© Kamla-Raj 2019 J Hum Ecol, 67(1-3): 55-65 (2019)
PRINT: ISSN 0970-9274 ONLINE: ISSN 2456-6608 DOI: 10.31901/24566608.2019/67.1-3.3158

# Socio-demographics and Domestic Water Conservation Intentions

**Kevin Onyenankeya[1*], Oluwayemisi Onyenankeya[2] and Oluyinka Osunkunle[3]**

*Department of Communication, University of Fort Hare, Alice, South Africa, Private Bag X1314, Alice 5700*
*[1]Cell phone: +27 613 262 099, [1]E-mail: konyenankeya@ufh.ac.za,*
*[1]ORCID (iD): http://orcid.org/0000 0001-5814-8823*
*[2]E-mail: yemisi_nkem@yahoo.com, [2]https://orcid.org/0000-0001-9008-8883*
*[3]E-mail: oosunkunle@ufh.ac.za, [3]https://orcid.org/0000-0001-8110-6517*

**KEYWORDS** Behavioural Intentions. Peri-urban. Residents. Rural. Socio-demographics. Water Conservation

**ABSTRACT** This paper examined the role of socio-demographic factors on water conservation intentions of peri-urban and rural populations to identify the key demographic variables to target in designing policies and communication approaches for engaging individuals to cultivate judicious water use practice. Findings showed that socio-demographic variables play a defining role in individuals' water conservation intentions. Income emerged as the most important determinant for individuals' water-efficient intentions. Rural residents were associated with less water-efficient intentions. It emerged that those with greater intentions to perform water efficiency actions were homeowners with higher incomes and education levels who reside mainly in the peri-urban areas. These findings not only highlight the importance of policies that can motivate the rural populace to acquire and install water-saving appliances but also the need to construct water conservation messages in a way that rural population can easily understand.

## INTRODUCTION

Water conservation has become increasingly important in water resource management across the world. In many water-stressed countries like South Africa where water supply is being constrained by hydrological conditions and global warming, conservation is central to attempts to rein in water usage and ensure sustainable management of the limited water resources. Over the years, South Africa's water authorities have initiated several strategies aimed at encouraging households and organisations to embrace water conservation practices. However, according to the Department of Water Affairs (DWA), the numerous initiatives to promote conscientious water-saving habits appear not to have yielded the expected results. A diagnostic report by the Department in 2012, indicates that the "culture of indifference and disrespect" to water conservation exemplified by "high levels of water wastage and inefficient use" persist (Onyenankeya 2017: 18). In 2015 the Department of Water and Sanitation published another report which suggests that there has been little or no shift in the negative attitude towards water resources as "many South Africans are not playing their parts in conserving the scarce water resources" (Onyenankeya and Salawu 2019: 350).

A variety of reasons have been adduced for the seeming apathy by South Africans toward water conservation and the attendant high rate of water wastage. Hedden and Cilliers (2014: 11) identify a lack of awareness and education on the necessity to save water as an important contributory factor. It appears the salience of water conservation is yet to be recognised by many residents especially in the rural areas where there appears little or no social support to engage in water conservation behaviour (Struwig 2010; Onyenankeya et al. 2017). The indifference towards conservation especially among rural and peri-urban residents has also been linked to alienation and perception (Cock and Fig 2001; De Beer and Marais 2005). There is also the issue of narrow and inadequate communication strate-

*Address for correspondence:*
Kevin Onyenankeya
Department of Communication,
University of Fort Hare,
Alice, South Africa,
Private Bag X1314, Alice 5700
*Cell Phone:* +27 613 262 099
*ORCID (iD):* http://orcid.org/0000 0001-5814-8823
*E-mail:* konyenankeya@ufh.ac.za

gies especially in educating and creating public awareness about water conservation.

Existing communication strategies appear focused on commercial and urban domestic users and rely largely on traditional communication campaigns (Anderson 2009; Onyenankeya and Salawu 2018). Moreover, the water communication campaigns "neither attempts to appreciate the social dynamics underpinning the water conservation habits of rural communities nor seeks their commitment and understanding" in arriving at water conservation strategies" (Onyenankeya and Salawu 2018: 349-350). As a result, the critical masses in the rural areas are unaccustomed to water demand management strategies (Onyenankeya et al. 2017: 2). A study that investigated college students' attitude and behaviour to water conservation has shown that students especially those from rural townships, were "disconnected from water conservation campaigns and appeared unaware of water issues such as water scarcity, and efficient and effective use of water" (Onyenankeya et al. 2015: 23). If college students who ordinarily should be better informed about issues in their environment are ill-informed, there is no gainsaying the paucity of knowledge about water issues among the less educated rural populace. From the findings above it is safe to infer that the campaign to conserve water is yet to resonate with rural residents.

