Availability Of Domestic Water And Sanitation In Households:

A Gender Perspective Using Survey Data

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Abstract

There is a general consensus on the relationship between population, development and the environment. The debate about population increase started several decades ago, but to date the controversy surrounding the relationship of the three variables in terms of cause and effect is yet to be resolved. It is in relation to the theme of "Urban Population, Development and Environment Dynamics" that the paper intends to analyze availability of water and sanitation in South Africa by gender of head of households. The paper argues that the urban poor are victims of urban envinmental problems. For instance ecological disruption due to various city activities, emissions of green house gases, inadequate waste management are certainly not caused by the urban poor. This argument was also put forth by (Satterthwaite, 2003:23) that there exists little evidence of urban poverty attributing to environmental degration than evidence that urban environmental hazards attributing to urban poverty and health impacts on the urban poor. Different perspectives of understanding lead to different policy orientations. For instrance, if the urban poor are regarded as primary contributors of urban environmental problems –most likely the policy would be to curb rural-urban migration. On the other hand if various

development investiments are regarded as main contributors –the policy orientation would be to have an effective mechanism to reduce environmental impacts (*ibid*).

The paper argues that although environmental impacts stretch far beyond national or regional boundaries the most pressing problems that have to be dealt with is where they happen. As was argued earlier the urban poor are not more of contributors to environmental problems as they are sufferers of urban environmental problems, it is paramount to understand various socioeconomic and demographic factors of households in order to develop practical intervention to assisting the urban poor. The study uses South Africa General Household Survey to exactly do that. The reason for selecting household as a unit of analysis stems from the fact that more often poverty reduction measures are not targeted at this level. Results indicate that female headed households (FHHs) are poorer than male headed households (MHHs) hence require support. It is cautioned that monitoring and evaluation need to be in place to ensure intervention reach targeted people. For instance with time, poor FHHs might walk out of poverty hence require no special assistance.

Plan of the papers is as follows; section one presents an introduction. This is followed by methodology where source of data and data analysis will be presented. The third section deals with discussion on urban population, poverty and environment. The fourth section will present results and discussion and the last section will present policy implications.

Introduction

There is a general consensus on the relationship between population, development and the environment. The debate about population increase started several decades ago, but to date the controversy surrounding the relationship between the three variables in terms of cause and effect is yet to be resolved. Different scholars explain population effect on development and the environment differently for various reasons. For instance, while some argue that population increase is the root cause of all problems others maintain that population growth is important for technological innovations. Among the former Malthus is the most prominent while among the latter Ester Boserup has been the most influential. Africa can be regarded as showing a typical Malthusian theory. Population increase is Africa in perceived to significantly contribute to the prevailing poor economic growth. Furthermore, there is no enough evidence to support Boserup thesis. The impact of Africa's population on the environment is also unprecedented. Other demographic factors such as the proportional of children, adults and other persons of working age and the elderly within a particular country have an impact on future population growth, development and the environment. However, the extent to which population increase negatively impacts on the environment differs markedly in the context of rural and urban areas.

The present paper argues that regardless of such factors, the urban poor are not damaging the physical environment but are victims of environmental problems inherent in urban areas. In this context the paper argues that it is paramount to understand various socioeconomic and demographic factors of households in order to develop practical

interventions to assisting the urban poor. Special attention should also be paid to the structures and composition of there households.

Statistics such as housing, access to water and sanitation, sources of energy for both cooking and lighting serve as environmental indicators. It is noted that poor services including inadequate water provision, sanitation, drainage and garbage collection are important features of the world's fastest growing cities with increasing urbanization (Cairncross, Hardoy and Satterthwaite, 1990; WHO, 1992). In order to get an adequate focus we intend to concentrate our analysis on a set of issues. These are ; availability of domestic water and sanitation, demographic characteristics of households gender of head of household. This is expected to inform more on the level of urban poverty by gender of head of household for practical policy implications on poverty reduction.

