

**Factors influencing the participation of women in rural water supply projects in the
Asante Akim South District
Boateng, J. D.¹ and Kendie, S. B.²**

¹ Human Resource Manager, Ghana Education Service, Central Regional Office,
Cape Coast

² Professor of Development Planning and Environmental Management, Institute for
Development Studies, University of Cape Coast

Abstract

This article discusses factors influencing the participation of women in Asante Akim South District in the Ashanti region of Ghana. Using a multi-stage sampling technique, eight communities from four out of seven clustered circuits operating under Phase III of the Rural Water Supply Project (RWSP) were selected. Data were collected from 256 household respondents in the communities under study. Two factors were found to influence the participation of women in decision-making in RWSP project in the district. These were, male domineering and socio-cultural norms which inhibit women to participate actively in decision-making fora in the district. The study suggests that to ensure active participation of women in the district, there is the need to develop a gender awareness system whereby the different interests and knowledge of men and women are included in the design and management of water supply systems. Precisely, there is the need to promote the involvement and inclusion of all members of the community in such development projects.

Key words: gender, rural, water supply, water management, participation, community

Introduction

Like many rural communities in the world, tradition ultimately influences the respective roles played by men and women in the management of water supply and Ghana is no exception. While men have been dominating decision-making processes which affect the management of water supply, (IRC, 1994), women play a major role in collecting, managing and maintaining communal water supply, regulating and controlling its social use and safe maintenance (Barrett & Browne, 1995; SIDA, 1994). By this, women have the most information, knowledge and skills on water availability, quality, reliability, and its purity across the contexts of household, community and subsistence livelihood conditions (Agarwal, 1992; Green & Baden, 1994; Leach, 1992). Thus, for an improved and a sustainable management of water supply, the involvement of both men and especially, women in decision-making is very crucial (GWS, 2010; Narayan, 1995; World's Women, 2010). This is because when rural women are given the platform to voice their concerns pertaining to matters that affect their daily livelihood, or are involved at all levels of water management and policy formulation, they can help mobilise the potential of water for development and

ensure that water does not become a constraint to sustainable development (Hemson, 2002; Kuzwayo, 2002).

Lessons from Africa and some parts of the world have demonstrated that increased women's participation in decision-making and water management does not only lead to better operation and maintenance of water facilities but also, help them contribute more to the economy of their households (Hemson, 2002; Kelemen, 2001; Sam, 2006). For instance, UNICEF (1994a) reports that consulting women to choose and localise a new water point will improve water accessibility which will meet their specific needs by ensuring that time and energy daily spent on collecting water will be reduced and rather spent on more productive activities, such as their household sanitation and food production, which will reduce physical workload (UNICEF, 1994b). Having acknowledged the important role women play in water supply management, the last four decades had witnessed a full, equal and beneficial integration of women in issues regarding water provision and management (UN Water, 2006).

The first systematic concern with women and water began with the United Nations Water Conference in 1977 in Mar del Plata, Argentina (Lundquist & Gleick, 1997). It was at this conference that women's role as providers and managers of water was recognised. That conference led to the UN General Assembly declaring 1980s as the International Drinking Water Supply and Sanitation Decade (IDWSSD). This recognition was given prominence during the International Conference on Water and Environment (ICWE) held in Dublin, Ireland, in January 1992, the United Nations Conference on Environment and Development (UNCED), known as the Earth Summit held in Rio de Janeiro in 1992, and the World Conference on Women organized by the UN in Beijing in 1995 (Agarwal, Delos-Angeles & Bhatia, 2002; UNDAW, 2005). At these conferences, concerns were raised on the need to take due cognisance of those who depend on natural resources for livelihood, by facilitating their active involvement and participation in all decision-making processes particularly indigenous people in rural areas and women (Verhasselt, 1998; World Bank, 1993). The Dublin Conference, for instance, gave rise to four principles that have been the basis for much of the subsequent water sector reforms on water management. These principles introduced a new approach known as the Integrated Water Resources Management (IWRM) which, among other things, acknowledges fresh water as a finite and vulnerable resource and the central role women play in its provision and management (GWP, 2005). Acceptance and implementation of this principle requires positive policies to address women's specific needs, equip and empower them to participate in water resource programmes at decision-making and implementation in ways defined by them (ICWE, 1992).

Also, the recent increase in the number of women appointed as water and environment ministers is an exciting trend which may provide an impetus to gender mainstreaming in water programmes. In 2005, there were 40 women ministers of water or environment, representing every region and level of development in the world out of which five were from Africa, specifically from Kenya, Lesotho, South Africa, Ghana and Uganda (UN Water, 2006). Women leaders for WASH championed the role of women in decision-

making, capacity building, educating children on sanitation and hygiene, and mobilizing political will around other priorities, such as the linkages between water, sanitation and hygiene.

Although the importance of strengthening the role of women in the management of water supply has been the subject of numerous conferences, workshops and seminars, and projects involved with the organisation of community-based groups do make mention of their intention to guarantee some degree of participation of women, women continue to be underrepresented, denied opportunities to participate in decisions that affect their lives and their number remains low compared to men (MDG Report, 2013; World's Women 2010). This is because the channels through which water supplies are being managed, tend to weaken and reinforce unequal participation in technical training programmes, decision-making processes, and women's position in water management and users' committees (Elson & Cleaver, 1993; GWA, 2003; Gordon, Young, Dooge & Rodda, 2004). For instance, a study by UN Water (2006) reveals that efforts geared towards improving the management of the world's finite water resources and extending access to safe drinking water and adequate sanitation by decision-makers often ignores this hidden chest of knowledge and, thus, overlooks the central role of women in water management.

Chachange (1991) argues that, in theory, men and women participate in water and sanitation projects equally at all levels, but in practice, women still tend to be the implementers and men the decision-makers at the rural level. Men, as pointed out by IRC (1994), have traditionally been responsible for making decisions and have dominated the processes which affect the management of water supply. In support, Dayal, Wijk-Sibesma and Mukherjee (2000) maintain that while women are involved, the nature of their involvement relative to that of men is biased toward voluntary physical work, such as cleaning and greasing hand pumps and collecting payments. Men handle the management decisions, such as the use of collected payments.

According to Onyango (2003), the subordinate position of women in rural water supply management has been strongly contested in policy. This is because even when women occupy positions of some authority, in practice, their participation and decision-making appear to be subordinated to male authority (Hemson, 2002). Hemson (2002) again posits that the non-participation of women in the decision-making on the design, planning, implementation and management of water supply projects in developing countries is a major obstacle to the improvement of their well-being (World Bank, 1998) and long-term sustainability (PRB, 2001). Studies have shown that many women realise how crucial their involvement in the management of water and sanitation work is, but they are very conscious about how they state their demands or else they may be branded as social misfits (Binamungu, 1993; Drangert, 1993; Tam, 2012; Singh, 2006).