Water conservation can be a convoluted term. Its interpretation continues to vary over space and time and among different social groups (Wescoat 2014). Water conservation according to the Department of Water Affairs and Forestry encompasses "the minimization of loss or waste of water, the care and protection of water resources and the effective and efficient use of water" (Tsatsi et al. 2010: 24). Generally, conservation can be achieved through human agency and technology. Environmental psychologists conceptualise conservation from a binary perspective which dwells on the behavioural determinants of conservation. Gardner and Stern (1996) for instance, hold that individuals generally engage in two conservation activities – "curtailment behaviours" and "efficiency behaviours". With regards to water conservation, curtailment behaviour refers to those ongoing everyday actions that individuals perform to save or limit water usage such as spending lesser time in the shower, using washing machine only when there are full loads of clothes or using a glass of water while brushing teeth instead of turning off the tap (Fielding et al. 2012).

In contrast, efficiency behaviour involves "the accomplishment of a function, task, process or result with the minimal amount of water feasible" (Vickers 2002: 434) through the use of technological or mechanical devices such as dual-flush toilets and low-flow taps. While curtailment behaviours are often a continuous daily routine, efficiency behaviours are generally one-off activity. The two conservation behaviours are not mutually exclusive and can be executed simultaneously. The decision to carry out either or both of the conservation behaviours, is determined by a variety of factors including psychosocial (for example, attitude, behavioural tendency), situational or contextual factors (that is, social, economic or political situations, for example, incentives, prices, home tenures, fines, etc.) and demographic factors (for example, gender, age, educational level and income).

Behavioural intention is considered an important predictor of behaviour in the theory of planned behaviour. Ajzen (1991) describes behavioural intention as an individual's willingness to perform a set of behaviour or actions (Ajzen 1991). According to Ajzen (2006) the intention to conserve water is influenced by three key constructs – attitude of an individual towards the act, subjective norm that is the shared "normative beliefs" about the behaviour (Bicchieri and Chavez 2010) and perceived behavioural control which refers to the perceived control individuals have over the behaviour.

**Objectives**

The primary objective of this paper was to examine the role of socio-demographics for example income, home tenure education level and age on the water conservation practices and intentions of peri-urban and rural families in the Eastern Cape Province of South Africa to understand the demographic variables that could be the focus for water conservation campaigns. In line with existing studies, it was expected that:

water conservation intention will be positively related to age, education level, income and home tenure.

## The Context

South Africa faces water scarcity challenge which experts project could crystallise by 2050 (Black and King 2009). Some experts hold that a water scarcity situation can significantly constrain "South Africa's human development" (Hedden and Cilliers 2014: 1). The Food and Agriculture Organisation (FAO 2005) describes Water scarcity as a state where there is a "higher level of total water demand than available supply" (Onyenankeya 2017: 14). In South Africa, over 60 percent of the country's water supply systems cannot meet the surging demand for water (DWA 2013). Many basins providing water to the cities continue to contend with significant gaps in the water supply chain (Boccaletti et al 2010). A survey that examined the long-term water requirements for all the municipalities shows that 30 percent of towns in South Africa are struggling with water shortages (DWA 2012). In recent times, some metropolitan water authorities have been forced to introduce drastic measures to curb water demand which has overtaken supply. In early 2018 for instance, Cape Town one of the country's largest cities effected drastic water-saving measures including limiting individual water consumption to 50 litres a day in a desperate bid to manage shrinking supply (Onyenankeya and Salawu 2018). Efforts to close the demand-supply gap continue to be imperilled by natural and infrastructural impediments. This poses huge water management challenges (Carden et al. 2016).

Water supply in South Africa is constrained by a variety of factors. South Africa presents a peculiar climatic and hydrological environment – low rainfall and limited underground aquifers (Water Resources Group 2009). Unlike most of the world where groundwater, that is, water flowing within aquifers below the water table, constitutes the bulk of readily available freshwater resources, groundwater contributes only about 13 percent of South Africa's overall water resource (Riemann et al. 2012). The combination of meagre rainfall and high natural evaporation levels "often three times more than rainfall makes South Africa one of the driest country in the world" (DWA 2013). South Africa relies mainly on freshwater and "its development potential" (DWA 2013: 27). But according to a report by the Institute of Security Studies, in many areas of South Africa, surface and groundwater resources are already "over-exploited" and could become "over-harvested for the next 20 years even if policies that would close the demand-supply gap by 2035 are put in place now" (Hedden and Cilliers 2014: 9). Consequently, South Africa has to rely on significant "water transfers from neighbouring countries" to feed its water basins according to the Water Resources Group, (Onyenankeya and Salawu 2019: 349).