Understanding living conditions and poverty levels of female-headed households is particularly important for not only policy process but also programmes on poverty reduction. This is especially important especially as noted in literature that these households are on the increase. Bongaarts (2001) analyzed DHS data for 43 developing countries which participated in DHS from 1990 to 1998 and found that the proportion of female headed households was substantial. Other studies have documented that there is an increasing proportions of female headed households in developing countries (Kossoudji and Mueller, 1983). Of a particular concern is the argument that female-headed households are generally poor, disadvantaged and associated with economic deprivation. More importantly literature suggests that in most cases these households

have limited access to resources (Mbugua, 1997; Oppong, 1997; World Bank, 1991). Poor households are also unable to access important services such as water and sanitation. This puts their lives and health at a continuous risk. In light of various social, structural and economic changes gender differentials in household structures deserve adequate attention for practical interventions. In the face of resource constraints and competition over resources for development and social assistance, gender differentials in household structures and socioeconomic conditions need to be highly visible (Chant, 2003).

Methodology

The study uses 2002 South Africa General Household Survey (GHS). This survey is conducted annually to primarily assess government development programmes and projects (Statistics South Africa, 2003). The sample comprised of 30 000 dwelling units. The data have three files; household, personal and worker. Data from different files were linked on basis of a record identifier. A total of 26 243 dwelling units are used in the present study as other had to be dropped because of incomplete information. Out of these, only 15 219 households were analysed as the paper focused on urban area.

Data analysis is mostly descriptive including percentages of variables as well as cross-tabulation. Principal component analysis is used to estimate wealth for households by gender of head. The study uses information such as ownership of goods and housing condition such as wall and roofing material, toilet facilities and source of water and energy, and ownership of durable assets to proxy for wealth. These poverty correlates

have been recommended in other studies (Merrick, 2001). The other reason the present study uses asset to estimate wealth is as asserted by Satterthwaite (2003) that the levels of poverty in urban areas has been underestimated due to among other factors estimates primarily based on income and consumption levels and not considering variables such as housing conditions and lack of basic services such as water and sanitation.

Urbanization, Poverty and the Environment

In order to fully understand the relationship between urban population growth and the environment it is important to firstly have a better grasp of the urban environmental problems. When urban environment is the question at hand, the common definition encompassing of natural resources such as water and land seem inappropriate because the definition does not include pertinent issues in the context of urban areas. These include health problems that majority of the urban poor suffer. Satterhwaite (2003) asserted that the relationship between environmental degradation and urban development is mainly on levels and patterns of consumption especially by higher income groups. The damage from human activities, urban production and consumption by this group is borne by the urban poor who at times are regarded as contributors to environmental degradation.

The blame on the poor people for environmental degradation is by no means groundless. The reason behind is that poverty presents a formidable challenge to what options that the poor segment of the population have to support life. As a matter of fact, poverty tends to encourage the poor especially in rural areas to mainly focus on the immediate needs

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rather than on benefits that may materialize in long term. To the extent that they have contributed to species extinction and habitat change, it has generally been because of increasing pressure from forces beyond their control. Because they are poor their attempts at adaptation and innovation are often at the expense on the very resource endowment on which they rely. However, our focus is on the urban poor, so we will leave the rural poor out. As for the urban poor, these usually have low or no income to pay for services such as water and garbage collection. They also, more often, build in such a way that they block entrance for services such as water and garbage collection. In this premise, they would be attributing to their poor living environment.

The concern of urban environment and development is increasingly becoming an active area of research for a great variety of reasons. The major one is an ever increasing urban population in general and those living in poverty in particular. Figure 1 below presents the urban percentage in South Africa from 1950 to 2005. The figure shows that urban population in South Africa, just like in other countries in developing countries is on steady increase.

