

**DETERMINANTS OF FERTILITY IN KENYA: A COMPARATIVE STUDY OF  
NYANZA AND CENTRAL PROVINCES**

BY

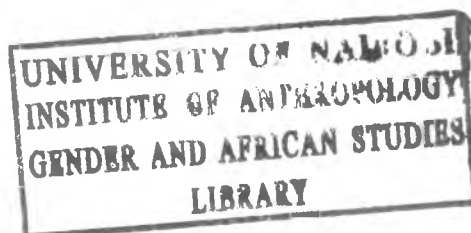
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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF  
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POPULATION STUDIES AT THE POPULATION STUDIES AND RESEARCH  
INSTITUTE, UNIVERSITY OF NAIROBI.


**NOVEMBER, 2011**



**DECLARATION**

This research project is my original work and has not been submitted for a degree at this or any other university or institution.

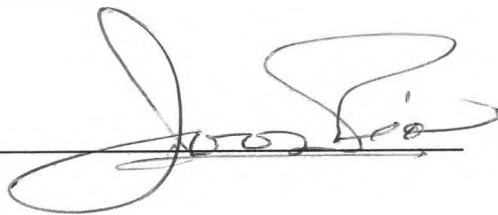
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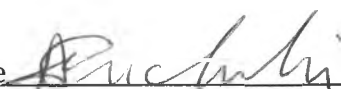
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## DEDICATION

I dedicate this work to my beloved wife Florence and our daughter Sandra.

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The genesis of this research project can be traced to an assortment of learning experiences under different teachers, some within the institutional framework of a formal education system and others from my schooling in everyday life. This undertaking would never have been possible without the support, encouragement and contributions of these individuals. I welcome fully this opportunity to express my gratitude knowing that such debts can never be repaid and can only be reciprocated.

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Last but not least, I extend my most sincere gratitude for the love, sacrifice and support from each and every one of my family members. To my father *Mzee* L. Y. Okal and



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## ABSTRACT

This project examines the determinants of fertility in Nyanza and Central provinces of Kenya. The study specifically examines the effects of demographic, socio-economic and socio-cultural factors on children ever born to answer the question: what are the determinants of fertility in Nyanza and Central provinces of Kenya? Data from the 2008-09 Kenya Demographic and Health Survey (2008-09 KDHS) of 1,318 and 973 women aged 15-49 from Nyanza and Central provinces respectively were used. The study is premised on John Bongaarts' (1978) framework for analyzing proximate determinants of fertility. The main methods of analysis used include descriptive statistics, simple bivariate and multivariate linear regression analyses. The Statistical Package for Social Science (SPSS 17 for windows) software was used to analyze the data.

Results of multivariate analysis established that all the demographic/ intermediate variables included in the study are significant determinants of children ever born (CEB) in Nyanza province. In Central province, on the other hand, and to our surprise, ever use of contraceptive is not significantly related to children ever born when other variables are controlled for. With regard to the socio-economic factors, wealth index is the only statistically significant determinant of children ever born in Central province when the effects of all the other variables are held constant. However, in Nyanza province, education, wealth index and place of residence are significantly related to children ever born in Nyanza province when other variables are held constant. Women's work status as an indicator of socio-economic variable is not a significant determinant of children ever born in the two regions. Finally in the category of the socio-cultural factors, results show that type of marriage (the only socio-cultural factor studied) is a significant determinant of

children ever born in Central province, whereas it is not a significant determinant of children ever born in Nyanza province.

The study recommends that concerted efforts should be put on expanding family planning and child health programmes, specifically to reduce fertility as well as infant and maternal mortality and consequently maintain and enhance the overall well-being of the family. The study further recommends increased opportunities for girl child education.

## CHAPTER 1

### INTRODUCTION

#### 1.0. Background

Although global statistics show that the world population growth rate has slowed down from 2.1 per cent per year in the late 1960s to 1.2 per cent today, the size of world population has continued to increase – from five billion in 1987 to six billion in 1999, and to seven billion in 2011 (Population Reference Bureau, 2011). The sixth and seventh billion were each added in a record time of only 12 years thus, placing us squarely in the middle of history's most rapid population expansion. Virtually all future growth will occur in the developing world, that is, Africa, Asia, and Latin America, while the developed world is expected to see little change (Bongaarts, 2006). As population continues in these continents, great pressure is being exerted on natural resources such as land, water and forest.

Kenya's population has grown rapidly since 1948 increasing about 7 times from 5.4 million to the current 38,610,097 and is projected to increase to 65 million by 2030 (Kenya National Bureau of Statistics, 2010; NCAPD, 2010). This increase has been attributed to the trends in fertility and mortality levels, the key components of population change at the national level. In the 1960s and 1970s fertility remained high and continued to increase reaching about 8.0 births per woman in 1979 and mortality continued to decline (NCAPD, 2009). These trends resulted in an increasing population growth rate which reached 4.0 percent per annum in 1980, one of the highest ever recorded (Bongaarts, Frank and Lesthaeghe, 1984). Between 1989 and 2003, the total fertility rate declined from 6.7 to 4.9

children per woman which available evidence indicate that fertility level stalled at a high level of 4.9 (Askew, *et al*, 2009; Kimani, 2005). However, given the most recent KDHS (KNBS and ICF Macro, 2010), Kenya seemed to have returned to the path of the demographic transition which is said to have started in the late 1980s (Bongaarts, Frank and Lesthaeghe, 1984). The 2008-09 KDHS results show that fertility had declined to 4.6 births per woman from the 4.9 reported in the 2003 KDHS (KNBS and ICF Macro, 2010).

While the overall reduction in fertility is encouraging, evidence from the 2008-09 KDHS reveal that the pace and intensity of this decline has by no means been uniform. On the contrary, the regional fertility differentials observed in the 2003 KDHS report persisted in the 2008-09 KDHS. For instance, Central province recorded a total fertility rate (TFR) of 3.4 while Nyanza province recorded a TFR of 5.4 (KNBS and ICF Macro, 2010). In addition, population of Nyanza province currently stands at 5,442,711 with an annual population growth rate of 2.1 percent while the population of Central province stands at 4,383,743 with a below replacement level of an annual growth rate of 1.6 percent (Kenya National Bureau of Statistics, 2010).