Water availability is further being severely constrained by climate change. South Africa experiences episodic dry spells which, in recent years, have resulted in devastating drought in some parts of the country. Experts have long warned that the climate change conundrum, which affects weather and seasonal freshwater flows, is likely to heighten not only future water availability but also, seriously impact on the socioeconomic health of many countries especially in the developing world (Bates et al. 2010; Palaniappan et al. 2010). Jacob Zuma, former President of South Africa had noted in 2014 that the country was "rapidly growing into a water-scarce country, particularly due to broader changes which are caused by climate change and global warming". Zuma's observation is consistent with the report on the country's water situation published by the National Planning Commission. The report had noted that "climate change adds one more layer of uncertainty to an already challenged water sector and has the potential to worsen existing systemic water shortages over the medium to long term" (RSA 2011: 20). The Department of Water Affairs insists water would be "the primary medium through which the impacts of climate change is going to be felt in South Africa" (DWA 2013: 75). Climate variability is expected to impact not only the people and the economy but also the ecosystems ultimately exacerbating the water situation. The rising demand for water in the face of limited water resources that is already vulnerable to climate change underscores the urgency to pursue water conservation as a sustainable water resources management strategy.

### *Socio-demographic and Water Conservation Behaviour and Intentions*

Previous studies identified income, age, level of education and home tenure as some socio-demographic factors that exert varying degrees of influence on water consumption and water-saving intentions. For example, Gregory and Di Leo (2003) report that households with older people tend to use a lesser amount of water. Mayer and Deoreo (1999) and Makki et al. (2012) assert that young people use more water. Although some studies found a difference in water consumption pattern between the elderly and teenagers, the reported variance may not necessarily be as a result of age. According to Russel and Fielding (2010: 7), the difference in water usage between the age groups may be "a function of the demands associated with particular life stages and the different experiences of generations" For instance, it has been argued that older persons tended to use a lesser amount of water because they work full time and spend less time at home (Fielding et al. 2012). While there is a clear or direct correlation between age and water consumption pattern, the relationship between individuals age and their intention to conserve water (Lam 2006).

With regards to education and income, research findings have indicated that the intention to conserve water is often stronger in households with higher education levels (Gilg and Barr 2006; Lam 2006). Education enhances individuals' competencies for example "knowledge and skills" which have been shown to promote conservation behaviours (Stern 2000). As has been argued by Mathipa and Le Roux (2009: 256), "pro-environmental skills constitute the capacity to act in an environmentally responsible way". Educated individuals who earn higher incomes are likely to be better informed about ways to conserve water and therefore, likely to have a greater capacity to procure and install water-saving appliances devices that can reduce daily water consumption considerably (De Oliver 1999; Clark and Finley 2007; Kantola et al. 1983; Lam 1999). Past research also shows greater water use in family units with higher earnings (Jeffrey and Gearey 2006; Gregory and Di Leo 2003). Intentions do not always transform into actual behaviour. Earlier studies (De Oliver 1999; Gregory and Di Leo 2003) that investigated actual water consumption suggested that households with members who possess higher education tend to engage less in water conservation compared to households with lower education. Other findings have also shown that lower-income households use less water compared to households with higher incomes (Gregory and Di Leo 2003; Jeffrey and Gearey 2006; Renwick and Green 2000).

However, households with higher income appear to exhibit stronger intentions to perform efficiency behaviours such as fitting water-efficient devices (Lam 1999). In the main, when it comes to water consumption, households with a smaller number of people who hold lower education and income are generally inclined to use a lesser amount of water (Fielding et al. 2012). In terms of home tenure, past research has established household tenancy as an overarching determinant of water consumption (Fielding et al. 2012) and intentions. It has been reported that individuals who live in detached or separate houses exhibit greater intentions to save water (Clark and Finley 2007; Gilg and Barr 2006). However, as can be seen from past studies this practice is not universal. For instance, Lam's investigation showed that in Kaohsiung and Taipei areas of Taiwan some households who dwell in separate houses "had less intention to retrofit because they did not have to share water tanks with their neighbours, as did apartment residents" (cited in Russel and Fielding 2010: 8). Conversely, landlords or homeowners were more likely to install water-efficient appliances than tenants because they tend to have complete control over the homes (Randolph and Troy 2008). As evinced from literature, socio-demographic variables exert a varying degree of influence on the rural population intentions to conserve water.

## METHODOLOGY

This research aimed to measure the relationship between socio-demographics and water curtailment and efficiency intentions among rural and peri-urban households. Curtailment action was described in the questionnaire as "everyday actions to save water" (for example spending less time in the shower or turning off

tap while brushing teeth,), while efficiency actions refers to "installing water-efficient appliances" for example dual-flush toilet, showerheads, low-flow taps, rainwater tank plumbed into the house, hose with trigger (Fielding et al. 2012: 6). The survey was conducted within four local municipalities in the Eastern Cape Province. Participants were first stratified by place of residence – rural and peri-urban. The communities that emerged were: Gaga and Sada (rural), and Fingo and Dimbaza (peri-urban). Finally, a proportional sample was drawn respectively, from the two selected peri-urban and rural communities using the 2016 population census as the sampling frame. Only the participants that had running water in their homes were included in the survey. In total, 400 surveys were administered and 383 were returned representing (96% response rate).

