Why is Zambia's Rural Fertility Declining at Slow Pace? A Review of DHS Data 1992-2018

Million Phiri[1]*, Caroline Banda[2], Musonda Lemba[3]

[1]*Lecturer of Demography and Monitoring and Evaluation, Department of Population Studies, School of Humanities and Social Sciences, University of Zambia, Lusaka-Zambia.*

[2]*Lecturer of Demography, Department of Population Studies, School of Humanities and Social Sciences, University of Zambia, Lusaka-Zambia.*

[3]*Senior Lecturer of Demography, Department of Population Studies, School of Humanities and Social Sciences, University of Zambia, Lusaka-Zambia*

A B S T R A C T

Introduction: Zambia, like much of sub-Saharan Africa is one of the last countries in the developing world to initiate fertility decline (Shapiro et al 2011). Scholars have for some time claimed that fertility transition in sub-Saharan Africa has been characterised by stalling in a number of countries (Bongaarts 2005, 2008; Westoff and Cross 2005; Shapiro and Gebreselassie 2010). Among the key transition variables in fertility decline are education and contraception use for women. However, quite little research has been documented about factors contributing to slow pace of fertility decline in rural Zambia.

Methods: The study examined the factors associated with trends in rural fertility in Zambia. This study used secondary data from the 1992, 1996, 2001 and 2007, 2013-14 and recent 2018 Demographic and Health Surveys. Nationally Representative samples of (7060 women in 1992, 8,021 in 1996, 7,658 in 2001/2, 7,146 in 2007, 16,411 in 2013-14 and 13,683 in 2018). The samples covered all women of reproductive age 15-49 years. Trend analysis of proportions of children ever born and contraception use was performed using Stata software. Bivariate and binary analysis using logistic regression model were also performed on the data to understand to proximate determinants of fertility rates in rural Zambia.

Results: The study results show that overall Zambia's fertility declined from 6.5 births per woman as reported in the 1992 DHS to 4.7 births per woman in the 2018 DHS—a drop of just over one birth per woman over a period close to three decades. However, this decline is more pronounced in urban Zambia. Fertility in rural Zambia has been resilient for a long time even though contraception use has significantly increased over the years from about 9% in 1992 to 46% in 2018. Currently, the rural fertility rate is still almost twice higher than that of urban even though contraception prevalence gap is narrowed over the years.

Conclusion: Unless concrete reproductive health interventions are undertaken seriously Zambia's fertility levels especially in rural areas are likely to remain relatively high for some in the future. The increase is contraception use in rural areas has had less effect on declining fertility. There is therefore need to consider strengthening education and awareness campaigns on the importance of contraception use among women in rural Zambia.

Keywords: Fertility Trends; DHS Data; Rural-Urban; Zambia

1. Introduction

Fertility has been declining for some years now world over buts has remained highest in sub-Saharan African countries than in any other parts of the world. This is mainly due to strong kinship networks and high economic and social values of children in most African cultures (Romaniuk, 1980). At the macro level, high fertility leads to high population growth which leads to a more serious issue of poverty. Poorer families, especially women and

* *Corresponding author.* Tel.: +260 973 990482;

E-mail address: million.phiri@unza.zm

marginalised groups, who bear the burden of large number of children with fewer resources per child, further adding to the spiral of poverty and deterioration in the status of women. Sub Saharan Africa has been characterised by high population growth rate resulting from high levels of fertility for over five decades now. Although new evidence suggests that fertility levels have begun to decline in the region. The pace and intensity of such change among the countries in the region, has by no means been uniform (Palamuleni, 2010).

Fertility is the most important component of population dynamics and plays a major role in changing the size and structure of the population of a country. Uncontrolled fertility can have adversely influence the socio-economic, demographic and environmental development of a country. At the individual level, high fertility can undermine the economic potential of woman and is also associated with high maternal mortality risks. Studies have revealed that different fertility regulation mechanisms such as use of modern contraceptives, termination of pregnancies and delayed marriages that contribute to fertility reduction have made an impact in urban areas but are not available in rural areas to play similar roles in most sub-Saharan African countries. It is for this reason that urban and rural fertility trends in Zambia need to be carefully examined to identify the trends determinants of the differentials.

The 2010 census of population and housing indicate that on average Zambia's fertility reduced from 7.2 in 1980 to 5.9 in 2010. This is barely a reduction of one child in the period of three decades.

Since 1992, the government of Zambia, through The National Health Policies and Strategies has invested a lot of resources and made tremendous efforts in the provision of family planning programmes. The government's policy is to reduce the high level of fertility, particularly adolescent fertility, and to improve sexual and reproductive health, including family planning, so as to encourage small family size (MOFNP, 2007). Fertility has been identified as one of the demographic variables that helps to determine the size, structure, and composition of the population in any country (CSO, 2009).

Unless concrete reproductive health interventions are undertaken seriously Zambia's fertility levels especially in rural areas are likely to remain relatively high for some in the future. Zambia's national population policy on fertility is to slow population growth by providing family planning services, allowing couples and individuals to plan their families.