Green and Baden (1994) point out the partial involvement of women in water management to the fact that governments and donor agencies usually see women's involvement in water supply management primarily from the perspective of their roles in social reproduction, such as the provision and management of water for use by the family.

Such social roles, Wijk-Sibesma (1998) maintains, have created the assumption that women fit the treasury position better in water committees than men. However, UNDP (1990) has revealed that the question of women's involvement in water supply management mainly depends on their attitude. This is because some donor-aided projects provided equal training opportunities to both women and men but unfortunately women attended poorly as a result of poor motivation (Makule, 1997).

In Africa, women became engaged in projects related to water supply and sanitation as early as the 1970s (Dangerfield, 1989). In Ghana and Burkina Faso, for example, though women have increasingly influenced communal decision-making, especially in deciding when new wells are to be drilled, yet in these parts of Africa, socially constructed norms and beliefs have shaped patterns and roles played by men and women in the management of water supply (SIDA, 1996). A commonly cited example of cultural delineation of roles is the collection of water which is considered the responsibility of women (Regmi & Fawcett, 1999).

Access to water supply and sanitation in Ghana, as Mumbo (2002) observes, is considered a human right and basic priority for water reconstruction and development. Following a review of the results achieved by Ghana at the end of the International Drinking Water Supply and Sanitation Decade (IDWSSD) in 1990, reforms were introduced in the early 1990s to accelerate the coverage of the rural communities and small towns with good drinking water and sanitation facilities. A national rural water supply and sanitation conference, held at Kokrobite, near Accra in 1991, in recognition of the significant role women play in water management, proposed that there should be a focus on the active involvement of women in designing, planning, operating, and managing of community water and sanitation projects (World Bank, 1991). This conference led to the establishment of the Community Water Supply and Sanitation Division (CWSD) (later transformed to an Agency by an Act of Parliament, Act 564 in 1998), a semi autonomous body under the then Ghana Water and Sewerage Corporation (GWSC), to ensure the implementation of the Rural Water Supply and Sanitation Programme (RWSP). The RWSP, which was introduced in 1994, was initiated by the Government of Ghana following the global consensus on the principles guiding the provision of rural water supply, to promote potable water supply in rural areas. The driving force behind this approach is participation (Kendie, 1994) involving consultation with and participation by the local community in the design, planning, operation and maintenance of the water systems (Engel, Iskandarani & Useche, 2005).

CWSD is now a fully fledged organisation and known as Community Water and Sanitation Agency (CWSA), with the mandate to act as a facilitator for the delivery of water and sanitation facilities and hygiene education to rural communities, and to oversee the accelerated provision of potable water and hygienic sanitation facilities in a congenial environment in rural areas (WRC, 2000).

In the Asante Akim South District, as in many parts of Ghana, investment in water resource management is an important prerequisite for development. This is because the district is beset with a host of water and sanitation problems. Access to good drinking water

is a major problem in most communities, particularly during the dry season. Even though the district has rivers and water bodies, most of them dry up during the dry season. Hence, most of the community members, especially women, have to cover long distances in search of water that may not necessarily be safe for consumption (WSP, 2005). Among the consequences are the stresses on women's time and energy, risk of injuries, prevalence of water-related diseases and inadequacy of water for improved livelihood (WSP, 2005).

Considering the importance of water to the economy and social and environmental conditions of the district, it is absolutely critical that its water resources be managed efficiently and equitably for both current and future generations. It is in this direction that the RWSP has been initiated in the district to provide potable water for the people, curb the health, economic and social problems associated with unsafe water and ensure its proper management through its concept of participation by all beneficiaries. This project involves the formation of local gender-balanced water and sanitation committees to provide local institutional support for its implementation and promote community ownership (Engel, Iskandarani & Useche, 2005).

The project outlines specific guidelines requiring that at least one third to 40% of the available leadership positions in the water and sanitation committees must be allocated to women. This specified quota represents a clear and significant departure from earlier projects, where communities were only appealed to and sensitised on the need to include more women in their local committees and then left to decide how they would do it and how far they wanted to reach out to women and elect them as leaders (Opare, 2005). Since non-compliance with the guidelines invariably meant exclusion from any benefits, the guidelines were largely adhered to.

However, Djegal, Price and Acquaye (1996) observe that this does not always result in meaningful involvement of women in the decision-making process in some communities because very few women are given the role of secretary or treasurer; none is WatSan committee chairperson. Opare (2005) again notes that although some communities are willing to accept a predetermined quota of women in leadership positions on the WatSan committees in order to qualify for project assistance, they still assign the key posts involving higher responsibilities to men, while women remain ordinary members with minimal influence (Saeed, 2003).

According to Danquah (2003), during community meetings, women are grouped behind men or at the blind side of the main facilitators or speakers of the meeting. Thus, despite concrete efforts to promote women's greater involvement in decision-making in community projects, the belief that, men should predominate in this domain remains entrenched in people's minds.

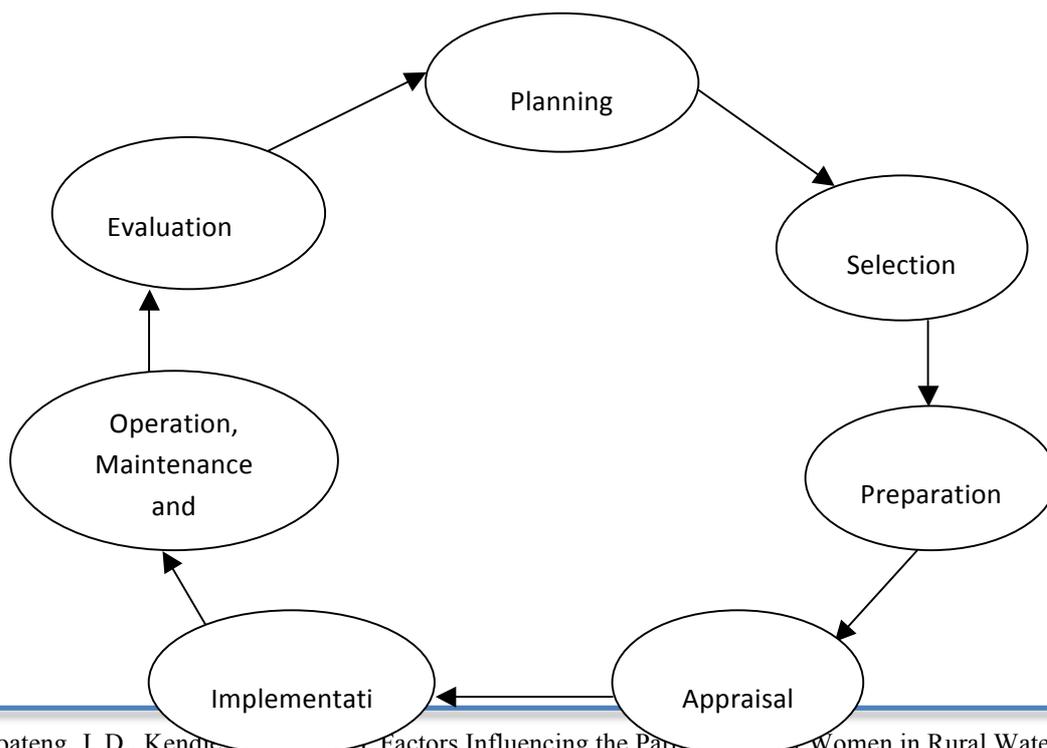
Women's participation is therefore seen as a challenging issue in infrastructure projects in Ghana, which are traditionally considered a concern socially targeted to men, despite the fact that in reality women and children are more vulnerable to bad sanitation conditions and lack of water (Kendie, 2002). In many cases, the studies on water supply discuss various issues related with community participation on water treatment, water quality

