such a responsibility, a community needs to arrive at a reasoned and independent choice of appropriate and affordable technology. Proof of the community desire for a water improvement is the financial contribution to the capital expenses of the project.

In the interviewee’s descriptions of the process, it was unclear who had the specific responsibility to work with the community or monitor how informed the community selection was. The overall impression was of an uncoordinated approach, with different strategies being employed by different groups. Most local NGOs offer community mobilization programs to implementing agencies, but they complain funds are not sufficient to setup effective long-term programs. Their exponents bitterly

complained of the lack of understanding of donor agencies regarding the costs associated with sending personnel to a remote location for an extended period of time. Additionally, those testimonials point out the government is either not responsible or lacks the resources to carry out these “software” activities.

Several interviewees talked about the planning being made by the “consultant,” and how constraints in program rules dictated implementation. This consultant, or consultancy, is a figure quoted by most as a decision maker external to the local reality and imposed on local government from the big decision makers, either the central government or the World Bank and International Developing Partners. According to several stakeholders, the outcome of the consultant work has been a duplication of efforts, such as new wells built next to existing wells, inappropriate choice of technology, such as motorized water schemes with costs larger than the district’s water budgets, and shortsighted plans, like larger schemes built without consideration of future users’ growth.

An additional challenge emerging from the interviews is that of representation. When donors, the consultant, NGOs, or district teams go to a community, they interface with a small group of people, reported to be about 5-10%. These are the people providing input about affordability of different technology choices, committing the community to the cost of the improved water services, and driving the formation of the managing groups. Given the fact that this managing group controls the water funds, which is by far the largest pool of funds in the community, it creates a very powerful new social entity. The entity is independent of the traditional power structures in the village;

especially once the managing groups acquire legal status by registering at the district and becoming quite independent from the village government. Although this might offer some advantages in term of avoiding the local government's diversion of water funds toward other activities, it fuels social attrition, which often requires direct outside intervention to be resolved, especially if the majority of the community was not involved in the decision making process. Additionally, the community does not feel bound by the minority decision and refuses to accept the financial burden imposed by the water points improvements. Difficulties in registering the community management group as a COWSO due to a lack of operating funds at the district and national levels is also listed as a challenge to implementation of the institutional arrangement prescribed by the national water policy. Across the board, everybody reported the insufficient allocation of funds, time, and resources to carry out community mobilization and sensitization activities as a major challenge in the national program.

#### Post-construction Support and Cost Recovery

Several of the interviewees reported that often communities fail to assume ownership and contribute or that water funds are misappropriated or used toward other development projects that have higher priority for the community. In some cases, the water user group members stop participating in the management of the water supply and a management vacuum forms in the community. Water tariffs, by bucket or by monthly contribution are supposed to cover the O&M costs and build up a village water fund for replacement costs. These tariffs are decided by the community based on affordability. They do not reflect the actual cost of providing a water service. According to the pump

vendors interviewed, the few orders for spare parts received directly from COWSO did not exceed \$50, which only covers very small, wearable items for hand-pumps, such as gaskets and bobbins. Larger parts are affordable only on the black market generated by the theft of pumps. With the exception of the WAMMA teams<sup>1</sup> created in Water Aid sponsored programs and paid by Water Aid in the early 1990s, no government efforts have succeeded in creating a network for technical supports or spare parts.

If tariffs do not reflect the costs of providing a water service, the financial viability of COWSO is a big challenge. According to most interviewees, the district was supposed to address this challenge by providing backstopping, in the form of subsidizing O&M and rehabilitation costs. None of the interviewees was able to provide a satisfying description of the backstopping mechanisms. Backstopping is not explicitly mentioned in any of the policies or acts, but seems to be expected to support the functionality of the water scheme beyond the community capacity. As a matter of fact, several interviewees concentrated on topics related to expansion of water services, planning, and construction and had to be prompted to describe how operation, maintenance, and rehabilitation was supposed to work, either by asking what challenges are experienced in the process or by a direct question such as “so far we have mainly covered the topic of implementation of new systems, what about operation and maintenance of existing ones?” Eventually, all interviewees stated that according to the water policies, the community was responsible

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<sup>1</sup> WA –WaterAid M – Maji (the Tanzanian Water Department); M –Maendeleo ya Jamii (the Community Development Department) and A – Afya (the Health Department)

<sup>2</sup> A tap stand is water point in a distribution system i.e., a water point that is not a dug hole or a well

for managing and maintaining effective water services, including regular contributions into a Water Funds to cover O&M and replacement costs.

Possibly, interview responses about the mechanism governing district assistance to communities were confusing and contradictory because these mechanisms are not regulated by policy. The districts were indicated to be responsible for subsidizing rehabilitation costs, which are above what is affordable by a community, but nobody was able to quote a specific threshold above which a community is entitled to obtain financial support, not even the district Water engineers who make that decision. At minimum, the lack of guidelines creates an arbitrariness in the decision about which community will receive assistance and which will not. It is undeniable that guidelines guaranteeing an equitable distribution of backstopping funds are much harder to define when each village uses a different technology like in Tanzania and Uganda where in the latter, the technology choice is standardized to protected springs and wells equipped with hand pumps by national policy.

The lack of clear guidelines is also reflected in the district budgeting process. According to government officials, the district does not have a specific budget category for O&M replacement costs, only for construction of new systems and rehabilitation. The line between rehabilitation and replacement costs is blurred. In a developed country, preventive maintenance plans the replacement of worn-out parts before they break down and the water service is disrupted. Preventive maintenance cannot be done without available funds. The emerging picture from the interview is that when parts break, the water stops flowing, the community stops paying for the service, and eventually, the



village becomes an entry in the lists of communities in need of water service rehabilitation. Districts can request a budget during the following fiscal year to rehabilitate these systems, but according to one of the district Water engineers interviewed, only about one-tenth of the funds requested are approved each year in the national budget.

The only way for a district to obtain money for replacements is to have sufficient funds in the district water department, non-colored budget, called Other Charges, or to receive a grant of funds generated at the local government level from the district council. But guidelines discourage utilizing government funds to bail out communities; consequently, receiving approval to restore water services is reported as much more difficult than receiving approval for new construction or major rehabilitation.

Several interviewees mentioned the community's lack of knowledge of the proper channels to demand support from the district as a challenge. Another challenge mentioned about community management was the fact that community management fades away over time as members of the committee became less and less active or were unwilling to take on unpleasant roles such as going house-to-house collecting money instead of "be[ing] out attending their crops or carrying out some other more gainful work."

Community sensitization to create awareness is a driver. Programs that develop the community's capacity to make appropriate technology choices and financially manage a water point are also drivers. These are usually referred to as "software"

activities, in contrast with materials, engineering, and labor costs, or “hardware” activities.

Most interviewees attributed a lack of funding for software activities as a challenge, and blamed donors, who either directly or through basket funds disbursed by the national government tended to allocate money toward hardware, costs easier to track. These comments imply donors have a large control on the government budget allocation decisions. In the interviews, this is also referred to as too much emphasis on projects instead of services, and counting beneficiaries reached each year instead of focusing on sustainability of services.

A driver reported by several interviewees was to transform the Water Fund into a micro-credit revolving fund, which appears to work well in a community where strong leadership either existed or was developed with appropriate capacity development programs. Most rural areas do not enjoy any form of bank services and are not offered micro-credit opportunities. These revolving funds allow residents who contribute to the water fund regularly to borrow small amounts of money to initiate businesses and return it with a small interest. The funds allow the Water Fund to grow much faster, both because it offers an incentive for regular contributions and because of the interest accumulated.

### Choice of Technology

Linked both to a lack of capacity in the communities and national government and donor funding mechanisms is the theme of inappropriate choice of technology, which emerged in several interviews. It often emerged in association with the decrease of

surface water due to climatic changes. In principle, gravity schemes are the option that can serve the largest population with the smallest operating costs and low maintenance skills, but they require high capital investments. Motorized pumping schemes service smaller populations and require higher maintenance skills, including procurement of spare parts and significant capital costs, especially if solar technology is employed, or very high operation costs if generators are used to power the pump. Hand-dug shallow wells equipped with hand pumps are significantly cheaper, especially if rope pumps, which can be manufactured locally, are used. Few small local NGO working independently from large national programs are actively promoting these low-cost solutions by providing communities with small capital grants and comprehensive capacity developing programs.

Most stakeholders agree a rural community is not in the position to make an informed choice unless sufficient time is spent being educated about each technology's pro-and cons, especially the costs associated with it. According to most people interviewed, the final decision is top-down, not only because of the decision-making capacity of the community, but because the bearer of the capital costs are either the government or the donors, and not only are they constrained by the available budget, but by annual budgeting rules forcing a quick cycle of project planning and implementation. The timing is further exacerbated by the fact the government role is that of facilitator, not implementer. Time needs to be allocated for design and implementation, usually contracted out after a lengthy tendering process. Since funds not utilized within the fiscal year for which they were released are returned to the central government, contractors

must work fast if they want to receive full payment; they cannot wait for the community to organize and participate in the construction by contributing labor.

### Monitoring

Both TAWASANET (2010) and the districts compile reports of water development progress to provide feedback to the national government. Yet monitoring activities both from NGOs belonging to the network and from government officials emerged in the interviews only in the context of not having sufficient funds to carry it out. The regional government, in its role of the link between central government and local government should be “explaining the central government policies to the local government [...is] there to interpret and provide guidance on the policies,” monitor the districts and provide guidance through written reports. It was unclear from the interviews if there were any mechanisms to ensure districts comply with the regional recommendation.

### Ownership in the National Water Development Process

By far, the most disturbing finding that emerged from the interviews conducted in Tanzania was the lack of ownership stakeholders had in the Water Sector Development Program (WDSP). Half the interviewees referred to the WDSP as the World Bank program; most comments about the program were negative, as stakeholders complained the rules dictated by the programs were inadequate, either in terms of selection of intervention, technology emphasis, budget release mechanisms, duplications of efforts, or squandering of existing successful programs. The failure of the first phase of the ten-year plan was substantiated by the findings of a 2.5-year WDSP review and by the Joint

Supervision Mission carried out in April 2010 by the World Bank and the Development Partners. In the word of one interviewee working closely with the program, “last year” after the first five-year phase of the \$1.2 billion program,

during the Water Sector Review [...], the Minister of Water and Environment announced that the biggest achievements have been that all district council have been equipped with their own cars, with computers and their offices have been refurbished. And more than half of the money had been spent, but no single drop of water has been flowing yet. (TZ-NGO 1)

Some interviewees complained about corruption in the government ranks, but some of the expenses were justified by the bureaucratic requirements of the program, including payments of international consultants responsible for planning.

During Phase 1, rural intervention focused on the Quick Wins program in which each district was supposed to select ten villages based on need and proceed with the implementation of low budget projects, which would result in an immediate impact. The district role was to identify ten of the poorest communities in need of water improvement, and tendered the planning stage to external consultants, following the World Bank regulations. As quoted in an interview “it seems these consultancies, they went to the village communities and told them what do you want, a water pump or a piped scheme... do you like a bicycle or a Mercedes Benz? So the unit costs exploded. And actually [the district] could not afford” to implement the plan within the program budget (TZ-NGO 1).

Some districts that had already developed district-wide plans, working directly with development partners, were forced to abandon them, as the development partners joined the Sector Wide Approach and decided to contribute through the WSDP basket funds. The WSDP regulations required planning to be repeated through the external

consultant; new rules of implementation required all work be contracted to the private sector, which was required to finish the work within the specified timelines under contract. Therefore, employed laborers did the work instead of required community participators providing free labor. This created attrition between neighboring communities, as villages included in the Quick Wins were paid for the labor and others, part of previous district-led development had not been paid. Districts officials were accused of “eating the money” supposed to go to those village laborers. The local stakeholders’ lack of ownership and frustration with the WSDP was best expressed with their words directly quoted from the interview transcripts.

*Question: What do you see as the biggest challenge you face to bring water to communities?*

Of course for the time being the major challenge is the Water Sector Development Program. Instead of funding our projects according to the phases which have already been established... it is a challenge. Furthermore if you construct these small Quick Win projects the impact will not be seen. You take a huge area, like one with 30 villages, than the impact will be seen, but if you work in these small area then you skip a bunch of villages and do a project in this other not connected area... It is very difficult even to have a common understanding of the people about how to pay for water bills. Because for instance now some projects are metered [previous implementations] and some projects are not metered [WSDP]. So why one village pay less money as they pay a flat rate and some other villages pay more with a metered rate? That is why we asked if we could use the WSDP to continue our plan. In an area with about 13 villages, [there] is a registered private entity [that] manages the main water sources in [...] the district council and their main pipeline goes by those villages and feeds our communities there. Now there is a crisis because most of the neighboring villages are not metered. So why those ones managed by [the water entity] are metered?

Another challenge of this Quick Wins program is that there might be 2-3 villages upstream and the water source is in the forest so the pipe goes to the downstream villages which have been selected to get water, but does not provide any water to the village upstream which see the pipe going through the village. The way they have instructed us is to revise the design period and make sure we

use the cheapest material to construct the system. There goes sustainability. Many of the rules of WSDP makes no sense. Like for these water source which skip villages we are supposed to design using a small pipe diameter as we do not need a large quantity of water for these villages. Yet if you later try to branch off to reach some of the villages which have been left out you have to replace entire sections of pipes because the one used originally are too small. Very poor planning. They say design according to the population that you have right now. (TZ-Government 1)

With these Quick Wins project we did not have any element of management. Now, this is where the problems come from. Funds are there for infrastructure. No funds to train. No fund to create Water User Entities. And no funds are allocated to do O&M. this is a big problem. (TZ-Government 2)

*Is it not possible for districts to request funds for O&M?*

This was just a special program, no district had anything to say. The program was decided at the national level. The ministry decided we provide money for infrastructure; and whenever we come to request money for management or capacity building the ministry reply that decisions have been made and they are not able to change the plans. So there is nowhere to get money. That was the first of the problem. We implemented a lot of projects in the region; especially for [this region] we went for about 110 projects which were rehabilitation and few which were new construction. But no capacity building, no management strengthening. As I am talking now, we already have some of those projects which are not functioning. Last year we were trying to pass in the community and in the villages to see how the projects are doing, but there are such serious problem, because communities are not contributing, they are not even aware that they are the owners of the projects. When we asked the district why is it like that, they respond we have no funds. We do know we need to sensitize the communities to at least register the user entities, but we do not have funds. This is a very serious issue. (TZ-Government 2)

The World Bank project is crazy and indeed I expect the project will be abandoned. The flow of cash from the World Bank is not coming. the plan called for 10 villages/district in the first 3 years. But the money was not available, so only 2-3 villages every district. (TZ-NGO 3)

We had a problem with shortage of funds For example the World Bank promised to assist, the project started in 2006, but it is not going forward Last year we were approved for 1 billion Tsh, but we received only 200 million only. (TZ-Government 3)

The problem with the non-release of funds lies with the fact that the World Bank and the Developing Partners were not satisfied with the reporting procedure used by the Tanzanian government. They requested the government adopt a different reporting method for which the local government is not set up. The freezing of the funds after the government had signed contracts with consultants and contractors created an impasse in which every stakeholder blamed the other. The WSDP is also criticized for the choice of technology “they are emphasizing the construction of new infrastructure, forgetting about reviving the functionality of existing systems, they are going for high tech. I have seen a paper saying NO HAND PUMPS. Motorized pumps and piped scheme projects” (TZ-NGO 2).

It is important to remember that the failure of the WSDP can only be responsible for the lack of improvement since 2005, while lack of progress in starting rural water development has been a problem since 1990 when privatization and decentralization pressure began to change the status quo. Still, the picture emerging from the interviews is that the national government and the International Developing Partners decided to adopt a new approach not based on the local existing resources, creating new bureaucracy and forcing external rules on the district government.

### **Stakeholder Interview Analysis: Uganda Rural Water Development**

#### Awareness of Governance

Community awareness of their role is recognized as a challenge in Uganda as well, particularly in the Northern districts where the war forced most of the population



into refugee camps and everything was provided to them free of cost and responsibility. Although it is recognized as a challenge, more often it is mentioned in the context of describing the sensitization activities recognized in all the stakeholder interviews as an important driver for rural water development. None of the interviewees complained about the complexity of the policy, described by all interviewees in identical and clear terms.

### Demand-driven Approach

According to the interviewees, sensitization and mobilization campaigns were the bulk of the activity at all government levels. Sub-county health officers and community development officers are the first level interfacing with a community; they organize meetings in the villages where the priorities of the community are discussed. If water is a high priority, the community is educated on the requirements for obtaining a water improvement project. There are six critical requirements to which a community needs to commit to receive services. The first requirement is that the community compile an application expressing their demand for assistance and accompany the application with a contribution toward capital expenses, regulated by guidelines on different technology options; the community contribution for a protected spring is about 45,000 Ugx (20 USD), for a shallow well is 90,000 Ugx (40 USD), and for a deep borehole is 200,000 Ugx (87 USD). The above contributions are about 0.02% of the implementation costs, and they just represent a sense of ownership without representing an unaffordable financial burden.