Figure: 1: Percent distribution of urban population in South Africa (1950-2005).
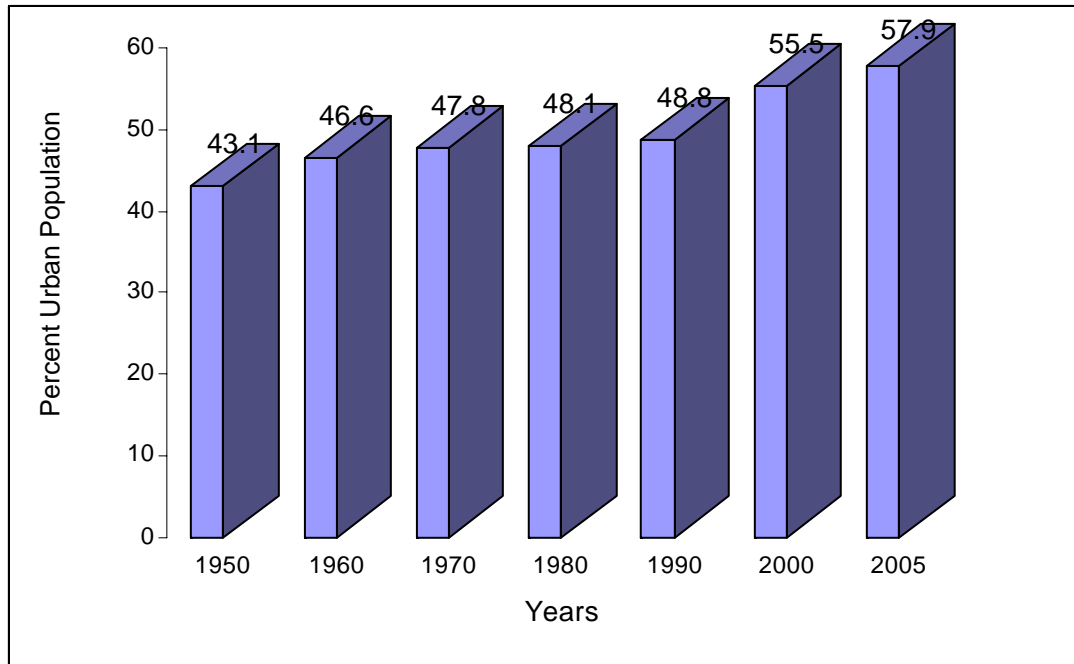
Source: Globalis-South Africa

Environmental changes in rural areas are somewhat easy to measure and understand. The reason is that environmental issues that are typically dealt with in rural areas are water, land and forests. Degradation of the mentioned resources is relatively easy to measure. The challenge is on urban environment. Dynamics of urban environment are complex and hard to comprehend. Examples of these as documented by Hardoy and Satterhwaite (1984) are at regional level, city level, household level and even in work places. But the threats to the urban environment that activities at these levels cause vary. It therefore requires a definite assessment to identify the dominant problems and develop approaches to reduce their impacts especially on the urban poor. The extend to which different urban

environmental problems are increased and or magnified by urban population growth also differs.

Poor people suffer the most from urban environmental problems. The burden is mostly related to health and living conditions. In most cases the socioeconomic status of the rural poor is low, hence inability to secure better housing and afford health services. A plausible explanation is that type of dwelling, in most cases, is closely related to income. Normally, the occupants of poor housing unit are predominantly characterized by low income. Poor income among the urban dwellers is responsible for their poor living conditions, such as living in houses with no supply of piped water and drainage. All these examples exemplify the argument that the urban poor suffer urban environmental problems than contributing to them.

It must be noted that some of the environmental problems emanating from urban development activities are unintended side effects. This brings into the equation effective preventative measures. The burden of environmental impacts could be reduced by having an effective Environmental Impact Assessment (EIA) mechanism in place. This could happen if a shift of paradigm from regarding natural resources and the environment as predominantly rural concern to including urban environmental issues. Lack of better practices on EIA would result into continuous environmental problems and heavy burdens on the urban poor.