or willingness to pay (IVO, ICTA, ITN-BUET, CEDECON, 2008; Kendie, 1994; Nielson et al, 2009; Padangwangi, 2009; Rodrigue & O'Neal, 2004). Only very few studies have addressed the gender aspect in community participation (Bediako, 2006; Boateng, Brown & Tenkorang, 2013; Opare, 2005; Sam, 2006; WHO & UNICEF, 2009). This study therefore sought to explore factors underlying the low participation of women in rural water supply management especially at decision making level.

Theoretical Underpinning

Participation in community development projects place considerable emphasis on consulting potential users, establishing and responding to their priorities and demands. In this way, it is important that marginalised groups such as women be actively identified and included in the consultative process. These issues should be reflected in the capabilities and skills of project staff, and the time and resources made available. Deverill, Bibby, Wedgwood and Smout (2001) have therefore proposed a demand-responsive project development cycle which takes these factors into account (Figure 1).

- Planning:** Deverill, Bibby, Wedgwood and Smout (2001) argue that under the planning stage of the demand-responsive project development cycle, the community agrees to the overall project objectives, geographical area, major activities and outputs; establishes key institutional linkages, roles and responsibilities; design activities for each objective, estimating the resources required; establish project management systems; identify and train project staff; and agree, and if necessary, test the methodologies to be used with project partners and stakeholders (Reed & Ockelford, 2000).



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Source: Deverill, Bibby, Wedgwood and Smout

- **Selection:** The selection stage mostly indicates where to work and who to work with. At this stage, the community has sufficient information about the objectives, costs and benefits of a project necessary to make an informed decision about whether to participate or not.
- **Preparation:** At the preparation stage the community demonstrates its collective demand for the project being prepared. This could take the form of the collection of funds in a community managed bank account, or alternatively the collection of local construction materials. This reinforces the need for transparency, accountability and openness between project staff, potential users' representatives in their priorities and perceptions.
- **Appraisal:** At this stage, the criteria used to appraise a project should be agreed with stakeholders during the planning stage of the project cycle. In particular, appraisal provides an opportunity to assess whether the marginalised groups risk exclusion by the approach being adopted.
- **Implementation:** Once a detailed proposal has been approved and funding arrangements are confirmed, individual households can then be informed on the options available and the associated price or contribution required, and how this is to be made at the implementation stage. It may be necessary to negotiate the final design, balancing individual preferences with what is technically feasible and environmentally sustainable, and the resources available. The need to provide an affordable basic level of service should also not be compromised. This stage therefore provides key opportunities to develop and practice the systems by which the scheme is to be managed and demand is to be met in the future. Again, during implementation there are opportunities to: ensure that long term roles and responsibilities are understood and are reflected in the selection, training and activities of individuals; establish financial, management, technical and monitoring systems that continue to be used after implementation; train more than one individual for key roles such as book keeper or pump mechanic; develop a user friendly management, operation and maintenance support manual that is referred to during and after implementation.
- **Operation, Maintenance & Management:** Operation in this context means continuing to respond to user demand. This implies not only operating and maintaining a system, but meeting any increase in demand caused by demographic change or people wanting to change their service levels. In this context, meeting does not necessarily mean satisfying but managing consumption in order to reflect supply

limitations. Simple monitoring systems may also facilitate the long-term management of a scheme. In practice, monitoring is more often associated with the external needs of implementing organisations to improve their own performance. Whilst this is important, there is a need to identify simple process indicators (concerning the use and sustainability of the scheme) and performance indicators (concerning its management) that can be used by the management organisation itself.

- **Evaluation:** This is the penultimate stage in the project cycle. Evaluation is usually done shortly after a project has been completed. This provides insight into the initial use of facilities however; it is difficult to determine how sustainable facilities are going to be in the longer term. For instance, a good quality hand pump may function for five years or more before a component fails. This reinforces the need to establish sustainability indicators that take into account people's perceptions as well as the physical condition of facilities. It may be possible to tie these in with the monitoring system

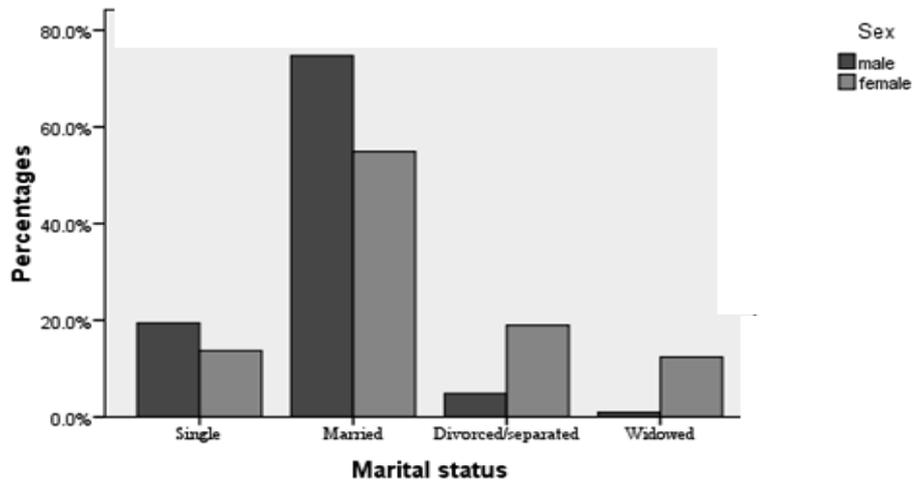
Methodology

The study was a cross-sectional survey carried out among household respondents operating under the Rural Water Supply Project (RWSP) Phase III in AASD in the Ashanti region of Ghana. The study population was made up of people who had stayed in the beneficiary communities operating under the RWSP III project in the Asante Akim South District for a minimum of two years. A multi-stage sampling technique was employed in the study. The entire district was clustered into seven area councils according to District Assembly demarcations. These were Nnadieso, Komeso, Asankare, Banka, Banso, Juaso and Obogu and took account of all possible socio-cultural variations (if any) among the communities within these area councils.

