

# **Water at the Centre of Poverty Reduction: Targeting Women as a Stepping Stone in the Nadowli District, Ghana**

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## **Abstract**

*Poverty reduction has been a challenge in developing countries, pushing many development partners to devise strategies to tackle it. One of such strategies is the provision of water services. Although there has been much focus on water provision, the practice and benefits of integrating multiple-use water services in the design and implementation have been underexplored. This paper argues for the role of multiple-use water services in reducing rural poverty, especially among women. This is based on a case study that was conducted in two communities in the Upper West Region where multiple-use water services have been provided. Data was collected using focus groups discussion mainly with water user associations who are made up of women only, survey of 26 households, and physical observations of the water infrastructure and activities around the infrastructure. We found that access to water services saved time in water collection and contributed to increase household productive hours. Consequently, this resulted in increased output in their economic activities with positive ripple effects on other sectors of the rural economy, leading to poverty reduction as indicated by the participants. It is argued that investing in multiple-use water services is a major way of empowering women to actively engage in multiple streams of income and thus a great potential for achieving the sustainable development goals.*

**Keywords:** Multiple-use Water Services, Household Livelihood, Rural Women, Poverty, Ghana

## **Introduction**

Poverty, a term that has received wide interpretation, is part of humanity and exists in varied forms across the globe. The United Nations defined poverty as multidimensional, entailing a situation in which a person lacks basic needs or resources to feed, cloth, maintain a healthy life, get education, as well as actively participate in social life (Gordon, 2005). Although poverty is a global issue, it is predominant in East and South Asia, and sub-Saharan Africa (SSA). In 2013, 33% of the world population who lived below the threshold of extreme poverty was in Africa. While 24.2 % of the population of South Asia lives on less than US\$1.25 a day, the proportion is much higher in Africa (36.3%) (Turner, Cilliers, & Hughes, 2014). About 75% of the over 1.2 billion people who live in extreme poverty, reside in rural areas (Rahman & Westley, 2001), and the trend has remained unchanged over the years. Although 70% of the poor live in rural areas, they equally have fewer alternatives to livelihood apart from agriculture (De Fraiture, Molden, & Wichelns, 2010). This has triggered the international community to fashion out interventions aimed at alleviating poverty. Poverty reduction is an undisputed overriding goal of development and the primary challenge facing the development community (van Koppen, Namara, & Safilios-Rothschild, 2005). Despite significant poverty reduction over the years, in all ecological zones, northern Ghana has still 'been left behind', with most of the poorest of the poor being female rural dwellers (Koc, 2007).

The historic poverty statistics in SSA urged institutions such as the New Partnership for Africa's Development (NEPAD) and the Commission for Africa to call for accelerated efforts to double infrastructure provision, especially water infrastructure. This is justified because poor households often suffer from poor water provision, resulting in a significant loss of time and effort, especially for women (Sullivan, 2002). Water provision should however take a strategic approach; one that encapsulates the different uses of water (Hanjra, Ferede, & Gutta, 2009). In relation to the different uses, it is noted that both men and women often use potable water for various functions, thus creating competition for water, particularly during water shortage (Voegelé, Villarreal, & Cooke, 2009). Despite the multiple water needs of communities, the public sector of most countries have mandates for 'single use' service delivery, such as irrigation, drinking water or fishing and, as such, people's multiple water needs have not often been factored into the conventional water delivery approach (Srinivasan, Palaniappan, Akudago,

Cohen, & Christian-Smith, 2012; van Koppen, Moriarty, & Boelee, 2006b). As a result, water development projects are often structured independently or even occasionally in conflict with one another (Srinivasan et al., 2012).

Given that water supplied for domestic purpose ended up serving other functions, an enhanced approach, dubbed 'Multiple-use water services' (MUS) emerged within the academic and practitioners' domain as an effective alternative to the design and supply of water services to take care of the varied uses of water, especially in rural communities (van Houweling, Hall, Sakho Diop, Davis, & Seiss, 2012; van Koppen; Moriarty, & Eline Boelee, 2006a). The overarching objective of MUS is to meet people's multiple water needs, roles and functions (Smits, Renwick, Renault, Butterworth, & van Koppen, 2008), with the prime focus of reducing poverty in rural areas (Smits, van Koppen, Moriarty, & Butterworth, 2010). This paper seeks to project the central role of MUS in reducing poverty, especially in rural areas, and for that matter in contributing to achieving Sustainable Development Goal One in particular.

## **Concept of Multiple-Use Water Services**

Since the 1980s, emphasis has been on the provision of potable water. This was orchestrated by the insurgence of water-related diseases at the time. But it has been observed that though potable water is usually provided, households use it for varied purposes. Consequently, there is a growing concern about developing approaches that capture the multiple uses of water. The argument for such an approach is twofold: (i) it is expected to make a more comprehensive impact on the multiple dimensions of poverty, including health, food security, income, and other aspects of livelihoods through access to water for both domestic and productive purposes; and (ii) it is expected to contribute to improved sustainability and performance of systems at the community levels (Smits et al., 2008). These arguments led to a new concept, dubbed "Multiple-use water services".

According to Srinivasan et al. (2012), the term Multiple-use water services (MUS) stresses the multiple purposes for which rural and peri-urban poor need water, ranging from drinking and sanitation to growing food and productive activities. The MUS is a participatory, integrated and poverty-reduction focused approach in poor rural and peri-urban areas, which takes people's multiple water needs as a starting point for providing integrated services, moving beyond the conventional sectoral barriers of the domestic and productive sectors (van Koppen et al., 2006a). Although not totally a new concept in practice, the design of water infrastructure did not take into consideration the multiple uses to which water is put, resulting

in unhealthy competition at water points. A promising corridor to use water effectively for poverty reduction and gender equity is a multiple-use water services approach, which takes poor people multiple water needs as the starting point. This approach recognises that when rural communities construct their own water infrastructure, they typically do so for multiple uses: domestic purposes, sanitation, agriculture, livestock, tree growing and industrial purposes (Castillo, Namara, Ravnborg, Hanjra, Smith, Hussein, Béné, Cook, Hirsch, & Polak, 2007).