Zambia's family planning programs have recently undergone a fundamental shift from being focused on women only to focusing on men individually, or on both partners.

However, contraceptive use among married women has remained low in most rural parts of the country. Men's role in reproductive decision-making remains an important and neglected part of understanding fertility control both in high-income and low-income countries. Family planning (FP) services have been promoted as critical in giving couples the freedom to space and plan the number of children they wish, but also contributing to the health and overall quality of life of the population (UNFPA, 2012).

Therefore, the Government has a responsibility to facilitate people's ability to make informed choices and to create an enabling environment in which they can effectively manage their lives, (CSO, 2009). Male involvement in family planning remains limited despite the 1994 International Conference on Population and Development in Cairo, which emphasized the need for men's involvement in sexual and reproductive health issues (World Health Organization; 2002).

2. Study Objective

This study focused on examining Zambia's rural fertility trend and understand factors contributing to slow pace of decline with evidence from Demographic and Health Survey data collected between 1992 and 2018.

3. Methods and Materials

This study utilized the Zambia Demographic and Health Survey (DHS) datasets, collected in 1992, 1996, 2001/2002, 2007, 2013-14 and recent 2018. The DHS surveys included nationally representative samples of women of reproductive age 15-49 with samples (7,060 in 1992, 8,021 in 1996, 7,658 in 2001, 7,146 in 2007, 16,411 in 2013-14 and 13,683 in 2018).

The demographic and health studies use multistage sampling design that first selected a random sample of enumeration areas and then selected a random sample of households systematically from a household listing of all households in the enumeration area. All eligible women in the sampled households are asked to participate in the interview. Information on women's birth history was capture with the view of measuring life time and current fertility. Women were also asked questions about fertility preferences and family planning.

The analysis focused on rural-urban trend analysis of total fertility rates (TFR) and contraception prevalence rates (CPR), children ever born, fertility preferences and desire for children during the period 1992 to 2018. Trend analysis of total fertility rates and proportions of children ever born were performed on weighted datasets. Bivariate analyses and Multivariate analysis using logistic regression model were also performed to assess the influence of contraception use and other proximate determinant on fertility in rural and urban Zambia. All analyses were adjusted for the multi-stage sampling design and were weighted. All analyses were performed using Stata software version 13.0.

4. Results

4.1 Demographic Characteristics of women of reproductive age

Table 1 describes the basic socio-demographic characteristics of women in the Zambia DHS samples captured in 1992, 1996, 2001/2, and 2007, 2013/14 and 2018. The study sample includes all women interviewed in the survey. Less than half of the women surveyed in all the five DHSs were younger than age 24, and about one-third were between the ages of 25 and 34.

The majority of women in samples finished primary school but did not continue with secondary school. Over half of women the last five DHS samples lived in urban areas. The proportion of women with no formal education has reduced from 16.5% in 1992 to only 7.7% in 2018. And those with attaining higher level of education has increased from 1.8% to 5.5%.

About three-quarters of the women in the DHS samples were Protestant, and most of the remainder was Catholic. At least 6 in 10 women of the study samples reported that they were currently married at the time of the survey. Less than 20 percent of women had at least one child.

Table 1: Socio-demographic characteristics of women in DHS Samples, Zambia 1992-2018

DHS Study Samples						
Background characteristic	1992 (n=7,060)	1996 (n=8,021)	2001/2 (n= 7,658)	2007 (n=7,146)	2013/14 (n=16,411)	2018 (n=13,683)
Age						
15-24	48.5	47.8	45.4	41.2	40.4	41.9
25-34	29.7	29.5	30.9	33.9	32.2	30.0
35-39	9.3	9.5	10.1	10.5	12.2	12.4
40-44	7.2	7.1	7.7	7.9	8.9	9.2
45-49	5.4	6.2	6.0	6.6	6.2	6.6
Residence						
Urban	51.5	44.9	38.9	42.1	46.2	46.6
Rural	48.5	55.1	61.1	57.9	53.8	53.4
Education						
No education	16.5	13.3	12.0	10.4	8.4	7.7
Primary	60.0	58.9	58.9	54.4	46.8	44.3
Secondary	22.0	25.0	26.3	29.9	39.7	42.5
Higher	1.8	2.8	2.8	5.2	5.1	5.5
Religion						
Catholic	27.9	24.1	23.4	20.4	18.2	17.2
Protestant	69.1	74.6	75.1	77.8	80.4	81.1
Muslim	0.4	0.3	0.3	0.5	0.6	0.5
Other	2.6	1.0	1.1	0.3	0.8	1.2
Marital status						
Never married	25.4	25.3	24.6	25.9	27.9	31.2
Currently married	63.1	61.1	61.7	61.6	60.1	55.9
Formerly married	11.5	13.5	13.7	12.4	12.1	12.9
Number of children						
None	29.6	28.9	28.8	25.9	25.1	25.5
1	17.4	17.4	16.9	15.4	15.4	17.8
2	12.2	13.7	14.4	14.7	14.0	14.6
3	10.0	10.9	12.0	12.6	12.3	11.7
4+	30.7	28.9	29.8	31.3	33.2	30.4
Total	**100**	**100**	**100**	**100**	**100**	**100**