Results

(i)   Household size

The number of household members is one of the basic demographic characteristics of a household. The average household size for South Africa according to South Africa 2001 Population Census is 3.8 (Statistics South Africa, 2003). In the present study average household size in both male and female headed households is 3.7. When analysis was done by gender of head of household, the average household size for female headed household was found to be 3.7. The figure for male headed household is 3.6. These results are presented in Figure 2. Of particular interest is the percentage of households with six to nine members. The Figure indicates that more female headed households have six to nine members than male headed households. This observation suggests that female headed households are more likely to be larger than male-headed households. This is a point of concern because literature maintains that households with more members have higher probability of experiencing poverty than households with fewer members (Kimenyi and Mbaku, 1995).

Figure 2: Distribution Number Of People In Household In South Africa
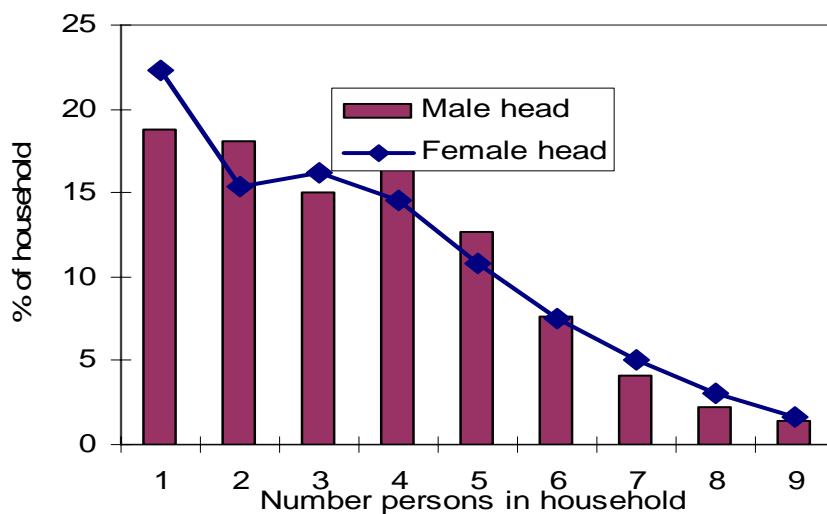
Source: Calculated from 2002 GHS data files.

(ii)   Household composition

Household members in this study are categorized as the elderly (65+ years), adults (18-64 years) and children (0-17 years).   Results indicate that 19.1 per cent female headed household has one elderly person as opposed to only 7.9 per cent male headed households. As for children, 10.1 percent female headed households have 3 children while the figure for male headed households is 7.3 percent. Table 1 presents distribution of children, the elderly and workers in household by gender of the head. Results indicate that female headed households have fewer number of workers than male headed

households. Results suggest that female heads of households tend to be only workers in their households as opposed to male headed households. This observation can have negative impacts on the household members as it suggests that their economic status is likely to be low while their household sizes are larger. Weeks (2005) documented that household size is closely linked to its socioeconomic status and its member's prospects in life. For instance children in households with low socioeconomic status are less likely to go to school than their counterparts in households with higher socioeconomic status. Children in poor female headed households are more likely to be poor than those in better off households.

Table 1: Number Of Elderly, Children, Workers And Unemployed In Households By Gender Of Head Of Households.

Variable	Male	Female	Total
Number of Elders (65+) in a household			
1	7.9	19.1	11.9
2	3.9	1.0	2.7
Number of Children (0-17 years) in a household			
1	61.8	59.6	61.0
2	28.1	26.3	27.4
3	7.3	10.0	8.3
4	2.2	3.0	2.5
Number of Workers in a household			
1	46.8	49.7	47.8
2	27.2	10.1	21.1
3	4.2	2.7	3.7
Number of unemployed			
1	19.7	20.5	20.0
2	6.2	7.8	6.8
3	1.9	3.1	2.3

Source: Calculated from 2002 GHS data files.