The implementation work is tendered to the private sector, which is responsible for O&M of the facilities for the first six months of operation. The second requirement is that all land disputes are settled by the community on the land where the facility is going to be installed. The third and fourth requirements are the formation of a village Water Committee composed by at least 50% women who must be elected in positions of responsibility, such as the chairperson, the treasurer, or the secretary. A sanitation improvement is the fifth requirement; 100% of the community leaders must build a latrine and the rest of the community must increase the number of existing latrines by 30%. The sixth requirement is that the community develops a three-year action plan for operation and maintenance of the facility.

The districts actively monitor the sub-county work and cover the expenses of community mobilization. Central government guidelines require that 8% of the water department budget is spent on these software activities. The sensitization activities carried out by the local government is also complemented by the work of local NGOs that follow the same training method recommended by government guidelines because “there is no reason to reinvent the wheel” (UG-NGO 1). This implementation of the demand-driven prescription is hindered by interference of politicians who use their influence to have water coverage in certain areas in exchange for votes, creating communities that will receive water without a firm commitment to owing the O&M of the water points.

Some local NGOs try to capitalize on this challenge, by training the community in exploiting electoral time leverage, “no water, no vote,” through lobbying and advocacy

techniques. The core of these initiatives is to sensitize the community “about [the fact that] water as a right to them,[...] and who has the duty to provide, whom they have to go to demand these services,[who] is the budget holder, who control this, who makes the decisions, this one decision is more binding than the decision of this other one” (UG-NGO 2), sometimes even organizing peaceful demonstrations to receive water services, as access to water is felt as a right.

### Post-construction and Cost Recovery

Despite much more emphasis on and funds poured into community mobilization, Ugandan stakeholders also reported community willingness and the capacity to manage their facilities as one of the biggest challenges. After a short time, only two or three of the water committee members were active; some stakeholders mentioned the fact that it was unrealistic to ask a few household members to carry such a responsibility unpaid. Just as in Tanzania, villagers were hesitant to pay into the water O&M fund, as they did not trust the people managing the funds. A recent approach under experimentation is to involve the village government level in arbitrating and regulating the by-laws and Memorandum of Understanding between the various members; the involvement of the lower government level allows the establishment of small fines for members of the committee who fail to attend to their responsibilities.

The government encourages monthly payments instead of per buckets fees, as the human resource required for this latter option makes the price of water much higher. But most stakeholders report that sooner or later, the water funds are insufficient to care for O&M replacement costs, and further involvement by government and NGO are required

to make the system work. Government guidelines set a monetary threshold of 300,000 Ugx (130 USD) for a community of fewer than one hundred households; the district is responsible for replacement costs above the thresholds with funds coming from the 11% of the yearly budget dedicated to O&M expenses. Repairs below 300,000 Ugx are the responsibility of the community and assistance requests are handled by sending staff to meet with the community, repeating some of the sensitization and mobilization steps until the community manages to re-organize and collect the money for the repairs. Proactive field monitoring at the sub-country, district, and national levels provides a mechanism to educate the community on the available channels to request assistance. Some NGOs stressed the importance of creating relationships between a community and their local government and slowing down the execution speed of the program going through the government channels, allowing sub-county and district representatives for the area to be the faces of the project.

To facilitate the communities in carrying on the repair and acquiring spare parts, the government, with the collaboration of local NGO, set up a network of hand pump technicians, whose work was monitored by the borehole maintenance units from the districts' water departments. The hand pump mechanics were trained to provide regular maintenance and troubleshoot problems with hand pumps. They received payments directly from the communities and were supposed to report to the borehole units if a repair was above their level of competence or the financial status of the community water funds. The hand pump mechanics do not have enough work to make a living just servicing hand pumps; a problem often reported is that they overcharge the community,

or even vandalize a pump to sell parts or simply to charge the community for work not needed. Districts recognize the challenge and try to monitor the hand pump mechanics' trustworthiness through their borehole support units, with an uneven rate of success; recently, some districts tried to address the problem by creating guilds and associations of hand pump mechanics.

Unlike in the Tanzanian case, in Uganda, there were no discrepancies in any of the interviewee descriptions of the guidelines regulating roles and responsibilities of the various stakeholders for operation and maintenance of water points. It must be noted that the fact that the choice of technologies is restricted to protected springs, boreholes, and shallow wells with standardized hand pumps contributes to significantly simplifying the interaction between stakeholders.

Also in Uganda, revolving funds have been set up to encourage community contributions; loans from the water funds have different interest rates depending on the borrower contributions into the water fund. Even more communities are encouraged to pool their water funds together and borrow from one another when repairs are needed, almost creating sinking funds for multiple water points.

#### Choice of Technology

Choice of technology for rural development is dictated by the 1999 water policy to the detail level of the brand of hand pumps. The only mention of technology choice during the Ugandan interviews was related to the ongoing efforts to integrate multiple technologies to face the challenges posed by climate change. Several districts in Uganda are already water stressed. Rainfall patterns have become very unpredictable, and over

pumping without allowing for well recharging times require a more creative policy approach. In particular, rainwater harvesting is not well integrated in the policy; small households' rainwater harvesting tanks, 150-3000 L, are much diffused as they are more affordable than larger ones and might be sufficient to satisfy a household's water demands. Yet water tanks below 6000 L are not recognized by the policy as a water source. This exacerbates the reported problem of water re-selling in urban and peri-urban areas. The Ugandan government regulates water prices by source and district, imposing a maximum price that can be charged per unit to recover the costs of operating and maintaining water systems. These smaller water harvesting systems fall below the radar of government control.

#### Monitoring

Eight Technical Support Units (TSU) (Government of Uganda 2000) composed of engineers, health officers, and development specialists monitor the districts activities in addition to providing advice and compiling reports for the Ministry. The TSU staff spend four days a week traveling to the field and are able to monitor each of the districts assigned to each staff member multiple times every quarter. The TSU were introduced in 2002 to monitor the district utilization of the large conditional grants they were receiving for water improvements.

#### Ownership in the National Water Development Process

Unlike Tanzania, the Ugandan interviewees clearly expressed the feelings of national responsibility to guarantee the right to water to all citizens. The central government is holding the responsibility for allocating the water budget. Foreign

interference was not mentioned during interviews. The World Bank was hardly mentioned by any of the stakeholders, even if a portion of the national water budget is provided by International Developing Partners, including the World Bank.

Harmonization of the NGO activities is strongly felt and strong attempts are made to regulate it. NGOs operating in the water sector are required to disclose their plans and budgets to the districts in which they operate to allow optimized planning of the combined budget and minimize duplication. Although international NGOs' failure to comply with these requirements is tolerated, almost all national NGOs are abiding by it. UWASANET is responsible for reporting on the activities of all NGOs operating in the water sector, including their budgets.

#### **Case Study, Tanzania: The Ngelenge Water Distribution System**

Ngelenge is a village of about 2,200 residents (about 350 households) located in southwestern Tanzania, very close to the shore of Lake Nyassa, in the Ruhuhu ward, Ludewa district (see figure 13). The village is composed of four adjacent sub-villages (Kivukoni, CCM, Maguland, and Shuleni) and an agricultural area (Faulkland) about a forty-minute walk away from the main village. The residents' livelihoods are mainly based on subsistence agriculture and fishing. According to a socio-economic household survey carried out in 2010, the average monetary income in households of four to five members is \$30/month. The Ngelenge Development Association (NGEDEA), started by a group of village residents in 2001 with the goal of improving the living condition of Ngelenge residents, formed a partnership with Engineers Without Borders (EWB), San Francisco Professional Chapter in 2005.



Figure 13. The village of CCM, with the Ruhuhu river delta and lake Nyassa.

The EWB mission is to support community-driven development programs worldwide by collaborating with local partners to design and implement sustainable engineering projects while creating transformative experiences and responsible leaders. During the initial site visit (2005-2006), an economic assessment of the community and development priorities were established with participatory workshops. The main priority identified by the villagers and NGEDEA during this time was the need for a health dispensary; seed funding was provided by EWB and TASAF (Tanzanian Social Action Funds) for construction of a health dispensary, which was completed and staffed in 2009. The second priority was identified as improvement to their clean water access. The 2,200 residents in Ngelenge fetched water from three wells equipped with hand pumps. Most households were further away than the 400 m defining the basic service level in the



national water policy, but not exceeding the 1.5 km distance, which qualifies water services in Uganda. The wells were constructed by Concern International in 1997. At the time of the first EWB assessment, village residents claimed only one of them had a consistent supply of clean water.



Figure 14. Bucket lined up at the CCM well.

To improve the community's access to water, EWB proposed the construction of a water distribution system designed to provide a maximum of 20 L per person per day of potable water to the residents of Ngelenge. Water is distributed through a piped network with eighteen water access points distributed across a 5 km<sup>2</sup> area, fed by gravity from a 15,000-gallon tank filled with water pumped from a deep borehole. Power to the system is provided by a 1.2 kW solar array, as the village is about 100 km away from the closest electrical grid.

The system was very similar, albeit much larger, to a system installed in the neighboring village of Nsungu by a German NGO, designed to bring water to a division health center, elementary school, the Ward Police Station, and the Manda Catholic Mission. Technical work on the system began in 2005 with a hydrogeological survey that identified potential locations for a well with sufficient yield to satisfy a minimal

requirement of 20 L/household/day. Between the 2006 trip and the 2008 trip, EWB initiated several discussions with villagers regarding planning, design, construction, and long-term operations and maintenance needs for a sustainable, pumped water distribution system. The district government was informed of the plans but did not participated in the discussion and did not provided advice nor requirement for coordination.

Topics discussed with NGEDEA, village leaders, and community members covered village roles prior to and during construction; ownership, management, maintenance, and funds. Specifically, residents were asked to contribute to capital expenses by raising 3,000,000 Tsh (\$6.5/household), provide free labor for excavation and other unskilled work, form a Water User Committee and agree on a Water Constitution to regulate O&M of the system, and take full responsibility for O&M, including the financial costs with a monthly contribution of 6000 Tsh/year (\$4.5/household). The cost for O&M was a rough estimate at this point as the design of the system had not been completed.

Upon village approval of the plans, the implementation started in 2006 when three wells were drilled, as the first two locations did not yield sufficient water for the water distribution system. One well was identified as suitable for installation of a powered pump, the other two were equipped with hand pumps. The community formed two new water committees to take care of the new wells. During the 2006 trip, an elevation survey was performed to identify appropriate locations for storage tank, water lines, and the

location of the distribution system tap stands<sup>2</sup>; terms were decided in consultation with members of the village government. The final design and budget of the water distribution system was completed in 2007 and sent to the community for approval in early 2008, with a letter reminding the community of their commitment to raise 1,000,000 Tsh before construction began, and the remaining 3,000,000 Tsh during the implementation, to contribute labor and locally available materials and to establish a water management structure responsible for O&M of the system according to a water constitution approved by the whole community. Communication with the village was handled by a representative of NGEDEA, which reported that the contribution had been collected and the community was looking forward to beginning the construction of the system and the preparation of the management structure. EWB began construction in the summer of 2008; the system was completed in 2009.

Excessive sand infiltration in the well caused an excessive load onto the pump. By February 2010, the pump had stopped working. It was under warranty; therefore, the vendor sent the village a replacement pump in late spring 2010. Since the village technician did not have a controller to reset the shutoff pressure thresholds, the pump could not be set up until EWB arrived in the village in June 2010. The pump vendor informed us that since the cause of the pump failure was excessive sand infiltration in the wells, it was not included in the warranty; therefore, they would not provide any other replacement.

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<sup>2</sup> A tap stand is water point in a distribution system, i.e., a water point that is not a dug hole or a well with a pump. Basically it is a faucet to open and water flows out.

Working with the village water technicians, EWB attempted to redevelop the well in 2010, but could not reduce the sand infiltration, and after a few months of operation, the pump failed again. In June 2011, EWB dug a new well with an improved filter pack and purchased a new pump. The system has been functioning without major technical issues since August 2011.

#### Demand-driven Approach, Awareness of Policies, and Representation

The first team of EWB volunteers reached the village in early July 2008 with the belief that the community had a strong desire for and was committed to the implementation of a water distribution system such as the one in the neighboring community of Nsungu. The 2008 implementation trip plan consisted both of hardware and software activities. EWB prepared a construction work plan, purchased materials to build the system water tank, and created the distribution network to the first two water points. Guidelines from the Tanzanian Ministry of Water and the Environment were brought to the village to establish a managing committee and prepare a Water Constitution and a Rules and Regulation management plan for the operation of the water system.

The events of the summer of 2008 lead to questioning the community's desire and commitment and exposed the challenge faced by an external agency such as EWB to translate in practice the principles of demand-driven development. Additionally, it revealed the lag between the 2002 water policy and its actual diffusion. Upon EWB arrival in the village, a first meeting with the village government officials and members of NGEDEA was organized to discuss plans moving forward. EWB presented the

construction work plan for the summer, highlighting the village contributions of labor and local materials; presented the government guidelines to ratify a village-based governance model; and requested a report on the 1,000,000 Tsh community buy-in contribution. Based on communication with NGEDEA representatives, EWB was operating under the assumptions the community wanted and was supportive of the project. While the people attending the meeting reiterated the village desire and commitment, by the end of the meeting, it was clear the situation on the ground did not coincide with the communication received in the previous months by EWB. The village government reported that not all the 1,000,000 Tsh was available as the collection was still under way, and they could not provide specific information on the amount collected.

They did promise to mobilize the community to begin the work and quickly elected a committee to work on the formulation of a Water Constitution and a Rules and Regulation attachment. The committee election was a great glimpse into how decisions were made by the village government. The people assembled at the meeting began to nominate candidates who were then either affirmed or denied by majority vote. Within 15 minutes, the committee was formed. Several of the people nominated for the task were not present at the meeting. Interestingly, the appointment of the committee came much easier than many others, including what would seem to be much simpler decisions such as where to store bags of concrete. Such a nomination process raised doubts that the elected members felt invested in the work in which they were required to participate, without even knowing the time commitment they needed to dedicate to the task.

Obtaining a report on the status of the financial contribution was extremely challenging. During the first few weeks in Ngelenge, EWB made a number of unsuccessful requests for a progress report on the collection of the village contribution to capital costs. The funds had been collected independently by each of the sub-village leaders and by the NGEDEA treasurer, and receipts had been kept, but the location and exact quantity collected was unclear. Attempts to call a meeting with all the people involved in the collection were unsuccessful.

The first report on fund generation was made in early August, almost a full month after EWB's initial request and more than two months past the initial deadline. The total amount reported was 338,000 Tsh. During the initial report, there was some mistrust and confusion expressed in relation to the forms created by NGEDEA to assist in money collection. It appears people believed the money was going to NGEDEA instead of the water project, motivating their refusal to contribute.

EWB, with ten volunteers traveling from the U.S. and \$450,000 of materials already in the village had to make a decision between proceeding and abandoning the project. We convinced ourselves that part of the problem was the capacity of the village to sensitize and organize the community and decided to proceed with the planned first phase of the implementation, constructing the water tank and trenching for the distribution lines. But we made it clear to the village leadership we would not proceed with the purchase of solar panels and pump until the full amount was collected.

Another report on the fund generation was given at the end of August in a signed letter by the village executive officer, the only paid government official in the village.

The total contribution reported was 864,000 TSH. It was found out later that this report included goods such as hens, beans, and cassava that had been promised to the project but needed to be sold in order for the money to be available. In a final report on fund generation given in early September at a whole village meeting, it was reported that a total of 525,000 Tsh had been raised. The report only included the funds that had been physically collected for the project.

The mobilization of the community labor proved to be just as challenging. Despite EWB specific requests to organize labor teams, mostly communicated to NGEDEA, few volunteers reported to work. The question of whether the community's failure to collect the buy-in contribution or participate in the construction work was due to a lack of interest in the project was clouded by the constant reaffirmation that Ngelenge wanted the water system by the people EWB trusted to be the voice of the community. When EWB began discussing the project with village residents, it became clear that most did not really understand the scope of the project or what services it would provide. It was clear that neither NGEDEA, nor the village leaders, had effectively communicated the project to the village as a whole. Construction activities were delayed due to a lack of volunteer laborers. EWB relied on NGEDEA as an interface to the community, but clearly NGEDEA did not represent the view of the whole community.

To bring the average resident up to speed, EWB requested a whole village meeting be held to explain the projects and motivate the community. Unfortunately, attendance was not as high as we hoped at these meetings. Participants arrived at different times; at the time of top attendance, the first whole village meeting did have

about 170 adults, possibly representing less than 20% of the community. Some of the participants reiterated their need for a better water delivery system, but they did not appear to be particularly enthusiastic about having to contribute or about the request of free labor. Somehow, by the end of the meeting, the participants agreed to participate in the next few months of construction work.

As work progressed, it became clear that one of the problems was the lack of a leading group mobilizing the community; nobody seemed to have the mandate to represent the community. EWB did not understand which mechanism should be adopted to communicate to the residents. NGEDEA had no authority to ask people to come out and provide the labor required for construction, and the village sub-leaders required active pressure from the village executive officer to organize groups of laborers. Work proceeded extremely slowly and required that EWB volunteers constantly exert pressure to mobilize labor. By the end of the three-month implementation trip, only the water tank had been constructed, with most of the work done by the same few village volunteers. Materials for plastering the water tank were left in the village and a village mason was paid to complete the work.