4.2   Fertility trends

The government of Zambia's population policy aims to reduce the high level of fertility for the country, particularly adolescent fertility, and to improve sexual and reproductive health, including family planning, so as to encourage small family size (MOFNP, 2007). Fertility helps to determine the size, structure, and composition of the population in any country. This information is relevant is development planning process. The government of the republic of Zambia has made frantic efforts to integrate population variables in the national planning process. Results in figure 1 and table 2 show fertility trends by residence and overall in Zambia during the period 1992 to 2018. Generally, fertility has decreased

from 6.5 births per woman in 1992 to 4.7 births per woman in 2018, representing about two-child decline in period close to three decades. Fertility reduction is more pronounced in urban areas than in rural areas of the country. While fertility has reduced by slightly over two children in urban areas it has only reduced by 1.3 children in rural areas in the same period.
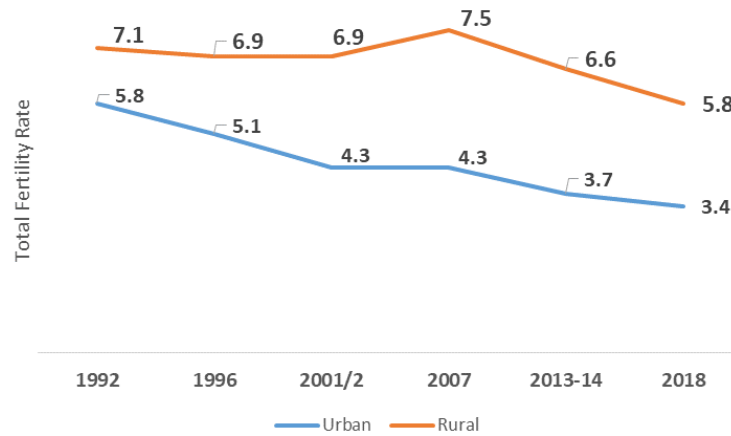

Figure 1: Trends in Total Fertility Rate by DHS years and residence 1992-2018

Table 2: Trends in Total Fertility Rate by DHS years and residence, Zambia 1992-2018

Year	Total Fertility Rate		
	Urban	**Rural**	**Total**
1992	5.8	7.1	6.5
1996	5.1	6.9	6.1
2001/2	4.3	6.9	5.9
2007	4.3	7.5	6.2
2013-14	3.7	6.6	5.3
2018	3.4	5.8	4.7

The level of fertility is inversely related to women's educational attainment. Table 3 shows total fertility rate classified by education attainment in the five DHSs conducted in Zambia. Fertility decreased rapidly from 4 births to 2.4 births among women with higher education. Fertility has remained high among with no formal education and those with who attained only primary level of education (6.4 births and 5.6 births respectively in 2018 DHS).

Table 3: Trends in Total Fertility Rate by Education level and year, Zambia 1992-2014

Year	Total Fertility Rate			
	No education	**Primary**	**Secondary**	**Higher**
1992	7.1	6.8	5.4	4.0
1996	6.8	6.7	5.1	3.9
2001/2	7.4	6.5	4.9	3.1
2007	8.2	7.1	4.2	2.4
2013-14	7.2	6.3	3.8	3.0
2018	6.4	5.6	3.7	2.4

4.3 Contraceptive prevalence rate and fertility trends

In 2012, the Zambian government committed to increasing the use of modern contraceptives among married women from 33% in that year to 58% in 2020. To operationalise the commitments made at the London Summit on Family Planning in 2012, the country developed the Integrated Family Planning Scale-up Plan 2013-2020 (MOH 2013). Between 1992 and 2018, the total fertility rate (TFR) in Zambia fell more than one child per woman (from 6.5 to 4.7) while the contraceptive prevalence rate (CPR) among sexually active women increased by more than five folds from 11% in 1992 to 50% in 2018. However, the aggregate picture masks important underlying disparities between rural and urban areas. Urban areas enjoyed substantial decreases in TFR (from 5.8 to 3.4) and increases in CPR (any method: 14.4 percent to 54.3 percent). Even though contraceptive use has increased significantly in rural areas (Any method: 8.5 percent to 46.4 percent) the reduction is TFR has been slow.
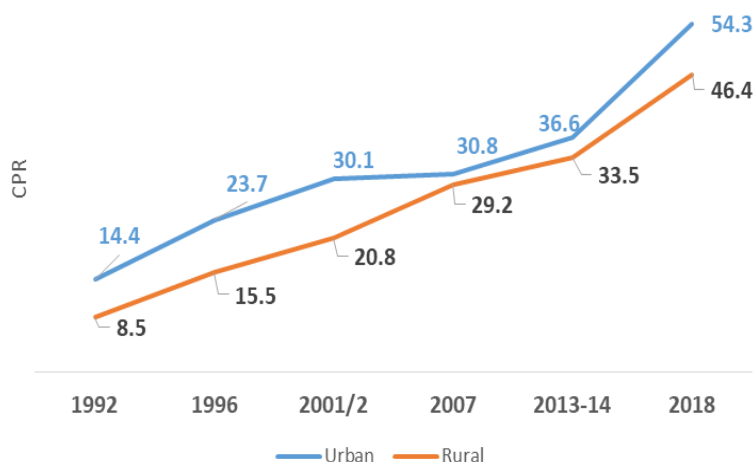