(iii)   Household Structures by Sex of Head

Table 2 indicates a relatively equal distribution of single households for male and female heads (18.8 and 22.3 percent respectively). A remarkable difference exists for couple, couple and children, and couple, children and other relatives. Male headed households scored higher than female headed households as results show.   This observation is reversed for the following types of households' single-parent, single parent and other relatives, and head and other relatives. Female headed household scored higher in these types households than male headed.

Table 2:   Distributions of Household Type by Sex of head o household

Type of household	Male	Female	Total
Single person	18.8	22.3	20.1
Couple	13.9	1.1	9.3
Couple and children	36.6	2.2	24.4
Couple, children and		1.1	10.0
other relatives	14.9		
Single-parent	2.2	25.6	10.5
Single parent and			
other relatives	2.4	31.9	12.9
Non-related persons	1.0	0.9	0.9
Head and other relatives	5.0	11.4	7.3
Couple and other relatives	2.9	0.7	2.1
Other household	2.4	3.0	2.5

The above households were further grouped into two categories as shown below;

- Nuclear households   – including single person households and couple and children households
- Extended households –nuclear household plus other relatives

Results indicate that females are more likely to head extended than nuclear households while the opposite is true for male heads. These findings have been documented by Amoateng (2004); Zulu and Sibanda (2005).

Table 3: Household type by sex of head of household

Type of household	Male	Female	Total
Nuclear	71.5	51.2	64.3
Extended	28.5	48.8	35.7

(iv)   Availability of Water and Sanitation

Analysis of socioeconomic variables and availability of water and sanitation will not only enable to rank communities according to their needs and poverty levels but also decide on more practical, affordable and sustainable interventions especially to the urban poor. Lawrence *et al.,* (2002) argued that people can be 'water poor' not because there is no safe water in their area but because they are 'income poor'. Inadequate provision of piped water and proper sanitation are identified as serious problems with insect and water borne diseases for the poor urban dwellers (Satterthwaite, 2003). He further reveals that many of the diseases in Africa, Asia and Latin America are environmental related because air, water and soil act as medium. WHO (1999) also asserted that due to inadequate provision of water, sanitation, drainage and garbage collection urban areas pose health hazards to human population as many disease vectors thrive when there is inadequate provision of the mentioned services.

Table 4 indicates higher percentage of male headed households obtain water from three mentioned sources than female headed households. As for energy for cooking higher percentage of female headed households depend on paraffin and wood than male headed households. On household amenities for all analyzed variables, male headed households scored higher than female headed households. This suggests that male headed households are better off than female headed households.

Table 4: Percent Distribution Of Household Amenities, Source Of Water And Energy By Gender Of Head Of Household

Variable	Male	Female	Total
Household's main source of water			
Piped tap in the dwelling	61.8	55.3	59.5
Piped tap on site	30.0	35.0	31.8
Public tap	5.9	6.8	6.2
Energy for cooking			
Electricity from mains	77.2	70.2	74.7
Paraffin	15.4	19.5	16.9
Wood	1.9	2.5	2.1
Energy for heating			
Electricity from mains	69.3	60.5	66.2
Paraffin	11.7	16.2	13.2
Wood	5.0	6.6	5.6
Toilet facility			
In dwelling flush toilet connected to a public sewage system	58.4	50.5	55.6
Onsite flush toilet connected to a septic tank	25.6	29.3	26.9
On site pit latrine without ventilation pipe	6.0	8.1	6.8
Household amenities			
Own vehicle	40.9	17.0	32.4
Own television	72.0	68.0	70.6

Own Bicycle	25.5	13.9	21.4
Own Radio	85.5	79.7	83.4
Own Bed	97.8	97.4	97.7
Own Watch	90.7	87.5	89.6

Source: Calculated from 2002 GHS data files.