The lack of participation and financial contribution could be interpreted in several ways. The first and most critical was the absence of a need for water improvement. Originally the village had three wells equipped with hand pumps, and in 2006, EWB had added two more wells, providing water points to the households of the communities living further away from the older wells. Water quality data indicated that four out of the five wells' water was within the WHO standard for safe water of less than 1 *E. Coli*



colony in 10 ml. Certainly the water distribution system was going to provide better coverage, satisfying the National Policy requirement of water access within 400 m of each household and serving fewer than 250 people, but perhaps not to the level that would motivate households to commit free labor and an additional financial burden.

In retrospect, I believe the EWB failed to correctly interpret the fact that by having added two wells providing a better service to the villages' outskirts in 2006, water was no longer a priority for the community. All indications pointed to the community commitments not supporting statements that water was a priority for the village. Worst of all, these declarations were made by the few village members who spoke English and could communicate with the "msungu" (white people), not necessarily by a solid project counterpart that had the mandate from the community to negotiate the steps moving forward. Clearly, NGEDEA opinion did not reflect the point of view of the community. Furthermore, the community had never been in the position of choosing the technology, only EWB was.

It is easy to talk about what a community needs or thinks as a theoretical concept; in reality, a community is a collection of individuals, and each one of them has different priorities and views of development. The effort to understand the compromised solution that would benefit the majority of people in a community is not easy for an outsider, especially if a community has not elected a person or a group of people to represent it. This was the issue EWB decided to confront during the 2009 implementation trip, as it is described later.

The development of a water constitution and management plan for the distribution system was just as important as the technical portion of the project. The structure and content for the constitution and management plan were adapted from a set of documents available from the Tanzania Ministry of Water website, prepared in the context of the Water Sector Development Program, and included different water source management schemes, sample constitutions, and management plans (The United Republic of Tanzania 2006, Annex 7, 10). These documents give guidelines for facilitating community planning and explain many of the existing structures for water system management in Tanzania. It is worth reporting the comment of one EWB volunteer, who worked two years in Mozambique with the Peace Corp and participated to the 2006 assessment trip, “it looks like some white bureaucrat who never lived in a village wrote those.”

EWB had met with the Ludewa district officers every year since the beginning of the project in an attempt to coordinate our activities, which practically resulted in a mere exchange of information about the status of the project. During the first week in Ngelenge, EWB volunteers traveled to the Ludewa district office to meet with the district executive director and the district water engineer to inform them of the summer plans. During that meeting, EWB showed them the documents from the Ministry and asked the district for guidance facilitating the village committee in the task of organizing an effective management structure. Nobody had ever seen any of the documents from the Ministry; they asked to borrow them from EWB to make copies.

The goal of the constitution was to define the organizational structure that would operate and maintain the distribution system along with roles and responsibilities, term

limits, election and voting rules, quantity of meetings, etc. The management plan is a separate document defining the expected maintenance costs, money collection, persons responsible for maintenance, and rules and regulations. Despite the existence of five village water committees managing the existing water sources, the level of generality of the constitution and management plan templates made it difficult for the committee to relate. The majority of the first meeting was spent explaining the purpose of the constitution. During the following meetings, the Swahili sample constitution from the Ministry of Water was read, article-by-article, and committee members were prompted to discuss whether anything was missing. As this was the first document like this any of the committee members had ever seen, there were very few unprompted comments. However, when prompted with a situation the constitution did not do a good job of covering, they quickly understood and thought of alternatives to fix the omission. Also, the committee was not familiar with the type of language and structure used in the water constitution; for instance the practice of defining the parties, such as “Users,” at the beginning of the document and then referring back to them later in the document was difficult for them to understand.

The two topics that created the most animated debates were that of corruption and the possible breakdown of the committee. These were significant concerns, but it was not clear what could be written in the constitution to prevent them from happening. In retrospect, the community members involved had foreseen some of the difficulty the project was going to face in the years to come. The final version of the constitution was almost identical to the Ministry template; it was subsequently submitted to the village

government and the whole village assembly for approval and was approved by both. After approval, a conflict arose in which NGEDEA felt that they should have representation on the committee. EWB did not support NGEDEA's request and suggested NGEDEA members candidate themselves for elections according to what was stated in the constitutions. Despite the fact that eventually NGEDEA members were elected in the key positions of treasurer and secretary, this created a long-lasting fracture between EWB and NGEDEA.

According to the approved constitution, each of the tap stands providing access to water had to be managed by a Water User Group (WUG) composed by six members elected from the 10-25 beneficiaries' households, responsible for operating and collecting water tariffs. An Executive Water Committee (EWC), elected from the members of the WUG, was to provide oversight and manage the village water fund created to collect all water points' contributions; none of the entities created by the constitution had a history in the village. While the functions of the WUG were practically identical to that of the existing water committees, the fact they were named differently introduced confusion. By the time the last EWB volunteer left the village in September 2008, the election of these committees had not been carried out. In summary, the WSDP guidelines were ineffective.

They did not build from the village experience with their water committee and were very theoretical, to the point that nobody, neither EWB volunteers nor the committee members who reviewed the template, realized that in a village such as Ngelenge, to organize a general meeting of  $18 \times 6 + 2 = 110$  people twice a year was totally

unrealistic. Additionally, the Ministry documents assumed that from day one, all involved would carry out their functions without flaws, since there was no mechanism to fine tune such a complex and new organization outside of a general meeting.

The other consideration to be made is that it should not have been EWB's duty, a foreign organization with no cultural tie to Tanzanian rural village, to facilitate the creation of governance of the water scheme, especially without any support from the local and district government. Yet, it was quite obvious nobody at the district level was either knowledgeable enough or responsible enough for such a task, even six years after the publication of the national water policy and two years after the publication of the WSDP documents.

The events of 2008 lead EWB to elaborate a new strategy consisting of transferring full responsibility for completing the water distribution system to the community, offering only funds, technical advice, and training to them but no leadership. In early 2009, EWB sent a letter to the village government detailing a proposal aimed at having the village take leadership of the project through the Executive Water Committee (EWC) that, according to the Water Constitution, was going to hold responsibility for the system upon completion. EWB would return to the village in the summer of 2009 and, with the support of NGEDEA, organize a series of trainings to help the EWC understand construction, operation, and management tasks required for a successful and sustainable project implementation. Aside from the trainings, EWB volunteers would only act as technical consultants.

The letter explained how EWB would not set any timeframe for the continuation of the project. It could only move at the pace at which the community was willing to move it forward. EWB also required that the portion of the piping network purchased in 2008 and stored in the village be installed and the 1,000,000 Tsh contribution be collected before purchasing the solar array and the pump and the remaining piping network. For technical reasons, EWB volunteers had to be in the village at least one month after installation of the solar pump to provide technical assistance and monitor the performance of the system, which challenged the village to complete the requirements by July 2009 if the implementation had to be completed before the end of the summer. Otherwise, the installation would be scheduled at a later time, most likely after the 2009-2010 rainy season.

EWB created the training course based upon the *Guide for the Training of Water and Sanitation Committees and Water User Entities* published by the Tanzanian Ministry of Water (The United Republic of Tanzania 2006, Annex 11). The guide was designed to train a facilitator leading a multiple week-long participatory based course to create the capacity needed in a community to plan, implement, operate, and maintain a water scheme. EWB recruited as trainer a former Peace Corp volunteer who spent three years as a secondary school teacher in a village 50 km away from Ngelenge and asked NGEDEA to provide a second facilitator for the training sessions. With this strategy, EWB hoped to address the lack of community participation while fostering the formation of the leadership group, which would continue to operate the system upon completion.

The proposal was approved by NGEDEA and the village government. During the first meeting between EWB and the village government in 2009, a report was made that the collection of the capital contribution had not progress past the 500,000 Tsh; during the spring of 2009, the village formed a water user group for each of the water points, and they were ready to proceed with the election of the executive water committee. During the meeting, it was clear the proposal of transferring responsibility for the system construction was met in a positive manner by the village government. They expressed the need for close coordination between the executive committee plans and the village political leadership. The village government stated that each step in the construction planning had to be cleared by the village government. A concern expressed by the village government members was that they wanted the executive committee to be composed by a villager with a track record of hard work for the community, not people just wanting the post to gain public recognition. A discussion on the topic had already being initiated by NGEDEA. The village had decided to ask the people interested in serving in the executive committee to write formal letters of candidacy addressed to the village executive officer. Those letters would serve as a guarantee that candidates understood what they were committing to and their statements were binding to their commitment.

A whole village meeting with ninety-seven participants (less than 10% of the adult residents) was held on short notice; the meeting was largely conducted by the village authority and NGEDEA. The first argument to be addressed was the need to restart the collection of the village capital contribution to the construction of the water

system. Although the total amount already collected was not explicitly mentioned, the villagers were reminded that each sub-village chairman had a list of names, amounts, and collection dates. People from the audience complained that records were not kept properly; they were reminded that making sure contribution records were well kept was the people's responsibility as much as the collector's, since signed receipts were given to both parties with the amount and date and everybody's signatures. After a brief debate, it was decided collection should be restarted as soon as possible because people just finished harvesting so they had money (or rice) available to pay. People from the audience had very strong opinions on how to enforce collection – analogies were made between people not contributing and kids skipping school, and how the latter gets beaten. Villagers suggested the village government set harsh consequences for people delinquent on their contribution and there was strong agreement in the audience.

NGEDEA explained the EWB proposal of having a village elected executive water committee (EWC) managing the construction of the water distribution system. The village authority stressed the importance of electing committed community members and therefore, encouraged everybody to participate in the selection process so the whole village was involved and everybody's opinion was heard. The village leaders declared the elected members of the committee would be held accountable for their commitment by the village authority. A member of the audience asked if EWC members could be picked outside of the members of the WUG. An NGEDEA representative who participated the year before on the preparation of the constitution – holding a copy in his hands – reminded the audience that the constitution clearly stated only water point



committee members could be considered for a post in the EWC. He added, the constitution was read in front of the whole village and approved by the whole village. He also pointed out he had warned everybody to pick active people for their tap stand committee as the EWC was going to be elected from those.

The leadership also requested voluntary labor to restart construction at the tank the next day. Specifically, he requested every villager take three buckets of sand and each woman take three buckets of water to the tank so the masons could begin plastering to speed up construction while the election and training of the committee was completed. This work was left for the community to complete and paid for in full at the end of the previous summer's implementation trip.

EWB's disappointment at the realization that none of the work left for the community to complete was mitigated by the realization the community had discussed and elected the various tap stand WUGs, and they seemed excited by the new course of events. Ten percent of the village residents who participated in the meeting seemed to really look forward to continued construction.

By the time the meeting to elect the EWC was held, about eighteen letters of candidacy had been received by the village authority. About forty people were present at the meeting, with about 30% of the water point committee members with voting rights present; at least one representative from each water point was there. The election was carried out in a very structured and fair manner with two exceptions. The elected chairman of the EWC was not entitled to assume that role by the constitution, which clearly stated no member of the village government could be elected. His appointment

was well seen by many people, including EWB, since he had been active in all development projects carried out in the community. A decision was made that he would resign the other post. The man elected as treasurer was not present at the meeting, neither was he informed of what was going on in the village as he was in Dar Es Salaam for some family issue. There was no doubt that most people wanted him to be the treasurer because of his track record for honesty as a village ward and NGEDEA treasurer. Another member of NGEDEA acted as the missing man throughout the meeting, including mimicking his posture and his personality to the amusement of the whole assembly.

The first training meeting, which lasted over eight hours, started relatively on time and was attended by all the elected EWC members plus about five community leaders. The training was a shortened version of the Ministry guide and covered objectives, roles, and responsibilities of the committee members, discussed in depth and related to events from past community projects analyzed thoroughly in terms of obstacles and solutions. Mobilization of the community created a lively discussion when EWB volunteers were asked to describe mobilization tools used in United States. Additionally, a breakout of all remaining construction steps and technical details of the water systems were discussed. The project's full budget was reviewed at the end of the meeting and the astronomical costs of over 110,000,000 Tsh was pointed out to all the members to make them aware of the big responsibility they had accepted.

The series of meetings following the first one departed from the Ministry script, as it was realized there was limited value in the theoretical streamlining of ideal

situations. It seemed to make more sense to point out concepts in the context of the work being done in the village. Only about two-thirds of the EWC members were ever present, but two villagers who had been appointed as water technicians started attending regularly, and occasionally masons and other active villagers would join. The meetings were led by the EWC chairman, and opened with a review of the last action plan made and a discussion on obstacles and opportunities. During the second meeting, all O&M costs were detailed and reviewed, and the committee was asked to set the water tariffs. They decided that 600 Tsh/household/month was a reasonable compromise between affordability and cost recovery. The water tariff chosen corresponded to about one-third of the estimated full-recovery costs. The path to make the decision on the tariffs was interesting. Africans have the capacity of coming to a common agreement by compromising. The other interesting note was that everybody sitting at a meeting would have the same weight on the decision as the appointed decision makers.

Construction work proceeded at a moderate rate. The EWC did its best to organize laborers for trenching the main inlet line and the path leading to the first two water points; they mobilized the community through the sub-village leaders, with an alternate outcome. About eight to nine people would trench a few hours every day. Some villagers chose to pay the members of the EWC to trench for them. After the trenching was completed, the EWC requested the VEO send letters to the whole village to come out for a work day to lay the pipe, specifically requesting men to lay the pipes, women to back-fill the trenches, and elders to bring food for the laborers. About 200 laborers turned out the next day; the EWC and EWB volunteers struggled to coordinate

the crowd, but somehow the whole piping network was laid in a single day. At the end of the day, the village celebrated with copious amounts of locally brewed beer.



Figure 15. Laying PE pipes in Ngelenge.

The change compared to the previous year was profound. It was clear to the EWB volunteers that somehow the community had found the right formula to mobilize, based on a new leadership group, the EWC, working in coordination with the existing power structure, the village executive officers and the sub-village leaders. Despite few setbacks, the project continued to move forward much faster than EWB volunteers had expected.

The same success in organizing construction was observed in completing the collection of the buy-in contribution, despite the latter turning out to be a labor intensive and frustrating job. The first step consisted of transferring the cash, records, and receipts

collected by the sub-village leaders to the EWC treasurer, which also had collected some of the contribution by villagers who did not trust the sub-villager leaders. When the process started, the NGEDEA treasurer was still out of town. Several attempts to schedule a meeting with all sub-village leaders were unsuccessful. In all honesty, without the pressure exerted by the EWB presence in the village, I do not believe the EWC would have been successful in taking control of the water fund.

The main reason the sub-village leaders delayed the meeting was they had not been given enough time to prepare for the meeting; the reality was they had invested part or all the money into some personal business and needed time to disinvest. Eventually, it was decided to hold a separate meeting. At each of the meetings the EWC added up each of the sub-village receipts presented by the leader and requested the full sum to be transferred. At that point, the sub-village leaders presented a list of expenditures related to the previous year's project which had been paid without anybody's approval, and a discussion ensued on the validity of each item, which included things like a pen or a meal during a workday. Once consensus was reached over acceptable expenses, the money was transferred and recorded in the EWC ledger book.

Within a few weeks' time, most of the money collected by the sub-village leaders and most of the receipt forms had been transferred; some funds and receipts continued to surface throughout the whole summer, considerably complicating EWB's efforts to verify the total sum collected. A list of all households supposed to contribute had never been compiled, although the two members of the village government had made a decision about which households were too poor to participate to the contribution. With the

collection receipts on hand, the EWC proceeded to go house-to-house requesting contributions. At each stop, the forms were searched for the name of the household head, and a balance payment was requested. Few households declared to have already contributed, but receipts were not available; all those claims were verified without discussion with the sub-village leaders who supposedly had collected the sum. Some of the missing receipt forms surfaced at a later time. It was quite a confusing process and despite multiple attempts to total the contributions, the amount kept changing in both directions. Most payments were done with rice, maize, hens, or ducks, which made the accounting very complicated. Some of the households refused to contribute stating they were too poor to afford such a high payment. I accompanied the EWC during this task filling in the treasurer's role, who had not yet returned from Dar Es Salaam to collect the 6000 Tsh (\$5) contribution, about the price of a plastic bucket. It felt like stealing from those who had nothing.

Once the NGEDEA treasurer returned, EWB asked him several times to confirm that he had all the cash that had been recorded in the receipt forms, as the fact that receipt forms arriving at different times kept the total changing. Each time, he would reply, "yes, that is the amount I have." Eventually, it became clear he had not kept a separate record of NGEDEA funds, EWC funds, and his family money.

Eventually, EWB asked him to bring out all the money he should have had according to the receipts and count them to prove that the 1,000,000 Tsh had been collected. Thanks to a personal donation from the district executive director and the district council Chairman of about 200,000 Tsh, which made up the difference between

money the sub-village leaders or the NGEDEA treasurer already spent for the project and the one in possession of the treasurer, he proved the first tranche of the collection was completed.



Figure 16. The 1,000,000Tsh village contribution to capital costs.

Once the 1,000,000 Tsh was collected, the EWC declared it was going to continue the collection until the full 3,000,000 Tsh was collected. EWB decided to pull back from policing the collection of the additional 2,000,000 Tsh. By mid-August, the pump and solar array were installed and water flowed to the first two tap stands; excitement was high in the village.