The concept of MUS is new in academic literature but the practice is not new in both rural and urban settings. Although people use different water sources for different uses, in most cases, one source is used for myriad functions (Moriarty, Butterworth, van Koppen, & Soussan, 2004; Namara, Hanjra, Castillo, Ravnborg, Smith, & van Koppen, 2010). The current focus of MUS design is to meet multiple water needs of households – drinking water, hygiene, and productive needs – for the betterment of their lives (Srinivasan et al., 2012; van Koppen et al., 2006a).

Multiple-use approaches are thought to be effective for poverty reduction and gender equity for several reasons: they reduce drudgery and improve health as well as increase food security and income from livestock, fish, crops, and small businesses. The MUS also promotes sectional representation in user association because having a water user association that includes all water users, instead of having parallel irrigation committees, domestic water committees, and traditional structures governing the same water resources could be more effective and sustainable (Castillo et al., 2007; Smits et al., 2008). Integrating multiple use services need to be guided by the existing water delivery approaches in order to ensure compatibility of approaches, and thus promote sustainability of the water services.

The current approach to water services delivery in rural areas takes a community-based management approach, where decision-making, management powers and 'ownership' of the water resources are devolved to community level structures (Fielmua, 2011; Harvey & Reed, 2004; Schouten & Moriarty, 2003). The provision and management of MUS in many countries follows this approach (Smits et al., 2010). In that respect, the willingness of the communities to take a strong sense of ownership of the water facility and handle operation and maintenance related issues is central to a sustainable MUS (Kaunmuang, Kirtikara, Songprakorb, Thepa, & Suwannakum, 2001; Short & Thompson, 2003), with its rippling positive effects on other sectors of a rural economy, thus placing water at the centre of several development goals of the communities.

## Contribution of Water Services to the Sustainable Development Goals

The UN Millennium Declaration and the consensus reached at the World Summit on Sustainable Development (WSSD) place poverty reduction at the top of the international development agenda, presenting a challenge to all sectors to define strategies that can contribute to this goal (Soussan, 2004). With the launch of the Millennium Development Goals (MDGs), there have been significant achievements such as poverty reduction, improved education, reduced infant and maternal mortality, increased access to water and sanitation facilities. Despite these successes there remain some gaps. For example, poverty continue to pose a challenge, gender disparities in access to resources exists in households with limited access to basic services and households without access to basic services (United Nations, 2015a).

As the MDGs come to an end, a set of 17 goals called the Sustainable Development Goals (SDGs) and 169 targets were adopted by all member states of the United Nations. The SDGs, which are interlinked and integrated in nature, seek to build on the MDGs and to accomplish the unmet MDGs targets (United Nation, 2015b). The SDGs are self-reinforcing and, as such, require networking in the implementation process. The discussion on multiple-use water services (MUS) in the preceding section demonstrates that it can play a significant role in contributing to other SDGs. The implementation of SDG 6 on water can have implications for other SDGs because water problems such as water scarcity, salinity, disasters, transboundary basin management among others are major constraints on development in the affected countries. Achieving SDG 6 directly contributes to eight SDGs, as demonstrated in Table 1. For example, ending poverty is especially a major rural concern and, as such, reducing it by half as stipulated in the SDG 1 (United Nation, 2015b) requires investing in rural areas.

**Table 1: Link between water supply services and eight other SDGs**

Sustainable Development Goals	Contribution of water to the targets of SDGs
SDG 1. End poverty in all its forms everywhere.	<ul style="list-style-type: none"> <li>· Water is a core factor of production in agriculture, cottage industry and other economic activities.</li> <li>· Investments in water infrastructure and services serve as a catalyst for local and regional development.</li> <li>· Household water treatment and safe storage reduce disease burden among the poorest who hitherto had no access to safe drinking water.</li> </ul>
SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.	

Sustainable Development Goals	Contribution of water to the targets of SDGs
SDG 3. Ensure healthy lives and promote well-being for all at all ages.	<ul style="list-style-type: none"> <li>· Access to improved quantities and quality of water reduces morbidity and mortality for children.</li> <li>· Improved cleanliness, health and reduced labour burdens from water portage contribute to reduction in mortality risks.</li> <li>· Improved access to water supports HIV/AIDS affected households and enhances the impact of home care programmes.</li> <li>· Improved access to water reduces its related diseases.</li> </ul>
SDG 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	<ul style="list-style-type: none"> <li>· Access to water reduces water carrying burdens, especially for girls, and contributes to improve school attendance&amp; home studies.</li> <li>· A safer school environment for girls, through appropriate water and sanitation facilities in schools, results in increased attendance.</li> </ul>
SDG 5. Achieve gender equality and empower all women and girls.	<ul style="list-style-type: none"> <li>· Gender sensitive water management programmes help empower women and give them confidence to increase their role in other societal activities.</li> <li>· Community-based gender sensitive organisations (such as water user associations) improve women social capital.</li> </ul>
SDG 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.	<ul style="list-style-type: none"> <li>· Supply of water infrastructure, including irrigation systems, creates jobs for youth and contributes to high level of economic productivity.</li> <li>· Irrigation systems contribute to women economic empowerment.</li> </ul>
SDG 10. Reduce inequality within and among countries.	<ul style="list-style-type: none"> <li>· Access to irrigation contributes to increase rural income and bridges inequality between the rural and urban populace.</li> <li>· Targeting women through MUS contributes to bridging income and decision-making power differences between men and women.</li> </ul>
SDG 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	<ul style="list-style-type: none"> <li>· Improved water management, including pollution control and sustainable levels of abstraction, are key factors in maintaining ecosystems integrity. Achieving this target will enhance the fight against climate change (SDG 13).</li> </ul>

Source: Authors' construct, with ideas from Soussan, Noel, Harlin, and Schmidt (2006) and Vasquez (2004).