A part from fertility variations, a lot of differences exist between Nyanza and Central provinces which makes a comparative study between these two regions imperative. Ethnically, Nyanza province is inhabited by four main tribes namely the Luo, Abagusii, Kuria, and Abaluhya communities, thereby making it heterogeneously inhabited. On the other hand, Central province is largely inhabited by one tribe namely the Agikuyu community who have consistently adopted small family size (Bauni, Gichuhi and Wasao, 2001). Nyanza province has consistently reported triple number of infants dying before age one for every 1,000 children born since 1989 compared to Central province. Currently,

under-five mortality is 51 and 149 for Central and Nyanza province, respectively. HIV/AIDS prevalence rate is highest in Nyanza province at about 14 percent and lowest in Central province at 5 percent (KNBS and ICF Macro, 2010). The levels of teenage childbearing are highest in Nyanza province (27 percent) and lowest in Central province (10 percent). About 44 percent of births in Nyanza province occur in a health facility compared to the Central province with an average of 73 percent (KNBS and ICF Macro, 2010). Contraceptive prevalence rate is high in Central province with 67 percent of married women using some family planning method, compared to a low of 37 percent in Nyanza province. Lastly, 11 percent of women in Nyanza province have completed secondary education compared to 19 percent in Central province (KNBS and ICF Macro, 2010).

Previous demographic studies in different parts of the world have credited fertility differentials with preference for male child, spousal age differences, marital duration, ethnicity, household headship, landownership, contraceptive use, level of education, and increased female labour force participation (Adhikari, 2010; Regassa, 2007; Susuman 2006; Siripirom, 1992; Wasao, 1998). Ngalinda (1998) observed that age at first birth in a non-contraception society becomes an important factor in explaining variations in fertility levels since it determines the length of reproductive life and thus is highly and negatively correlated with fertility. He noted that late age at first birth shortens the reproductive period of a woman, which will consequently reduce the total number of children ever born. Knowledge about determinants of fertility in different regions is necessary for designing policies to provide services to address those who are at risk. This research project therefore, attempts to examine determinants of fertility among Kenyan women in Nyanza and Central provinces.

## 1.1. Problem Statement

Apart from variations in fertility among countries, there are large fertility differences within geographic regions and by ethnic and socio-economic groups within countries, like Kenya (Bongaarts, Frank and Lesthaeghe, 1984). Although Kenya was among the first countries in sub-Saharan Africa to support family planning in 1967 (Mhloyi, 1986), contraceptive prevalence rate had remained low for many decades. But since the late 1980s when Kenya is said to have entered the demographic transition, the contraceptive prevalence had reached 39 percent. TFR is said to have dropped from 8.1 in the late 1970s to 5.6 and currently stand at 4.6 according to the 2008/2009 KDHS (Mhloyi, 1986; KNBS and ICF Macro, 2010). Despite these gains, major regional variations are documented to exist on demographic indicators. Nyanza and Central provinces – the two regions which are the focus of this study are documented as being on the extreme end. Statistics show that, fertility levels in Central province have continued to decline from 3.7 in 1998 to 3.4 in 2003 and 2008-09. Nyanza province on the other hand, had a TFR of 5.0 in 1998 which rose to 5.6 in 2003 and settled at 5.4 in 2008- 09 KDHS. The annual population growth rate of Nyanza is currently 2.1 compared to Central province annual population growth rate of 1.6 percent (KNBS, 2010). This high annual population growth rate of Nyanza province together with the high TFR poses a threat to sustainable development; the critical key question centres on why the difference. Teenage pregnancies, HIV/AIDS prevalence rates and childhood mortality rates are also highest in Nyanza province and lowest in Central province (KNBS and ICF Macro, 2010). Many factors have been noted to determine differences in fertility levels in many regions in the world. Wasao (1998) established that higher educational levels, increased female participation in labour force and urbanization

had a negative effect on fertility and accounted for large fertility variations. Bauni, Gichuhi and Wasao (2001) found that ethnicity, place of residence, level of education and contraceptive use were closely associated with fertility. Ezeh (1997) found that high fertility areas were characterized by high incidences of polygamy. Other studies have also credited differences in fertility levels with preference for male children and age at first birth (Adhikari, 2010; Susuman, 2006; Ngalinda, 1998).

Central to the arguments of this study is that Central province, which is characteristically as rural as other provinces such as Nyanza province, exhibits a TFR comparable to that of more developed countries while Nyanza province demonstrates TFR of Third World countries (KNBS and ICF Macro, 2010). Because of the wide regional variations in fertility levels between Nyanza and Central province, the two key questions to this study are: (a) what are the determinants of fertility in Nyanza and Central provinces of Kenya; and (b) in which ways do these key determinants of fertility differ in the two regions. To this end, the purpose is to investigate the influence of socio-economic, demographic and cultural factors on fertility in the two regions. The findings of this study will contribute towards understanding of determinants of fertility levels different regions in Kenya, and attainment of other development objectives through influencing patterns and levels of fertility as well as inform policy.

## **1.2. Study Questions**

This study seeks to answer the following questions:

- i. What are the determinants of fertility in Nyanza and Central provinces of Kenya?



### **1.3. Objectives of the Study**

The general objective of the study is to examine the key determinants of fertility among all women aged 15-49 years living in Nyanza and Central provinces of Kenya. The study is aimed at giving further insights on the country's demographic scenario using data from the 2008-09 Kenya Demographic and Health Survey (KNBS and ICF Macro, 2010).

Specific objectives of the study are:

- i. To investigate the effects of demographic factors on fertility in Nyanza and Central provinces.
- ii. To examine the influence of socio-economic factors on fertility in the two regions.
- iii. To investigate the effects of socio-cultural factors on fertility in the two regions.

### **1.4. Justification of the Study**

This study aims to contribute to the understanding of determinants of regional fertility levels in Kenya by examining the situation prevailing in two regions of Kenya, namely Nyanza and Central provinces. Central to the study is why the two regions, which are characteristically rural, exhibit different fertility levels. The focus on Nyanza and Central provinces as regions of study is partly because Nyanza province has lagged behind Central province both in terms of economic development and in terms of initiating the demographic transition. Nyanza province has a higher population growth rate of 2.1 percent and TFR of 5.4 compared to Central province low population growth rate of 1.6 percent and low TFR of 3.4. This high population growth has been demonstrated to have negative effects on economy, education, health, employment, agriculture, environment and

urbanisation (NCAPD, 2010). It is against this background that the government of Kenya has continuously developed and reviewed national population policies, which among other things, encourages reduction of fertility.

Although, Kenya recognised the implication of population growth on overall development long before most countries in sub-Saharan Africa started to worry, it was 20 years later that fertility started to decline (Oucho, 1994). This implies that more effort needs to be made towards an understanding of the determinants of fertility in African societies so that proper strategies can be formulated. To identify regions where fertility is relatively high or resistant to decline vis-a-vis regions where fertility is relatively low or has declined is a step forward in any programme meant to reduce fertility.