Figure 17. Installation of the solar array.

Usually EWB implementation trips did not extend to the fall, but we agreed to the EWC request to complete the piping network and remaining tap stands. EWB extended the implementation trip to the end of October, purchased the additional materials, and provided assistance to the community as it completed the system. The full system was completed and operational by November 2009.

#### Cost Recovery and Management of O&M

The difficulties observed in the collection of the village contribution, in terms of willingness to contribute, capacity to handle financial records, and ability to avoid misappropriation, gave EWB a small glimpse of the challenges the village would face managing the post construction phase. How labor intensive it had been to collect 6000 Tsh/household over more than a three-year period raised doubts about the ability of EWC



to collect the 600 Tsh/household/month to contribute to the O&M funds necessary to guarantee the long-term sustainability of the system. Collecting money for the maintenance and operation of a water point was not new to the community, which organized to manage the five wells.

In 2009, EWB conducted a survey of the five wells to assess contamination risks, such as the condition of the hand pumps, proximity to latrines, cracks in a well's apron, and livestock passing nearby. The survey was conducted by EWB, and each well committee was composed of six members: chairman, treasurer, secretary, technician, and two additional members. None of the wells had fences during the inspection; EWB was told that originally the three wells concerned had wooden fences, but after several years, termites had eaten through the wood and the fences were destroyed; they were never rebuilt. Without the fences, livestock was free to get close to the wells, and that introduced the risk of fecal contamination. Worse yet, at several wells, the drainage ditches had been purposefully widened for cattle to drink from.

During the survey, EWB interviewed the well committee to understand how it managed the wells. We were told that in theory, the well committees collect funds for each of the wells' maintenance. The yearly contribution per family is about 500 Tsh. The treasurer of each committee should deposit the collected amount in a bank account opened at the closest bank in the district town of Ludewa, a four-hour, 8000 Tsh, bus ride from the village. The committees reported they had 260,000 Tsh in the bank account, which had not been touched in many years, mainly because of how difficult and

expensive it is to access those funds. In practice, the committee mobilizes only when one of the pumps breaks; at that point, it collects funds for repairs.

The community is unable to purchase original replacement parts for the wells; original parts are quite expensive and a distribution chain for spare parts is nonexistent. Parts need to be purchased in Dar Es Salaam and somehow shipped by bus. The bus trip to the closest bus stop takes two full days and is managed by two different bus companies, so somebody in the town of Songea needs to pick up the part from one company and take it to the other one. A local black market for parts is also available; the parts are mainly salvaged from pumps that are not functional or worse, are purposely vandalized for the parts. Inspection of each of the hand pumps revealed missing or modified part, typically sleeve bearings and one or two of four bolts or nuts that attach the base, clamping the sanitary seal. The hand pump in the worst condition, on the Maguland well, had a hole in its body plugged by a piece of cloth fixed by strips of rubber. The water of that well was found unsafe to drink, containing more than 1 *E. coli* colony/10 ml, but villagers usually do not collect drinking water from that well because the water is dark and oily. Water quality tests conducted on the other wells, with a 10 ml presence/absence test kit, proved that despite missing seals and potentially open contamination channels, four out of five wells provide water considered safe, according to the WHO guidelines for water quality. Despite the flaws noted above, EWB was generally pleased with how the community cared for its wells. All the aprons were regularly washed, people removed shoes before stepping on the aprons, and the well

technicians cleaned the pump column from the built-up iron bacteria once every three or four months.

For this low-tech water source, the community reactive maintenance model proved to be a good compromise for an affordable maintenance model. The same model can hardly be applied to higher technology solutions that have fixed operation costs that need to be covered every month and elevated replacement costs that cannot be raised in a short time by community contributions. A comparison between the O&M costs to the community of the wells and of the water distribution system is shown in table 9.

**Table 9.** Ngelenge O&M cost per technology and level of cost recovery

<b>Variables</b>	<b>Current O&amp;M Only Wells</b>	<b>Minimum O&amp;M level Water Distribution System</b>	<b>Medium O&amp;M level Water Distribution System</b>	<b>Full O&amp;M level Water Distribution System</b>
Quantity of water	Unlimited	20L/person/day	20L/person/day	20L/person/day
Price of water	500Tsh/year	5.5 Tsh/bucket	8 Tsh/bucket	12 Tsh/bucket
		800Tsh/month	1,200Tsh/month;	1,800 Tsh/month
		9600 Tsh/year	14,400 Tsh/year	21,600 Tsh/year
O&M level	NA	The system lifetime will not be extended past major component lifetime	The system lifetime will be guaranteed even if the pump will need replacement and for most piping replacement	The system lifetime will be guaranteed as long as the community continue to pay the fees
Water source	Well+hand pumps	Tap stand	Tap stand	Tap stand

If sustainability is the goal, the full O&M level shall be used; yet the cost of water from a distribution system can be as high as forty times the cost of the wells. The difference between the three O&M levels for the water distribution system depends on

how many replacement costs are included. Annual O&M cost estimates are based on a standard percentage of the system component costs. System components include the well, solar panels and tracker, pump, two water storage tanks, distribution piping and fittings, and eighteen tap stands. The annual repair and replacement costs are based on a pro-rated life expectancy of the component; this implies that, if any of the components fails before its projected lifetime funds are not available for replacement, not even if the community chooses the full O&M level.

Monthly payments are not the only choice for water tariffs; another popular alternative is a per bucket payment. It is important to realize that different payment systems require different infrastructures and each different infrastructure dictates the price of water. Water fee collection is probably easiest by buckets as long as a tap stand attendant is in place. However, paying salaries to tap stand attendants would almost double the cost of water to the system's users. In our case, the tariffs of a monthly 600 Tsh/household chosen by the EWC and based on the consideration of affordability are insufficient even to cover the minimum O&M level.

This is the core problem with rural water development, which brings up the need for government backstopping discussed in the interview analysis section. When something breaks in the system, the community does not have the financial capacity to make the repairs. Realizing this challenge, EWB designed a two-pronged tactic – to increase our understanding of the typical household economy and the residents' understanding of why they had to pay these high water fees while stepping up efforts to connect the EWC to the district officials and create paths to obtain district support.

Throughout the project, members of the district of Ludewa were informed of what was going on, provided the few resources available to it, such as trucks to ferry sand, and occasionally visited the village and talked to the community. The village executive coordinator maintained communication with the district water department members and coordinated the contact. In 2009, EWB traveled to the district office with the chairman and secretary of the EWC, the village leadership, and NGEDEA representatives to meet with the district executive director and the district water department members. During the meeting, we discussed our concerns that the village could not afford full-cost recovery and asked that the district provide support. The district executive director replied he was supportive of the project but could not agree to support the system O&M costs. His argument was the people of the community would not pay a single shilling if it knew he was going to help them, and, by policy, the responsibility for the system resided in its beneficiaries.

After a long negotiation, EWB convinced the district director to match the contribution from the village by depositing the same amount collected by the village into the EWC bank account. The following year, during another meeting at the district, the agreement was formalized and signed. As long as the EWC treasurer would present properly written financial records and come to Ludewa to deposit part of the contributions in the EWC bank account, the district director would match the funds. The agreement lacked a well organized plan for execution. Despite good intentions, the plan was never put into place, mostly because the village contributions were never sufficient

to grant a trip to Ludewa to show the records to the district auditor and partly because none of the residents had faith in the government support.

In 2010, EWB carried out a sensitization campaign through a willingness-to-pay questionnaire attached to a comprehensive socio-economic survey designed to gain a deeper understanding of the priorities and financial abilities of the village households. The survey enumerator randomly sampled 60% of the households in the sub-villages of Kivukoni, CCM, Maguland, and Shuleni, which are part of Ngelenge and served by the water distribution system. To test for validity, the enumerator interviewed about 30% of the residents of the next two villages, Ilela, which has two water wells equipped with hand-pumps, and Kipingu, which has no improved water sources. The enumerator collected data on family composition, education, health, income, water usage, wealth, and spending priorities. Additionally, she was trained, only for the residents of Ngelenge, to explain the need for preventive maintenance for the new water system, to explain the costs of O&M, and to ask what the household head was willing to contribute.

The result of the survey was that the median monetary monthly income in the community is less than 20,000 Tsh (~\$15), and the income of more than 75% of the population is less than 60,000 Tsh (~\$50). This income supports families of four or five members on average. The monetary income does not capture the wealth of a family, as the village economy is largely based on bartering fish, livestock, and agricultural product. About 75% of the households raise pigs, goats, and poultry, but only 33% have cows; 100% of the population grows cassava, but only 35% produce enough rice to sell it, and 20% produce enough maize to sell. Only 28% of the population fish, with 13% selling

fish. Eighty percent of the population report having difficulty providing food for the family. Clearly 1800 Tsh/month for a water tariff is not a negligible expense for the average household; therefore, priorities dictate the willingness to pay it. To get a sense of household priorities, the survey asked the question of how households would utilize an additional 20,000 Tsh, 75,000 Tsh, 200,000 Tsh a year. Seven categories were suggested: food, clean water, school expenses, healthcare, travel, entertainment, and other uses. The results are summarized in table 10.

**Table 10.** Household priorities

<b>Having additional</b>	<b>20,000</b>	<b>75,000</b>	<b>200,000</b>
	<b>Tsh/year</b>	<b>Tsh/year</b>	<b>Tsh/year</b>
	<i>Frequency %</i>		
<b>Food</b>	53	48	21
<b>School Supplies</b>	40	25	22
<b>House Improvement</b>	14	22	29
<b>Health Care</b>	34	42	59
<b>Clean water</b>	<b>51</b>	<b>55</b>	<b>56</b>
<b>Travel</b>	3	2	4
<b>Entertainment</b>	0	1	0
<b>Other</b>	7	7	10
<b>TOTAL</b>	202	202	201
<b>RESPONSES</b>			

*Source:* Data from 2010 household survey

Out of the 203 people who responded to the question, 25% indicated they would use extra money to pay for water if they had an extra 20,000 Tsh/year, or about three times the water fee amount; an additional 26% would use the extra money to pay for water if they had an extra 75,000 Tsh/year, and another 26% would pay for water if they had an extra 200,000 Tsh/year, about 30 times the yearly water fees. Overall this indicates that about 78% of the residents do not consider water fees such a priority that

they would be willing to pay for it with their current household economy. The average amount the respondents declared to be willing to pay was 1,413 Tsh, but even if most respondents of the survey declared they understood why they were paying water fees and found the fees to be appropriate, that was not paralleled by payments.

During the first three months in which the system was providing water in 2009, the EWC did not attempt to collect water fees. After that, the system started having problems, and regular service did not restart until the well redevelopment of June 2010. EWB covered part of the 2010 operating expenses, mainly the salary for the guard and compensation for the water technicians who spent a significant amount of time troubleshooting the pump. In July and August of 2010, while EWB was in the village, the EWC attempted to begin collecting water tariffs. This proved a very difficult task, as residents were not forthcoming with payments.

In principle, each WUG was responsible for collecting the water fees and transferring them to the EWC treasurer. Despite multiple attempts by EWC, supported by the village government, to set a deadline for the July 2010 payments collection, each deadline slid. A variety of reasons were brought up, none of which justified the lack of compliance according to a Western point of view. One of the biggest challenges in managing a communal water point is to decide what to do if the payments are not collected in full. About 15-25 households fetch water at a water point; maybe only a portion of them pay water fees. The WUG is, therefore, unable to deliver the full amount to the EWC. EWC has two possible lines of actions: shut the tap stand off until everybody has paid or forbid the non-paying household from fetching at the tap stand.



The latter requires that a tap stand is policed by an attendant, or the beneficiaries as a group organize to gate access to the water. During a meeting, the options were discussed; in the end, nobody seemed interested in such an ingrate job as refusing water to their non-paying neighbor. The former option punishes the households who paid, and who might decide not to pay the next month if water is not available to them, but it could also lead the paying beneficiaries to pressure the non-paying ones.

At a meeting where all WUG were represented, EWB suggested shutting off the tap stands that failed to bring funds to the EWC by the deadline. EWB stressed the importance of paying for a town crier to make sure all residents were aware of the deadline and of the consequences and explained how over time, people would grow accustomed to the idea of paying fees to collect water. EWC set a new payment receipt deadline of the day before the arrival of the bishop for the yearly confirmations. Since, according to the water constitution approved in 2008, operation and maintenance of the wells was transferred to the Executive Water Committee, and the same water fees covered access to both the wells and the tap stands, they decided it was necessary to shutoff the tap stands and use locks to prevent people from pumping water from the wells.

The deadline arrived, and funds for water did not materialize. Not a single tap stand was paid the full amount, most of the community did not even show up. Additionally, the full amount was yet another number that kept changing and was hard to track as it was unclear how many families were associated with a tap stand. EWC shutoff the water and locked the wells. As expected, that upset a lot of people. The sub-village

leader of Maguland cut the chain to his sub-village well; angry people who had paid water fees confronted the EWC. The women who usually take care of fetching water for EWB volunteers in the village left EWB totally out of drinking water.

It was never EWB's intention to create a situation where the only available water to the village was the far and unsafe Ruhuhu river water, denying access to the water point preceding the water distribution system. EWB tried to suggest EWC create two levels of water association membership: a cheaper option for people opting to only fetch at the well and a more expensive one that would allow fetching at both wells and tap stands. At a meeting, several members of the community replied that if people are allowed to fetch at a well they would never consider paying for tap stand usage. Such responses made EWB deeply question the value of building an expensive water distribution system for a village that felt it could be served adequately (even if not within 400 m from each household as specified by the Tanzania water policy of 2002) by five wells equipped with hand pumps in the village.

In August 2010, after two months of constant pressure on the community to obtain payments, and during the post-harvest months when people had most of the money for the year in their hands, EWC succeeded in collecting only 65% of the payments. In addition to all the challenges convincing the community to contribute to the water O&M fund, EWB spent a significant amount of time ensuring the funds collected were not misappropriated. Over the years, EWB has spent a significant amount of time in the village attempting to train the committee on how to manage the water fund in a transparent manner, making sure the budget is balanced, and making sure financial

records are kept and adequately communicated to the community. Part of the challenge is related to the amount of bureaucracy required that creates a non-negligible amount of work for a small group of unpaid village volunteers who have received limited training based on the assumption of ideal cooperation from the community. Reconstructing financial records has been a daunting task, partly because of disorganization and partly due to a constant small misappropriation by several of the people involved. A good example of most of the issues involved is provided by what EWB refers to as “the cement and construction labor saga.”

When the last volunteer was due to leave the village in Ngelenge in November 2009, a number of small construction tasks remained to be completed. A meeting was held in which the EWC members listed all the tasks. Several required a skilled mason, so EWB tasked the EWC with negotiating a price for completion of this job. After a few negotiations, the masons agreed to a fixed bid contract covering twenty-six days of work at 3,000 Tsh per day for work yet to be done. EWB communicated that if it took longer, there would be no additional payment as it was a fixed bid. A formal grant was written and EWB left the money for the payment with the EWC and fifty-five bags of cement to complete the construction work.

When EWB returned to Ngelenge in 2010, the majority of this construction work had not happened. When EWB discussed the issue with the EWC and the mason, they were told the money for labor granted was for past work, not for completing the construction. This represents a stark disagreement between EWB, the EWC, and the mason regarding what was negotiated in 2009. There are numerous possible explanations

for the simple miscommunication, from a cultural difference on how to form contracts to actual collusion to defraud EWB. Unfortunately, the written EWC grant request approved by EWB in 2009 did not contain enough details to officially settle the disagreement. Because of the confusion, EWC requested and obtained a new grant to pay the mason to finish construction work in June 2010. Unfortunately, even once additional funds were made available, the mason could not begin working because no cement was available. During EWB's absence, the EWC leadership had decided to sell the cement to a contractor working on the construction of a district project, a cattle dip to disinfect them from parasites by immersing the animals in a pool with treated water. The contractor used the cement and promptly paid the EWC. The EWC used about half of this cash to pay the man guarding the solar array and other outstanding debts that had been incurred during the winter of 2009-2010 while the system was not operating and water fees were not collected.

In addition, the EWC leadership group (chairman, secretary, and treasurer), without consulting all the EWC members, agreed to lend the other half of the funds to the village government, which needed it as an initial deposit to open a bank account in Ludewa. The village government promised to repay the money within four days as a district check made to the village government cleared. Unfortunately, four months later, the village government had not repaid the loan. It took EWB volunteers approximately two months to gather an understanding of all the financial transactions related to these events, as the EWC was not forthcoming with this information in an attempt to receive additional money from EWB to recover the operating costs for the winter months. There

were no written records of any of these transactions, so it was impossible to audit the books, consequently understand the correct series of events, and assign individual responsibilities for the missing material, funds, and labor. EWB was asked by several members of the community to right this wrong. After waiting for over one month for the village government to return the loan either in cash or in cement bags needed to complete construction before the end of the implementation trip, EWB requested government assistance by asking the village executive officer to personally oversee the transaction and threatening to file a formal complain to the Manda Police Department, which would have been the equivalent of stating he was unable or unwilling to perform his duties in the village. As a result, three days later, the village government repaid the loan with cement bags. It was clear at that point that without EWB intervention, these funds would not have been recovered. The community does not appear to have the ability or to be willing to require transparent financial management, despite the constitution clearly giving everybody the right to request an audit of the books. It is important to realize the amount of money left with the EWC is very large compared to the amount of money the village government handles and is available for other community projects. During the many meetings held in the village during the events recalled above, it became obvious the disagreements between stakeholders needed to be addressed.