Water is a key driver of sustainable growth and poverty alleviation as it serves as an input to almost all production, in agriculture, industry and energy (Grey & Sadoff, 2006; Hussain & Hanjra, 2004). Improved access to water can contribute to poverty reduction in several ways: increases production and productivity, stabilises income and consumption, and contributes to non-farm output (Namara et al., 2010). Voegelé et al. (2009) also indicated that improvements in access to water also reduce the time and energy spent walking long distances, especially by women and girls (Table 1). This allows women to use the time gains for economic work in agriculture, food processing, and community development. Similarly, it was established that increase in access to water to support agricultural purposes comes with increased food output, diversification of crop production which often results in access to balanced diet (Lipton, 2001; Namara et al., 2010).

Additionally, provision of water, especially based on the MUS approach, is generally gender friendly since the link between water and gender is inextricable (Short & Thompson, 2003; van Koppen et al., 2006a). In most instances, women are the beneficiaries of MUS and, as such, it has been identified as a gender-equitable and a women empowering approach to development of rural areas (van Houweling et al., 2012). This is because there are benefits of MUS that are particularly to the advantage of women. In societies where women are landless, MUS, which are mostly supplied around the household, potentially increase women economic activities and their income (van Koppen et al., 2006a). For example, in Senegal, a study of 47 MUS showed that women participation in gardening was twice that of their men counterparts and this contributed to women economic empowerment (van Houweling et al., 2012).

Moreover, improved domestic water supply contributes in income generation, time saving, health benefits (Moriarty et al., 2004). In terms of maternal health, Sultana and Crow (2000) established that in Bangladesh, maternal cases (complications) were linked to women carrying water pitchers on the hip due to long distance to water sources. Again, access to water is linked to the practice of proper hygiene (Montgomery & Elimelech, 2007), with implications on the attainment of the SDG in combating diseases. For example, access to water supply has reduced the incidence of illness among adults by 11% and an increase in weight-for-height by 0.835 kg/m in rural areas (Zhang, 2012).

During the implementation of the MDGs, the pivotal role of water in many sectors of the economy and its role in accomplishing many of the MDGs, made Soussan and colleagues to conclude that:

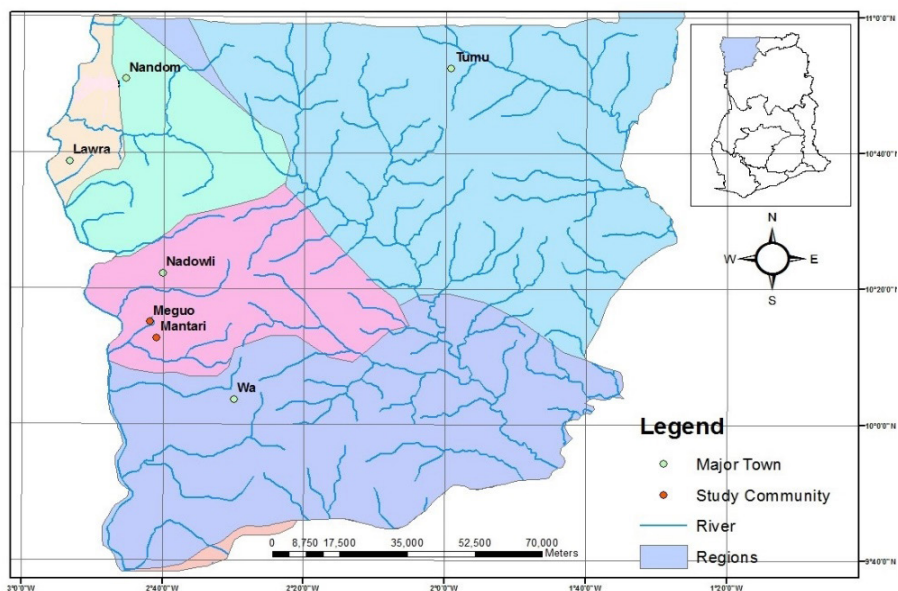
Investments in water resources development and management can contribute to meeting the MDGs as a whole both through broad interventions designed to promote sustainable development on an area basis — such as multi-purpose river basin development and aquifer management—and through targeted actions addressing one or more particular goals in a specific location, such as watershed management within degraded areas farmed by poor families. Both types of interventions are important for making many of the MDGs a reality; indeed, holistic approaches to water resources development and management can help to deliver the MDGs more cheaply and sustainably (Soussan et al., 2006:12).

Given the thematic nature of the SDGs and the role of water in fulfilling the different but related SDGs, integrating multiple functions of water in water delivery process remains relevant.

## **The Study Area and Methodology**

This research was conducted in the Upper West Region of Ghana using two case communities (Mantari and Meguo) in the Nadowli District (see Figure 1). These communities are rural and the members depend on peasant agriculture as their major source of livelihood. Other economic activities engaged in by the people include shea butter extraction, dawadawa processing, and 'pito' (local alcoholic beverage/beer) brewing. The communities are located close to the Black Volta River, approximately 3km away. Prior to the construction of the water facilities, the communities depended on the Black Volta River as their main source of water for all water-related needs.





*Figure 1: Regional map indicating the study areas*

The concept of MUS happens at different scales: household, water system level, community level, and catchment or river basin level (Smits et al., 2008). The focus of this study is a combination of household, water system and community levels. In that regard, this paper is a synthesis of a multiple case study (two case communities that have benefited from multiple-use water services). These cases are the only communities that have benefited from MUS facilities in the District. The MUS facilities were provided by a consortium, comprising Care International, Global Water Initiative, Catholic Relief Services and the International Union for Conservation of Nature. Data were obtained from household survey, interviews, observations and focus group discussions. Prior to the field work, preliminary visits to the communities were made to enable the researchers acquaint themselves with the setting, the demographic characteristics, the water facilities of the communities, and also to guide in the design of the research tools.