Four area councils were visited. These were Juaso, Asankare, Komeso and Nnadieso. Two communities were randomly sampled from each of the four circuits. The communities were Asikafoamantem and Yawkwei in Juaso, Kwabeng and Omarikrom in Asankare, Kwakurukrom and Yaw Barima in Komeso, Pra River, and Ahyiresu in Nnadieso. The selected communities had 752 households. The household selection was based on Krejcie and Morgan's table for determining sample size from a given population (Sarantakos, 2005). The table suggests that, for a population of 752, a sample size of 256 is convenient. The 256 households sampled for the study was equitably distributed among the eight selected communities to obtain information about the factors influencing women's role in rural water supply management. In all, 103 men (32.6 %) and 153 women (64.4 %) were selected for the study. Respondents ranged in age from 18 years to 80 years (mean = 41.8; SD = 14.5).

Figures 2, 3 and 4 indicate the biographic data of respondents.

Figure 2: Marital status of respondents by sex



Source: Fieldwork, 2010

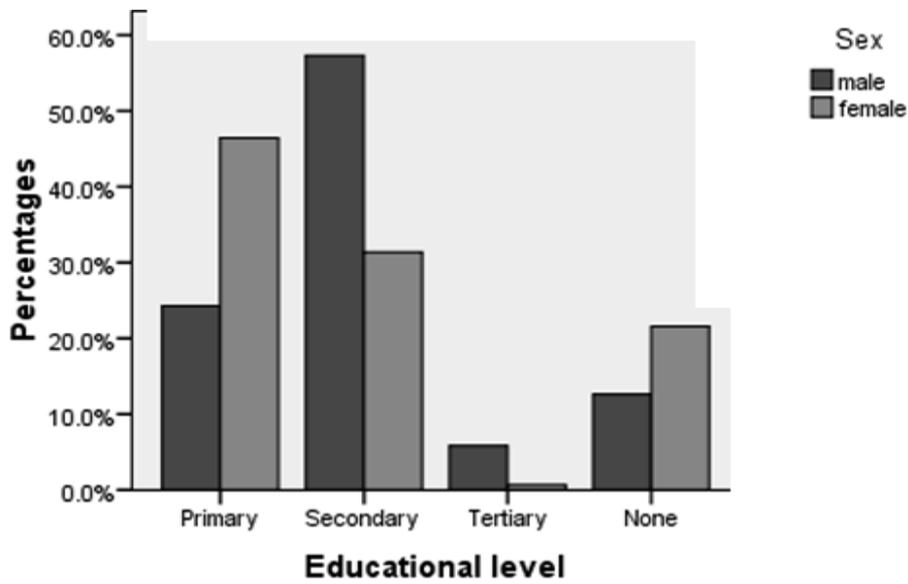


Figure 3: Educational level of respondents by sex

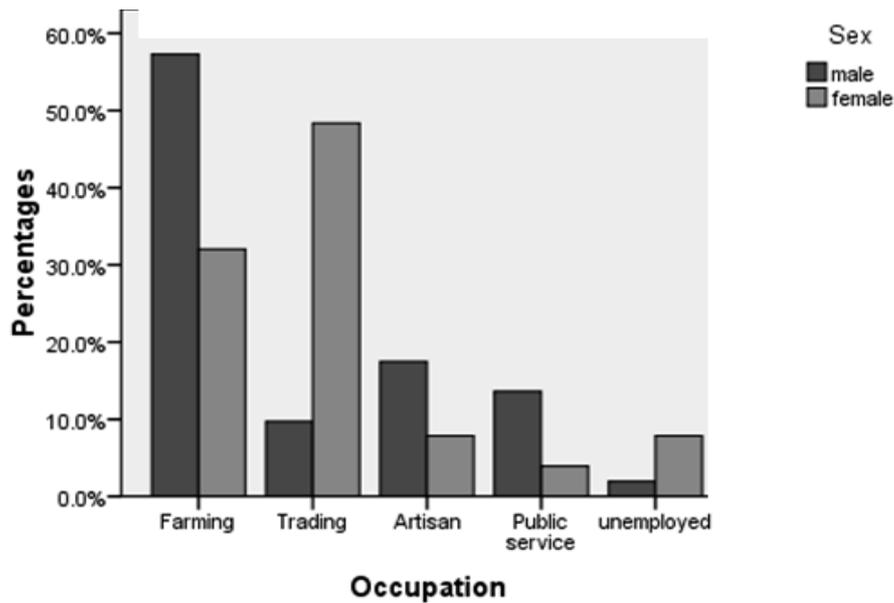


Figure 4: Occupation of respondents by sex

Source: Fieldwork, 2010

The Afrobarometer sampling technique of household selection was employed in the selection of the individual households. A water source whose landmarks can carefully be randomly rotated was chosen (Afrobarometer, 2007). Four trained research assistants walked away from this point in the following random directions. Each Assistant used the “day code” to establish an interval (n^{th}) for household selection (Afrobarometer, 2007). The day code which was calculated by adding together the numbers in the day of the month was used because it introduced randomness into the interval. In every case, the Assistant selected the n^{th} house on the right. Women and men aged 18 years and above, who had stayed in the community for at least two years, formed the sampling unit for the selection. One respondent per household was selected. However, in cases where there were more than one respondent, the lottery method of the simple random sampling technique was used for each to have an equal chance of being selected (Borg & Gall, 1989).

Interview schedules and focus group discussions (FGDs) were the instruments used for data collection. The interview schedule was chosen because, according to Babbie (2005), interviews ensure a higher response rate, decrease the number of “don’t know and no” answers and clarify matters so that relevant information is obtained. Focus group discussion (FGD) was used to triangulate and gain deeper insight into information obtained from the interview schedule. The factors influencing women’s participation in water supply management were measured using a 25-item scale developed from the various studies in the literature review. In developing the instrument for the study, it was assumed that the challenges to women’s participation were multidimensional. Four scales that were considered to be appropriate for the interview schedule were male domineering, socio-cultural norm, illiteracy and criticisms from other women. Each item was scored on a five-point Likert-type scale format (5-Strongly agree, 4-Agree, 3-Undecided, 2-Disagree, 1-Strongly disagree).