In Kenya, a comparative study of determinants of regional fertility is therefore very timely because of various reasons. While many studies have been undertaken on fertility in Kenya, especially since mid-1980s when fertility transition started, few if any have compared determinants of fertility between Nyanza and Central provinces. It is important to understand why fertility continues to be high in Nyanza province and low in Central province, in spite of the fact that the two regions are characteristically rural. It is essential to identify key factors that inform strategies for addressing fertility rates in the two regions. This can be done by identifying determinants with the most significant effects on fertility so that government interventions can be focused on those key sectors that will have direct and immediate impact on reducing fertility instead of engaging in multifaceted approach with no visible impact. The outcome of the study will provide useful knowledge and information which would be fundamental to reproductive health program planners and policy makers to understand various factors influencing fertility in the two regions in

order to design strategies to accelerate fertility decline in Nyanza province which has a high fertility, while maintaining low TFR in Central Province. Lastly, this study will contribute to the growing literature on fertility in Kenya.

### **1.5. Scope and Limitations of the Study**

There is no doubt that, fertility levels in Kenya has declined from 8.1 in 1978 to the current 4.6 (KNBS and ICF Macro, 2010). Of course, behind this change in fertility level many changes have occurred in its proximate determinants, which influence fertility directly. The study concentrates on analysing determinants of fertility differentials at the regional level: Nyanza and Centrals. The study relies on 2008-09 Kenya Demographic and Health Survey (2008-09 KDHS) data set for all women aged 15-49 years from the two provinces (i.e. 1,318 from Nyanza province and 973 from Central province). This study gives a picture of fertility situation and demographic, socio-economic and cultural determinants of fertility at one point of time.

The study has some limitations which cannot be ignored. First, the study relied heavily on quantitative data with no focus on qualitative data. The qualitative data would have provided critical reasons behind some of the key findings. Second, the design of the study and the variables included in the regression model were analysed for statistical association between the variables and fertility, and not necessarily to show cause-effect relationship. Third, migration may be an important factor in explaining fertility levels and behaviours of a population (Oucho, 1994), and the two regions are not immune to effects of migration in so far as fertility is concerned. However, the study did not analyse the effects of migration on fertility behaviour in the two regions. Finally, KDHS data does not collect

information on income of women, but instead only on employment status of women and their occupations, short of ascertaining the income earned. Clearly, information on income and/or earnings would be a better measure of socio-economic status of women because it permits comparison of the purchasing power parity.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.0. Introduction

This section focuses on reviewing existing literature on the socio-economic, socio-cultural and demographic determinants of fertility. Second, it concentrates on reviewing the theoretical approaches to fertility and the conceptual framework of the study. Finally, it discusses operational hypotheses.

#### 2.1.0 Theoretical Background

The intricate nature of human behaviour when it comes to fertility decision has led to the co-existence of several fertility theories, none of which has become fully dominant. The proliferation of contrasting theoretical approaches may seem counter-productive at a first glance, but ultimately is likely to promote healthy discussion and more appropriate policies.

Davis and Blake (1956) argued that fertility can be regulated by 11 intermediate variables, and any social factors influencing the level of fertility must operate through these intermediate variables. Davis and Blake pointed out that there are actually three phases to fertility: intercourse, conception, and gestation. The 11 intermediate variables are categorized according to whether they influence the likelihood of **intercourse** (age at first sexual union, proportion of women never entering sexual unions, reproductive period spent after or between unions, voluntary abstinence, involuntary abstinence, coital frequency); **conception** (fecundity or infecundity affected by involuntary cause, use or non-use of contraception, fecundity or infecundity affected by voluntary cause); or

**gestation** (miscarriage and induced abortion). This theoretical structure was later modified by Bongaarts (1978) into an operational framework.

Families tend to choose fertility levels in order to maximize their well-being, represented by the utility function, subject to certain exogenously determined constraints (Becker, 1960). The most considered constraint is the scarcity of household resources, as captured by the budget constraint, which equates household expenses with household income. The parameters of household budget constraints are determined by factors such as market wage, the cost of raising children and other household expenses. Since raising a child certainly diverts family income that might otherwise be used for purchasing other goods, we may speak abstractly of the “price” of children (Becker, 1960). Becker was one of the first economists to recognize that since children contribute “utility” and since they have a “price”, then the fertility decision is in some sense like other consumer behaviour.

Becker and Lewis (1974) stated that the underlying concept in fertility is that not only do couples value the number of children they have, they also value the quality of those children, and education is usually used as the proxy. Since quality of children can also be thought of as having a price, in that resources are required to improve quality, parents must decide how to allocate their scarce resources between quantity and quality of children. Thus, as income rises, the effect on fertility will depend on whether the demand for number of children increases more rapidly than does the demand for quality of children, or vice versa. The key emphasis on fertility is demand for children as key to understanding fertility behaviour (Easterlin, 1978). He asserts that determinants of fertility are seen working through one or more of the following; the demand for children, potential output of children, and cost of fertility control.

Caldwell (1976) asserts that the key to demographic transition is the direction and magnitude of inter-generational wealth flows at the individual family level. Only when the balance has shifted from a regime of net flows of wealth from children to parents to one of net flows of wealth from parents to children, is fertility decline economically rational. Furthermore, this shift will not occur unless social transition to the emotional nucleation of family has taken place that is when the emotional bond and attendant obligations are stronger between conjugal partners and their offspring than with any other relatives, acquaintances or institutions. Within the contexts of historical experiences of European populations, in Caldwell's opinion families had undergone this shift before the mortality decline began marking the beginning of demographic transition. Furthermore, he states that this social transition takes place in today's developing countries as a result of exposure to Western ideas concerning the family through education and the media.

Bongaarts (1978) argues that fertility is directly determined by only a few variables, namely the "intermediate" or "proximate" variables. Any change in individual fertility must occur through an alteration of one or, of a combination of several of these variables: that is, the proximate determinants form a closed system, and if they could be measured with complete accuracy, differences therein would account for all variations in fertility. The proximate determinants can be thought of as providing a link between social, cultural and economic factors, on the one hand, and the physiological processes which ultimately determine fertility on the other hand (Bongaarts, 1978). They immediately determine fertility, and all other variables act through combinations of them. Bongaarts identified a set of eight intermediate variables that affect fertility and their relative importance in accounting for fertility variations. These are proportion married, use of contraceptives,

induced abortion, involuntary infecundity, frequency of intercourse, sterility, spontaneous intrauterine mortality, and duration of the fertile period. While fertility variations can always be traced to variations in one or more of the intermediate variables, the scope for variations differs among the variables as does their degree of influence in different societies and over time within societies (Bongaarts, 1978). The first four proximate variables are the most important in explaining fertility among populations, while the rest are relatively less important.