The EWC chairman, secretary, and treasurer, and two other members were not happy with the level of participation of the other members. The chairman expressed the desire to amend the constitution to expel the non-participating members and asked for EWB assistance in this matter. Incidentally, it is worth noting the constitution actually

had such provisions already, but the chairman was not familiar with or did not understand the constitution.

The remaining three members of the EWC complained about not being informed of important decisions regarding finances, not being shown financial records during the bi-yearly association meeting, and generally not being informed of association activities such as meetings. The water technicians clearly complained about “wars” revolving around the water system. They also complained about being harassed during the months the system was nonoperational and not receiving payments and about the lack of financial transparency. On this last item, they insisted EWB intervene to avoid making corruption a standard practice.

We did try to call a few meetings to discuss these issues, but it was very hard to get the key members involved, the accused and/or accusing of wrongdoing in the same place at the same time. The issues had divided the community profoundly. EWB had to use all its leverage to bring stakeholders to a table to discuss issues and resolutions. That led to some, less than satisfactory, increases in participation; while many statements made went in the right direction, actions were much slower to follow. During these weeks, the shortcomings of the Water Constitution became evident. Most decisions required convening a General Assembly comprising all tap stand committees (18x6), 108 people in addition to the seven EWC members and representatives of the village government and social service committee. Even if only half were required to reach a quorum, that number was still hard to reach and maintain for the full duration of important discussions such as financial management, funds misallocation, and water fee

payment enforcement. The 2008 Water Constitution and Rules and Regulation Document mainly contained a general governance system description, but it was fairly vague in terms of who had the actual responsibility for executing the group decisions, and who was entitled to take smaller day-to-day executive decisions. As an example of it, the constitution stated water fees had to be collected by the WUG, but once they failed to do so, nobody knew exactly how to proceed.

On August 2010, the acting Ludewa district water engineer, the Iringa Regional water engineer and a water management expert from a local NGO, visited Ngelenge, during a monitoring trip. They asked the EWC chairman to give them an update about the performance of the water system, the management organization and the community support. Nothing of what they heard was new to them. After a quick review of the 2008 Water Constitution, they pointed out that the committee-driven management scheme, formerly recommended by the Tanzanian Water Ministry had proven to be unsuccessful in many places. The major problem was attributed to the fact that there was no separation between decision makers and implementers. Committee sizes tended to become very large, and since one-half of the people were required as a quorum for decisions, it was very expensive (people typically received food or a stipend at these meetings) and almost impossible to get everybody together. Also, they pointed out how the constitution statement that a committee is responsible for financial and technical operations is not specific enough in terms of who is actually doing the work, or has the ability to instruct others to do work.

They recommended revising the constitution to adopt a more successful approach, which was the management model where the elected committee acts as a board of directors and hires paid staff, a manager, treasurer, and technicians to run the day-to-day operations. They also stressed that once the community approved it, the constitution had to be registered at the district to make the water association a legal entity, which can sue and be sued, independent from the village government in its power to regulate water matters. EWB took the opportunity to ask if it was possible to have the district or the region provide training, advice, and support in this endeavor. There were no resources available to do so, but on a personal level, they agreed to provide help in drafting a new constitution and rules and regulations starting with examples from registered successful schemes in the region as long as EWB could organize and cover the expenses to take the EWC leadership to Iringa (1.5 days away). This was an expensive trip that could not have been afforded with village funds; EWB paid for it. One EWB volunteer traveled to Iringa with the Ludewa district water engineer and the chairman and secretary of EWC.

They suggested a new constitution calling for a smaller water users association, with two representatives for each tap stand (water user group) and six executive water committee members (chairman, secretary, and four ordinary members), augmented by the village executive officer, the village chairman, and the Health and Education Committee officers. The Water User Association general meeting convenes twice a year and makes top-level decisions about the system management, including hiring and/or reappointing the water system manager. The EWC meets monthly to supervise the manager and treasurer work, and receives a detailed account of the association finances. The chairman



and the secretary were given examples of the Water Constitution and Rules and Regulations of a village in the Iringa district and were tasked with creating equivalent documents for Ngelenge.

The final version was almost identical to the example, including rules which made no sense in Ngelenge's case. One more time, the institutional requirements of the national water policy and acts were above the capacity of the village, and resources to train and help the villagers were not available. The new documents were presented to the community at a whole village meeting, during which representatives of the district read parts of the 2002 national water policy to stress the fact that ownership and responsibility for the system belong to the community and not to the government. The new constitution was approved quickly, possibly with about 3% of the population present, and new elections were held without following the exact procedure proposed by the constitution. The old EWC denounced election irregularities and refused to step down, leading to an impasse, which had to be resolved by EWB in summer 2011. Basically, the old committee refused to transfer the available water fund to the new committee; additionally, they refused to transfer signatures on the water association's bank account in Ludewa. One more time, EWB had to use its leverage to force all involved to sit at a negotiating table and resolve differences. Additionally, despite the level of involvement of district and regional officials in the preparation of the new water governance documents, registration of the board of directors as a COWSO was never achieved, entirely due to the fact that the district could not provide instructions on the procedure to register.

The new institutional model adopted in 2010 did not improve the fundamental problem of a lack of community contribution toward the O&M of the system. Since the system was rehabilitated in July 2011, and after the migration to the new more effective management model, contributions dropped from 65% in August 2010 to 55% in August 2011 (with no contribution in between and EWB taking responsibility for most of the O&M costs while the system was not operating). Both high percentages were collected while EWB was in the village. After EWB left the village, contributions dropped to 6% in September 2011; in October, replacement of some of the faucets (10,000 Tsh/faucet) was needed. The EWC reported that after some pressure, 23% of the expected contributions were collected.

Since then nobody has contributed any other funds. In January 2012, the treasurer ran out of money to pay the guard and requested that EWB ask the district to retrain the water committee on their responsibilities, as participation at meetings and activities are low. The district water engineer, contacted by email, offered to go to Ngelenge in person and pay the guard. In summary, it seems quite obvious the Ngelenge water distribution system is far from being financially sustainable. Now that EWB transferred the O&M responsibility to the village, as soon as the first large component fails, the community will not have enough funds to repair the system; therefore, there will be no future for the system without backstopping from the district government.

#### Appropriate Technology

Most of the discussion between EWB and the community on the choice of technology was done during the 2006 implementation trip. At that time, the ideas

proposed included installing another shallow hand-pump well, installing a deep well with a hand pump, and installing a deep well with a powered pump. Due to the fact that some of the shallow hand-dug wells were dry toward the end of the dry season, the village had a strong preference for a project, which included a deep well. The initial plan was to dig a deep borehole with sufficient water yield to serve the whole community, install 6” casing to be able to accommodate a motorized pump in future development, but for the time being only install a hand pump on it.

During the same time, a solar water project was undertaken in Nsungu, a village forty minutes walking from Ngelenge, was completed. The project was a partnership between the Ludewa district government, villagers of Manda Ward, and a German philanthropic organization known as the German African Assistance (GAA), headed by Dr. Ludwig Gernhardt. The initial success of the Nsungu project steered EWB toward suggesting the implementation of a similar system, which on paper appeared to have a low cost of ownership for a motorized pumping scheme. The small percentage of residents participating in the choice of technology applauded the idea, possibly not based on careful considerations of long-term costs/benefits to the community, but as a gut reaction to a choice between traveling long distance in a Mercedes Benz instead of pedaling on a bike.

Usually motorized pumping systems are powered by generators, which leads to very elevated operating costs. Solar technology reduces those costs to zero at a price of a large capital investment. Once energy is available, a choice needs to be made between a DC pump, supplied directly by the panels, and an AC pump requiring the panel voltage

output to be transformed with an inverter. Inverters are considered the least reliable component of a solar power system. Despite their reliability being improved greatly over the years in the west, there were doubts about the quality of the ones distributed in Tanzania. This consideration led to a decision to purchase a DC pump, almost twice as expensive in relation to an AC pump and an inverter.

This way of thinking favors a technological choice of high-tech components that might be sold in Tanzania, but are not manufactured locally. Usually those are more expensive and have a small market so vendors do not stockpile replacement parts. AC pumps and inverters might be a cheaper and less reliable technical solution, but they can be purchased everywhere in Tanzania. In our case, everything was manufactured by Mono Pumps and shipped from their manufacturing plant in Australia, with two to three months' lead time for most items. Basically, the system was designed choosing expensive technology, which is advertised as requiring minimal service costs and required knowledge and a long replacement life.

Local technical knowledge has never presented itself as a challenge in the EWB project, as training had been a carefully designed component. The trained technicians have been able to independently carry out all maintenance tasks required as long as funds were made available. The biggest challenge they encountered was to be taken seriously from the Tanzanian vendors they had to deal with when the problems with the pump started. For instance, the vendor would not acknowledge their requests unless EWB stepped in. The most blatant example happened in the spring of 2009, when the original pump was replaced under warranty, yet could not be put in operation for more than two

months because the technician did not have a \$15 controller to reset the pressure shutoff thresholds. The problem was diagnosed by the village technicians on the same day they installed the pump and communicated to the vendor who claimed they were wrong and refused to listen to their reasons. Frustrated, they called EWB, who tried to reason with the vendor and convince him to temporarily send the controller to the village, but the vendor would not agree and kept repeating that the technicians were ignorant village people who did not know what they were talking about. Yet the local technician's argument made perfect sense. Eventually, EWB sent a controller from the U.S. to the village, and in about five minutes, the technicians restarted the system proving their assessment was absolutely correct. Despite the many frustrating incidents such as the one described, the Ngelenge system technicians have always exceeded expectations and shown unparalleled dedication to the project.

Obviously the larger challenge is that the O&M costs of the system greatly exceed the O&M costs for basic technologies such as a protected spring or well (see table 9) to the point of making the system unaffordable for the community, as already described. One question is who should have the responsibility for the final decision between the community, the implementing organization, and the government? In our experience, the small percentage of the community who participated in the decision did not have the technical capacity to make this choice and the largest percentage was not even sufficiently mobilized to participate. EWB, as most foreign implementing organizations, overestimated the need for water improvements and underestimated the capacity required to sustain it; it is this author's opinion that guidance to both the community and the

outside organization should come from the national government employee, which through his monitoring efforts, is in the best position to know what is best for his people.

The central government guidelines in Tanzania promote adoption of high-tech solutions vs. low-tech ones. In 2008, EWB attempted to convince the Ludewa district to contribute to the capital expenses of the Ngelenge system. One of the arguments to convince them was that, according to the formula-based allocation published by the Ministry of Water to facilitate budget preparations within the WSDP, they were going to receive a larger budget. The block grant formula-based allocation was the tool provided to districts to estimate the percentage of the national budget they are able to access through block grants; the allocation each district receives is based on technology, population, and poverty for recurrent budgets and technology and underserved population for development budgets. The WSDP's available recurring budget is larger the higher the technology available in the area, so a district government has all interest in promoting higher technology solutions.

The weird way in which the WSDP budget allocation works became clear in 2011. The district water engineer disclosed he had independently requested funds to rehabilitate the Ngelenge water distribution system and obtained them in the 2011 budget, as a Quick Win project funded by the WSDP. Basically, it had been easier for the district to receive WSDP funding to rehabilitate our high tech system, implemented in a community that already had basic access to water, instead of receiving funds to provide clean water sources to one of the many communities in the district that had no improved water source from which to drink.

Appropriate technology is one of those broad terms requiring a definition to be meaningful. Adopting Betz's definition (as cited in Akubue 2000),

appropriate technology equate[...] with providing technical solutions that are appropriate to the economic structure of those influenced: to their ability to finance the activity, to their ability to operate and maintain the facility, to the environmental conditions involved, and to the management capabilities of the population. (p. 38)

This author believes in the case of rural Tanzania, only protected spring and hand pumps falls in the category of appropriate technology.

### **Case Study, Uganda: The Kizzi Pipeline Extension**

Kizzi is a small village in the southern central region of Uganda, in the Mpigi district, about one hour from Kampala. This village is home to approximately one hundred households, whose residents support themselves with agriculture and livestock. The majority of children suffer from malnutrition.

Due to its vicinity to Mpigi town, this rural village administratively depends on the town council; therefore, it is classified as peri-urban. Mpigi Town is about a thirty-minute walk from the village. The village is spread on hills sloping down to a swampy valley; at the bottom of the valley the government built four protected springs in the 1990s. Due to the steepness of the terrain, only young people can reach the springs (see figure 18). An informal survey carried out in 2010 found that it takes between twenty and forty minutes for most households to fetch water.



Figure 18. Kizzi children on their way to the protected spring.

The project was started in 2009 by a small group of Santa Clara University students who learned of the village needs from a Kizzi resident who spent two years in the U.S. as a seminar student. The students connected with the traditional head of the village, a relative of the seminar students, and planned an assessment trip in February 2010. During the assessment trip, the students evaluated the possibility of designing a solar pumping system delivering water to a tank and by gravity to few tap stands, but after consultation with the town council water engineer, it was decided a gravity extension of the pipeline serving Mpigi town was a better solution. The pipeline, which



delivered water to approximately 79% of the 11,400 residents through a 1028-yard tap connection and 1000 house connections, is managed by Trand Int, the private operator contracted by the Mpigi Town water authority. Both yard and household connections are granted as a private contract between a single family unit and Trand Int (see figure 19).



Figure 19. Mpigi Town metered yard connection.

Trand Int is responsible for maintaining the service up to the water meter and charges the government set price of 1,556 Ugx/1000 L +15% VAT + a flat service fee of 1,500 Ugx/month, which translates to about 40 Ugx (2 cents U.S.) for a 20 L jerry can. Prior to leaving the village, the students hired a local engineer to carry out an elevation survey from the main pipeline to the village and provide plans to Trand Int to design and

quote the pipeline extension. Additionally, a group of thirty women in the village was paid to make jewelry that could be used to fundraise for the project in the U.S. Once the funds were raised, the students planned an implementation trip in July 2011 to supervise the construction and work with the community to create the infrastructure necessary for an equitable distribution of water. I was asked to participate in the trip as an advisor.

Within a few days from the team's arrival to Mpigi a few issues were discovered. The first one was that half the planned extension had been built in 2008. The 2008 plan was supposed to cover the entire village, but the town council ran out of money and the implementation stopped short of its goals. Several of the village households already had yard connections, and they were reselling water to their neighbor at 100-200 Ugx/20 L jerry can. Basically, the plans sent by the engineer had already been prepared. The second issue was that the cost of materials in the quote had been highly overestimated, inflating the cost by a factor of about 1.5. Eventually, all issues were worked out and construction began in late July. The 3.2 km extension was completed by the end of August 2011 and it has been functional since.

### Representation and Equity

During the initial stage of the project, the traditional village leader and another family relative had written a report to explain the condition and need of the village of Kizzi (2009 report). In the report, they detailed how the community fetches about 10 L/person/day of water at the government protected springs and needed improved access to water for household use, to feed the livestock, and to irrigate. The report continued explaining how the Mpigi town council had developed a new water project pipeline

through the National Water and Sewage Corporation, but the program was slow reaching the peri-urban areas and too expensive to be affordable for the people of Kizzi since they had to contribute toward the construction cost, and it would not be suitable for irrigation.

They welcomed the idea of a water supply system, especially geared toward irrigation, but “they foresaw a conflict with the government in case such program came to the village.” The rationale provided was that despite no funds for water programs at affordable prices to its people, the government of Uganda maintains control over water project implementation, and in order to navigate through the bureaucracy, it would take a very long time to implement such a program. Therefore, they requested help building household rainwater tanks.

This report was disregarded when the students arrived in the village for the assessment trips. I was not present and was not able to satisfactorily reconstruct the reasons why the project direction moved away from the rainwater jugs, but possibly it was due to a combination between conversation with the seminar students in the U.S. and a fair dose of miscommunication during the assessment trip. Eventually, the students compared the costs of O&M of an independent solar pumped water system and the cost of paying for water from the Mpigi pipeline and decided they were equivalent. They met with the town council water engineer who also recommended the extension of the Mpigi pipeline and set the engineer up for the surveying. Nobody mentioned the fact that half the pipeline already existed and the first half of the village already had tap stands. The traditional village leader took the students to meet several of the villagers, giving them a chance to ask their opinions on the extension and inquire about the affordability of paying

the water bills. None of the villagers spoke English, so all communication was gated by the traditional village leader. By the end of the assessment trip, everybody involved appeared satisfied with the solution.