Sources of water were further characterized as safe and unsafe. Results are posted in Table 5. It can be seen that generally both male headed households and female headed households obtain water from safe sources. However, the percentage of male headed households obtaining water from unsafe source is lower than that of female headed households. These results suggest that female headed households are worse off than male headed households.

Table 5: Persons accessing water from safe source by gender of head of households

Source of water	Male	Female
Unsafe source	12.3	26.0
Safe source	96.4	85.2

(v)   Results of Composite analysis

Principal analysis starts with specifying each variable by its mean and standard deviation (Filmer and Pritchett (2001:117). In the present study dummy variables were created for 18 assets. The asset indicators are grouped into three types namely household ownership of consumer durables namely ownership of clock, bicycle, radio, television, motorcycle and car. Second category is characteristics of household's dwelling with three indicators

about toilet facility, three about the source of drinking water, one about rooms in the

dwelling, two about building materials and one each about source of energy for cooking

and lightning; and the last one about land ownership.   Table 6a-c presents mean and

standard deviation of the principal components, component matrix and scoring factor.

The index is obtained by dividing scoring factor by standard deviation (results posted in

Table 6c last column). Interpretation is easy as variables took value 0 or 1. For instance

if a household owns a clock its points go up by 1.17 where as a household with chemical

toilet, bucket toilet and none has its points going down by 1.52. Households were then

sorted out by asset index for percentiles, 20 per cent, 40 per cent and another 40 per cent.

The last 40 per cent is characterized as poor, the following 40% middle and the first 20

percent as rich.

Table 6a: Descriptive Statistics

Variable	Mean	Std. Deviation	Analysis N
Own Clock	.83	.372	26120
Own Bike	.19	.389	26120
Own Radio	.79	.407	26120
Own Television	.57	.495	26120
Own Motorbike	.01	.116	26120
Own Car	.24	.425	26120
Water sources 1	.07	.259	26120
Water sources 2	.08	.271	26120
Water sources 3	.84	.362	26120
Toilet facility 1	.56	.496	26120
Toilet facility 2	.31	.461	26120
Toilet facility 3	.13	.340	26120
Source of energy for lighting	.77	.421	26120
Source of energy for cooking	.25	.433	26120
Number of rooms	4.00	2.299	26120
Own high quality	.19	.390	26120

dwelling			
Own low quality dwelling	.22	.412	26120
Owner Land	.05	.215	26120

Table 6b: Component Matrix

	Component				
Variable	1	2	3	4	5
Own Clock	.434	.283	-.159	.178	.440
Own Bike	.290	.349	.142	.129	-.197
Own Radio	.372	.379	-.116	.190	.475
Own Television	.641	.309	-.037	.067	.209
Own Motorbike	.152	.243	.212	.099	-.577
Own Car	.548	.407	.270	.008	-.131
Water sources 1	-.341	.404	-.188	-.761	.042
Water sources 2	-.541	.278	.422	.210	.177
Water sources 3	.658	-.498	-.183	.389	-.164
Toilet facility 1	.785	-.235	.283	-.193	.007
Toilet facility 2	-.465	.318	-.725	.201	-.171
Toilet facility 3	-.516	-.087	.570	.009	.222
Source of energy for lighting	.683	-.031	-.180	-.114	.008
Source of energy for cooking	-.648	.256	-.004	.115	-.055
Number of rooms	.297	.677	.025	.116	-.088
Own high quality dwelling	.514	.169	.288	-.152	-.066
Own low quality dwelling	-.533	-.124	.140	.309	.118
Owner Land	-.220	.398	.127	.180	-.201

Extraction Method: Principal Component Analysis.

Table 6c: Presents The Scoring Factors From Principal Component Analysis Of 18
Variables.