**Measures**

Questionnaires were the data collection instrument used for this study. Respondents were asked to respond to a set of statements through a five-point Likert scale ranging from strongly agree to strongly. The researchers and four assistants distributed the questionnaires. First, the attitudes of respondents were measured. This was considered imperative as research has established that attitude is a determining factor of behavioural intention. To measure attitude towards water conservation respondents were requested to "agree" or "disagree" with 10 positive attitudinal statements around water conservation as used by Onyenankeya et al. (2017: 4). The 10 statements were computed and higher numbers of responses in percentage reflected a positive attitude toward water conservation. The scales used to measure water conservation intentions were adopted from the measures used by Fielding et al. (2012). The respondents' plans or intentions to engage in daily actions to save water were assessed with three items on a five-point scale ranging from strongly disagree to strongly agree. The three items are: (1) "I expect I will engage in everyday actions to save water around the house and garden in the next 12 months", (2) "I intend to engage in everyday actions to save water around the house and garden in the next 12 months", and (3) "I want to engage in everyday actions to save water around the house and garden in the next 12 months" (strongly agree =5, strongly disagree=1). The average of the three items provides a reliable measure of water conservation intentions.

Similarly, Intentions to engage in efficiency behaviour were measured with three items: (1) "I expect I will install water-efficient appliances around the house and garden in the next 12 months", (2) "I intend to install water-efficient appliances around the house and garden in the next 12 months", and (3) "I want to install water-efficient appliances around the house and garden in the next 12 months" (strongly agree =5, strongly disagree =1). The frequency in percentage for each statement provided a measure of water conservation intentions. The "test-retest method" was used to further prove the reliability of the measuring instrument in which the questionnaires were administered two times within two weeks interval on 20 respondents, who were not part of the study sample, but shared similar characteristics with targets of the study. When the two tests were correlated it produced a correlation coefficient value (> 0.5) which indicates that the scales were valid and reliable.

## RESULTS

The demographic profile shows that females constitute 54.2 percent of the sample. More than 76 percent of the respondents are between the ages of 25 and 34 years while 3.6 was the average household size with a range of 1 to 6. The bulk of households (57.1%) with 4 to 5 people were located in rural areas. Nearly 45 percent of the households earned between R15000 and R25000 per month and more than half of the respondents (56.3%) possessed high school certificates (Table 1). The results are consistent with the household distribution and literacy achievement in the Eastern Cape as captured in the 2011 general household survey.

**Rural and Peri-urban Attitudes toward Water Conservation**

Both the peri-urban and rural respondents reported favourable water conservation attitudes. As can be seen from Table 2, cumulatively, 77.9 percent of peri-urban and 74.4 of rural

**Table 1: Respondent's demographic profile**

| *Demographics* | *Value (%)* | | |
|---|---|---|---|
| | *Peri-urban* | *Urban* | *Total* |
| *Gender* | | | |
| Male | 29.7 | 15.9 | 45.6 |
| Female | 31.8 | 22.4 | 54.2 |
| | | | *n=383* |
| *Age* | | | |
| 16-24 | 11.5 | 5.5 | 17.5 |
| 25-34 | 24.2 | 8.1 | 32.3 |
| 35-44 | 9.9 | 4.9 | 14.8 |
| 45-54 | 10.1 | 5.4 | 15.5 |
| 55 and above | 8.4 | 11.7 | 20.1 |
| | | | *n=383* |
| *Home Tenure* | 52.2 | 24.5 | 76.7 |
| Home owners | 20.6 | 2.6 | 23.2 |
| Tenants | | | *n=383* |
| *Income* | | | |
| Less than 5000 | 15.6 | 8.3 | 23.9 |
| 5000-15000 | 26.1 | 18.2 | 44.3 |
| 15000-25000 | 9.6 | 4.9 | 14.5 |
| 25000-35000 | 9.9 | 1 | 10.9 |
| 35000- and above | 7.8 | 0 | 7.8 |
| | | | *n=383* |
| *Education Levels* | | | |
| Less than grade 7 | 2.3 | 4.2 | 6.5 |
| Grade 7 or primary | 10.2 | 5.2 | 15.4 |
| High school | 36 | 20.3 | 56.3 |
| Degree | 13.3 | 1.8 | 15.1 |
| Postgraduate | 5.7 | 0.8 | 6.5 |
| | | | *n=383* |

respondents were favourably disposed to water conservation. Almost the same number of respondents in the peri-urban (98%) and rural (96%) communities thought it was important to conserve water around the house every day. Similarly, 95 percent and 85 percent of peri-urban and rural respondents respectively, felt it was beneficial to conserve water around the house everyday was beneficial, while 85 percent of rural and 95 percent of the respondents considered water conservation everybody's responsibility. Respondents with higher levels of education in both rural and peri-urban areas reported a more positive water conservation attitude. It could be that this category of respondents is more exposed to water issues. Similarly, both female peri-urban and rural respondents reported more positive attitudes than their rural and peri-urban male respondents. A plausible explanation could be the fact that the majority of the households are headed by females.