Data Analysis

Data were subjected to series of item analyses in order to identify items whose removal would enhance the internal consistency of the instrument. A series of factor analysis were conducted using SPSS on the interview schedule for the challenges to women's participation in AASD using principal axis factor analysis to determine the factors influencing women's participation in AASD.

Results and Discussion

In refining and validating the interview schedule for the factors influencing women's participation, factor analysis was conducted using SPSS. Prior to performing the principal component analysis the suitability of the data for factor analysis was assessed. An inspection of the correlation matrix revealed the presence of many coefficients of 0.3 and above. The Kaiser-Meyer-Okin value was 0.87, exceeding the recommended value of 0.60 Kaiser (as cited in Pallant, 2007) and the Barlett's test of sphericity reached statistical significance ($p = 0.00$), supporting the factorability of the correlation matrix. The 25 items on the interview schedule were analysed using principal axis factor analysis. Factor analysis suggested six components with eigenvalues greater than one explaining 37.4%, 14.0%, 6.8%, 5.4%, and 4.4% of the variance respectively to be rotated. These six components explained a total of 72.05% of the variance. Using Cateli's (1966) scree test, it was decided to retain three components for further investigation. This is because an inspection of the screeplot revealed a clear break after the third component indicating that the interview schedule consisted of more than one linear scale and hence the assumptions that more than one scale influenced the participation of women in rural water supply projects in AASD was upheld. The three components were: male domineering; socio-cultural norms; and women's marital and domestic roles. The decision to retain the 3 components was further supported by the results of Monte Carlo PCA for Parallel Analysis, (Table 1).

Table 1: Comparison of eigenvalues from PCA and criterion values from parallel analysis

Component Number	Actual eigenvalue from PCA	Criterion value from Parallel analysis	Decision
1	9.347	1.621	Do not Reject
2	3.500	1.523	Do not Reject
3	1.694	1.447	Do not Reject
4	1.347	1.381	Reject
5	1.101	1.327	Reject
6	1.024	1.273	Reject

The table showed only three components with eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size (25 variables x 256 respondents). The rotated solution as shown in Table 2 reported the following three interpretative components: male domineering; socio-cultural norms; and domestic/marital roles. To this end, three components with eigenvalues greater than one were rotated using a varimax rotation procedure. The three-component solution explained a total of 58.2% of the variance with component 1 contributing 37.4%; component 2 contributing 14.0%; and component 3 contributing 6.8%.

Table 2: Rotated component matrix showing factor loading and amount of variance explained for the challenges to women participation in RWSP instrument

Item number	Factor		
	1	2	3
24	.842		
25	.814		
17	.811		
13	.791		
23	.783		
10	.773		.348

12	.769		
16	.769		
19	.744		
14	.737		
22	.708		
9	.704		.314
20	.698		
21	.687		
18	.589		-.438
15	.536		-.343
11	.488		.426
2		.804	
4		.802	
3	-.320	.783	
1		.744	
7		.595	.320
5		.527	
8		.431	
6			.557
<hr/>			
% of Variance explained	37.39	14.00	6.78
Eigenvalues	9.38	3.50	1.70
Factor 1= Male domineering, Factor 2 = Socio-cultural norms, Factor 3 = Domestic/marital roles			

The varimax rotated component matrix in the Table depicts a complex structure, with Components 1 and 2 showing a number of strong loadings, and Component 3 showing moderate loadings with variables in Component 3 loading substantially on either Component 1 or Component 2. The rotation of these three components using varimax and the resultant interpretation seem appropriate. This is because factor analysis led to the deletion of 8 items (47, 46, 55, 52, 48, 44, 43) from the instrument which made up the third component (women domestic and marital roles). The reason was that these items loaded significantly on more than one factor with a cross-loading greater than .40 (Schonrock-Adema et al., 2009). Women's domestic and marital roles did not emerge as a factor inhibiting women's participation in RWSP during the validation of the instrument and items that belonged to that scale were removed. This is not surprising, as male respondents during the male FGD in Yaw Barima when asked which category of women were elected by the community to play a leading role in their water management. His response was:

The community does not elect or appoint anybody to be in the WATSAN committee but those who could manage and take responsibility of community projects just like they do to their family.

It could thus, be inferred from the above response that married women in AASD are seen as responsible citizens who were entrusted with community responsibilities. Thus, the assertion that the responsibility for water for cooking, cleaning, washing and bathing children traditionally falls to women as wives, mothers and daughters and problem arises when they have to leave home either for short or long durations to attend meetings and training workshops on water and sanitation (Lubisi, 1997; Sandys, 2005; Sigenu, 2006) is refuted and does not apply in the AASD.

A two-factor solution was therefore settled on and a factor analysis was conducted. When factor and item analyses were conducted on the remaining 17 items using a two-factor solution, two factors with eigenvalues greater than one and a total variance of 60.55% were explained with component 1 (male domineering) explaining 42.48% and component 2 explaining (Socio-cultural norms) 18.07%. To aid in the interpretation of these two components, oblimin rotation was performed. The rotated solution revealed the presence of simple structure (Garson, 2010; Tabachnick & Fidell, 2001; Pett, Lackey & Sullivan, 2003), with both components showing a number of strong loadings and all variables loading substantially on only one component (Table 3). There was a weak negative correlation between the two factors ($r = -.18$) showing that the analysis support the view that male domineering and socio-cultural norms are separate factors inhibiting the participation of women in RWSP in the AASD of Ghana.

Male domineering in the context of this study was interpreted to mean the extent to which decision-making, planning, designing and implementing water projects have been a concern or a sense of partnership and shared responsibility between men and women; the number of women and positions held by women in Watsan Committees; the level of verbal participation in decision-making as well as gender divide over paid (skilled) and unpaid (unskilled) work in the district. Socio-cultural norms on the other hand was interpreted to mean the extent to which women are able to speak publicly in front of men; and societal belief on certain positions preserved for women in Watsan committees. For instance, the belief that women make better treasurers for water committees than men and men as heads or chairman of such committees.