Figure 1: Contraceptive prevalence rate DHS years and residence, Zambia 1992-2018

Table 4: Total Fertility Rate and Contraceptive Prevalence Rate by Residence and year, Zambia 1992-2014

Year	Urban		Rural	
	TFR	CPR	TFR	CPR
1992	5.8	14.4	7.1	8.5
1996	5.1	23.7	6.9	15.5
2001/2	4.3	30.1	6.9	20.8
2007	4.3	30.8	7.5	29.2
2013-14	3.7	36.6	6.6	33.5
2018	3.4	54.3	5.8	46.4

Parity data show how average family size varies across the DHS years in Zambia. Table 5 show the trend in children even born to all women by residence in Zambia from 1992 to 2014. Women living in rural areas are more likely to have a higher family size compared to their counter parts in urban areas. The proportion of women who have never given birth has been consistently higher in urban areas than in rural areas for example in 2013-14 and 2018 surveys it is 10 percentage point higher.

4.4   Trends in Children Ever Born (CEB) in Zambia

Table 5: Percent of women by number of children ever born by residence and year, Zambia 1992-2018

Year/Urban	Children Ever Born				
	0	1 – 3	4 – 6	7 – 9	10+
1992	30.9	36.1	19.0	10.5	3.5
1996	30.3	30.9	18.9	8.7	3.1
2001/2	28.6	40.9	20.1	8.1	2.3
2007	32.5	40.3	18.6	7.2	1.5
2013-2014	30.2	43.7	20.2	5.1	0.8
2018	30.0	46.2	19.4	3.8	0.5
Year/Rural					
	0	1 – 3	4 – 6	7 – 9	10+
1992	22.6	36.9	20.4	13.8	6.2
1996	22.4	37.4	22.6	12.6	5.0
2001/2	21.5	38.2	22.9	12.9	4.5
2007	18.1	36.5	28.4	13.7	3.3
2013-14	18.8	34.9	27.1	15.6	3.6
2018	19.8	38.6	25.9	12.8	2.9

4.5   Factors explaining fertility differentials

Marriage exposes women to a high frequency of sexual intercourse, and thus the beginning of exposure to the risk of pregnancy, marriage is an important social and demographic indicator and, in most societies, represents the point in a woman's life when childbearing first becomes acceptable. Duration of exposure to the risk of pregnancy depends primarily on the age at which women first marry. Women, who marry early, on average, are more likely to have their first child at a young age, give birth to more children overall, contribute to higher fertility rates, and experience possible maternal health implications.

In table 6, the rural-urban trends of median age at first marriage for women is presented. Age at first marriage is defined as the age at which the respondent begins living with her or his first spouse/partner. Marriage occurs relatively early in rural than in urban Zambia. In 2013-14 DHS results show that women living in rural areas were likely to marry two years earlier than their urban counterparts.

Table 6: Median age at first marriage by residence and year, Zambia 1992-2018

Year	Median age at first marriage (20-49)		
	Urban	Rural	Total
1992	18.0	17.4	17.7
1996	18.7	17.5	18.0
2001/2	18.7	17.7	18.1
2007	19.6	17.8	18.4
2013-14	19.9	18.0	18.7
2018	a	18.4	19.4

a = Omitted because less than 50% of the respondents began living with their spouse or partner for the first time before reaching the beginning of the age group

Early exposure to sexual intercourse can be associated with an increased risk of having multiple lifetime sexual partners, unprotected sex and unwanted pregnancy. Women who start having sexual intercourse at an early age may have a higher risk of getting pregnancy. While median age at first sexual intercourse is reducing in urban areas it is on the other reducing in rural areas. Meaning that women is rural areas are engaging in sexual intercourse as early as age of sixteen.

Table 7: Median age at first sexual intercourse by residence and year, Zambia 1996-2018

Year	Median age at first sexual intercourse (20 - 49)		
	Urban	Rural	Total
1996	16.9	16.1	16.4
2001/2	17.4	16.5	16.8
2007	17.9	16.8	17.2
2013-14	18.1	16.9	17.4
2018	17.5	16.2	16.7

The onset of childbearing at an early age has a major effect on the health of both mother and child. It also lengthens the reproductive period, thereby increasing the level of fertility. Results in table depict the rural-urban trends for median age at first birth. Generally, the median age at first birth has been low in Zambia over the year. At age 19 in Zambia a woman is expected to be completing her secondary level of education. Though in urban areas median age at first birth has increased by one year in rural areas it has remained the same from 1992 to 2018.