**Table 2: Rural and peri-urban attitudes to water conservation**

| *Statements* | *Agreement (frequency)* | |
|---|---|---|
| | *Rural (n=137)* | *Peri-urban (n=246)* |
| I think saving water around the house every day is environmentally friendly | 50% | 67% |
| I think saving water around the house every day reduces water use | 52% | 78% |
| I think saving water around the house every day saves money | 55% | 79% |
| I think saving water around the house every day is rewarding | 69% | 80% |
| I think saving water around the house every day is being wise | 76% | 93% |
| I think saving water around the house every day is being responsible | 76% | 93% |
| I think saving water around the house every day is beneficial | 85% | 95% |
| I think saving water around the house every day is good | 91% | 97% |
| I think saving water around the house every day is everybody's business | 94% | 97% |
| I think saving water around the house every day is important | 96% | 98% |
| *Cumulative* | 74.40% | 77.90% |

## Respondents' Water Conservation Intentions

The majority of rural (95%) and peri-urban (97%) respondents stated that they intend to save water around the house every day. Equally, an overwhelming 96 percent of peri-urban and 91 percent of rural residents said they are willing to make an effort to save water around the house every day. The fact that most of the respondents have a positive attitude towards water conservation may be the underlying factor for the stated intention to conserve water. It has been reported that positive water conservation attitudes could engender strong intentions to participate in water-saving actions (Russell and Fielding 2010). Water curtailment intentions were almost evenly spread across the age categories among rural and peri-urban respondents. Similarly, both low and high-income earners in rural and peri-urban areas reported greater intentions to save water every day. There were very minimal disparities between everyday water con-

**Table 3: Rural and peri-urban respondents' water conservation intentions**

| *Demographics* | *Value (%)* | | | |
|---|---|---|---|---|
| | *Save water every day* | | *Install water-efficient appliances* | |
| | *Peri-urban* | *Rural* | *Peri-urban* | *Rural* |
| *Age* | | | | |
| 16-24 | 95% | 92% | 7% | 5% |
| 25-34 | 94% | 96% | 30% | 9% |
| 35-44 | 97% | 96% | 41% | 3% |
| 45-54 | 96% | 97% | 42% | 6% |
| 55 and above | 98% | 95% | 51% | 2% |
| *Home Tenure* | | | | |
| Homeowners | 98% | 97% | 53% | 28% |
| Tenants | 88% | 85% | 4% | 0 |
| *Income* | | | | |
| Less than R5000 | 96% | 87% | 4% | 0 |
| 5000-15000 | 95% | 93% | 15% | 0 |
| 15000-25000 | 96% | 92% | 25% | 2% |
| 25000-35000 | 97% | 94% | 54% | 5% |
| 35000 and above | 97% | 96% | 57% | 4% |
| *Education Level* | | | | |
| Less than grade 7 | 89% | 87% | 2% | 0 |
| Grade7 or primary | 98% | 97% | 15% | 2% |
| High school | 98% | 98% | 17% | 2% |
| Degree | 98% | 97% | 25% | 5% |
| Postgraduate | 98% | 98% | 24% | 1% |

servation intentions of landlords and tenants. In the same way that respondents with higher and lower education levels reported strong water curtailment intentions. The findings in Table 3 show only respondents' intention to perform curtailment activities.

When it comes to water efficiency intentions such as installing water-efficient appliances there were noticeable differences across the variables. The majority of respondents (51%) that reported stronger intentions to perform water efficiency activities were peri-urban respondents between the ages of 55 years and above. Landlords or homeowners in peri-urban areas reported greater intentions (53%) to engage in water efficiency behaviour than rural peri-urban tenants (28%). This is consistent with previous studies which show that owner-occupiers are more likely to install water-efficient appliances than leaseholders or tenants (Randolph and Troy 2008). Only 4 percent of peri-urban tenants reported intentions to carryout future water-efficient activity in the next 12 months, while no rural respondent indicated any intention to fix water-saving devices in the same period.

The low intentions reported by tenants may be attributed to the locus of control. Unlike landlords, the locus of control to retrofit is not within the power of tenants (Randolph and Troy 2008). The majority of peri-urban respondents (57%) who earned R35000 and above reported greater intentions to perform efficient actions. Correspondingly, peri-urban respondents with higher-level education reported the highest water conservation intentions (degree=25%; Postgraduate=24%) than their rural counterparts. The findings are comparable to previous findings (Lam 1999; Gilg and Bar 2006; Clark and Finley 2007) which suggest that individuals with higher levels of education and income have stronger intentions to fit water-saving systems.

A multiple linear regression analysis was used to test the relationship between water efficiency intentions and predictor variables. As shown in Table 4 the model yielded an adjusted $R^2$ 0.912.