## **2.2.0 Review of Previous Studies**

Over the years the study of fertility has benefited from numerous investigations. Many scholars of demography have carried out studies on factors that are perceived to be responsible for fertility differentials among population. This section therefore, focuses on reviewing related past studies on demographic, socio-economic and socio-cultural factors affecting fertility differentials.

### **2.2.1 Demographic Factors**

#### ***Women's Current Age***

Age of the woman is an important factor that determines fertility levels, since fecundity is negatively associated with age (Mhloyi, 1986). The expected number of children will increase as a woman's age increases (Adhikari, 2010). Age variables in cross-sectional analysis capture not only the stage in the life cycle but also differences among cohorts. A study on intra-rural fertility determinants in Zimbabwe, found out that elderly women tend to have higher fertility compared to younger women (Gwebu, 1997). A study on demographic, socio-economic, and cultural factors affecting fertility differentials in



Nepal found out that older women have significantly higher number of children ever born (Adhikari 2010).

### ***Age at First Birth***

Although age at marriage has long been regarded as one of the proximate determinants of fertility (Davis and Blake, 1956; Bongaarts, 1982), some studies suggest that family wellbeing is conditioned by how soon child bearing begins and how rapidly it proceeds (Adhikari, 2010; Ngalinda, 1998). Furthermore, age at first birth may not differ widely with age at first marriage, especially in many developing countries such as Kenya. This is because in these countries, birth takes place in marriage or soon after, and where a woman gives birth out of wedlock, she immediately gets married (Hassan, 1996). Sometimes, marriages take place because the woman is already pregnant (Mhloyi, 1986). This study will therefore, examine the effects of age at first birth only, as opposed to both age at first birth and age at first marriage. This is because the two variables are expected to be highly correlated.

Ngalinda (1998) observed that age at first birth in a non-contracepting society becomes an important determinant of the length of reproductive life and thus is and negatively correlated with fertility. Late age at first birth shortens the reproductive period of a woman, which consequently reduces the total number of children ever born (and vice versa). The complete family sizes appear to be strongly influenced by age at first motherhood. In a study of the United States, Bumpass (1978) found that both a young age at first birth and premarital first conception might be associated with rapid subsequent fertility. Therefore, he associated adolescent motherhood with rapid subsequent fertility.

### ***Age at First Sex***

Studies in Tanzania has shown that a large proportion of school girls in primary and secondary schools drop out from school due to pregnancies and early child births – a clear indication that girls engage in early sexuality and subsequent child bearing (Mpangile et. al., 1993). Furthermore, large proportions of women choose to remain single nowadays in Tanzania but continue to bear children. Therefore, the concept of universality of marriage, and births within marriage seems to be a misleading concept in modern times. In Demographic and Health Surveys Comparative Studies it was found that in sub-Saharan Africa countries 12-67 percent of women experienced intercourse one or more years prior to their first union (Arnold and Blanc, 1990). This suggests that age at first marriage/union is insufficient to capture all sexual exposure that leads to pre-marital births. Moreover, marriage undergoes a shift from arranged marriages to romantic marriages of which sexual intercourse before marriages is a prerequisite (Mturi and Hinde, 2001). Sometimes these premarital sexual activities result in premarital pregnancies.

### ***Contraceptive Use***

Use of contraceptives has been described as the most important proximate determinant of fertility (Sherris *et.al.*, 1985). Some studies have indicated that difference in levels of use of contraception explains 92 percent of the variation in fertility (Robey, Rutstein and Morris, 1992). This implies that where use of contraception is widespread, fertility is low. The use of contraception to delay or limit the number of children born clearly affects a society's fertility level. It is therefore unsurprising that a major cause of the declining fertility in Tanzania during the 1990s is thought to have been the slow but steady increase in use of contraceptives (Mturi and Hinde, 2001). However, Wasao (2001) found

out that contraceptive use was linked to higher fertility in Cameroon, mainly because of high fertility desires existing in the country, such that women only turn to contraception for birth limiting after having achieved their family desires.

Robinson (1996), while acknowledging that fertility had begun to decline in Kenya, found that contraceptive prevalence in Kenya was rising and fertility was declining. He noted that couples in Kenya were conceptualizing an ideal family size, and that a rational weighing of costs and benefits of having children was occurring in Kenya more frequently than before. He went on to emphasize that the modernization of Kenyan society and economy were in collision with traditional pro-natalist values, but modernization was winning. He further argued that government programs were becoming effective and are increasing the cost of children and lowering the cost of obtaining contraceptive services. Kalipeni (1995) established that modern contraceptive prevalence is strongly associated with declining fertility in Africa and that the declining trends need to be reinforced through the provision of safe and effective contraception.

### ***Child-Death Experience***

Child and infant mortality is also one of the intermediate factors known to affect fertility (Onuoha, 1992). Infant mortality can affect fertility through either biological or behavioural mechanism. The biological effect relates to the fact that women with early deaths will naturally resume ovulation earlier than women with surviving breastfed children (Van Ginneken, 1974). The behavioural effect regards that couples with high infant mortality will seek to have additional children either to replace those that are lost, or as insurance against perceived potential losses (Preston, 1975). Women who have had a child-death experience are likely to have higher number of children than those who had no

such experiences (Adhikari, 2010). Adhikari (2010) further argued that where mortality declines more rapidly, the pace of fertility will also be more rapid. The Korean data collected for National Fertility Survey indicated conclusively that infant death increased the sequential risk of child bearing across the birth order irrespective of time, and whether family planning services were available or not (Park, Han and Choe, 1979). A study conducted in urban Addis Ababa has also shown the fertility enhancing effect of child death after controlling for variables like age at marriage, desired number of children, educational level of woman and husband and working status of women (Dejene, 2000).