In the communities, focus group discussions were held with the Water and Sanitation Committees, Water User Associations (community members who use the water system for gardening) and school children. The participants of the FGD ranged from four to six for the Water and Sanitation Committee while that of the Water User Association ranged from 12 to 25. Interviews were conducted with the basic school Head Teacher and the 'Tendamba'. The FGD with the school children was made up of nine pupils. Tendamba are the descendants of the first settler of the

community and customarily the supreme or allodial owners of the land. The main thematic areas covered in the above sources include: improved access to water and its externalities; gender-based dimension of MUS; and economic and social impact of MUS on households and the communities at large. The preliminary field work revealed the following demographic characteristics and the state of water facilities prior to the construction of the MUS facilities in the two communities (Table 2).

**Table 2: Characteristics of the communities**

<b>Variables</b>	<b>Mantari</b>	<b>Meguo</b>
Total Population	174	193
Male	91 (52.3%)	86 (44.6%)
Female	83 (47.7%)	107 (55.4%)
Number of houses	21	16
Number of Households	21	12
Water facilities prior to MUS	1 Borehole with Hand pump	2 Hand Dug Wells fitted with hand pump

Source: Field survey, 2012

As shown in Table 2, Meguo strangely had less number of households in relation to the number of houses. They explained that although there are sometimes many households (preferably termed sub households) in one house, they usually belong to one family and have one 'overall' household head. For instance, the sons of the chief have separate houses from the palace but still share the same housekeeping arrangements and being catered for as one unit. This makes them one household. One remarkable activity in both communities is seasonal migration of both males and females to southern Ghana for economic activities. The major activities they mostly engage in during migration include small-scale surface mining dubbed 'Galamsey', head portage popularly called 'kayaye' and minor season farming.

Based on the demographic characteristics in Table 2, samples were drawn for the main field work. In Mantari, 16 households, representing 72.2% of all households were surveyed. In Meguo, 10 households, representing 83.3% of all households in the community were surveyed. In sum, 26 households were surveyed in the two communities with 34.6% and 65.4% of the respondents as males and females respectively. Simple random sampling was used to select the households to be surveyed. This method was used because the settlements have either nucleated or dispersed pattern. It is emphasised here that the focus of a case study is not on geographical representation of findings but to give an in-depth analysis of the cases in question. It focuses on analytical generalisation: how the concept of MUS relates to the needs of the people and its contribution to poverty reduction.

Again, rural communities are more homogeneous in their ways of living and tend to have similar interest and aspirations as compared to their urban counterparts. Therefore, after covering the above percentages in the household survey, the researchers noticed that the findings were being repeated. That is, a saturation point had been reached and as such the team directed their attention to the FGDs and key informant interviews.

Statistical Package for Social Scientists (SPSS, Version 20), particularly descriptive statistics was used to analyse the household survey data. The FGDs and key informant interview were recorded in the local language using digital recorders, subject to the consent of the participants. The audios were transcribed and analysed based on pattern matching. That is, issues of similar thematic areas were matched internally, using the qualitative data from the FGDs and interviews, and later matched with the household survey results.

## **Results and Discussion**

### **Characteristics of the Respondents**

Of the 26 household respondents, 96.2 % were married whilst 3.8% were single. Generally, household sizes in the study area were large. According to the Ghana Statistical Service (2005), a one member household is single household, a household size of 2 – 5 is small, a household size of 6 – 8 is large and a household size of 9 or more members is considered very large. Based on these definitions, 42.3% of the households were very large and another 42.3% of them were large. Further, 11.5% of the households were small and 3.8% were single. Given that majority of the households have large sizes there will be high water demand and usage of water in such households, provided the economic activities of households do not vary significantly.

All the respondents were above 20 years of age. Specifically, 30.8% of them were over 50 years old and the least proportion (7.7%) falling in the age brackets of 41 and 50. Another 26.9% of them aged from 20 to 30 years whilst 34.6 % were from 31 to 40 years of age. Generally, there was a fair representation of respondents across the various age cohorts and impliedly their views reflected the various age groups.

### **Improved Access to Water and the Externalities**

Before the construction of the MUS facility, various sources of water, both improved and unimproved were used by the communities. In Meguo, there was inadequate water in the wells in the dry season, compelling the people to move to Mantari

(about 700 meters away from Meguo) to draw water. According to the household survey and the focus group discussions, this created congestion at the borehole with hand pump at Mantari, especially in the dry season, resulting in delays in accessing water. In all the households surveyed, women and girls are the collectors of water. Table 3 shows the detail on the time spent by community members (in percentage) to access water in the dry season before and after the MUS facilities were provided. The focus was on the dry season because the preliminary field work showed that communities did not have challenge in accessing water in the rainy season. This is due to rain harvesting and availability of adequate water in hand dug well, although the quality of the water was doubtful.

**Table 3: Time spent to access water**

Time Spent	Before MUS	During MUS
Less than 30 min	11.5%	69.2%
31 – 60 min	0.0%	23.1%
61 – 90 min	0.0%	7.7%
Over 90 min	88.5.0%	0.0%

Source: Field Survey, 2012

Multiple use water service does not require a new technology in most instances. In a study of eight countries, using 30 communities, Smits et al. (2010) observed that MUS can and really used existing technologies. Hence, Smits et al. (2010) did not look at time benefit because they assumed that it is not significantly different from previous access to water. The difference between this study and Smits and his colleagues is that in our communities, access to water was already a major challenge, and the MUS project was to serve a dual purpose – improve access to water for domestic purpose on the one hand and for productive use on the other. The dualistic role of MUS is termed ‘domestic-plus’ (van Koppen et al. 2006a). This makes it necessary to assess contribution of the new facilities to access to water. As shown in Table 3 above, 88.5% of the respondents spent over 90 minutes to collect water prior to the establishment of the MUS facility. Given the multiple uses of water, spending over 90 minutes to access about 20 litres of water actually implies a loss of productive hours in search of water. This is because the water drawers will move to the water source at least four times to be able to access enough water for the various household uses.