Table 8: Median age at first birth by residence and year, Zambia, 1992-2018

Year	Median age at first birth (20-49)		
	Urban	Rural	Total
1992	18.8	18.6	18.6
1996	19.1	18.5	18.7
2001/2	19.2	18.6	18.8
2007	19.9	18.7	19.0
2013-14	19.8	18.7	19.1
2018	a	18.7	19.2

a = Omitted because less than 50% of women had a birth before reaching the beginning of the age group

Teenage pregnancies are a global problem occurring in high, middle, and low-income countries. Around the world, however, adolescent pregnancies are more likely to occur in marginalized communities, commonly driven by poverty and lack of education and employment opportunities (UNCEF, 2013). This is evident in the results of all the Demographic Health Surveys conducted in Zambia. Teenage pregnancy and early motherhood has been consistently higher in rural areas compared to urban. In 2018, for example 37% compared to 19% of teenagers become mothers in rural and urban areas respectively.

Table 9: Trends in proportions of Teenage pregnancy and motherhood by residence, Zambia 1992-2018

Year	Teenage pregnancy and motherhood		
	Urban	Rural	Total
1992	28.5	40.0	33.8
1996	26.6	34.4	30.7
2001/2	27.1	34.9	31.6
2007	20.4	35.0	27.9
2013-14	20.0	36.4	28.5
2018	19.3	37.0	29.2

Information about women's desire for more children is important for understanding future reproductive behavior of the population. The provision of adequate and access to family planning services is dependent on the availability of such relevant information. In the Zambia Demographic and Health Survey, currently married women and sexually active women (whether pregnant or not) were asked about their intentions to have another child and, if they had such intentions, how soon they wanted the child. In table 9 results show that in all the DHSs conducted in Zambia women in rural areas were more likely to prefer to have another child soon than their rural counterparts.

Table 10: Percent distribution of currently married women by desire for children by residence and year, Zambia 1992-2018

Year	Urban			Rural		
	Have another soon	Undecided	Want no more	Have another soon	Undecided	Want no more
1992	65.6	4.2	25.2	70.1	4.1	20.5
1996	58.0	2.7	33.2	70.2	2.5	22.0
2001	54.3	1.5	40.3	63.7	3.3	29.7
2007	48.0	8.2	40.0	60.0	5.7	31.5
2013-14	56.0	4.7	35.8	57.1	4.8	34.8
2018	54.0	4.4	38.9	56.6	5.7	36.0

All the six DHSs in Zambia collected information from women age 15-49 about their preferred total number of children in their lifetime. Even though this information is based on a hypothetical situation, it provides two measures. Firstly, for women who have not yet started a family, the data provides an idea of future fertility. Secondly, for older and high-parity women, the excess of past fertility over ideal family size provides a measure of unwanted fertility. Results in table 8 indicate that in 2018 DHS the proportion of women living in rural areas who preferred to have more than 6 children were more than double those in urban areas. This shows that the demand for large family size is higher in rural settings compared to urban.

Table 11: Percent distribution of women's preferred ideal number of children by residence and DHS years, Zambia 1992-2018

Year/Urban	Ideal number of children						
	0	1	2	3	4	5	6+
1992	0.3	0.7	6.0	6.9	26.7	17.2	37.5
1996	0.4	1.4	11.2	11.3	30.4	15.6	25.8
2001	0.5	1.6	16.3	17.5	32.1	12.2	17.0
2007	1.2	1.6	16.2	20.2	31.5	12.0	14.4
2013-14	0.8	0.9	11.3	18.2	36.2	13.3	17.3
2018	1.5	1.2	11.3	19.6	36.7	13.3	15.4

Year/Rural							
	0	1	2	3	4	5	6+
1992	0.0	0.5	2.7	3.8	13.7	16.9	54.9
1996	0.1	0.4	3.5	4.9	16.8	18.3	49.7
2001	0.1	0.9	6.0	8.2	21.8	20.1	34.8
2007	0.7	0.8	5.4	8.0	22.6	19.3	34.4
2013-14	0.9	0.9	6.1	8.9	23.8	18.3	36.2
2018	1.4	0.7	5.6	10.4	29.9	17.4	35.2

4.6 Logistic regression analysis

4.6.1 Total fertility rate

Table 12 presents trend analysis of odds ratios from logistic regression of residence associated with children ever born. The findings show that in all the period nearing three decades women living rural areas were more likely to have given birth more times than their counterparts living in urban areas. The odds ratios indicate that the gap in the number of children ever born is increasing over the years (from 1.47 in 1992 to 2.90 by 2018). Fertility in rural areas now almost thrice more than that of urban areas.

Table 12: Logistic regression analysis of Children Ever Born by residence, Zambia 1992 - 2018

Total fertility rate			
DHS Year/Residence	Rural Urban (reference)		
	Odds ratios	Confidence Intervals	p -value
1992 (n=7,060)	1.47	1.32 – 1.65	0.000
1996 (n=8,021)	1.52	1.35 - 1.71	0.000
2001/2 (n= 7,658)	1.77	1.54 – 2.04	0.000
2007 (n=7,146)	2.16	1.90 – 2.45	0.000
2013/14 (n=16,411)	2.69	2.48 – 2.96	0.000
2018 (n=13,683)	2.90	2.60 - 3.24	0.000

All analyses are weighted and control for survey design.