### ***Son Preference***

Sex preference has also contributed significantly to fertility levels in many parts of the world. A family's decision to have a child is determined by the sex of the child (ren) they already have or desire to have. Differentials in fertility levels are due to differentials in the value of boy and girl child (Susuman, 2006). Susuman (2006) argued that both boys and girls are perceived as contributing rather differently to the basic values and that boys are perceived to contribute to the satisfaction of greater number of values and needs than girls. Financial security, being accepted by others, having a happy home, personal achievement and carrying on the family name were all values that were associated with more boys than girls in India. He mentioned that preference for sons which has been observed in many parts of India, has been shown to have an adverse effect on fertility behaviour. The desire for sons discourages some couples from discontinuing childbearing after reaching their desired number of children because they have not yet had their minimum desired number of sons. The mean number of children ever born among women has been found to significantly vary according to the number of sons a woman wished to

have during the course of her life (Regassa, 2007; Siripirom, 1982). These studies have shown that the more sons a family had the less likely it was to conceive another child, because the family may have satisfied its preference for sons.

### ***Marital Status***

According to Bongaarts (1978), marriage is one of the variables that have been considered to significantly affect fertility levels of a population. Kimani (2005) found that reduction in the proportions of the women married was one of the factors which contributed to maintaining fertility at the 1998 levels (TFR of 4.7). He therefore, recommended that Kenyan laws that regulate age at marriage should be strictly adhered to as a strategy of reducing the proportion of married women. Tesfaghiorghis (1995) found that there were changes in marriages and nuptiality patterns which favoured fertility decline in Kiribati. He noted that the proportion single, especially among young females aged 15-29 years, had been rising, and there was a small but steady increase in the proportion not ultimately marrying.

## **2.2.2 Socio-economic Factors**

### ***Women's Level of Education***

Generally from most studies of fertility in developing countries, education has the most powerful influence on fertility preferences and outcomes. Cohen (1993) established that fertility was either curvilinearly or negatively related with education but did not appear very responsive to low levels of education. Some comparative studies have shown that higher education of women is consistently associated with lower fertility and that fertility differentials can be explained by differences in the level of women's education (Wasao, 2001; Wasao, 1998; Susuman, 2006). Mboup and Saha (1998) found that in many

countries of sub-Saharan Africa (including Burkina Faso, Ghana, and Senegal), women with no schooling have about two to three children more than women with secondary or higher education. The woman's level of education affects fertility in many directions such as desire for a small family size because they prefer consumption items related to children (Ranson, 1998). Also, education increases women's income so they prefer to be in the labour force rather than take care of children (Wasao, 2001; Askew, *et. al* 2009). Education does not affect fertility directly, but through other variables such as wealth and employment. The most important supply effects of education are age at marriage, infant and child mortality, and contraceptive use (Shapiro and Tambashe, 1997).

### ***Wealth Index***

Wealth has been considered one of the key determinants of fertility. Caldwell (1976) asserts that the key to a change from high fertility to low fertility is the direction and magnitude of inter-generational wealth flows at the individual family level. Only when the balance has shifted from a regime of net flows of wealth from children to parents to one of net flows of wealth from parents to children, is fertility decline economically rational. Adhikari (2010), found an inverse relationship between wealth status and fertility in Nepal, with significantly lower fertility occurring among the richest women. Some of the reason that have been advanced regarding low fertility among the rich compared to high fertility among the poor, is that poor people may perceive children as a source of income, thus motivating them to have more children (Karki, 1982). Another reason could be that the poor people have less access to education and family planning. Weerasinghe and Nicholas (2002) noted that there was significant effect of wealth index on fertility indicating that, in Sri Lanka, as accumulated household wealth increased, marital fertility decreased. The

fertility-reducing effect of higher wealth may be explained in terms of greater preference of wealthier people for a higher quality as opposed to a higher quantity of children, the rising opportunity costs of parental time, and the reduced reliance on children for support in the old age of the more wealthy parents (Weerasinghe and Nicholas, 2002).

### ***Place of Residence***

Place of residence has also been seen to have a relationship with fertility and studies have shown that rural women have higher fertility than urban women (Adhikari, 2010; Zarate, 1967). This is partly due to the fact that urban women are more likely to use contraceptives and tend to marry at later ages than their rural counterparts. Wasao (1998) found that urbanization did not have a uniform effect on fertility across the provinces in Kenya. The high fertility provinces of Nyanza, Western and Rift Valley, had the highest rates of urban growth as compared with the lower fertility provinces of Central and Eastern. In addition, the study results indicated that higher levels of urbanization were significantly associated with lower levels of fertility, confirming the hypothesized association between urbanization and fertility. This suggests that although overall, there exists a negative association between fertility and urbanization, the effect is not uniform across provinces in Kenya. Wasao (2001) noted that fertility was lowest in highly urbanised regions.

### ***Work Status***

A relationship between fertility and female participation in labour force has been documented in many fertility studies (Adhikari, 2010; Beguy, 2009; Peng, 2002). The participation of women in labour force has been shown to be negatively related to fertility rate. Female employment outside the home is related to forming small families. Working women tend to have fewer children than those who do not work because employment

entails alternative satisfaction to children (Blake, 1979). A study investigating the influence of women's professional life on fertility in Dakar and Lome, illustrated how it was important to consider the social gender-specific roles in order to accurately determine the influence of female employment on fertility (Beguy 2009). In Dakar, the study showed that neither female employment nor human capital had a significant effect on the likelihood of giving birth while in Lome women involved in paid economic activity delayed their fertility when they were married. The hypothesis of role incompatibility between wage employment and maternal obligations seemed to have been corroborated in Lome, where the results of the study showed that being wage employee rather than self-employed decreased the risk of giving birth overtime. Peng (2002) and Wasao (1998) showed that with educational improvement and increase in women's participation in modern sector, the proportion of women that would remain unmarried can be expected to increase, consequently leading to low marital fertility. That is, pre-marital work experience tends to delay marriage since women who worked before marriage were married three and half years later than those who did not work.