In both communities, the Black Volta was the source of water for household consumption and other uses. The use of the Black Volta as a source of domestic water was common prior to the provision of the facility. At the time of the field work, the time spent in drawing water has reduced substantially because the crowd

that used to characterise major water points in the communities has dissolved with the provision of the MUS facility. In these communities, closeness of the facility contributed to reduced time in fetching water. Moreover, the MUS facilities are piped systems where no physical energy (manual work) is required to pump water; unlike borehole or hand dug well with hand pumps. With these facilities, more than two-thirds of respondents spend less than 30 minutes in obtaining water. There are ripple effects of reduced time spent on fetching water. It has improved teacher-pupil contact hours in school, as testified by both teachers and pupils. Pupils report to school early because they spend less time to obtain water prior to school hours. Relatedly, according to the focus group discussion with the women and the Water and Sanitation Committees, reduced time at water points for women in particular, has given them enough time for farm work and other household chores. This is similar to what van Houweling et al. (2012) established in Senegal where the presence of small piped system (MUS), earned time for women to invest in new economic activities. This further confirms that improving access to water contributes greatly to achieving other SDGs.

### **Gender-based Participatory MUS as Poverty Reduction Machinery**

User participation has been espoused as a key ingredient for sustaining projects especially when external support ceases. The essence is to also ensure that benefits are equitably shared and cost borne by all parties with the exit of donors. As Patrick, John, and Barbara (2004) put it; ‘the provision of water services that include water for productive uses, needs to be planned to ensure that benefits are inclusive or pro-poor. In planning, implementation and research, it is important to hear and act upon the voices of the poor, women, and children, recognising that otherwise benefits may be captured by elites’ (p.16). We assessed user participation at two levels. The first level comprises the decision on the provision and operations of the MUS facility and the second level focuses on mode of decisions on the usage of the MUS facilities, especially for economic gains. The FGD and all the household respondents indicated that community members participated in various aspects of the project implementation. During construction, they contributed labour and at times provided accommodation for the artisans who are non-resident in the case communities. The choice of the type of technology (solar powered piped water system) was determined by the donor with no community influence. The study also established that the community members selected the Water and Sanitation Committee, decided on the days and hours of operation of the facility, pump levies

and mode of payment. In Mantari and Meguo, 32 and 27 women respectively worked in the garden.

The second dimension of community participation examined the utilisation of the MUS facilities for economic gains. In both Mantari and Meguo, the community members unanimously agreed for women to take up gardening. According to the respondents, women are mainly responsible for buying ingredients for households and, as such, should know the types of vegetables that will be required in a household. Moreover, women know the market demand for the various vegetables and therefore can determine which vegetables to grow and make profit. A man in Mantari pleasantly had this to say about women engagement in dry season gardening:

*We have allowed only women to engage in gardening because they are the housekeepers. If a woman sells vegetables the proceeds will reach home for the entire household to benefit, but if a man sells vegetables, he will use the proceeds to drink alcohol and the wife will still be required to buy vegetables for the household (Excerpts from Interview, 12<sup>th</sup> April, 2012).*

This implies that the men have realised the crucial role of women in sustaining households, and as such granting them access to land and the MUS facility to engage in gardening as a way of improving household livelihood and thus reducing poverty. The actions of the men in Mantari and Meguo complements the findings that improved income of women is felt at the household level because women spend their income for the general being of the family in relation to their male counterparts (Meinzen-Dick & Zwartveen, 1998; van Koppen, 2002). Similarly, women empowerment increased calorie intake of household in Bangladesh (Sraboni, Malapit, Quisumbing, & Ahmed, 2014), and women contribution to food expenses in Ghana (Doss, 2006). Largely, women empowerment has several benefits to the households. As regards participatory decision-making in the communities, both men and women in Mantari and Meguo at different discussions indicated that women take part in decision-making on development issues, and water supply and management in particular.

## **Economic Impact of the MUS Facilities**

Linked to the gender-based participation in the usage of the MUS facility is the economic impact of the facility. From the economic perspective, the major sources of income for households and especially women in the study area are economic activities that depend on large quantities of water. These activities include pito

brewing, shea butter extraction and dawadawa processing. This means that without adequate and efficient water supplies, i.e., where there is ‘water poverty’, any measures to reduce income poverty are unlikely to succeed (Sullivan, 2002). In the case communities, the households have not had a shift in economic activities in the rainy season. All households continue to rely on farming for their livelihood in the rainy season. Economic activities in the dry season however changed slightly. Farming, shea butter production and ‘pito’ (local alcoholic beverage) brewing were key activities before the establishment of the facility. For instance, 42.3% of the households were engaged in shea butter processing and pito brewing. After the facility was constructed, gardening became a major dry season activity. Table 4 shows the comparison of households’ economic activities in the dry season before and during the MUS.

**Table 4: Major dry season households’ economic activities**

Households’ Economic Activities	Before Facility	During the MUS
Crop farming and animal rearing	2 (7.7%)	0 (0.0%)
Shea butter production only	1 (3.8%)	0 (0.0%)
Pito brewing only	10 (38.5%)	0 (0.0%)
Shea butter and pito	11 (42.3%)	0 (0.0%)
Gardening only	0 (0.0%)	6 (23.1%)
Pito & gardening	0 (0.0%)	9 (34.6%)
Pito, gardening & shea butter	0 (0.0%)	10 (38.5%)
Nothing	2 (7.7%)	0 (0.0%)
Rearing only	0 (0.0%)	1 (3.8%)
<b>Total</b>	<b>26 (100%)</b>	<b>26 (100%)</b>

Source: Field Survey, 2012

As shown in Table 4, 38.5% of the women are able to engage in three economic activities (shea butter extraction, gardening and pito brewing) concurrently as a result of the water facility. This implies that MUS comes with multiple economic activities and consequently, multiple income streams. This complements the empirical literature that MUS has contributed to increased household income, improved food supply and security for households, and reduced household expenditure on food that they hitherto did not produce (Cousins, Smits, & Chauke, 2007; Mikhail & Yoder, 2008; Smits et al., 2010). Although the frequency (number of times a household produces in a week) of small scale industrial activities such as pito brewing and shea butter production has not changed significantly, the patronage/demand has increased and based on the increased demand, they are able to increase production levels.