4.6.2 Contraception Use

Trend analysis of odds ratios from logistic regression of residence associated with contraceptive use are presented in Table 13. The findings show that in all the DHS years, women living in urban areas were more likely to use any method of contraception than women living in rural areas, though the difference has become insignificant by 2018. For example in 1992 women in urban areas were almost twice (1.78) more likely to use any method of contraceptive than women in rural areas. However, the gap in the odds ratios has reducing over the years (from 1.78 in 1992 to 1.03 in 2018). This means that update of contraception has improved significantly among women living in rural areas.

Table 13: Logistic regression analysis of contraceptive prevalence use by residence, Zambia 1992 – 2018

Contraception use			
DHS Year/Residence	Urban Rural (reference)		
	Odds ratios	Confidence Intervals	p -value
1992 (n=7,060)	1.78	1.53 - 2.06	0.000
1996 (n=8,021)	1.68	1.50 - 1.88	0.000
2001/2 (n= 7,658)	1.63	1.44 - 1.84	0.000
2007 (n=7,146)	1.14	1.03 - 1.27	0.009
2013/14 (n=16,411)	1.13	1.06 - 1.20	0.000
2018 (n=13,683)	1.03	0.94 - 1.08	0.485

All analyses are weighted and control for survey design.

4.6.3 Other fertility determinants

Bongaarts and Potter (1983) quantified the effects of effects of proximate determinants of fertility. Contraception use, marital union, education attendance, fertility preference and prevalence of teenage pregnancy are among the variables analysed in paper. The results in study are consistent with many previous studies conducted on determinants of fertility differentials. It is evident that women living in urban areas were almost four times likely to attend school compared to their counterparts living in rural. This explains why rural fertility gap is increasing over the years. Women living in rural areas

are almost twice likely to be in marital union compared to those living in urban areas. Early motherhood is common is rural areas, teenagers are almost three times likely to become mothers compared to their counterparts in urban areas.

Table 14: Logistic regression analysis of other fertility determinant by residence, Zambia 1992 – 2018

Fertility determinants (2018)			
Characteristic/Residence	Odds ratios	Confidence Interval	p- value
Education Rural **(reference)**	3.54	3.03 - 4.15	0.000
Fertility preference Urban **(reference)**	1.14	1.05 - 1.23	0.001
Marital status Urban **(reference)**	1.78	1.66 - 1.90	0.000
Teenage pregnancy and motherhood Urban **(reference)**	2.59	1.83 – 3.64	0.000

All analyses are weighted and control for survey design.

5. Discussion

This paper was set out to examine Zambia's rural fertility trends and examine the explanatory factors for slow fertility decline. The paper has presented detailed analysis highlighting rural-urban fertility trends, differentials and provided explanations to the slow fertility decline observed in rural areas. The findings of this study have consistently revealed that fertility has been declining in Zambia although the pace of decline differ by residence with urban fertility declining at a significant rate in comparison to rural segment of the country. In 1992 TFR in urban areas was 5.8 children compared to 7.1 children in rural areas, representing a difference of 1.3 children. By 2018 the difference in the average number of children between urban and rural has increased to 2.4 children.

Age at marriage, age at first birth, education level of women and early exposure to sexual intercourse have generally been identified as factors that affect the level of fertility at micro level (van de Walle and Foster, 1990). The results of this study have shown that the difference in fertility rate by residence is widening in Zambia over the past twenty eight years. A woman's age at first marriage and the age at which she has her first child determine the length of her reproduction period. Therefore an early age at first birth or marriage entails a longer period of reproduction which can leading to high levels of fertility. The findings indicate that women in rural areas are more likely to experience a longer child bearing period because of lower median ages at first marriage and first birth.

The study findings are consistent with other studies conducted in sub-Saharan Africa, indicating that women living in rural areas are more likely to have seven or more children ever born. The number of children ever born to all women of reproductive age is another measure of fertility. Further the proportion of women who have never given birth has been consistently higher in urban areas than in rural areas for example in 2018 DHS, the difference is 10 percentage point higher.

Education is one of the most important determinants of a woman's fertility behaviour. Higher level of education is universally associated with lower and delayed fertility (Brown, 2004; Mapoma, Phiri, Nyirenda, 2018). According to Becker (1992) women's education raises their labour participation which in turn raises their earnings, "and hence greater investment in market-oriented skills" which increases women's time value. Women living in urban areas are more likely to be educated than their counterparts living in rural areas. There are significant differences in fertility between women with different levels of education. The largest difference is between women with no education and those with higher education. It is likely that women with higher education spend more time in school and thus delay marriage and childbearing. Women with higher education are also more likely to use effective contraceptive methods to space or limit their births. The logistic regression analysis in this study show that women in urban areas were four times likely to attend school compared to their rural counterparts. Further two-third of women in rural areas had only reached as far as primarily level of education with only 2% reaching beyond secondary level of education. In the past 20 years, many theoretical and empirical studies have investigated the relationship between women's education and fertility. It is widely recognized that enhancing women's education is critical for fertility reduction. Most empirical studies have indicated a negative relationship between the level of women's education and their fertility or stated fertility desires (Goldstein, 1992), a conclusion that fits with the current findings. The findings also concur with those of Martin and Juárez's (1995) study on the impact of women's education on fertility in Latin America.