**Table 4: Multiple regression analysis predicting water efficiency intention**

| | | *Coefficients*[a] | | | | |
|---|---|---|---|---|---|---|
| | | *Unstandardized coefficients* | | *Standardised coefficients* | | |
| *Predictor variables* | | *B* | *Std. error* | *Beta* | *t* | *Sig.* |
| 1 | (Constant) | -0.623 | 12.356 | | -0.05 | 0.963 |
| | Age | -0.657 | 0.465 | -0.651 | -1.412 | 0.265 |
| | Income | 0.782 | 0.182 | -0.758 | -4.296 | 0.005*** |
| | Educational level | 0.565 | 0.165 | 1.063 | 3.424 | 0.016** |
| | Home tenure | 0.523 | 0.191 | 0.9 | 2.738 | 0.034** |
| | Rural | -0.656 | 0.455 | -0.654 | -1.441 | 0.256 |
| | Peri-urban | 0.761 | 0.182 | -0.758 | -4.181 | 0.031** |

Consistent with hypothesis the predictor variables age, income, education level and home tenure accounted for 0.822 or 82 percent of the variance in water conservation intentions. This suggests that the socio-demographics are positively associated with water conservation intentions of respondents'. Income emerged as the most significant determinant of water efficiency intention ($P<0.05$). Residents in peri-urban areas were positively related to stronger water conservation intentions (Unstandardized coefficients = 0.76, $P<0.05$). Peri-urban respondents who reported higher income and educational levels had stronger intentions to conserve water. Home tenure also explained a significant variance of water conservation intention with unstandardized path coefficients of 0.523 ($P<0.05$) suggesting that occupancy as owner or tenant, is an important essential precondition for carrying out future water efficiency actions. Age was not associated with water conservation intentions. There was no positive relationship between the age of respondents and water conservation intentions.

## DISCUSSION

This paper examined the significance of socio-demographic factors in domestic water conservation in rural and peri-urban communities. The findings show that socio-demographics accounted for 82 percent of the variance in water conservation intentions. However, there were varying degrees of significance among the socio-demographics with regards to water efficiency intentions. Consistent with previous findings (Clark and Finley 2007; Gilg and Bar 2006; Lam 1999), income explained the biggest amount of variance in water conservation intentions. In summary, the results suggest that the respondents who had greater intentions to conserve water were homeowners, with higher incomes and education levels residing mainly in the peri-urban areas. As evinced from the data, age had little or no salutary effect on the respondents' water conservation intention. The finding is similar to previous research (Lam 2006) that found no relationship between age and water conservation intentions. The pattern of water use between older and younger residents may account for this finding. This study did not measure actual water use, however, previous studies indicate that older people are less eager to state their future water conservation plans than younger people (Kantola et al. 1982). One important finding that emerged from this study is that both rural and peri-urban population are favourably disposed to water conservation. Du Plooy (2009: 147) holds that "by measuring individuals' attitudes we are simultaneously dealing with predispositions of actual behaviour (favourable or unfavourable) towards the phenomenon being investigated."

Some empirical studies have found that behavioural intentions are positively correlated with (Armitage and Conner 1999; Clark and Finley 2007). If as this finding shows that residents are favourably disposed to engaging in water conservation, why then is there still a "culture of indifference and disrespect" to water conservation as reported by the Department of Water Affairs. Clayton and Myers (2009) argue that the fact that a person has a positive attitude towards an act is not a guarantee that the individual will ultimately carry out a related action. This state of affair has been described as the "value-action gap" (Blake 1999). The gap in which attitudes do not lead to related behaviours is caused by a range of contextual and social barriers such as social values. For instance, social values and personal identities can hinder "pro-environmental behaviours" (Bedford et al. 2010).

Whitemarsh et al. (2011) discovered that those who are positively inclined to lowering carbon emission were unable to translate this attitude into action because of factors outside their control and the way other transport models were fashioned. In contrast, people were more disposed to engage in recycling for the reason that it is less cumbersome to execute and enjoy social support (Whitemarsh et al. 2011; Defra 2013). This study did not measure the "value action gap" but we can speculate that the reason for indifference to water conservation in spite of positive attitude may not be unconnected to social values, in this case, the absence of a conservation ethics or social support arising from the lack of salience on water in social and media discourses. Clayton and Myers (2009), posit that attitude is more likely to influence behaviour if it is strong and grounded in first-hand

knowledge and, if the attitude object is perceived as important. Crano and Prislin (2006), hold that an individual's knowledge of an entity or attitude object increases the prominence and subsequently, the strength of that attitude and its probability of influencing behaviour ultimately.

The findings of this study have implications for policymakers especially the need to leverage demographics in reversing the seeming indifference to water conservation. As shown by the result education is an important predictor of water conservation intention. Education can help engender and strengthen positive attitudes toward water conservation. Individuals who are educated are likely to be more well-informed about water conservation. Providing information about water conservation especially to the younger population could shape how they develop their attitude to it. Trumbo and O'Keefe (2005) hold that information is a mediating factor on how much attitudes and norms influence intention and behaviour of individuals. This because according to Mathipa and Le Roux (2009: 256) "information covers intermediary behaviour in which enduring value systems and pro-environmental behavioural patterns are reinforced".