Once the plans were received, a quote for the extension was requested from Trand Int. The quote included labor for trenching and clearing bushes. Since no financial contribution was asked of the community, it was decided to request labor be provided for free, as typical in most water projects. Since the taps are installed as a private contract, only one household is responsible to pay the water bills to the private operator. If multiple families share a tap stand, there needs to be an agreement to ensure the group of households agrees on how they are going to share the water bill, especially since the cost of one jerry can is about 35 Ugx and the smallest coin is 50 Ugx. In preparation for the implementation trip, the team discussed at length with the seminar students the need to organize the community in such a way to avoid creating an unfair situation. A tentative plan to organize meetings with the community to sort out the issue was put together. Additionally, there was a concern that not all the households could afford to pay 50 Ugx per jerry can. It was, therefore, decided they would offer the difference between the money raised and the estimate to the community in the form of some micro-cooperative grants, which would augment the income of the households to cover the cost of water.

Once the team arrived in Mpigi in July 2010, first attempts were made to organize meetings with the community and with the community leadership. Despite the specific requests made to the traditional village leader, only the women who had made the jewelry were present, apparently to thank the students for the previous trip employment

opportunity. The traditional village leader communicated to the team that all able men had been employed by a contractor out of the village; therefore, it was unlikely free labor could be provided by the community.

The team also met with Trand Int to finalize the contract. During the meeting, Trand Int explained how the process to increase the coverage of the pipeline to the Mpigi Town worked. A village requests an improvement of their water source by writing to the water authority of the town council and to the private operator who has the contract to operate the water services. Once the extent of the project and the costs are assessed, the size of the community contribution is decided. If the community is unable to collect the funds, they can ask the town council to help them reach the full amount. The village is informed of the decision through their leaders in a meeting where Trand Int and a community development officer from the town council are present to explain all the details of the project.

Funds for the expansion of the Mpigi water systems were provided by the African Development Bank. Trand Int manages the O&M of the system with the revenue from customer payments; 85% of the revenue covers the salaries for Trand Int employees. The operation costs are quite high as water pumped from the swamps needs to be treated at a treatment facility; 5% goes to the overseeing water authority and 10% is usually dedicated to maintenance. If repairs are too large for Trand Int to cover, it can request assistance from the district, which allocates funds based on population. The community is responsible for the security of the valves, meters, and tap stands and for paying the water bills on the water consumed. They explained how the interaction between the

water authority, Trand Int, and the community is regulated by the Water Act of 1995, of which they showed us a copy.

Extensions of the main line are entirely managed by Trand Int, but beneficiaries can install a private connection upon requesting a permit and are responsible to cover all expenses for the connection except the first 10 m of connection line. The work can be done by Trand Int or independently. Labor for the construction is usually provided by the community, but they receive payments from Trand Int. Community sensitization to establish demand and disseminate information on the process, the roles, and the responsibilities is organized by the local government (LC1 – local council at the village level, LC2 – local council at the sub-ward level, and LC3 – Local council at the division level). Trand Int showed us all the forms to be filled out explaining how if a donor is involved in providing funds, a MOU needs to be signed by Trand Int, the donors, and the village leaders as they act as representatives, negotiate all land disputes, and organize the community. During the sensitization meetings, the cost of services and responsibilities of all parties are explained to the community.

So far, only private connections have been established in Mpigi, which is a problem as only the wealthiest people are able to afford the capital contribution for a yard tap connection, which is 50,000 Ugx (\$25) plus the cost of pipe in excess of the first 10 m. Average total cost to the household is 150,000 Ugx (\$75). Trand Int explained that most households invest in a yard tap as a business, re-selling the water at two to five times the government price; this was confirmed by people informally interviewed when

fetching water at the public springs who bitterly complained about how high the price of water at yard taps was.

Trand Int claimed that usually customers pay only about 75% of the bills. The unpaid portion accumulates and once it is deemed too large on a per case basis according to payment history and balance due, a warning letter about disconnection is sent out.

Trand Int tries to discourage letting the balance grow too high by charging a large reconnection fee, 50,000 Ugx (\$25). They explained that Kizzi had already submitted a request for assistance; therefore, plans were made, but nobody remembered or wanted to inform us of the outcome. We showed them the plans the engineer suggested, and that created some confusion about where the pipes were supposed to run.

Trand Int offered to create a pilot project in Kizzi where instead of establishing private connections, they would establish a communal tap stand selling water at 100 Ugx per jerry can; this would require they hire a tap stand operator from the community who is a local resident living nearby.

After the conversation with Trand Int, we decided to take a transect walk to clear the confusion about the plans. Much to our surprise, we discovered that half the suggested pipeline had been implemented in 2008; one of the tap stands in the plan had even been connected in 2008. Several households had their private connection and were reselling water at 150-300 Ugx per jerry can. The project had been implemented only partially because they ran out of funds to complete it. At that point, it became clear the plan, which had been submitted by the engineer, and paid for (\$2000), was an old plan prepared in 2007-2008. Since half the planned project was already there, the size of the

extension was much shorter than anticipated and the original quote provided by Trand Int had to be revised.

The team was determined to find a way to extend the pipeline to the areas not yet served and to find a way to avoid creating a resale water market. We developed three options for managing the tap stand. The first option was to establish a private connection and form a village committee to manage it in such a way that the price for water remained at the government price of about 35 Ugx per jerry can. The second option was the communal tap stand suggested by Trand Int at 100 Ugx per jerry can, and the third option was to form a committee to manage the tap stand at 50 Ugx per jerry can and establish a revolving fund with the extra 15 Ugx per jerry can, which would allow households to borrow money one at a time returning the loan with a small interest. We tried to schedule another meeting in the village asking that the local government leadership be present.

The meeting was poorly attended; in particular the LC1 representative and the village council members were absent. Eventually, the village political counselor of the town council came to the meeting, invited by the district youth counselor, whom we had met at a bar the night before. It became clear the traditional village leaders had not informed the local government leaders and possibly had not disseminated the notice about a meeting to decide on the water project. While we were waiting for attendance to improve, we tried to explain the three options to him and to the political counselors so he could explain them to the crowd. None of the three seemed enthusiastic about any of the three choices. Every one of them insisted that once we left, the ones with taps at their



houses would resell the water at a high price, as that was the way. The traditional village leaders, who were going to get a yard tap according to the plan, insisted that people reselling water were in the right to do so as they were attending the tap.

The village political counselor felt that maybe the community is unable to see any advantage of the pipeline extension until they actually see it extended; therefore, it was recommended to start working anyway. The youth political counselor explained that there were three groups of people in the community: the rich ones who want to benefit from a free installation of yard taps and will be able to pay their water bill at the government price, those of the middle class who would consider sharing a tap and making it work as a group, and the poor who will simply continue to fetch water at the swamp. There seemed to be a dividing line in the conversation; the politicians saw the pipeline extension as infrastructure improvement, and they did not care about equity of water distribution while the traditional village leader saw the tap as a convenient business capital investment, especially if we were to install one for him.

As the meeting began, our attempt to communicate the three options to the few residents who were present failed because the traditional village leader was not translating or worse yet, was presenting some of our views in a derogatory way. The only questions from the small audience were those such as, “I was promised a yard tap, am I going to get it?” We realized we needed another avenue through which to communicate with the community.

In the next few days, I began contacting organizations and government officials to gather interviews for this research. Through this activity, we had the opportunity to ask

for assistance from one of the NGOs interviewed who worked in the area doing community mobilization and constructing wells and rainwater harvesting tanks from the Kyakulumbye Development Foundation (KDF). Contact was also made with the district water department and with the technical support unit, the national monitoring team.

We invited the founder of KDF to the next meeting, asking him to assist us with connecting with the community so we could explain the concern about equity and affordability of water through the extension project, as well as propose they reconsider the construction of households' rainwater harvesting tanks. Our efforts were thwarted again. Before we were given a chance to explain our concerns or discuss options with the participants, there were a series of cheerleading-style speeches about starting the construction work and the presentation of a committee that would lead the trenching. Few in the audience inquired about payments for trenching and were told that we expected free labor from the community. No discussion was made about who would get yard taps and how they would be regulated.

The next day, we hired three recent university graduates as translators and, with our cook, divided the village into four zones. Each of us visited all households in their assigned zone. There was a lot of confusion about the project, and most residents who did not live close to the traditional leader's house did not really know what was going on, nor had they been informed of the meetings. As we explained the project, we made sure to explain that we could only bring a pipeline, but they had to pay Trand Int for the water. We asked if people felt they could afford the water payment and if they would prefer household rainwater harvesting tanks instead. Most of the households that knew about

the project expected to receive a yard connection so they could resell water and make money. One of the households claimed they had to pay 10,000 Ugx to the village traditional leader in order to be part of the project. The translators' comments at the end of the day were that there was a great need for training and sensitization within the community if an equitable solution was to be found. At the end of the day we briefed each other and a picture began to emerge. The people we had trusted to bridge us to the needs of the community felt entitled to decide for the community whether a pipeline extension and a few private connections at households that could resell the water at a profit was the best way to utilize the free money coming from the wasungu (white people).

As we were complaining about the situation with our cook and the two Mpigi youth village health team (VHT) members who lived in the hostel inside the Mpigi hospital, where we lodged as well, one of the two VHT members told us we had to talk to Amelia Kyambadde, the Ministry of Parliament elected from the Mpigi district. Much to our surprise, the Ugandan Ministry for Trade and Industry was on the phone with me within five minutes. We asked the VHT member what his connection was with her, and we were told none, but Madame Kyambadde is a true supporter of the people and she made herself available to all of us. We had a meeting with her the next day, and she offered us her support.

Before meeting with the Ministry, we met with the district water engineer and explained the situation. We were scolded for not following the proper channels and were instructed to write a letter to the town council explaining the scope of the project and

requesting the support of a community developer officer. We were also informed that the town council does not support the development of additional water sources, such as wells and springs, in the peri-urban area that can be reached by extension of the gravity system, as water fees are needed to support the system's existence and expansion. The Mpigi district's peri-urban rural areas already have a 95% improved water access coverage, with an 80% functionality rate, assessed in 2010. Areas that have not yet been reached by the pipeline are already provided with basic water services by springs and wells constructed in the 1990s. Digging new wells is also forbidden because the water table is getting lower every year and wells are drying up.

The district water engineer helped us write a letter officially requesting help, and we hand delivered it to the town council. The next morning, the town council community developer officer had already contacted the Kizzi LC1 leader, the village local government official, and scheduled a whole village meeting for the afternoon. This was worrisome, as we had yet to express to the community our concern and the proposal we wanted to make. With the assistance of the district water engineer, we succeeded in organizing a meeting at the Town Council office with the community developer officer, the district water engineer, the head of the Mpigi water authority, the Mayor of Mpigi Town, and Trand Int representatives. At the meeting, a short negotiation between Trand Int and the Mpigi water authority set the price of water for the communal tap stand pilot to 50 Ugx/ jerry can, with the excess costs to be used as a salary for the tap attendant. Trand Int also requested the communal taps be positioned at residences at the center of clusters of households to be able to efficiently service the largest number of families.

The whole village meeting was well attended, with at least fifty-five households represented and many youth. We found out Kizzi as a village was about twice as large as we thought and composed of two communities, Kizzi and Masujju. We decided to revise the plan and extend the pipeline to the entire area for a total length of 3.2 km. Our plan was explained, although with little emphasis on the rainwater harvesting tanks, as it was perceived by the town council as a competing threat to the pipeline revenue, which the community felt was needed to continue to fund extensions.

It was decided that work to dig the main pipeline extension would start the next day along with a mapping of the village with the location of households, including the preference of the household to receive a household rainwater harvesting tank. Location of the communal tap stands was going to be chosen by the community, but based on the most effective location for communal service as documented by the map. The community developer officer explained to us that the lack of participation in the project by a part of the community was due to the fact that they did not understand this project was separate from the 2008 town council attempt to extend the pipeline. Four or five families had paid 50,000 Ugx in 2008 to receive a water connection, so they felt entitled to receive it for free. Trand Int explained that the 50,000 Ugx was the connection fee for a private tap stand; they would honor the connection fees, but those residences still had to pay the cost of the service pipe in excess of the first 10 m, which in most cases amounted to roughly additional 100,000 Ugx. Additionally, people had been paid to trench in 2008, which is why they did not want to provide free labor. Once the community understood that this was not a town council project, they agreed to the terms and a decision was made

to start digging the trenches the next day. We were asked to provide pick axes and shovels. As an incentive to participate, we announced the intention of funding micro-cooperative grants for business development to the people who participated.

The next day, expecting participation on the trenching work similar to that experienced in the Tanzania project, this author brought to the village four pick axes and five shovels. By 10:00 in the morning, forty workers reported for work. We spent the morning going back and forth to the hardware store in Mpigi Town to purchase more pick axes and shovels. Work attendance did not decrease over time.

The excavation of 3.2 km of main pipeline was completed in four weeks. During that time, the community agreed on the location of the communal tap stands and three village masons were contracted to build concrete stands for the seven communal taps (see figure 20).



Figure 20. A completed tap stand in Kizzi.

The relationship between our team and Trand Int seriously deteriorated when the district water engineer discovered they had overcharged us by 40% of the cost of the project. The Mpigi Town Major, informed of the situation, forced Trand Int to renegotiate the quote. During a six hour-long meeting, a new contract was renegotiated and an MOU reflecting all the agreements for the communal tap stand was sent out for signatures to all the relevant authorities. Copies of the MOU were distributed to the community and everybody was made aware that if any problem arose with the price of water or the management of taps, the MOU would give them legal grounds for a formal complaint with the water authority. Few villagers negotiated a private connection with Trand Int. The entire project was completed by the day before our return to the United States. None of the residents elected to have a rainwater tank.

I returned to Uganda again in December 2011 to monitor the progress on the micro-cooperative efforts and evaluate the outcome of the pipeline extension. The biggest problem reported was the fact that water service was intermittent, as the treatment facility and the pumping stops whenever there is a power outage, which in the area is a daily event, at times extending for more than 24 hours. At a meeting organized by the Kizzi Youth Association, a report was made that households were now purchasing water at the communal tap stands and the price of water at the communal tap stands had been maintained at 50 Ugx/jerry can. A few problems that had developed at tap stands had been fixed by Trand Int within one or two weeks from their reporting. To a direct question as to whether there were still families fetching at the spring, the response was “Yes, the poorest families still do. But maybe fewer people than before. The ground

around the spring is not maintained as clean as before.” Piped water seems to be a commodity available only with due economic development. Until then, low technology solutions such as protected springs and hand dug wells are what guaranteed the right to clean water for all.

### **Considerations on Country-level Similarities and Differences**

Tanzania and Uganda are countries with markedly different identities, yet many of these differences are not significant enough to justify the marked difference in their rural development of water resources. Table 11 shows a list of these variables; validation for their prior exclusion comes also from the fact that they have not been mentioned during any of the stakeholder interviews nor observed during my participation at the two projects described in the case studies. Corruption is the only exception, as it has been mentioned and observed in both countries, but it is assessed at a similar level in both countries by the international assessment that periodically evaluates it (World Bank Database, n.d.).



**Table 11.** List of variables excluded from the analysis.

Variables Excluded by First Pass Analysis	Comments
Cultural and tribal differences	Multiple ethnicities present in both countries
Economic policy	Market-oriented since 1985-1986
Economy/GNI/GDP	Tanzania fares slightly better, but distribution of wealth more asymmetric in Uganda
Government expenditure pro capita	Tanzania larger in the last few years
International donors	Supported by the same group of countries
Export/import levels	Within 6%
Investment with private participation	Similar, compounded over the last 10 years
Corruption	Similar, according to World Bank assessment
Education	No difference
Workforce composition	No difference

Governance cannot be separated from the political history that shapes policy direction and controls the flow of funds that finance it. In the water contest, a recurrent challenge reported during the Tanzanian set of interviews is the fact that the rural population still believes in the idea that water is a free good, as it was during Nyerere's socialist policies. The significance of these statements must be considered carefully. Ujamaa, the mobilization of villages into the ten-households cells' strategy, and socialist principles in general, have been a part of both countries' histories. Water was free in rural areas prior to 1984 in Uganda, during the leadership of the socialist Obote, the fascist Amin, and at least for the first ten years of the Museveni administration until the 1990s. Ugandan political instabilities rendering government services unavailable did not eradicate the idea that water is a free good from people minds. This is demonstrated by the fact that, according to Ugandan stakeholders, large amounts of funds and activities in

the water sector are devoted to sensitizing communities to their responsibility of operating and maintaining water supplies, as community members expect this to be government work just as much as their Tanzanian counterparts. The belief among the rural population that water is free is, therefore, to be considered as a similarity between the two countries, and will not be considered as critical in the rest of this analysis. In summary, socio-economic and historical diversity are insufficient to justify the difference in the success of rural water development.

Physical differences between infrastructure and freshwater resources cannot be ignored in relation to the development of rural water access points. The fact that the rural population is more sparsely distributed in Tanzania and roads to these isolated locations are in worse condition affects the cost of the rural development process in a manner proportional to the technology employed. The difference in costs between constructing a hand-dug well or protecting a spring in an isolated location vs. a central location can be hundreds of dollars; more elaborate gravity schemes or deep boreholes for motorized pumping have larger costs associated when connectivity of a village is poor. The total costs of the Ngelenge case study project, carried out in an extremely remote location, equaled about \$150,000, with about \$15,000 spent solely on the transport of materials. It must, therefore, be noted that this is an economic challenge that is larger in Tanzania than in Uganda and yet the Tanzanian governance failed to address it in several ways. The government primarily ignored the added costs of promoting high-tech solutions (The United Republic of Uganda 2002) and software, which, as mentioned by several stakeholders, include the expense of transporting personnel.