Mapoma, Phiri and Nyirenda (2018) in their study found that despite wide differentials in actual fertility, desired family size was surprisingly homogenous across the education spectrum. The study showed that while the least educated and most educated share the small family norm, the gap in contraceptive prevalence between the two groups ranged from 20 to 50 percentage points. Better educated women have broader knowledge, higher socio-economic status and less fatalistic attitudes toward reproduction than less educated women. The results from the regression analysis indicated that these cognitive,

economic and attitudinal assets mediate the influence of schooling on reproductive behaviour and partly explain the wide fertility gap between educational strata. While regression analysis for the purposes of this chapter did not include some of the aforementioned factors, the explanation of the differences in fertility by educational status could equally explain the differences in observed between rural and urban in Zambia.

Generally, analysis of fertility preferences by type of residence shows that women living in rural areas are more likely to prefer having another child than women living in urban areas. Research also show that contraceptive use plays an important role in fertility regulation. Contraceptive use is recommended for women who want to limit their births, space their birth or to avoid bearing children. Study findings have revealed that in the early DHS's women living in urban areas are more likely to use contraceptives that those living in rural areas. But by 2018 the gap in contraceptive prevalence between urban and rural had reduced significantly even though the improvement in rural has not translated into considerable fertility reduction.

6. Conclusion

Fertility levels in Zambia have been predominantly on the higher side. Urban areas have experienced a considerable decline while rural fertility has recorded an insignificant decline in over two decades. High fertility levels translate to a high growth rate and to large populations putting a strain on the environment; causing underdevelopment and can lead to high poverty levels. High fertility levels can also associated with high maternal and child mortality. It is evident from the findings of this study the gap is fertility decline between rural and urban is widening. Unless concrete family planning and reproductive health interventions are undertaken seriously. Zambia's fertility levels especially in rural areas are likely to remain relatively high for some time in the future. The significant increase is contraception use in rural areas over the period nearing to three decades has had less effect on declining fertility. There is therefore need to consider strengthening education system and awareness campaigns on the importance small family size among women and men in rural Zambia. Empowering women in economic activities will have far benefits in reducing rural fertility as this will lead to higher decision making power to make informed choices on cost and benefit of child bearing.

Authors Contribution

MP: Conceptualised the study, manipulated the data and wrote the first draft of the paper in close collaboration with **ML**.

ML: Contributed to writing of the first draft and contributed greatly to the process of editing and developing the discussion of findings and conclusion.

MP: Contributed to the write up of the first draft and summarisation of the results into tables. **CB:** Performed the data analysis in Stata and produced tables in Ms-Excel and also contributed in the proof reading of the final document. All authors contributed to the revision of the final text and approved the final manuscript.

Competing Interests:

The authors declares that they have no competing interests

Authors Information

Million Phiri - Holds the following qualifications, Master of Arts Degree in Population Studies from University of Zambia; Postgraduate Diploma in Monitoring and Evaluation Methods from Stellenbosch University-South Africa, Bachelor of Arts Degree from University of Zambia and Certificate in Survey Data Analysis Using Stata from MEASURE Evaluation UNC. He is currently is a Lecturer and Researcher in Demography at University of Zambia, Department of Population Studies, School of Humanities and Social Sciences. He is also a board member of the Zambia Monitoring and Evaluation Association (ZaMEA).

Caroline Banda – Holds the following qualifications: Master of Arts Degree in Population Studies from University of Zambia. She also obtained a certificate in Intensive Epidemiology and Medical Statistics from London School of Hygiene and Tropical Medicine. She is currently is a Lecturer and Researcher in Demography at University of Zambia, Department of Population Studies, School of Humanities and Social Sciences.

Musonda Lemba- Holds the following qualifications: Doctorate and Masters' Degree in Sociology from University of Pennsylvania in the United States of America, Bachelor of Arts Degree from University of Zambia. He is currently a senior lecturer and demographer in the Department of Population Studies, in the School of Humanities and Social Sciences at University of Zambia.