Variable	Scoring factor	Mean	Stddev	Scoring factor/sd
Own Clock	0.434	0.83	0.372	1.17
Own Bike	0.29	0.19	0.389	0.75
Own Radio	0.372	0.79	0.407	0.91
Own Television	0.641	0.57	0.495	1.29
Own Motorbike	0.152	0.01	0.116	1.31
Own Car	0.548	0.24	0.425	1.29
Water sources 1	-0.341	0.07	0.259	-1.32
Water sources 2	-0.541	0.08	0.271	-2.00
Water sources 3	0.658	0.84	0.362	1.82
Toilet facility 1	0.785	0.56	0.496	1.58
Toilet facility 2	-0.465	0.31	0.461	-1.01
Toilet facility 3	-0.516	0.13	0.34	-1.52
Source of energy for lighting	0.683	0.77	0.421	1.62
Source of energy for cooking	-0.648	0.25	0.433	-1.50
Number of rooms	0.297	4	2.299	0.13
Own high quality dwelling	0.514	0.19	0.39	1.32
Own low quality dwelling	-0.533	0.22	0.412	-1.29
Owner Land	-0.22	0.05	0.215	-1.02

Looking at the poor and rich categories, results suggest that female headed households
are poorer than male headed households. However, the percentage for the middle
category indicate that majority of the female headed households are found in this group.
This suggests that homogeneity of female headship should be avoided as it can be
misleading and result in the misuse of resources.

Table 7:   Classification Differences Of The Wealth Estimates By Gender Of
                      Head Of Household And Residence

Economic status	Gender of Head of Household	
	Male heads	Female heads
40% 'Poor'	16.2	19.3
40% 'Middle'	45.3	58.8
20% 'Rich'	38.5	21.9

Conclusion

Among the contributions of the present work are; promoting the use of non metric measures (assets) to estimate for wealth of households and also gender based analysis to assessing how female headed households compare with male headed households. Specifically the paper has demonstrated differences in household structures by gender of head of the household. Results on nuclear and extended households indicated that female headed households are more likely than male headed households to be extended. Female headed households have also been found to have larger household size than male headed households. This phenomenon can be detrimental to children's welfare given results on principal component analysis which indicated that higher female headed than male households fell under the poor category. The study also found that higher female headed households than male headed households obtain water from unsafe source. It should be noted that poverty differential by gender of head of household and availability of domestic water and sanitation is not highly pronounced in South Africa, using the GHS 2002 data. This could be attributed by the sample or simply that female headed

households in urban areas in the country are not as poor as elsewhere. However, it can fairly be argued that female headed households are worse off than their male counterparts.

These results therefore suggest there is a need for site specific studies before interventions are put in place. Results further suggest that homogeneity of poverty among female headed households should be avoided. This observation is inline with studies conducted elsewhere which falsify the perceived general homogeneity of female poverty situations (see Moser, 1996 on Manila and Lusaka; Appleton, 1996 on Uganda). However, this in no way means denying that female-headed households are likely to be poorer than male headed households. Chant (2003) cautioned that denying the link between female headship and poverty may deprive them from resource that could enable them to overcome some of the difficulties. Analysis of poverty determinants is also important in order to tackle the problem from its roots. For instance analysis of socioeconomic and demographic variables in the household such as household size and composition together with economic activity are critical for understanding the contextual factors of poverty in female headed households.

Policy implications and recommendations

Based on the results presented above, it is recommended that various policies need to be in place in order to assist poor female headed household. These may include initiatives that specifically target female-headed households. Such initiatives will have among other

benefits (i) reduction of gender gaps in earnings (ii) assisting women to improve their income and the welfare of their members notably children (iii) potential benefit of equal distribution of development resources among men and women (iv) device water and sanitation pricing that can be afforded by female headed households or develop means of assist them to access water and sanitation at a subsided price.

It is worth noting that various initiatives are in place to addressing poverty and environmental problems. However it is recommended that it is important to clearly define urban environmental problems in the local context. This will greatly help in ensuring that interventions put in place are actually addressing problems at hand.

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