In most instances, when there is enough potable water, private gardening is the most immediate use to which water is put (Castresana, 2004), and this was the case in these communities. The vegetables produced in these communities are both for sale and household consumption. The analysis of the economic benefits of the MUS facilities estimated the value of vegetables using the selling price in the local market and the cost of production. The total value of vegetables sold in the market in a season (four to six months) in Mantari and Meguo were GH¢10,156.00 and GH¢ 8,011.20 respectively. The total value of vegetables produced in the season, including the ones consumed by households, was estimated at GH¢ 15,468.00 in Mantari and GH¢ 12,752.30 in Meguo. This gives an average of GH¢483.38/gardener for the 32 gardeners in Mantari, GH¢472.31/gardener for the 27 gardeners in Meguo. As households received income from the sale of vegetables, they also made savings on soup ingredients to a tune of GH¢166.00 per gardener in Mantari and GH¢175.60 per gardener in Meguo. These values exclude the earnings from shea butter extraction, pito brewing and dawadawa products. These were excluded from the computation because the process is not entirely dependent on the water facility but other services and core inputs. It is emphasised here that these earnings are additional earning because no community was engaged in gardening prior to the establishment of the MUS facility. The economic benefits of the MUS facilities, especially for women complement earlier findings on the role of water (irrigation) on household income. Productive water represented 31% of household income in Bushbuckridge in South Africa (Castresana, 2004). Similarly, in rural Senegal, the presence of MUS contributed about 50% of women income (van Houweling et al., 2012), and in general, access to water for agricultural related functions improves incomes of farmer households (Namara et al., 2010). This shows that there is a strong link between water provision and rural poverty reduction, and to a large extent the achievement of the SDGs.

## **Social Impact of the MUS Facilities**

Beyond the economic benefits obtained from the presence of the MUS facility, social benefits have been reported. The community members in general and women in particular, feel more dignified and respected within and outside the community, especially at market places, and other social gatherings. The MUS facilities have served as key factors that draw women from neighbouring communities into the Meguo and Mantari for marriage. Empirically, women have been the drawers of water in rural areas (see, for example, Giné & Pérez-Foguet, 2008; Sorenson, Morssink, & Campos, 2011) and will not want to marry in communities where water is scarce as that will increase their burden of carrying water over long distance. It has been established in Meguo and Mantari that the rate at which ladies come into



their communities for marriage has increased as a result of the MUS facility. Within the last three years, ten and four new wives had come into Mantari and Meguo respectively. The FGD revealed that perhaps only four and two women would have come to Mantari and Meguo respectively if the facility had not been provided. This is similar to what was established in Burkina Faso by MacMillan in the following excerpts:

*Young men in Silmiougou, a village in central Burkina Faso, would like a fair chance at finding wives in nearby villages. But they have a big handicap that is unrelated to their own suitability as husbands: their village has only one hand pump for 3,000 people. This fact makes women from outside Silmiougou dread the idea of marrying a man from there. They know their lives would be filled with the daily drudgery of spending hours fetching enough water to meet their family's needs. So Silmiougou men end up marrying from within the village or leaving altogether (MacMillan, 2001).*

This suggests that besides the economic benefits and the domestic purpose for which MUS facilities are provided, there are positive externalities that cannot be quantified but significant to rural settings. The forgoing discussion implies that poverty is in context and rural areas have their understanding and interpretation of poverty. This makes it necessary to ask questions such as poor in what (Reardon & Vosti, 1995)? Discussions with the community members showed that prior to the MUS facility, households suffered from 'kuo nang' (literally, water poverty) which has ripple effects on several dimensions of their lives. Substantially, MUS has reduced 'kuo nang' and equally strengthened social relations among households. In Meguo, a woman had this story to tell about the impact of the facility in their socio-economic lives.

*Initially, we had difficulty accessing water and that affected our social lives. For example, at early dawn, when it was best for love making, a woman pushed the husband aside and went out in search of water for the household. Also, before this facility was given to us, we did not have good meals and were often falling sick, and the children particularly suffered from anaemia, as indicated by medical doctors anytime we visited Nadowli hospital. Now, we have fresh vegetables from our gardens for good meals. We no longer frequent the hospital to complain of ill health. We have good nights and do not have to spend our lovemaking time to draw water. We now give birth and as you can see, these are our children all over. In sum, this facility has reduced hunger, weakened poverty (nang*

*baleε, i.e. poverty is weak) and brought peace and love to our households*  
(Excerpts from FGD, 12<sup>th</sup> April, 2012).

The voice of this woman adds more to the fact that freedom from poverty is more than income and material wellbeing, and includes opportunities and choices, nutrition, healthy life, creative life, freedom, dignity, self-esteem and the respect for others (Fukuda-Parr, 1999; UNDP, 1997) as well as having many children. This social impact of MUS as presented above is similar to what has been established in other settings. In Gujarat, women equally expressed concern on sleeplessness during summer in order to access water from shallow pits in pond. During the day the water evaporates and this compels them to draw water in the night which takes hours to fill a pot (Panda, 2006). In India, James (2003) highlighted the importance of water availability to personal gains such as sleeping and socialising because the time spent in fetching water is reduced. Therefore, MUS does not only meet the domestic and productive water needs of communities but also contributes to strengthening social bonding within households and the communities at large.