The amount of available water resources is a very important factor in the ability of a country to develop appropriate and sustainable access to clean water for the underserved population. Uganda water stress is a more urgent issue than it is in Tanzania, which provides an incentive to improve the quality of the development process. Given this circumstance, the fact that Uganda is performing better than Tanzania is an indication that Uganda has adopted a better model of rural water governance, including some measures specifically addressing this challenge, such as the adoption of mixed technology. It must be noted that water stress is a parameter of this problem and not a variable, as it is not under the full control of a national government. The true variable associated with it would be the difference that water scarcity creates as a motivation.

Within-country assessments published by various authors acknowledge water stress and poor infrastructure as a challenge to sustainability, but they focus on larger and more common challenges that occur independently from the accessibility of the water resources in the area (Gine 2008; Haysom 2006; Jimenez and Perz-Foguet 2010; Mahauri and Katko 1993; McConville and Mihelcic 2007; Montgomery, Bartram, and Elimelech 2009; Moon 2006; Mtinda 2006; Nkongo 2009). Following Haverland (2010). If factors are not considered critical in within-country analysis, they shall not be considered critical in a cross-country comparison. Table 12 shows the list of variables retained in the comparison between the two countries, some of which will be discussed in the following sections.

**Table 12.** List of variables retained in the analysis

Variable Included	Comments
Policies	Different approach to service the rural population
Funding	Difference in utilization of funds
Government Leadership	Uganda government own the development process, international donors own Tanzania development process
Aid Flow	Tanzania received more
Debt	Tanzania more debt, but also more cancellation/rescheduling
Population Density and Road Conditions	Tanzania sparser population, large distances and worse road infrastructure makes public work harder than Uganda
Water Stress	Uganda is water stressed, Tanzania not yet

### **Research Question Number One**

*What are the differences between Uganda's and Tanzania's water sector funding?*

Despite the limitation in estimating off-budget funds devoted to the water sector, the difference in the funds available to the water sector is insufficient to explain the stark difference in progress achieved. The main difference identified is in the decision about how to use funds and who controls the flow of funds rather than the availability of it. Uganda's commitment of funds to the provision of basic water services, including long-term support, is not paralleled in Tanzania, where an increasing amount of funds are devoted to the Urban and Basin Authority, managing the private water sector, regulating water for production, and to pay consultants for elaborate plans, whose value is deeply questioned by stakeholders. By not considering long-term support, Tanzania poorly protects its investments in the rural water sector.

## **Research Question Number Two**

*What are the major differences between Tanzania's and Uganda's guiding principles and strategies in rural water governance?*

Tanzanian and Ugandan water policies equally recognize that clean water has an economic value and that it comes at a cost, which would be best if covered by communities. Ugandan policy, upholding its peoples' constitutional right to water, acknowledges that the rural population has limited financial and management resources. Therefore, it creates a realistic network of support to the community to develop these capacities, based on a combination of sensitization and mobilization activities, subsidies, backstopping, and incentives to private sector support. The Tanzanian policy acknowledges the same challenges in various introductory statements, but in practice it creates an institutional apparatus to support a market-based mechanism requiring the existence of such financial and management capacities. Moreover, it fails to assign responsibility for creating capacity; a statement such as "[c]ommunities will be facilitated in acquiring technical and management skills" is not backed up by the specific identification of the owner of this task and by the allocation of funds for such activities. Thus, it is just an empty statement. This lack of assignment of responsibility was observed in Tanzania during the course of the Ngelenge project very often, as most requests for government assistance resulted in an offer of personal help by a government employee, or impromptu solutions that underlined the lack of a structured community assistance plan.

The Ugandan water policy set the cost of its rural development by a top-down decision regarding the technologies to be used. This allowed it to set clear guidelines for community contributions to capital expenses, water pricing, and the development of a private technical support network – the hand-pump mechanics. Tanzania’s policy promotion of environmentally friendly technologies relies on the assumption that communities will have the capacity to make informed decisions on the affordability of the costs of ownership. As detailed by the Ngelenge case study, that is an unrealistic expectation. Despite the district officers being informed of the plans, no one suggested the choice of technology was not appropriate.

The Ugandan policy accepts the fact that the community is responsible for setting water tariffs that are not required to fully cover the O&M of these systems and provides a budget and guidelines to the district on how to fill the financial gap. Despite having read the several documents published by the Tanzanian Ministry of Water multiple times, I do not feel confident I understood how tariff setting, cost recovery, and district backstopping thresholds are supposed to work. Criticism on both the clarity and the diffusion of the national water policy is a recurrent theme that emerged in the analysis of the Tanzanian stakeholders’ interviews, not only at the community level, but also at the local and national government level and with NGOs.

The lack of community funds for regular maintenance eventually leads to systems that break down and need to be repaired through government programs. In both countries, the government response is slow, and both countries delay their intervention in the hope that communities will organize and address the problem independently. But the

delay in government support is longer in Tanzania, where funds are not preventively allocated in the budget, and new implementation and extensions take priority relative to rehabilitation.

The Ugandan policy relies on the existing administrative apparatus for its implementation. The Tanzanian policy created a major overhaul of the administrative sector, which relies on resources not available to its local government offices. The Ugandan policy requires communities to organize in a water committee to manage their water points. The Tanzanian policy creates multiple options for management at the village level, which are fully defined over the course of a seven-year period from the 2002 national water policy to the 2009 Water Act. These options allow a move toward private management of water at the village level, neglecting the fact that private management requires revenue, which further increases the costs of water to the already insolvent beneficiary.

This becomes an issue of equity; if full cost recovery is above the average community economic capacity, only the rich communities have the right to sustainable water services. While Uganda's government understands the need to balance the cost of water with the right to it, controlling the costs by dictating low-technology solutions and setting a requirement that the community pays what it can with the rest coming from the government, the Tanzanian government settles for a consumer market solution where everyone has the right to buy water, as long as they can afford to pay for it.

Large differences also exist in the ways the two countries' policies are written. While the Ugandan national water policy is a detailed prescription of the technology,

implementation, financing, and management of sustainable water delivery to rural communities, the Tanzanian national water policy is more of an outline of principles that should be considered when developing an actual policy. The Tanzanian policy documents mainly create an enabling environment for development, while the Ugandan policies outline and streamline each of the steps of the development process. As an example, the two policy positions with regard to choices of technology are quoted directly.

The Ugandan water policy (1999) states:

(ii) Technology – water supply

Appropriate low cost technologies should be selected, offering good possibilities for community participation in decision making and in physical implementation, inclusive of operation and maintenance of completed facilities, without compromising the role of water as a vital infrastructure for socio-economic development.

For rural and sparsely populated peri-urban communities preference should be given to point sources such as protected springs, handpump equipped shallow wells or boreholes, and gravity fed piped schemes. Motor or engine driven pumps should normally be used for water supply in urban areas where availability of regular power grid and trained operation and maintenance staff are ensured.

Only well-known and tested technologies and hardware, preferably locally made/available, should be used. Standardization of equipment, e.g. handpumps, will be applied only as a means of safeguarding the community-based maintenance system through easy access to spare parts, repairs, etc. on the open (private) market. Therefore, the types of pumps should be limited, and the technical specifications should be available in the “public domain” to avoid monopoly situation and over-dependence on donor preferences.

In accordance with the Uganda National Bureau of Standards (UNBS) the U2/U3 handpump (Uganda version of the India Mark II and III pumps) is the standard equipment to be used in deep groundwater settings (borehole deeper than 20 m). In shallow groundwater settings three types, the U3 light handle pump, the TARA direct action pump and the NIRA AF 85 are to be field-tested and monitored in order to select at most two models to be the standard equipment.

The Tanzania (2002) water policy states:



Choice of technology.

Goal: A mechanism enabling communities to make appropriate choices of technology

Failure of some of the rural water supply schemes has been attributed to inappropriate technology and location of facilities, and lack of social acceptability and affordability. In order to put in place a mechanism which will allow communities to make informed choices of technology the following will be undertaken:

(i) Communities will be empowered and facilitated to make appropriate technology choices that suite them, particularly which require low investment costs and are least costly in operation and maintenance,

(ii) Use of environmentally friendly technologies including gravity, solar and wind power for pumping will be promoted.

The operationalization of Tanzania's 2002 national water policy was postponed until the 2005 National Water Development Strategy, which describes in more detail the institutional apparatus, but fails to provide clear and practical execution guidelines.

#### 4.11.2 Problem Statement

The lack of attention to selecting the most appropriate technology in providing water supply and sanitation services has led to:

- higher capital and operation and maintenance costs;
- higher charges to consumers;
- limited sustainability; and
- lack of consumer or community acceptability.

#### 4.11.3 Policy Direction

Service Providers will provide WSS services using the most cost effective technology available which is suitable to the area and the socio-economic circumstances of the users. In rural areas, where communities will be responsible for operation and maintenance, they will be empowered and facilitated to make appropriate technology choices that will suit their own capabilities, particularly in those which require low investment costs and are operated and maintained at least cost.

#### 4.11.4 Goal

Provision of WSS services is based on technologies best suited to the technical, social and economic circumstances of each scheme, and users will participate in the selection of the technologies to be used.

#### 4.11.5 Strategy

The strategy for adopting appropriate technology will be to:

- identify alternative technologies during the planning process;

- evaluate the consequences of alternative technologies in terms of service levels and costs to consumers, and overall sustainability; and
- involve consumers and communities in the planning and selection process. (The United Republic of Tanzania. 2005)

Further confusion is potentially created by the publication of the 2005 National Water Sector Strategic Implementation Plan, followed by its replacement in 2006 by the Water Sector Development Program (The United Republic of Tanzania 2010). Until the 2009 Water Act, the final version of the institutional apparatus was not steadily defined (The United Republic of Tanzania 2009). The effect of the lack of clarity and stability in the Tanzanian policies and guidelines is clear, both in the complaints of stakeholders about the lack of diffusion of the policy prescriptions and in my direct observations working with district officials and the community of Ngelenge. This is very different from the Ugandan situation, where the policies and guidelines set in the late 1990s never changed.

Figure 10 schematically depicts how the policies were rolled out relative to a more broad economic history and also shows how all those actions relate to increases, decreases, and stalling of rural water coverage. Quite obvious in the graph is the correlation between the timing of a slowdown in the expansion of coverage with the onset of structural adjustment, which marks the beginning of the period at which the government role transitioned from being fully responsible for development and its costs to sharing responsibility for development with the private sector and civil society. It is also interesting to note how Uganda created stronger macro-economic instruments to

support its program than Tanzania, and less bureaucracy, as well as fewer rewrites of policies and programs directly impacting the rural water sector.

### **Research Question Number Three**

*What are the major differences in challenges and drivers with regard to the implementation of sustainable rural water development?*

The same core challenges are present in both countries. Water costs are not high on the priority lists of more economically vulnerable populations. Given the limited economic and management capacities of communities, water funds are easily misappropriated. In neither country does the concept of preventive maintenance appear to be accepted by communities. Water sources are repaired only after they break if the replacement costs do not exceed \$50-60 and if the community has a functional water management structure.

Uganda has created several drivers that help protect investments in rural water resources, none of which have been paralleled in Tanzania. The process of development and maintenance of rural water points is clearly defined and known to everyone involved, including the choice of low-cost ownership technology. Ugandan districts have budgets to implement a series of activities lacking or uncoordinated in Tanzania, as funds to train workers and to deploy them are not available. Additionally, the fact that Uganda dictates each aspect of the development process minimizes the training requirement, and the Tanzanian lack of funds and resources is exacerbated by the level of competence required to educate a community to conduct a useful cost-benefit analysis of available technologies.

Another advantage spawning from the top-down choice of low-cost technologies in Uganda is the effective organization of technical support at the district and sub-county level. Moreover, limiting technology choices allows the Ugandan district to set clear guidelines on triggering backstopping based on a measure of equitable affordability. Ugandan districts can reserve up to 11% of the conditional grants for rehabilitation, operation, and maintenance, while Tanzanian districts find it difficult to have rehabilitation budgets approved. In Tanzania, if guidelines for providing support to communities for unaffordable replacement costs exist, they are not known to stakeholders. Standardization, however, creates some challenges at a systemic level in Uganda which are not as critical in Tanzania since a system is not in place. Challenges include dishonesty in the network of hand-pump technicians and systematic theft of hand pumps to feed a spare parts black market.

Coordination within the sector is also quite different between the two countries. Since the onset of the Sector Wide Approach both governments attempted to channel all donors' funds through the basket funds and asked donors working independently to coordinate their work at the district level. The two water NGO networks, UWASANET and TAWASANET, are stakeholders in this coordination effort, but they are in two different states of development. As pointed out by several interviewees working within the network, TAWASANET is only a few years old and is working to find its place and identity with the development process, while UWASANET's increased maturity in coordination and reporting is proven by the increasing number of NGOs who disclose their budgets and their plans for it (Government of Uganda 2011; Tanzania Water and

Sanitation Network 2010; Uganda Water and Sanitation Network 2010). Lastly, the Ugandan Technical Support Unit (TSU) efforts monitoring the relationship of communities with district, sub-county officials, and NGOs, as well as reporting back to the national level, is unparalleled in Tanzania. Ugandan TSU officers are traveling in the field four days every week, covering the entire territory every quarter.

The sense of ownership and responsibility the Ugandan government and national civil society have in the development programs is replaced with a sense of disenfranchisement in Tanzania. The Ugandan government is responsible, both by policy and in reality, for development, and all stakeholders, civil society, private sector, and government officials are aware of this responsibility. Water services cost money, and in that sense, most interviewees admit it is a commodity, as people who can afford it will have an easier time accessing the services. But it is a government responsibility to enact the right for people to have access to water by creating an environment of cooperation and participation in which all members of society do their part to cover these costs.

A very different picture emerges from the Tanzanian interviews. In theory, the government is responsible for water services, but in practice, the decision makers are the international development partners who control the funds and make the rules. Stakeholders feel disempowered and without the means to influence the process. Figure 21 illustrates the results of the policy network analysis. The graphs compare the relative frequency of each listed category, normalized by the frequency of the word water in the interview transcripts (right), in the 2010 national sector review (center), and in the two combined. The lower three categories compare the ratio between the frequency of

references to international, national, and local stakeholders relative to the frequency of the mention of government (which is inclusive of ministry and districts).

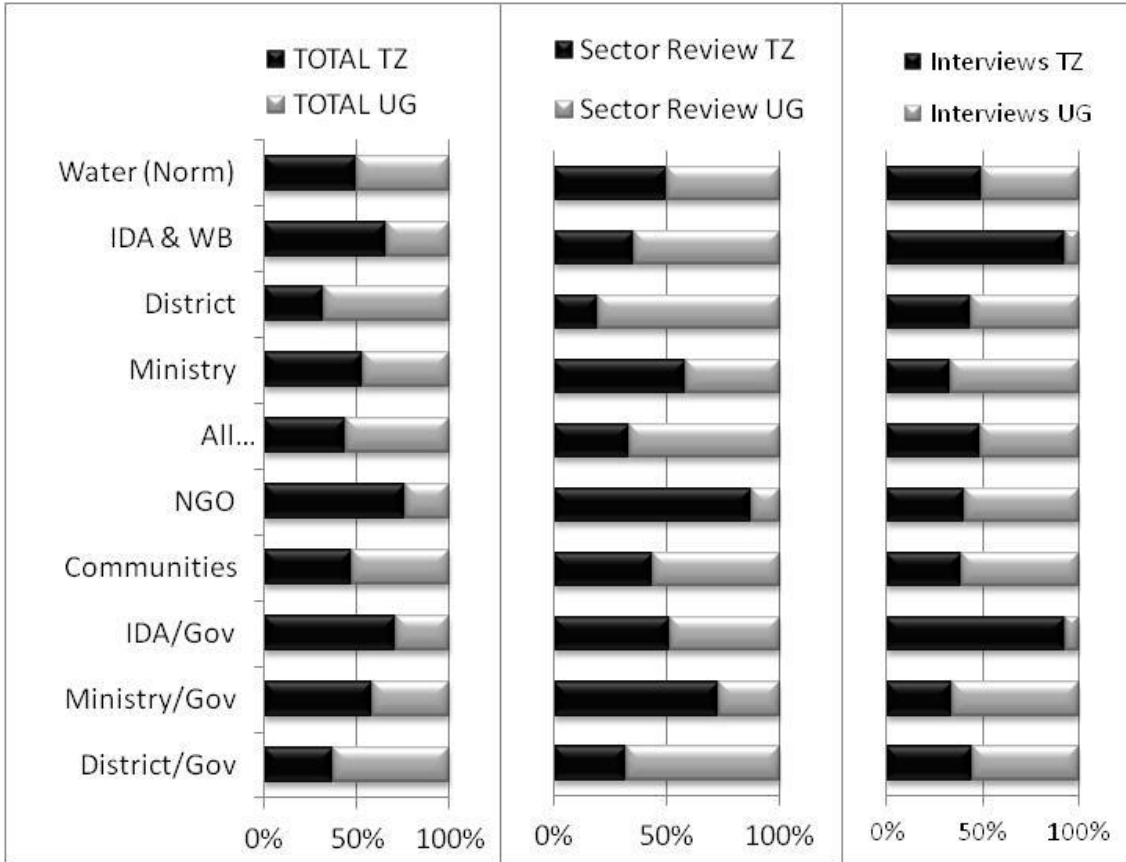


Figure 21. Comparison of policy networks.