REFERENCES

[1] Becker, G.S. (1992) Fertility and the Economy, Journal of Population Economics. 5(3):185-201

[2] Bongaarts, J. (2005) The Causes of Stalling Fertility Transition, Population Council working papers No. 204, Policy Research Division

[3] Bryant, J (2007) Theories of Fertility Decline and the Evidence from Development Indicators, Population and Development Review, 33: 101-127

[4] Caldwell, J.C and Caldwell, P. (1987) The Cultural Context of High Fertility in sub-Saharan Africa: Population and Development Review, 16 (3), 409-437

[5] Caldwell, J.C (1982) Theory of Fertility Decline: Academic Press, London in Africa

[6] Caldwell, J.C (1992) Fertility Decline in Africa: A New Type of Transition? Population and Development Review, 18 (2), 211-242

[7] Coleman, D. (2007) The road to low Fertility: Ageing Horizons, 7 December 2007. Pp 7-15

[8] Central Statistical Office (CSO) [Zambia], Ministry of Health (MOH) [Zambia], and ICF International. 2014. Zambia Demographic and Health Survey 2013-14. Rockville, Maryland, USA: Central Statistical Office, Ministry of Health, and ICF International.

[9] Central Statistical Office (CSO) [Zambia], Ministry of Health (MOH) [Zambia], and ICF International. 2020. Zambia Demographic and Health Survey 2018. Rockville, Maryland, USA: Central Statistical Office, Ministry of Health, and ICF International.

[10] Central Statistical Office (CSO) [Zambia], Central Board of Health [Zambia], and ORC Marco. Zambia Demographic and Health Survey, 1996. Calverton, Maryland, USA: CSO, CBH, and ORC Macro; 1998.

[11] Central Statistical Office (CSO) [Zambia] 2010 census of population and housing. Lusaka, Zambia; 2013.

[12] Cleland, J and Wilson C. (1987) Demand Theories of the Fertility Transition: An iconoclastic view, Population Studies, 41(1), 5-30

[13] Mapoma C, Phiri M, Nyirenda C (2018) Female Education and Fertility in Zambia, Book Chapter of Education in Zambia at fifty Years of Independence and Beyond, ISBN: 978-9982-03-103-5, UNZA Press, Lusaka

[14] Martin C. T and Juárez J (1995). The impact of women's education on fertility in Latin America: Searching for explanations in International family planning perspectives 21(2), June 1995: Guttmacher Institute

[15] Ministry of Finance and National Planning (MoFNP) [Zambia]. 2007. National Population Policy. Lusaka, Zambia: Ministry of Finance and National Planning.

[16] Ministry of Finance and National Planning (MoFNP) [Zambia]. 2014. Revised Sixth National Development Plan 2013-2016. Lusaka, Zambia: Ministry of Finance.

[17] Ministry of Health (MOH) [Zambia], Central Statistical Office [Zambia], and ORC Macro. Zambia HIV/AIDS Service Provision Assessment Survey 2005. Calverton, Maryland, USA: Ministry of Health; 2006.

[18] Palamulemi, M. (2010) Fertility decline in Malawi: An Analysis of the proximate determinants. Journal of Social Development in Africa, vol 25, No1.

[19] Pollak, R.A. and Watkins S.C (1993) Cultural and Economic Approaches to Fertility: Proper Marriage or Mesalliance? Population and Development Review 19(3): 467-496

[20] Romaniuk A. 2010. Fertility in the Age of Demographic Maturity: An Essay. Canadian Studies in Population, Special Issue, December 2010:283-295.Westoff, Charles F. and Anne

[21] R. Cross. 2005. "The Stall in the Fertility Transition in Kenya." Paper presented at the IUSSP International Population Conference, Tours, France, July 2005.

[22] Shapiro, David and Tesfayi Gebreselassie. 2010. "Falling and Stalling Fertility in Sub-Saharan Africa." Revised version of paper presented at the International Union for the Scientific Study of Population International Seminar on Human Fertility in Africa: Trends in the Last Decade and Prospects for Change, Cape Coast, Ghana, September 16-18, 2008.

[23] Tadesse F. (1998). Socioeconomic determinants of Fertility in Ethiopia, ESSP II.

[24] UNFPA (2012) State of World Population 2012, Family Planning, Human Rights and Development, UNFPA: 978-1-61800-009-5

[25] UNICEF. Ending child marriage: Progress and prospects. New York: UNICEF, 2013

[26] Vincent Kanyamuna, Million Phiri, Haggai Kanenga, Munalula Mulonda (2020) Role of Actors Outside Government in Strengthening the Country Monitoring and Evaluation System in Zambia, World Journal of Social Sciences and Humanities, 2020, Vol. 6, No. 1, 22-29 Available online at http://pubs.sciepub.com/wjssh/6/1/4 Published by Science and Education Publishing DOI:10.12691/wjssh-6-1-4

[27] Westoff, C. F. (1999). Mass communication and fertility. In R. Leete (Ed.), Dynamics of values in fertility change. Oxford: Clarendon Press.

[28] Westoff, C. F. and Bankole, A. (1999). Mass media and reproductive behavior in Pakistan, India and Bangladesh. Demographic and Health Surveys Analytical Reports No. 10, Macro International, Columbia, MD.

[29] Westoff, C. F. and Rodriguez, G. (1995).The mass media and family planning in Kenya, International Family Planning Perspectives 21(1), pp. 26–31.

[30] World Health Organization (2002) Reducing risks, promoting healthy life: WHO, Geneva