Table 3: Pattern and Structure Matrix for PCA with Oblimin Rotation of Two Factor Solution

Item	Pattern coefficients		Structure coefficients		Communalities
	Component	Component	Component	Component	
	1	2	1	2	
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Q 24	.869	.862	.745
Q 25	.833	.829	.688
Q 17	.822	.832	.696
Q 23	.815	.806	.652
Q 19	.799	.783	.620
Q 14	.766	.763	.582
Q 16	.762	.777	.609
Q 13	.754	.770	.602
Q 22	.752	.745	.557
Q 21	.697	.699	.489
Q 20	.687	.689	.475
Q 15	.576	.579	.335
Q 3	.891	.899	.809
Q 4	.864	.867	.752
Q 2	.860	.854	.730
Q 1	.832	.832	.691
Q 5	.512	.511	.261

$r = -0.18$

It was observed that, only men served as pump mechanics/technicians, with a greater number of women being hygiene officers and pump site cleaners in A.A.S.D. Though some women during the FGD in Yawkwei claimed they expressed interests to attend training programmes for pump mechanics, they never had the opportunity to do so. The views expressed by these women supported the assertion by Mehra and Esim (1998) and Sandys (2005) that there was a gender divide in skilled and unskilled works in RWSP management. They argued that while men normally participated in skilled jobs, such as pump mechanics, women only assumed responsibility for unskilled tasks, such as pump site cleaners. A 46-year old woman during the FGD at Kwakurukrom in the Komeso area council in AASD pointed

out that the appointment of women as pump cleaners was in the right direction. When asked why, she quickly responded that:

The pump sites managed by females were cleaner than those managed by men. Thus, one is forced to remove his/her sandals, when visiting the female pump sites for water.

This also meant that issues of hygiene education and awareness creation to the community were mostly carried out by women who served as hygiene officers. With men as pump mechanics, there was clear evidence that women's interest in technical careers was restricted and discouraged. As Joshi and Fawcett (2001) argued, such restrictions on women's involvement in these areas, either as voluntary or paid workers and their frequent involvement in the upkeep of water points, redefined their position at the lowest level of water management.

Again, the general notion held by people that women make better treasurers was also emphasised by the men during the FGD. When asked why men did not vie for the position of the treasurer, a man commented in a jovial manner:

Giving the treasury position to a male will mean giving him the opportunity and power to take more girl friends. We cannot take such risks.

This means that, the men saw women as more trustworthy and better keepers of community property such as money. This opinion expressed in the FGD confirms the findings of Dikito-Wachtmeister (2000) as cited Boateng, Brown and Tenkorang (2013) in study in Zimbabwe that men were not given charge of the money for fear they would spend it on beer. Even with this, both female and male FGD groups asserted that not every woman in the community qualified to be a treasurer. It was only women, who were either employed or engaged in a vocation, who were given the position. Even under such situations, the treasurer's role simply meant keeping money, while the secretaries kept the books.

However, on the issue of chairmanship and secretaryship, while the women FGD members claimed they would welcome a female WATSAN chairman, the males were a bit sceptical. Key positions, such as the chairman and secretary, which involved higher responsibilities, were still assigned to men, while women remained ordinary members with minimal influence. Thus, the interpretation of these two components, male domination and socio-cultural norms, was consistent with previous studies on factors influencing the participation of women in RWSP by Boateng, Brown and Tenkorang (2013); Fournier and Kelemen (2001); Kweka (1998); Mjoli (1999); Opare (2005) and; Sam (2006).

Table 4: A two-factor solution showing percentage of variance and eigenvalues

Factor 1	Factor 2
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	Male domineering	Socio-cultural norms
% of Variance explained	42.48	18.07
Eigenvalues	7.22	3.07

Item analyses procedures were conducted on the final 17 items of the interview schedule. Cronbach alpha coefficients for the two components accounting for the factors influencing women's participation in the AASD using individual household respondents as the unit of analysis. Coefficients of 0.83 and 0.92 exceeded the threshold value of 0.7 given by DeVellis (2003) (as cited in Pallant, 2007) as an acceptable reliability coefficient for research purposes.

In summary, the study identified two factors that underlie the influence of women's participation in AASD. These were male domineering and socio-cultural norms. A series of item and factor analyses on the instrument led to the emergence of a refined version of it which was found to report satisfactory internal consistency and factorial validity.

Policy Implication

The findings of this study provide evidence that male domineering and socio-cultural norms are the factors influencing the high participation of women in AASD. This means that, to improve women's participation in the study area, there is the need to break the cycle of male domineering and attention given to socio-economic norms in the area.

Recommendations

The participation of women is very critical to the efficient and effective management of rural water supply projects. It is thus important that efforts be made to erase any internal and external influence that would hinder their active participation. Ensuring an active participation of women could be done by developing a gender awareness system which builds on the different interests and knowledge of men and women into the design and management of water supply systems to promote the involvement and inclusion of all members of the community and to ensure a more effective and an inclusive use, and better management of water supplies. In this way, men and women should be educated on the shift away from the usual assumption that, in the execution of projects, men are responsible for the public sphere (decision-making) and women for the private sphere (ensuring cleanliness at borehole). Thus, just as women need to be more involved in decision-making, management and maintenance, so men should participate in hygiene education and sanitation, and should be encouraged to offer a fair share of the time and labour which is often expected of women. Again, the introduction of training and awareness programmes by the District Water and Sanitation Team in the communities on the importance of an equal participation of men and women in

decision-making fora on water provision and management would build women's self image, make them empowered, and motivate them to participate actively in all community activities. Finally, the study recommends the need to erase negative attitudes and social perceptions in the community about women's role as very important. This could be achieved when the entire community through education accept women's involvement and participation in committees as this would give women would the opportunity to learn new skills and leadership to boost their self-confidence.