## **Conclusion**

This paper contributes to the general debate on the role of water, especially MUS, in reducing rural poverty. The paper demonstrates that MUS is gaining grounds in many developing countries with increasing benefits. This makes the integration of MUS concept into water sector planning and infrastructure design indispensable. This is particularly relevant in rural savannah in sub-Saharan Africa, where the economic activity is seasonal farming. MUS is a strategy that responds to the full range of people's water needs: addressing domestic and productive water needs, with potentials of contributing to poverty alleviation and improved gender equity. MUS come with multiple economic activities for a household, leading to multiple household income streams. Therefore, the socio-economic benefits of MUS as discussed in this paper justify the need for water sector actors to mainstream MUS into the sector planning. This makes MUS a vehicle for achieving the SDGs. As nations begin to implement the SDGs, it is crucial that they identify sectors that can play a lead role, especially in rural areas. Therefore, individual member countries need to identify development triggers that can propel or serve as a catalyst for the remaining sustainable development goals. This will ensure cost effectiveness, especially for developing countries. This paper argues that investing in multiple use water services is one of such triggers to the achievement of at least 75% of the SDGs.

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## References

- Castillo, G.E., Namara, R., Ravnborg, H.M., Hanjra, M., Smith, L., Hussein, M. H, Bene, C., Cook, S., Hirsch, D., Polak, P. Valee, D., & van Koppen, B (2007). Reversing the flow: agricultural water management pathways for poverty reduction. In D. Molden (Ed.), *Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture*. London/Colombo: Earthscan/International Water Management Institute. pp. 149-191
- Castresana, P.D.M. (2004). Productive uses of water at the household level: evidence from Bushbuckridge, South Africa. *Moriarty, P., Butterworth, J. and Van Koppen, B.(2004). Beyond domestic: case studies on poverty and productive uses of water at the household level. Delft, The Netherlands, IRC.(Technical Paper(41).*
- Cousins, T., Smits, S., and Chauke, T. (2007). Access to water and poor peoples' livelihoods: the case of Ward 16 of Bushbuckridge Local Municipality. *Documento de trabajo del CPWF-MUS. Documento descargado de: www. musgroup.net/page/1017.*
- De Fraiture, C., Molden, D., and Wichelns, D. (2010). Investing in water for food, ecosystems, and livelihoods: An overview of the comprehensive assessment of water management in agriculture. *Agricultural Water Management, 97(4), pp. 495-501.*
- Doss, C. (2006). The effects of intrahousehold property ownership on expenditure patterns in Ghana. *Journal of African economies, 15(1), pp. 149-180.*
- Fielmua, N. (2011). The Role of the Community Ownership and Management Strategy towards Sustainable Access to Water in Ghana (A Case of Nadowli District). *Journal of Sustainable Development, 4(3), pp. 174-184.*
- Fukuda-Parr, S. (1999). What does feminisation of poverty mean? It isn't just lack of income. *Feminist Economics, 5(2), pp. 99-103.*
- Ghana Statistical Service. (2005). *2000 Population and Housing Census*. Accra, Ghana: Ghana Statistical Service.
- Giné, R., and Pérez-Foguet, A. (2008). *Sustainability assessment of national rural water supply program in Tanzania*. Paper presented at the Natural Resources Forum.

- Gordon, D. (2005). *Indicators of Poverty and Hunger, Expert Group Meeting on Youth Development Indicators*, United Nations Headquarters, New York, 12-14th December 2005.
- Grey, D., and Sadoff, C.W. (2006). *Water for Growth and Development*. Mexico City: Comision Nacional del Agua Retrieved from [http://siteresources.worldbank.org/INTWRD/Resources/FINAL\\_o6o1.2o/11/2o17](http://siteresources.worldbank.org/INTWRD/Resources/FINAL_o6o1.2o/11/2o17)
- Hanjra, M.A., Ferede, T., and Gutta, D.G. (2009). Reducing poverty in sub-Saharan Africa through investments in water and other priorities. *Agricultural Water Management*, 96(7), pp. 1062-1070.
- Harvey, P., and Reed, B. (2004). *Rural water supply in Africa building blocks for handpump Sustainability*. Loughborough University: Water, Engineering and Development Centre.
- Hussain, I., and Hanjra, M.A. (2004). Irrigation and poverty alleviation: review of the empirical evidence. *Irrigation and Drainage*, 53(1), pp. 1-15.
- James, A. (2003). Linking water supply and rural enterprise: issues and illustrations from India. In P. Moriarty, J. Butterworth, B. van Koppen, (Eds). *Beyond Domestic: Case studies on poverty and productive uses of water at the household level*. Delft, the Netherlands, IRC International Water and Sanitation Centre. (Technical Paper Series; no. 41). pp. 199-216
- Kaunmuang, P., Kirtikara, K., Songprakorb, R., Thepa, S., and Suwannakum, T. (2001). Assessment of photovoltaic pumping systems in Thailand—one decade experience. *Solar energy materials and solar cells*, 67(1), pp. 529-534.
- Koc, C. (2007). Assessing the financial performance of water user associations: a case study at Great Menderes basin, Turkey. *Irrigation and drainage systems*, 21(2), pp. 61-77.
- Lipton, M. (2001). Challenges to meet: food and nutrition security in the new millennium. *Proceedings of the Nutrition Society*, 60(02), pp. 203-214.
- MacMillan, N. (2001). Burkina Faso: Managing conflict at the village handpump and beyond. Retrieved from <http://www.idrc.ca/EN/Resources/Publications/Pages/ArticleDetails.aspx?PublicationID=772>
- Meinzen-Dick, R., and Zwarteveen, M. (1998). Gendered participation in water management: Issues and illustrations from water users' associations in South Asia. *Agriculture and Human Values*, 15(4), pp. 337-345.
- Mikhail, M., and Yoder, R. (2008). Multiple use water service implementation in Nepal and India: experience and lessons for scale-up.