### **2.2.3 Socio-cultural Factors**

#### ***Type of Marriage***

Polygamy as a factor that determines marital fertility has generated interesting debates with some scholars stating that it enhances fertility while others have argued that it suppresses fertility. Bongaarts, Frank and Lesthaeghe (1984), found that polygamy lowers fertility because time with the husband is shared, it facilitates the practice of postpartum abstinence, and that polygamously married women beyond the first wife tend to have even older husbands than monogamously married women. A study by the Central



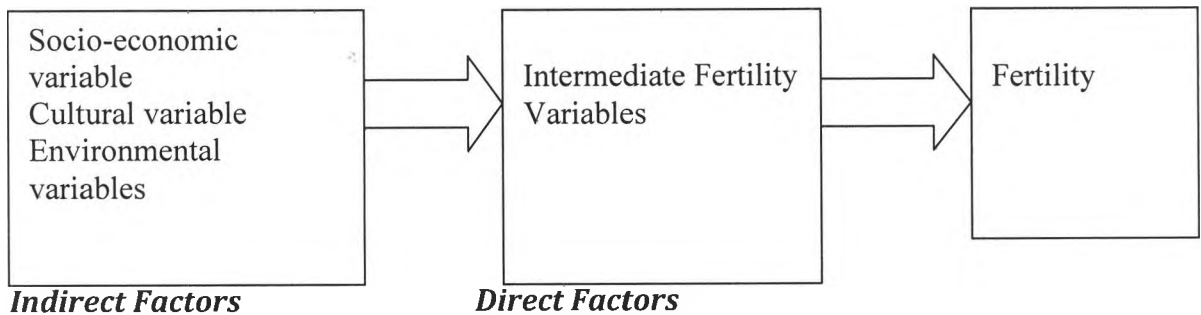
Bureau of Statistics in Kenya (1989) examined the impact of social and economic factors on fertility in rural Kenya at the provincial levels and found the practice of polygamy as suppressing fertility. However, Wasao (2001) found polygamous marriages in Africa associated with high fertility because they are viewed as placing the woman in a bargaining position vis-à-vis each other and the husband. Women in high polygamy areas tend to start sexual intercourse early and have high fertility goals (Ezeh, 1997). In such social organization, it is claimed that the only tool the woman can have to laying claim to property and inheritance (from the husband) are children (National Academy of Science, 1993). Ngalinda (1998) observed that younger women in polygamous marriages have higher cumulative fertility compared to women in monogamous marriages. This situation may be attributed to the competition effect, as young women in polygamous union would like to have as many children as possible to compete with older wives of the same union.

### **2.3.0 Conceptual Framework**

This study was premised on Bongaarts (1978) "Framework for Analyzing the Proximate Determinants of Fertility". According to this framework, factors influencing fertility can be classified into two groups, namely intermediate fertility variables, or proximate determinants, and socioeconomic variables. The former, is of interest because of its direct impact on fertility and since it consists of a set of biological and behavioural factors through which social, economic and cultural conditions can affect fertility. In other words, in the absence of these determinants, human fertility may reach a theoretical maximum of total fecundity (TF), accounting to an average of 15.3 births per woman. In this model, Bongaarts (1978) found out that fertility variations can always be traced to variations in one or more of the intermediate variables and that the scope of variation

differs among the variables as does their degree of influence in different societies and over time within societies. Thus, fertility differentials between regions and across time within the same region can be traced to changes in one or more of the proximate determinants.

**Figure 1: The Bongaarts Framework**



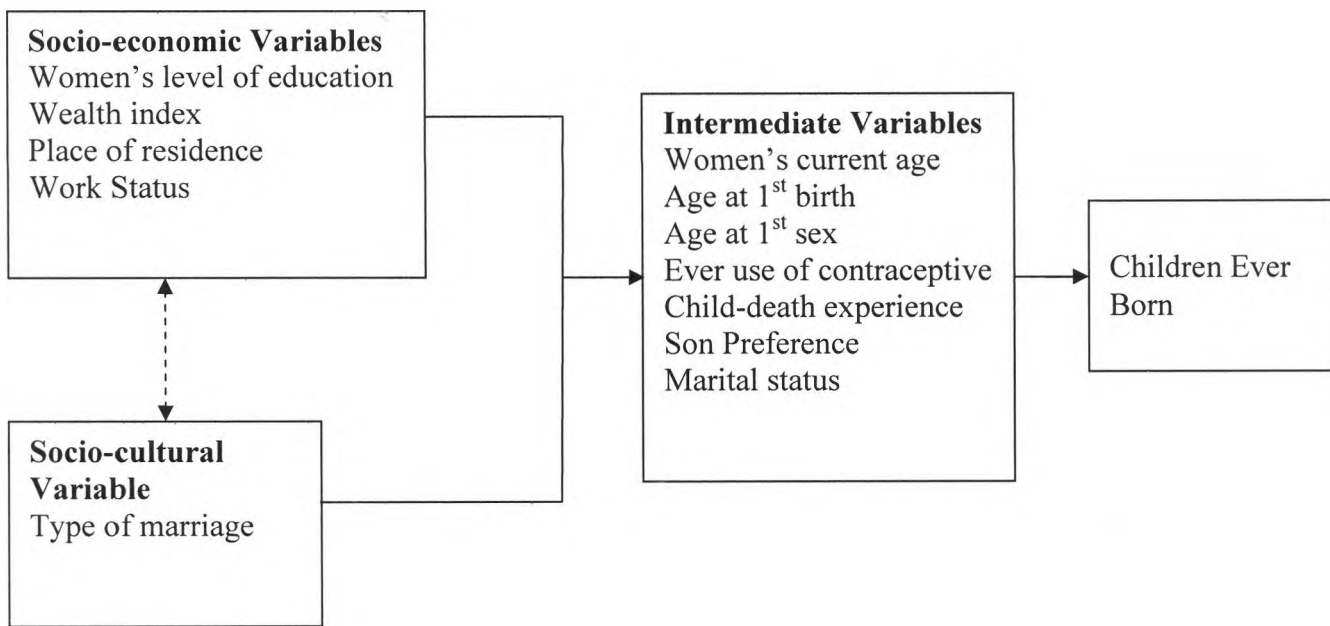
*Source:* Bongaarts, J. (1978) "A Framework for Analyzing the Proximate Determinants of Fertility". *Population Development Review* 4(1): 105-132

While Davis and Blake (1956) were the first to identify a set of 11 proximate determinants known as "Intermediate Fertility Variables", their classification did not get wide acceptance because it was not easily incorporated in fertility analysis. In view of that, Bongaarts (1978) reclassified this list of determinants into seven variables, including marriage pattern, contraceptive use, induced abortion, lactation infecundability, spontaneous abortion, frequency of coitus and sterility. However, after various studies and analysis, Bongaarts (1978) came to the conclusion that variation in four factors - marriage, contraception, lactation, and induced abortion - are the primary proximate causes of fertility differences among populations.

This framework is ideal for this study because it allows comparative fertility analysis to determine factors responsible for fertility levels in Nyanza and Central province.

Its applicability is valuable in the analyses of the socio-economic and socio-cultural determinants of fertility, because the intermediate fertility variables allow identification of the paths through which socio-economic and socio-cultural variables affect fertility and the relationship with fertility.