References

- Afrobarometer. (2007). Round 4 survey manual. The Afrobarometer Network. Retrieved August 20, 2009, from: www.afrobarometer.org.
- Agarwal, B. (1992). Gender relations and food security: Coping with seasonality, drought and famine in South Asia. In L. Benería and S. Feldman (Eds.). *Unequal burden: Economic crises, persistent poverty, and women's work* (pp. 374-378). Boulder, Colorado: Westview Press.
- Agarwal, A., Delos-Angeles, M. S., & Bhatia, R. (2002). Integrated water resources management. Global Water Partnership Technical Advisory Committee (TAC). Background Paper, 4, Denmark: Global Water Partnership.
- Babbie, E. (2005). *The basics of social research* (3rd ed.). Canada: Thomson Wadsworth.
- Barrett, H., & Browne, A. (1995). Gender, environment and development in Sub-Saharan Africa. In T. Binns (Ed.). *People and environment in Africa*. (pp. 31-35). Chichester: Wiley Publishers.
- Bediako, P. (2005). Gender, culture and water management practices: The case of Sene District in Ghana. TRITA-LWR Master Thesis, Retrieved June 18, 2009 from: www2.lwr.kth.se/publikationer/pdf_files/lwr_ex_04_17.pdf
- Binamungu, D. (1993) Towards gender-responsive planning in the HESAWA programme: Critical review. Workshop on gender and water resources management: Lessons learned and strategies for the future. Stockholm: SIDA, 1st-3rd December.
- Boateng, J. D., Brown, C. K., Tenkorang, E. (2013). Socio-economic status of women and its influence on their participation in rural water supply projects in Ghana, *International Journal of Development and Sustainability*, (Special Issues), Development and Sustainability in Africa, 2(2). www.isdsnet.com/ijds
- Boateng, J. D., Brown, C. K., Tenkorang, E. (2013). Gender and water management practices in Ghana, *Journal of Environment and Earth Science*, 3(5), 871-890.
- Catell, R. B. (1966). The scree test for number of factors. *Multivariate Behavioral Research*, 1, 245-76.
- Chachange, C. S. L. (1991). Rural water and sanitation programmes in Morogoro and Shinyanga regions: A study of women involvement in the implementation of the programme. Tanzania: Dar-es-Salaam University Press.
- Dangerfield, B. (1989). *Water and sanitation in developing countries*. Institute of Water Engineers and Scientists. London: IWES.

- Danquah, J. L. (2003). The gender agenda: Walking the talk at all levels. Dawuro. The News Letter of Water Aid-Ghana Programme, 5, 9. Accra: Editions Services. www.wateraidghana.org
- DeVellis, R. E. (2003). Scale development: Theory and applications (2nd edn). Thousand Oaks, California: Sage.
- Dikito-Wachtmeister, M. S. (2000). Women's participation in decision-making processes in rural water projects: Makoni District. Unpublished Ph.D. Thesis. University of Bradford, Zimbabwe.
- Djegal, A., Price M., & Acquaye, G. K. (1996). Evaluation mission report on rural water and sanitation programme, Eastern region of Ghana project GHA/88/017. Unpublished Report. Accra. Retrieved June 18, 2009 from: <http://www.jstor.org/stable/4030170>.
- Drangert, J. O. (1993). Who cares about water? A study of household water development in Sukumaland, Tanzania. Sweden: Linkoping University.
- Elson, D., & Cleaver, F. (1993). Gender and water resources management: Integrating or marginalizing women. Report from a Seminar held in Stockholm, Stockholm. Sweden: SIDA, 1-3 December.
- Engel, S., Iskandarani, M., & Useche, M. P. del. (2005). Improved water supply in the Ghanaian Volta basin: Who uses it and who participates in community decision-making? EPT Discussion Paper. Washington, DC: IFPRI. (129), 1-47.
- Fournier, V., & Kelemen, M. (2001). The crafting of community: Recoupling discourses of management and womanhood. *Gender, Work and Organisation*, 8 (3), 267-290. Retrieved June 12, 2009 from: <http://www.jstor.org/stable/4030170>.
- Garson, D. (2010). Factor analysis. Retrieved March 5, 2013, from <http://faculty.chass.ncsu.edu/garson/PA765/factor.htm>
- Gordon, J. Y., James, C.I., Doge, J., & Rhodda, C. (2004). Global water resources issues. Cambridge University Press. Amazon.com
- Green, C., & Baden, S. (1994). Water resources management: A macro-level analysis from a gender perspective. An Issue Paper Prepared for the Gender Office. Swedish International Development Cooperation Agency (SIDA) Report, 21, Bridge Development-Gender. Brighton. UK.
- GWA. (2006). Resource Guide for mainstreaming gender in water management, Version 2.1 UNDP www.genderandwater.org/
- GWP (2005). Toolbox: Integrated water resources management. Global Water Partnership. Retrieved June 09, 2009 from: <http://www.gwpforum.org>.
- GWS (2010). Mainstreaming Gender and Water and Sanitation, Water and Sanitation Programme: Working paper
- Hemson, D. (2002). Women are weak when they are amongst men: Women's participation in rural water committees in South Africa. *Agenda*, 52, 24-32.
- ICWE. (1992). Dublin statement. International Conference on Water and the Environment. Dublin. <http://www.gdrc.org/uem/water/dublin-statement>.
- IDRC. (1985). Women issues in water and sanitation: Attempts to address old age challenge.

- IDRC Proceedings Series 236e. Retrieved May 07, 2009 from: <http://www.idrc.ca/research/xplaw/pdf>
- IRC. (1994). Working with women and men on water and sanitation: An African field guide. Occasional Paper Series 25. The Hague: IRC International Water and Sanitation Centre. Retrieved May 07, 2009 from: <http://www.irc.nl/page/1858>.
- IVO (Development Research Institute), ICTA (Institut de Ciència i Tecnologia Ambientals, ITN-BUET (International Training Network Centre), CEDECEN (Central Department of Economics). (2008). Capacity Building for Enhancing Local Participation in Water Supply and Sanitation Interventions in Poor Urban Areas, Vol. 1. Retrieved January 23, 2014 from: <http://tinyurl.com/c42hugs>
- Joshi, D., & Fawcett, B. (2001). Water projects and women's empowerment. Paper presented at the People and Systems for Water, Sanitation and Health at the 27th WEDC Conference, Lusaka. Retrieved June 19, 2009 from: www.eng4dev.soton.ac.uk/.../R6575%20WEDC%20.
- Kaiser, H. (1974). An index of factorial simplicity. *Psychometrika*, 39, 31-6.
- Kendie, S. B. (1994). Willingness to pay more for rural drinking water services in Ghana and Togo. Discussion Paper, 3, Cape Coast: University of Cape Coast, Centre for Development Studies.
- Kendie, S. B., (2002). Linking water supply, sanitation and hygiene in Northern Ghana. Cape Coast, Catholic Mission Press.
- Kuzwayo, J. (2002). Don't do anything without communities: Keeping you informed. *Umsebenzi* 5(3), 13.
- Kweka, R. A. D. (1998). Woman in small holder irrigation in Tanzania. In D. Merrey & S. Baviskar (Eds.). Gender analysis and reform of irrigation management: Concepts, cases and gaps in knowledge. Proceedings of the Workshop on Gender and Water, Habarana, Sri Lanka. Retrieved June 18, 2009 from: <http://www.jstor.org/stable/4066041>.
- Leach, M. (1992). Gender and the environment: Traps and opportunities. *Development in Practice*, 2(1), 12-22.
- Lundquist, J., & Gleick, P. (1997) Sustaining our waters into the 21st Century. Scientifically based document prepared for the UN Commission for Sustainable Development's Comprehensive Assessment of the Freshwater Resources of the World. Sweden: Stockholm Environment Institute.
- Makule, D. (1997). Water and sanitation for all: Partnerships and innovations: Gender perspective. Tanzania: Ministry of Water.
- M. D. G., Report. (2013). The Millennium Development Goals Report. UN: New York
- Mehra, R., & Esim, S. (1998). What gender analysis can contribute to irrigation, research and practice in developing countries: Some issues. In D. Merrey & S. Baviskar. (Eds.), Gender analysis and reform of irrigation management: Concepts, cases and gaps in knowledge. Proceedings of the Workshop on Gender and Water, Habarana, Sri Lanka. Retrieved June 18 2009 from: <http://www.jstor.org/stable/4066041>.