Ugandan stakeholders, both at the national level (sector review) and at the local level (interviews) center the discourse on water development at the local level, districts, and communities, more than their Tanzanian counterparts, which is in line with the grassroots participatory process informing the Ugandan political discourse. At the local level, Tanzanians perceive the International Development Association and World Bank as more influential than Ugandans do; the latter seem more concerned with control

exerted at the national level than the former do. Interestingly, the situation reverses at the official national stakeholders level; the international developing partners are not as much at the center stage during the National Sector Review.

## DISCUSSION

### **From a Comparison to Explanatory Model**

The results of the Tanzanian and Ugandan rural water governance comparison discussed in the previous sections, augmented by within-country observations, allow the proposal of an explanatory model establishing a connection between policies' principles and outcomes, explaining the Tanzania rural water development failure. Tanzanian governance fails because it centers on the faulty assumption that full-cost recovery is a realistic expectation, as long as capital costs are subsidized. All the body of evidence in this work and in the work of others shows that rural communities, whose monetary expenditures are close to the poverty level, do not consider clean water a priority in their struggle to survive. This conclusion is not based on an economic assessment of the target population, which is very complicated in non-monetary economies, but on the fact that all data from the last twenty years points to communities lacking internally generated funds for repair. Arguing the idea that they should prioritize water, or that water costs are within their means, is just an expression of our Western point of view. They are clearly expressing their views with their financial commitment or lack thereof.

Although misappropriation of funds is compounded by the refusal to pay fees, it is hardly the source of the problem, as it does not justify the lack of participation in labor or in committee work, which are also indicators of the priority level. The misappropriation of funds often reported stems from the same economic problems. The community leader who misappropriates the money for personal gain is just as poor, and sees better investment opportunities in small business than in water services. The community



leaders who devote the water funds toward other community projects see a primary school or a health center as a higher priority than water. The relative success of the transformation of water funds into revolving micro-loans supports this explanation – economic development needs to come first.

The Ugandan experience proves sensitization and mobilization can only create a culture of caring for water facilities with basic affordable maintenance, which mainly involves labor (i.e., keeping the ground around a water point clean, greasing a water pump regularly, protecting equipment from theft and vandalism and contacting the right resource when a problem occurs). It cannot create the customer base required for full-cost recovery unless the economic structure of a community has reached a level of financial security that elevates clean, accessible water to a higher priority.

Uganda's success lies in the government decision to take over the financial burden to sustain basic water services until a community is economically ready to pay for them. This decision requires the existence of funds to cover the expenses, which Uganda created with macro-economic measures, such as the dedication of a sizeable amount of the HIPC debt relief funds and a deliberate effort to control costs through the government imposition of basic technologies. Naturally these technologies offer only the most basic level of service. But for rural communities, a very basic level of service is satisfactory, as demonstrated by the Ngelenge experience. Shutting down the water distribution tap stands to receive payment was not effective, as people would rather fetch water from the wells, even if they had to walk 1.5 km, than pay the 600 Tsh of water fees. Locking the well on the other side created outright hostility and rebellion.

Tanzanian policy attempts to establish a full privatization of the sector. The regional experts who helped Ngelenge transition from a committee-based model to a board of directors supervising the activity of a hired manager and treasurer, advised the community that the committee-based management model was proven ineffective compared to one in which managers are paid through the profits made on tariffs. The new management model was just as ineffective as the previous one. The words used by one of the same advisors one year later, during the interview for this work, were “now they are preaching this thing about private operators,” implying that the advice did not come as much from their direct experience as it did from pressure from above.

Uganda is pursuing an expansion of the private sector. The concept of the hand-pump mechanics network spawned from a desire to create an indigenous private sector, and the government did not support developing new water sources in peri-urban villages like Kizzi because they could be reached by the Mpigi Town water distribution network managed by a private operator. Large complex systems benefit from a professional utility management but in turn make water less affordable to all. Not everyone, not even in the urban center of Mpigi Town, can afford the upfront cost of a water connection. The ones who could afford it created such an unfair water reselling business that even the private operator actively tried to find more equitable solutions, such as suggesting a pilot project of a communal tap stand for Kizzi. Uganda creates space for the private sector, but does not pull back from its role in creating sustainable development. The government still maintains the basic level of service that provides water to the poorest strata of the population (see figure 22). When this author asked people at the Mpigi Town’s protected

spring why they were fetching water there, she was told that water from the distribution system was not within their means. Ironically, this author tested the water from the protected spring and from the Mpigi water distribution system and found that while the spring water was within the WHO criteria for safe water, the distribution system water was not. Most Ugandans boil that water before drinking it.



Figure 22. A protected spring in Mpigi Town.  
Women doing laundry (left) and children fetching water (right)

The government of Uganda's concern about affordability is also seen in the recommendation that village water committees collect water fees on a monthly basis, as it significantly reduces the price of water. In Tanzania, tariffs by the bucket are recommended as it is a stronger method of enforcing payment: no coin, no filling your bucket.

### **Suggestions for Future Research**

The trends toward privatization of the water sector observed in Tanzania and Uganda, and the influence exerted by debt, characterizes the policy trajectories of most developing countries. The cause-effect relationships suggested by this comparative study could be tested by repeating this analysis work in other countries. Researching a larger

number of countries would allow an in-depth analysis of the correlation between aid-generated debt and ownership of the development effort, which is not meaningful with a sample of only two countries. Additionally, it would be interesting to study the correlation between the concept that water is a right with a government's commitment to accept responsibilities for water services, including provision of funds for capital implementation, backstopping, and capacity development.

### **Neo-liberalism and the Millennium Development Goals**

Neo-liberal policies, pushing the government to a facilitator role, leads things in the opposite direction than the Millennium Development Goals are trying to achieve. Market based policies fail to establish sustainable development to the poor, and in the case of Tanzania, lead to inefficiency, poor investment protections, and duplication of efforts, which is the traditional argument in favor of privatization of public services. In this work, I provided several examples of how neo-liberal policies succeed to create business in the water sector by constructing water infrastructure, as pointed out by Goldman (2007) in his criticism toward the hegemony of the World Bank in creating development. The economic opportunity created by unsustainable infrastructure only provides an improvement to macro-indicators of the economy at the expense of the poor who are asked to invest in water infrastructure without a future. This is the same mechanism observed in the year post-structural adjustment. Macro-economic indicators such as GDP quickly improved, while the number of people living below the poverty line quickly increased. Poverty is not only cash poverty; it is compounded by privatizing access to social services such as water, health, and education. All countries, developing

or developed, are currently facing this dichotomy: optimizing economic growth, the rich are getting richer, and the poor are getting poorer. Quoting from Mikhail Gorbachev's remarks at The World Water Forum in Marseille (2012):

Ladies and gentlemen,

As someone who has more than fifty years of experience in politics, I am convinced that the water crisis is closely related to the flaws of contemporary economics and politics. Let me make two points in this regard.

We have met at a time when the world is still reeling from the consequences of a severe, global economic crisis.

The emerging signs of recovery in the world economy should not deceive us. The crisis has shown that the currently dominant model of economic growth is unsustainable. This model engenders crises, social injustice and the danger of environmental catastrophe.

There is a clear need for an evolutionary but sufficiently rapid transition to a different model. It should be based on a combination of markets and private initiative with the principles of social and environmental responsibility of business and effective government regulation.

We therefore need to rethink the goals of economic development. Consumption must not remain the only or the principal driver of growth. The economy needs to be reoriented to goals that include public goods such as a sustainable environment, people's health in the broadest sense of the word, education, culture and social cohesion, including absence of glaring gaps between the rich and the poor.

Major water projects, both national and international, could become one of the engines in a qualitatively new stage of the development of global economy.

My second point: the world needs a new political architecture, a new architecture of security, global governance and sustainable development.

It should be based on the rejection of confrontational thinking or any attempts to dominate international relations and on demilitarization of international politics. It is only on such a basis that we will be able to respond to the main challenges of this century – the challenge of security, the challenge of poverty and backwardness, and the challenge of the global environmental crisis.

Ladies and gentlemen,

During the fifteen years of its existence, the World Water Forum has helped to put water problems on the international political agenda.

Unfortunately, however, it has still not gone beyond general discussion between representatives of governments and the business community, nor has it produced breakthrough solutions to the water crisis. That is why, parallel to the forum, alternative discussion platforms are emerging as a result of civil society initiatives.

The voice of the public must be heard at this Forum. Therefore, let me convey to you the position formulated by our civil society partners:

“We believe that good governance of water and sanitation will only be brought about through human rights-based approaches and adequate investment in informed and effective civil society participation. We greatly welcomed the 2010 UN recognition of the human right to safe drinking water and sanitation and now urge all actors to support national governments to implement these rights for all people in accordance with human rights law and to recognize and effectively support local knowledge and community management as important to implement this right.”

Ladies and gentlemen, let us unite our efforts! Let us think and act on the basis of common principles: Peace for all. Water for all. Dignity and the life worthy of a human being, for all. We should not settle for less.

Gorbachev’s appeal for a change in political architecture stops short of denouncing the pressures and interferences of international giants such as the World Bank and the International Monetary Fund, as other critics of the neo-liberal approaches to development do (Budds and McGranaham 2003; Falkner 2003; Ford 2003; Jimenez and Perez-Foguet 2010). My research strongly suggests that the difference between Ugandan and Tanzanian governance is centered on the right to water and the right of a nation to determine its own path. Tanzania is one of the countries that abstained from voting on the UN resolution about a right to water, as its water policy is incompatible with the right to water. By requiring full-cost recovery and making it difficult for districts to obtain rehabilitation funds, the Tanzanian policy reinforces the idea that water is a right only in the sense that no paying customer is discriminated against; but micro-economics prevents the creation of a market-based development that stems from this idea.

In debating the implications of a right to water in their current policy, Tanzanian legislators should not ignore the excellent compromise reached in Ugandan policy: an

institutional arrangement that guarantees basic water services to all while allowing the development of privately owned or managed improved water services as economic development creates a market for it.

A market-based model of development cannot ignore the basis of all markets, the existence of paying customers interested in the product. To make an analogy, it is like a division of a company manufacturing a product that nobody wants, using loans to sustain the cost of production, and selling below cost in an attempt to stimulate interest in the market. Eventually, such an unbalanced model leads to capital depletion of the whole company, which is forced to declare bankruptcy with the potential sale of valuable assets. Taking this analogy to the next level, such a mechanism is beneficial only to the lenders, who profit from the interest covered by other more successful divisions of the company, and to the suppliers of the components required to make the product.

It is hard to believe international finance institutions fail to see this major issue. It is easier to believe their goal lies elsewhere: as the World Bank had explained to their funding partners as early as the 1950s, development creates markets for foreign goods and services. The most expensive parts of the Ngelenge water distribution system, the BP solar panels and electronics, the Australian made MONO pump, the British and Italian valves, are not made in Tanzania – they are part of the flow of imported goods which can tip a developing country's macro-economy into debt. This work substantiates Goldman's (2007) accusation that the World Bank has created a neo-colonial empire.

As a volunteer in an international NGO, I find it very disturbing to realize that we are just pawns in an undemocratic and illegitimate exploitation scheme; we talk about

empowering communities with a bottom-up development, when legislation is imposed upon them without any consideration for the democratic processes of these countries. This contradiction and its consequences are evident in the Tanzanian National Water Development Sector program (The United Republic of Tanzania 2006, Annex 4), which produced a large volume of documents about participation and training guides for district government officials to facilitate community participatory approaches, only to force onto districts, that already had comprehensive multi-year development plans, new insular (see figure 23) “quick win” projects, prepared by overpaid external consultants.



Figure 23. Illegal water source in a mountain community of Tanzania. A pipe planted in the gravity water distribution line traversing a village without appropriate water supply en route toward a village downhill.

The Water Sector Development Program has published an incredible number of pages of guidelines; reading them and attempting to follow them in the implementation of the Engineers Without Borders project lead me to believe that whoever wrote the



documents had very limited experience working directly with a Tanzanian rural community, and possibly was not even a Tanzanian national.

A large portion of the documents are intended for district water and sanitation teams, which begs the question of why these documents are not written in Swahili since very few workers in a rural district town are fluent enough in English to understand it. The concepts embedded in most of these documents are beyond the average community-level member's grasp, yet they are meant to enable participation, and lead to community making decisions on their water services. If I am correct, and these guidelines are written by external consultants, as hinted at also by the Tanzanian national stakeholders, we are in front of a development process dictated by international organization on the government of Tanzania, ironically, dictating methods to empower communities in making choices and enhancing ownership of the development process.

The disenfranchisement of the Tanzanian national stakeholders with the \$1.2 billion WSDP is not hard to understand, and it is not surprising that it led to large misappropriations of funds at the local government level. It certainly is true that the World Bank control over the Tanzanian development programs is pervasive and as illegitimate as president Museveni's presumed election rigging and refusal to step down as the Ugandan president. It is worrisome considering a sizeable portion of aid money administered by the World Bank comes from U.S. taxpayer contributions, yet, unlike government programs in the U.S., there is no political process in place whereby taxpayers have a voice in how the funds are utilized.

## CONCLUSIONS

This researcher, through this study, hoped to help donors and NGO grasp the complexity of pursuing the water Millennium Development Goal. Donors and volunteers are motivated by the desire to be a part of achieving the Millennium Development Goals target of bringing sustainable access to clean water to the poor. Everybody working or supporting NGOs who works on water projects talks about the sustainability of their projects, that most of them qualify due to the need of creating capacity in the community to support their own water system. This capacity is envisioned as technical capacity for repair, knowledge of how to procure the needed spare parts, and paying tariffs to cover the cost. NGO funds are, therefore, invested in materials for construction, sending volunteers provide technical training to the communities, or constructing and creating capacity development to manage the systems mainly focused on tariff collection and transparent accounting. By taking this approach, volunteers adopt and disseminate the neo-liberal model without questioning its validity. More than twenty well meaning volunteers worked with the community of Ngelenge over the four years I was actively involved with the project. Yet, it took about the same time for us to realize we were on the wrong path. Along the way, we realized that unless we committed to the responsibility of indefinitely raising funds for the repair of the system, we had failed at creating sustainable water services. Ironically, our project will be awarded the 2012 EWB-USA Premier Project, an award recognizing “outstanding EWB-USA Projects that epitomize EWB-USA’s Mission and Vision by fostering sustainable solutions, strong community partnerships and carefully following the EWB-USA project process.”

The neo-liberal model has two advantages that are very appealing to NGOs and donors. Firstly, assuming that once construction is over, the community takes ownership of their water services provides a great exit strategy for an NGO. Nobody can afford a long-term commitment to fund operation and maintenance. Secondly, it allows NGO to allocate most of the donated funds to materials, which are easy to trace and document, satisfying the donor desire to hear that the money is not wasted. Yet, as many Tanzanian stakeholders complained, if you want to protect your investment, funds need to go into working with communities to find viable solutions.

Based on my research, I recommend all donors and volunteers familiarize themselves with the water policies of the country in which they are working and begin a project at the district government level, gathering information about the support offered by the local government and about the technology that can provide basic services at the lowest cost of ownership. If they are working in a country where the government takes responsibility for basic water services, such as Uganda, NGOs need to work through the government, even if it can be slow and at times frustrating. If they are working in a country where the government does not fill this role, then before embarking on a construction project, one should consider simple ways to treat drinking water, which are viable options if a water source is relatively close to households. An example of a simple method is the three buckets settling method, which eliminates particulates from the water, or Solar Disinfection (SODIS) that can be managed for the small quantities used for drinking water. While these methods are not 100% effective, they still have the ability to

improve the water quality by more than 90%, which is already a large improvement in many situations.

If construction of a water source is necessary, the required budget for O&M needs to be created first. Village-based self-starting revolving funds have been very successful when appropriate support to create the administrative and leadership capacity is available. A small NGO in Tanzania, SHIPO, has been very successful at implementing water and sanitation improvement projects with a combination of low-cost and low-technology solutions using the creation of community-based revolving funds. The revolving funds are created by pooling contributions, which are loaned out to community members to do small business and returned with a small interest, typically set to 5-10%, and much less than that charged by larger microfinance institutions. The revenue of these villages' banking operations can be used to support water services as long as the technology chosen has a low cost of ownership. Donors need to understand that creating such revolving funds require investments in capacity development programs, which are best administered by local NGOs, and should be contracted out; by contracting local NGOs, local employment is also created, which is good. But as long as the concept that bringing a pipeline to a village is not the same as establishing sustainable water services sinks into donors' minds, there will be no equitable and sustainable development.

The 1988 book by Olaf Therkildsen (1988), *Watering White Elephants? Lessons from Donor Funded Planning and Implementation of Rural Water Supplies in Tanzania*, that analyzes the Regional Integrated Development Programs (RIDEP) in the Tanzanian water sector has a telling title. It is unfortunate to conclude that more than twenty years

after its assessment, water development projects are still the same white elephants, only bigger in size.

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