- Montgomery, M.A., and Elimelech, M. (2007). Water and sanitation in developing countries: including health in the equation. *Environmental science & technology*, 41(1), pp. 17-24.
- Moriarty, P., Butterworth, J., van Koppen, B., and Soussan, J. (2004). Water, poverty and productive uses of water at the household level. In P. Moriarty, J. Butterworth, B. van Koppen, (Eds). *Beyond Domestic: Case studies on poverty and productive uses of water at the household level*. Delft, the Netherlands, IRC International Water and Sanitation Centre. (Technical Paper Series; no. 41). pp. 19-48
- Namara, R.E., Hanjra, M.A., Castillo, G.E., Ravnborg, H.M., Smith, L., and Van Koppen, B. (2010). Agricultural water management and poverty linkages. *Agricultural Water Management*, 97(4), pp. 520-527.
- Panda, S.M. (2006). *Women's collective action and sustainable water management: case of SEWA's water campaign in Gujarat, India*: IFPRI.
- Patrick, M., John, B., and Barbara, v. K. (2004). *Beyond Domestic: Case studies on poverty and productive uses of water at the household level*. Retrieved from Delft, the Netherlands:
- Rahman, A., and Westley, J. (2001). The Challenge of Ending Rural Poverty. *Development Policy Review*, 19(4), pp. 553-562.
- Reardon, T., and Vosti, S.A. (1995). Links between rural poverty and the environment in developing countries: asset categories and investment poverty. *World Development*, 23(9), pp. 1495-1506.
- Schouten, T., and Moriarty, P. (2003). *Community Water, Community Management: From System to Service in Rural Areas*. London: Practical Action Publishing.
- Short, T., and Thompson, P. (2003). Breaking the mould: solar water pumping—the challenges and the reality. *Solar Energy*, 75(1), pp. 1-9.
- Smits, S., Renwick, M., Renault, D., Butterworth, J., and van Koppen, B. (2008). *From practice to policy: background paper for the symposium on multiple-use services*. Paper presented at the International Symposium on Multiple-use water services, Addis Ababa, Ethiopia.
- Smits, S., Van Koppen, B., Moriarty, P., and Butterworth, J. (2010). Multiple-use services as an alternative to rural water supply services: A characterisation of the approach. *Water Alternatives*, 3(1), pp. 102-121.
- Sorenson, S.B., Morssink, C., and Campos, P.A. (2011). Safe access to safe water in low income countries: Water fetching in current times. *Social Science & Medicine*, 72(9), pp. 1522-1526.

- Soussan, J. (2004). *Water and poverty: Fighting poverty through water management*. Asian Development Bank, Philippines.
- Soussan, J., Noel, S., Harlin, J., and Schmidt, S. (2006). *Linking poverty reduction and water management*. Stockholm Environment Institute, Sweden.
- Sraboni, E., Malapit, H.J., Quisumbing, A.R., and Ahmed, A.U. (2014). Women's Empowerment in Agriculture: What Role for Food Security in Bangladesh? *World Development*, 61, pp. 11-52.
- Srinivasan, V., Palaniappan, M., Akudago, J., Cohen, M., and Christian-Smith, J. (2012). Multiple-Use Water Services (MUS): Recommendations for a Robust and Sustainable Approach: Pacific Institute, Oakland, California, USA [online] Available at [www.pacinst.org/reports/MUS/full\\_report.pdf](http://www.pacinst.org/reports/MUS/full_report.pdf).
- Sullivan, C. (2002). Calculating a water poverty index. *World Development*, 30(7), pp. 1195-1210.
- Sultana, F., and Crow, B. (2000). *Water concerns in rural Bangladesh: a gendered perspective*. Paper presented at the WEDC CONFERENCE.
- Turner, S., Cilliers, J., and Hughes, B. (2014). Reducing poverty in Africa-realistic targets for the post-2015 MDGs and Agenda 2063. *Institute for Security Studies Papers*(10), 28 p.-28 p.
- UNDP. (1997). *Human development report 1997*. New York: Oxford University Press.
- United Nations. (2015a). *The Millennium Development Goals, 2015*. New York: United Nations.
- United Nations. (2015b). *Resolution adopted by the General Assembly on 25 September 2015. (A/RES/70/1)*. United Nations General Assembly.
- van Houweling, E., Hall, R. P., Sakho Diop, A., Davis, J., and Seiss, M. (2012). The role of productive water use in women's livelihoods: Evidence from rural Senegal. *Water Alternatives*, 3(5), pp. 658-677.
- van Koppen, B. (2002). *A gender performance indicator for irrigation: Concepts, tools and applications*. Retrieved from Colombo, Sri Lanka:
- van Koppen, B., Moriarty, P., and Boelee, E. (2006a). *Multiple-use water services to advance the millennium development goals*. (IWMI Research Report 98). Colombo, Sri Lanka: International Water Management Institute (IWMI).
- van Koppen, B., Moriarty, P., and Boelee, E. (2006b). *Multiple-use water services to advance the millennium development goals* (Vol. 98): IWMI.

- van Koppen, B., Namara, R., and Safilios-Rothschild, C. (2005). *Reducing poverty through investments in agricultural water Management. Part 1. Poverty and gender issues and Part 2. Synthesis of Sub-Saharan Africa case study Reports, Colombo, Sri Lanka*. IWMI (Working Paper 101) Retrieved from <http://www.iwmi.cgiar.org/publications/>.
- Vasquez, G.E. (2004). Good governance and users' participation in public water supply management in urban and peri-urban zones from developing countries. Retrieved from [http://www.protosh2o.org/sites/default/files/library\\_assets/W\\_PPP\\_49\\_E9\\_good\\_governance.pdf](http://www.protosh2o.org/sites/default/files/library_assets/W_PPP_49_E9_good_governance.pdf)
- Voegele, J., Villarreal, M., and Cooke, R. (2009). *Agricultural and rural development: Gender in agriculture Sourcebook*. Washington DC: The World Bank.
- Zhang, J. (2012). The impact of water quality on health: Evidence from the drinking water infrastructure program in rural China. *Journal of health economics*, 31(1), pp. 122-134.