**Figure 2: Operational framework: Adapted from Bongaarts Framework**



*Indirect factors*

*Direct factors*

### 2.5.0 Operational Hypotheses

- i. The older the woman the more number of children she is likely to have.
- ii. Women who had their first child at an early age have higher fertility than women who had their first child birth at older age.
- iii. Women who have had first sexual intercourse at an early age tend to have higher fertility than women who initiated sexual debut at older ages.

- iv. Women who have ever used contraceptives tend to have lower fertility than women who have never used contraceptives.
- v. Women who have experienced child death have higher fertility than women who have not experienced child death.
- vi. The higher the level of education of a woman, the lower the fertility levels.
- vii. Women from wealthy households have lower fertility than women from poor households.
- viii. Women who are living in rural areas have higher fertility than women living in urban areas.

## CHAPTER 3

### DATA AND METHODOLOGY

#### 3.0. Introduction

This section presents a description of source of data used for the study, variable definitions, and the analytical tools and procedures employed.

##### 3.1.0 Data source

Data for this study is drawn from the 2008-09 Kenya Demographic and Health Survey (KNBS and ICF Macro, 2010) which was a nationally representative sample survey conducted by the Kenya National Bureau of Statistics (KNBS) in collaboration with the Ministry of Public Health and Sanitation (including the National AIDS and STIs Control Program). The primary purpose of this survey was to furnish policy makers and planners with detailed information on fertility; family planning; infant, child, adult and maternal mortality; breastfeeding practices; nutritional status of women and young children; maternal and child health; and awareness and behaviour regarding HIV/AIDS and other sexually transmitted infections. The 2008-09 KDHS was carried out under the aegis of Kenya National Bureau of Statistics. The data used in this study is publicly available.

A representative sample of 10,000 households was drawn for the 2008-09 KDHS. This was a two-stage sampling design. The first stage involved selecting data collection points ('clusters') from the national master sampling frame. A total of 400 clusters – 133 urban and 267 rural – were selected from the master frame. The second stage of selection involved the systematic sampling of households from an updated list of households. Three questionnaires were used to collect the survey data: the Household, Women's, and Men's Questionnaires. The contents of these questionnaires were based on model questionnaires

developed by MEASURES DHS program that underwent only slight changes to reflect relevant issues in Kenya. The survey was conducted between November 13, 2008 and late February 2009. Interviews were completed for 8,444 women of reproductive age and 3,465 men aged between 15 to 54 years old in Kenya. For purposes of this study, the focus was on data collected from 1,318 women aged 15 to 49 years in Nyanza province and 973 women aged 15 to 49 years in Central province in the 2008-09 KDHS. The study was restricted to three years preceding the survey.

### **3.2.0 Variable Definition and Measurements**

This section presents the factors identified in the literature as important in explaining fertility change and fertility levels in Central and Nyanza provinces and the measures used for these variables.

#### **3.2.1 Dependent Variable**

This study based on the specific measure of fertility; i.e. children ever born (CEB). So the dependent variable used in the study was CEB. The survey question for the female respondent was “how many live births have you ever had?” CEB comprises information on the number of all children born alive (lifetime fertility) up to the survey date. Mean number of children ever born to women represents the childbearing experience of a real age cohort and reflects current and past fertility behaviour. Finally, CEB does allow for the generalization of data and an understanding that can provide the basis for further analysis (UN, 1983). Children ever born, the dependent variable was treated as a continuous variable in both bivariate and multivariate analyses.

### 3.2.2 Independent Variables

**Women's current age;** this refers to the number of years at the time of interview the respondent (woman) will have lived since she was born. It was categorized as less than 20, 20-24, and 25+.

**Age at first birth;** this refers to age at which a woman had her first child. It is expected that women who enter into child bearing at younger ages have higher fertility as compared to women who enter into child bearing at older ages.

**Age at first sex;** this refers to age at which a woman had her first sexual intercourse. It is expected that women who started their sexual debut at younger ages have higher fertility as compared to women who entered sexual debut at older ages.

**Ever use of contraceptive;** this refers to the type of method of fertility control a woman has ever used. Women who have ever used any contraceptives are expected to have lower fertility compared to those who have never used any form of contraceptive.

**Child death experience;** this refers to whether a woman has experienced death of one or more children during her reproductive periods. It is expected that women who have experienced child mortality will have more children ever born compared to women who have not experienced child death.

**Ideal number of sons;** this refers to the preferred number of sons a woman would like to have during her reproductive life time.

**Marital status;** this refers to whether the respondent is not married, currently married or formerly married. Those who have ever been married are expected to have more children ever born compared to those who have never been married.

**Women's level of education;** this refers to the highest level of formal schooling attained by a woman at the time of the survey. It is categorized into; no education, primary education, and secondary plus. The expected usual trend is that the number of children ever born reduces with the increase in the level of a woman's level of education

**Wealth index;** this is based on household ownership of material possessions such as radio, television, telephone, refrigerator, bicycle, motorbike, and car. It also includes the housing quality, whether the house has electricity, a finished floor, and a permanent roof, that is, corrugated iron or tiles. It serves as a proxy for household wealth and disposable income. It was classified as low, medium, or high. Those in the low wealth index are expected to exhibit high fertility.

**Place of residence;** this variable refers to the place where the woman resides. It has two categories; rural and urban areas. Those in the rural areas, in developing countries, are expected to exhibit higher fertility than those in the urban areas.

**Work status;** this refers to whether the woman was working during the time of survey. During the time of the survey, this was categorized into working and not working. It is expected that women who are not working have more children ever born compared to their counterparts who are working.

**Type of marriage;** this refers to the kind of marital union of a woman. It is expected that polygamous marriages have more children as compared to monogamous marriages.