- Mjoli, N. (1999). Democratising control of water resources, land and housing: Women speak out. *Agenda* 42, Feminist Media, 60-65. Retrieved June 18 2009 from: <http://www.jstor.org/stable/4066041>.
- Mumbo, G. (2002). Let's all work together to provide water to the poor. Dawuro. The News Letter of Water Aid-Ghana Programme. 1(1). Accra: Editions Services. www.wateraidghana.org
- Narayan, P. D. (1995). *Designing community based development*. Washington D. C: The World Bank.
- Nielson, E., Giltner, S., Dutton, P., & Donohoe, J. (2009). Independent evaluation of Australian aid to water supply and sanitation service delivery in East Timor and Indonesia. Commonwealth of Australia: AusAID. Retrieved June 23, 2013 from www.ode.usaid.gov.au/publications
- Onyango, M. (2003). Challenges of weather and climate to African women. Paper Delivered in the Second Conference on Women in Meteorology and Hydrology. Maseno University and DMC Kenya. Retrieved July 30, 2009 from: <http://www.wmo.ch/web/wmoh/womendocs/agenda.doc>
- Opere, S. (2005). Engaging women in community decision-making processes in rural Ghana: Problems and prospects. *Development in Practice*, 15(1), 90-99.
- Padangwangi, R. (2009) Community-driven development as drivers of changes: Water supply and sanitation projects in rural Punjab, Pakistan. Working Paper Series. No.4. National University of Singapore.
- Pallant, J. (2007). *SPSS survival manual: A step by step guide to data analysis using SPSS for windows version 15*. (3rd ed). Berkshire, England: Open University Press.
- Pett, M., Lackey, N. & Sullivan, J. (2003). *Making sense of factor analysis*. Thousand Oaks: Sage Publications, Inc.
- PRB. (2001). *Women, men and environmental change: The gender dimensions of environmental policies and programs*. Washington DC: Measure Communication.
- Regmi, S.C., & Fawcett, B. (1999). Integrating gender needs into drinking water projects in Nepal. In C. Sweetman (Ed.), *Women, Land and Agriculture*, 62-72. Oxford: Oxfam.
- Rodrigues, R., O'Neal, S. G. (2004). Water quality management: North American Development Bank Experience. *International Journal of Water Resources Development*, 21(2): 167- 177
- Saeed, H. (2003). The gender agenda: Overburdening women in the name of gender equity?. Dawuro. The Newsletter of Water Aid Ghana Programme, 6, Accra: Editions Services. www.wateraidghana.org.
- Sam, N. P. (2006). *Ghana: Gender integration in a rural water project in the Samari-Nkwanta community*. New York, United Nations.
- Sandys, E. (2005). *Women and water: Women 2000 and beyond*. United Nations Division for the Advancement of Women Department of Economic and Social Affairs.
- Sarantakos, S. (2005). *Social research (3rd ed.)*. New York: Palgrave Macmillan

- Schonrock-Adema, J., Heijne-Penninga, M., Van Hell, E. A. & Cohen-Schotanus, J. (2009). Necessary steps in factor analysis: enhancing validation studies of educational instruments. *Medical Teacher*, 31, e226-e232.
- Sherpa, L. (2004). Indigenous peoples, gender and natural resource management. A Report Submitted to the Kulu Women and Development. Denmark. Retrieved May 4, 2009 from: http://www.nepalreport_aug04pdf.
- SIDA. (1994). Towards a framework for including a gender perspective in water resources management. Development Assistance Committee Meeting on Water Resources Management, Paris. Stockholm.
- SIDA. (1996). Rural village water supply programme. Department for Natural Resources and the Environment. Botswana
- Singh, N. (2006). The changing role of the water management: myths and realities, *Wagadu* 3, Special Issue: Water and Women in Past, Present and Future, Spring 94-113
- Tabachnick, B. & Fidell, L. (2001/ 2007). *Using multivariate statistics*. Needham Heights: Allyn & Bacon
- Tam, T. (2012). Participation of women in rural water supply and sanitation projects: visible or invisible actors? The case of the Sub-District of Mau Bara (Liquica Timorleste). *International Journal of Multidisciplinary Thought*, 2(4), 149-170.
- Thurstone, L. L. (1947). *Multiple factor analysis*. Chicago: University of Chicago Press.
- UNDAW (2005). Equal participation of women and men in decision-making process, with particular emphasis on political participation and leadership. Report of expert group meeting. Addis-Ababa, Ethiopia. Retrieved on October 24-27 2005 www.un.org/wpmenwatch/daw
- UNDP. (1990). *Safe Water 2000*. UNDP: New York.
- UNICEF. (1994a). *Clean water and environment: Women and children at particular risk*. Waterfront, 6, New York: UNICEF.
- UNICEF. (1994b). *Implementing Agenda 21: A priority for IWES*. Waterfront.
- UN Water. (2006). *Gender, water and sanitation: A Policy Brief*. International Decade for Action, Water for Life, 2005–2015. Retrieved June 19, 2009 from: http://www.un.org/waterforlifedecade/pdf/pb_water_gender_up.pdf
- Verhasselt, Y. (Ed.). (1998). *Water: Worldwide and worthwhile*. Brussels: United Nations Office.
- World Bank. (1993). *Water resources management: A World Bank policy paper*. Washington: World Bank.
- World's Women (2010). *Trends and statistics*. Department of Economic and Social Affairs. UN New York
- WRC. (2000). *Water resources management problems identification and prioritization*. Accra: Ghana.
- WSP. (2005). *Five-Year medium term water and sanitation plan, Asante Akim North District*

Assembly.

Wijk-Sibesma, C. A. van. (1998). Gender in water resources management, water supply and sanitation: Roles and realities revisited. Technical Paper, 33, International Research Centre for Water and Sanitation. Delft: Netherlands.