## CONCLUSION

The findings suggest that tenancy, income, level of education and place of residence are predictors of water conservation intentions. Consistent with past studies, the findings established a strong link between income and residents' water efficiency behaviour. The findings of this paper underscore the importance of constructing a water conservation message in a way that everyone can easily understand. Similarly, the finding on income highlights the need for policymakers to devise a strategy of encouraging efficiency actions, especially in rural areas. As the data of this study revealed, income is a major constraint on the ability of residents to engage in water efficiency behaviour. Rural dwellers have low incomes and lesser intentions to purchase and install water-efficient appliances that could significantly reduce water use. What this means is that in the foreseeable future, water efficiency behaviour will be minimal in rural areas. Providing rural households with water efficiency appliances or giving incentives to those who voluntarily retrofit their home could be veritable ways of promoting residents' water efficiency behaviours.

## RECOMMENDATIONS

The Eastern Cape Provisional Government Local Municipalities in particular should consider retrofitting RDP houses with water-efficient appliances as the majority of rural and township residents are not likely to change to these appliances voluntarily. The municipalities could also offer rebates to residents who voluntarily fix water-efficient systems. Both the local municipalities and water authorities should engage in extensive public enlightenment programme to educate the rural populace about the benefits of water efficiency behavior.

## REFERENCES


Ajzen I 1991. The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, 50: 179–211.

Ajzen I 2006. Constructing a Theory of Planned Behaviour Questionnaire. From <http://www. people. umass. edu/aizen/pdf/tpb. measurement.pdf> (Retrieved on 24 November 2014).

Anderson A 2009. Media, politics and climate change: Towards a new research agenda. *Sociology Compass*, 3: 166–182.

Armitage CJ, Conner M 1999. The theory of planned behaviour: Assessment of predictive validity and perceived control. *British Journal of Social Psychology*, 38: 35-54.

Bates B, Kundzewicz ZW, Wu S Palutikof J 2008. *Climate Change and Water: Technical Paper VI*. Intergovernmental Panel on Climate Change (IPCC) Secretariat, Geneva, Switzerland, P. 210.

Bedford T, Collingwood P, Darnton A, Evans D, Gatersleben B, Abrahamse W, Jackson T 2010. Motivations for Pro-environmental Behaviour. *A Report to the Department for Environment, Food and Rural Affairs*, Defra, Resolve, London.

Black M, King J 2009. *The Atlas of Water, Mapping the World's Most Critical Resource.* London: Earthscan.

Blake J 1999. Overcoming the "value-action gap" in environmental policy: Tensions between national policy and local experience. *Local Environment*, 4: 257–278.

Bicchieri C, Chavez A 2010. Behaving as expected: Public information and fairness norms. *Journal of Behavioral Decision Making*, 23: 161-178.

Boccaletti G, Stuchtey M, van Olst M 2010. Confronting South Africa's Water Challenge. From <http:// www. foresightfordevelopment. org/sobipro/55/213-confronting-southafricas-water-challenge> (Retrieved on 22 November 2014).

Carden K, Ellis D, Armitage NP 2016. Water sensitive cities in South Africa: Developing a community of practice. *WIT Transactions on the Built Environment*, 165: 51–62.

Clark W, Finley J 2007. Determinants of water conservation intention in Blagoevgrad, Bulgaria. *Society and Natural Resources* 20: 613–627.

Cock J, Fig D 2001. The impact of globalisation on environmental politics in South Africa, 1990– 2002. *African Sociological Review,* 5: 15–35.

Crano W, Prislin R 2006. Attitudes and persuasion. *Annual Review of Psychology*, 57: 345–375.

De Beer F, Marais M 2005. Rural communities, the natural environment and development: Some challenges, some successes. *Community Development Journal*, 40: 50–61.

De Oliver M 1999. Attitudes and inaction a case study of the manifest demographics of urban water conservation. *Environment and Behaviour*, 31: 372-394.

Department for the Environment, Food and Rural Affairs (DEFRA) 2013. Water conservation. From <http//.www. defra.gov.uk. "Water Conservation Defra".> (Retrieved on 24 July 2014).

Department of Water Affairs 2012. The revised national water resources strategy report. From <http:/ /www. dwaf.gov.za/nwrs/> (Retrieved on 30 June 2016).

Department of Water Affairs 2013. National Water Resource Strategy (NWRS2). From From <http:/ www.dwaf.gov. za/nwrs/NWRS2013.aspx,9> (Retrieved on 30 June 2016).

Department of Water and Sanitation 2015. Let Us All Play Our Part In Water Conservation. From <http:/ /www. dwa.gov.za/> (Retrieved on 30 June 2016).

Du Plooy GM 2009. *Communication Research, Techniques, Methods and Application.* Cape Town: Juta.

FAO 2005. *9th United Nations Development Communication Roundtable Report.* Rome: FAO.

Gardner GT, Stern PC 1996. *Environmental Problems and Human Behaviour*. Boston, Massachusetts: Allyn and Bacon.

Gilg A, Barr S 2006. Behavioural attitudes towards water saving: Evidence from a study of environmental actions. *Ecological Economics*, 57: 400-414.

Gregory GD, Di Leo M 2003. Repeated behaviour and environmental psychology: The role of personal involvement and habit formation in explaining water consumption. *Journal of Applied Social Psychology*, 33: 1261-1296

Hedden S, Cilliers J 2014. Parched Prospects: The Emerging Water Crisis in South Africa. *African Futures Paper,* 11. Pretoria: Institute for Security Studies.

Jeffrey P, Gearey M 2006. Consumer reactions to water conservation policy instruments. In: D Butler, FA Memon (Eds.): *Water Demand Management*, IWA Publ. London, pp. 303–329.

Kantola SJ, Syme GJ, Nesdale AR 1983. The effects of appraised severity and efficacy in promoting water conservation: An informational analysis. *Journal of Applied Social Psychology.* 13: 164-182.

Lam SP 1999. Predicting intentions to conserve water from the theory of planned behaviour, perceived moral obligation, and perceived water right. *Journal of Applied Social Psychology*, 29: 1058–1071.

Lam SP 2006. Predicting intention to save water: Theory of planned behaviour, response efficacy, vulnerability, and perceived efficiency of alternative solutions. *Journal of Applied Social Psychology*, 36: 2803–2824.

Makki A, Stewart R, Panuwatwanich K, Beal C 2012. Revealing the determinants of shower water end-use consumption: Enabling better targeted urban water conservation strategies, *Journal Cleaner Production*, 60: 129-146

Mathipa KS, Le Roux CS 2009. Determining water management training needs through stakeholder consultation: Building users' capacity to manage their water needs. *Water SA*, 35: 253-260.

Mayer PW, Deoreo WB 1999. *Residential End Uses of Water.* Boulder, CO: AQUACRAFT, Inc, Water Engineering and Management.

Onyenankeya K, Caldwell M, Okoh A 2015. Water conservation and culture of indifference among college students: The nexus of descriptive norms. *Journal of Human Ecology*, 52: 15-25.

Onyenankeya KU 2017. *Development Communication for Water Conservation in Rural and Peri-urban Communities: A Study of Three District Municipalities in Eastern Cape, South Africa*. PhD Thesis, Unpublished. Alice: University of Fort Hare.

Onyenankeya K, Caldwell M, Okoh A 2017. Sustainable water use and the nexus of behavioural intentions: The case of four South African communities. *Water and Environment Journal*, 32: 285-291.

Onyenankeya K, Salawu A 2018. Negotiating water conservation communication through indigenous media. *Communitas*, 23: 178-193.

Onyenankeya K, Salawu A 2019. Folk Theatre: A potent vehicle for rural transformation. *Journal of Multicultural Discourses*, 13: 348-361.

Palaniappan M, Gleick PH, Allen L, Cohen MJ, Christian-Smith J, Smith C, Ross N 2010. Clearing the Waters: A Focus on Water Quality Solutions. *Reports prepared for the United Nations Environment Programme,* Pacific Institute, Oakland, CA.

Randolph B, Troy P 2008. Attitudes to conservation and water consumption. *Environmental Science and Policy*, 11: 441–455.

Riemann K, Chimboza N, Fubesi M 2012. A proposed groundwater management framework for municipalities in South Africa. *Water SA*, 38: 445-452.

Russell S, Fielding K 2010. Water demand management research: A psychological perspective. *Water Resources Research*, 46: W05302. https://doi.org/10.1029/ 2009WR008408

Stern PC 2000. New environmental theories: Toward a coherent theory of environmentally significant behaviour. *Journal of Social Issues*, 56: 407-424.

Struwig J 2010. *South Africans' Attitudes Towards the Environment. South African Social Attitudes 2nd Report: Reflections on the Age of Hope*. Cape Town: HSRC Press, pp.198-219.

Trumbo CW, O'Keefe GJ 2005. Intention to conserve water: Environmental values, reasoned action, and information effects across time. *Society and Natural Resources*, 18: 573-585.
Tsatsi C, Mila U, Mabaso S, Pongoma S 2010. Conserving a scarce resource: Water. *IMIESA*, 35: 24-33.
Vickers A 2002. *Water Use and Conservation*. Amherst, MA: Water Plow Press.
Water Resources Group 2009. *Charting Our Water Future. Economic Frameworks to Inform Decision-Making*. Washington D.C., USA: International Finance Corporation.
Wescoat JL Jr. 2014. Searching for comparative international water research: Urban and rural water conservation research in India and the United States. *Water Alternatives*, 7: 199-219.
Zuma J 2014. SA Water-Scarce Country. News24. From <http://www.news24.com/SouthAfrica/News/SA-a-water-scarce-country-Zuma-20141101> (Retrieved on 28 November 2014).

**Paper received for publication in July, 2017**
**Paper accepted for publication in July, 2017**