### 3.2.3 Operational Definition of Variables

**Table 1: Description and Specification of Variables of the Study of Determinants of Fertility in Nyanza and Central Provinces in Kenya**

Variable Classification	Variable Name	Variable Label	Categories
<b>Dependent Variable</b>	Fertility (Children Ever Born)	V201	Measured as a continuous variable
<b>Study variables</b>			
1.	Women's current Age	V012R	1 = ≤19 2 = 20-24 3 = 25>
2.	Age at first Birth	V212N	0=Never given birth 1 = ≤19 2 = 20-24 3 = 25>
3.	Age at first sex	V525R	1 = ≤15 2 = 16-19 3 = 20+
4.	Ever use of contraceptive	V302R	0 = Never used method 1 = Used traditional method 2 = Used modern method
5.	Child-death experience	dchild	1 = No 2 = Yes
6.	Ideal number of sons	V627R	0 = 0 1 = 1-2 2 = 3+
7.	Marital status	V502R	0= Never married 1 = Currently married 2 = Formerly married
8.	Women's level of education	Edurec	1 = No education 2 = Primary 3 = Secondary >
9.	Wealth index	V190R	1 = Low 2 = Medium 3 = High
10.	Place of residence	Residence	1 = Urban 2 = Rural
11.	Work status	V714R	1 = Not working 2 = Working
12.	Type of marriage	Martype	1 = Monogamous 2 = Polygamous

### 3.3.0 Method of Analysis

This section presents data analysis methods used in the study. Both descriptive and inferential statistics were used. The main fertility *response* on which all the analyses were based on was children ever born (CEB). Regression model was used to analyze the data. Regression analysis was used because the dependent variable, CEB is a continuous variable which was predicted from several independent variables known to be related to fertility. In addition, the regression analysis helped in determining the factors with most significant effect on fertility, as well as helped in exploring and describing the nature and strength of association between fertility and the selected factors of interest (Chan, 2004). The analysis was confined to all women aged 15-49 years in Nyanza and Central province (n=1318 and n=973 in Nyanza and Central provinces respectively).

Simple (bivariate) and multiple (multivariate) linear regression models were used in the study. The regression results were run separately for Nyanza and Central provinces. Simple linear regression helped to establish gross effect of every independent variable on dependent variable and multiple linear regressions established net effect of independent variable on dependent variable.

#### 3.3.1. Simple and Multiple Linear Regression

Both bivariate and multivariate analyses were performed to show the determinants of fertility in the two regions. Simple linear regression is a statistical tool that attempts to model a relationship between a dependent variable and one independent variable at a time by fitting a linear equation to the observed data (Munro, 2005). The linear regression model took the form:

$$Y' = a + bX + e$$

Where **Y'** is the dependent variable, **X** is the independent variable, **a**, is the intercept (coefficient) and is the value of Y when X=0. The letter **b** is the *regression coefficient* (slope) and is the rate of change in Y with a unit change in X. The letter **e** is the error term. Every independent variable was regressed against the dependent variable to establish individual gross effect on fertility. The slope coefficient measures the rate of change in Y per unit change in X. In bivariate analysis, total children ever born and other independent variables was analyzed to examine the association between children ever born and women's demographic, socioeconomic, and cultural characteristics. Analysis was performed separately for Nyanza and Central provinces.

Furthermore, the net effect of each predictor variable on the dependent variable after controlling for the effects of other predictors was also measured *via* multivariate analysis (multiple linear regressions). The multiple linear regression model took the form:

$$Y' = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k + e$$

Where **Y'** is number of children ever born,  $\beta_0$  is the **Y**-intercept or constant representing the average value of Y when Xs are set equal to zero;  $\beta_{1-k}$  represent partial regression coefficients of each explanatory variables representing the change in the dependent variable that arises from a one-unit change in the explanatory variable; X represents the explanatory variables associated with fertility and **e** is the error term representing random effects.

Multiple regression provided information on the predictive value of the overall model as well as how well each of the independent variable influenced the dependent variable, controlling for each of the other variables. Analysis was performed separately for Nyanza and Central province. Before using the multiple linear regression, the correlation

matrix was applied to test the degree and direction of relationship between each pair of independent variable and dependent variable. This helped in identifying if there was any multi-co linearity between the independent variables. The results demonstrated that there was no multi-co linearity ( $r > 0.6$ ) between the independent variables. So all the variables included in the bivariate analysis were also included in multivariate linear regression. F-test was employed to determine the overall significance of the model (Gujarati, 1992). The Statistical Package for Social Science (SPSS 17 for windows) software was used to analyze the data.

## CHAPTER 4

### RESULTS AND DISCUSSION

#### 4.0 Introduction

This chapter presents the study findings. Section 4.1 presents a description of the study variables for the two study regions while section 4.2 presents the results of bivariate linear regression analysis. Section 4.3 presents the results of multivariate linear regression analysis for the two study regions.

#### 4.1 Descriptive Statistics

Table 2 below displays demographic, socio-economic and cultural characteristics of Nyanza and Central provinces from the 2008-09 KDHS data. In terms of demographic characteristics, women in Nyanza province seem to be having more children ever born than Central province. For instance, about one-fifth of women in Nyanza have more than six children ever born compared to one-tenth of women in Central province who have six and above children ever born. Women from Central province prefer small families than their counterparts in Nyanza province. Results from descriptive statistics show that about 58 per cent of women in Central province have given birth to 0-2 children compared to 52 per cent of women in Nyanza who have 0-2 children ever born. Results further reveal that Nyanza province has more women in the younger age group (i.e. 22 percent at 15-19 years and 24 percent at 20-24 years) compared to Central province which has 19 per cent of women at 15-19 years.

In terms of age at first birth, majority of women in Nyanza province give birth at younger ages compared to Central province. For instance, more than a half of women in Nyanza province have given birth at ages less than or equal to 19 years old compared to

**Table 2: Percentage Distribution of Determinants of Fertility in Nyanza and Central Provinces**

Variables of Study	Nyanza Province (n=1318)	Central Province (n=973)
	Percentage	Percentage
<b>Total Children Ever Born</b>		
0-2	52.0	58.2
3-5	29.4	33.3
6+	18.6	8.5
<b>Women's Current Age</b>		
15-19 Years	22.2	18.7
20-24 years	23.8	17.4
25+ years	53.9	63.9
<b>Age At First Birth</b>		
Never Given Birth	23.7	27.4
≤ 19 Years	55.0	36.5
20-24Years	17.4	30.2
≥25 Years	3.9	5.9
<b>Age at First Sex</b>		
No sex	10.9	18.2
≤15 years	39.8	12.8
16-19 years	36.0	43.4
≥20 Years	13.4	25.6
<b>Ever Use of Contraceptive</b>		
Never Used Method	41.4	28.7
Used Traditional method	3.5	2.4
Used Modern method	55.1	69.0
<b>Child-Death Experience</b>		
No	72.8	87.8
Yes	27.2	12.2
<b>Ideal Number of Sons</b>		
No son	17.5	26.6
1-2 sons	63.4	68.3
3 sons +	19.1	5.0
<b>Marital Status</b>		
Never Married	25.8	29.8
Currently Married	61.1	58.1
Formerly Married	13.1	12.1
<b>Women's Level of Education</b>		
No Education	2.6	1.0
Primary	65.8	57.6
Secondary +	31.6	41.4
<b>Wealth Index</b>		
Low Class	39.1	12.6
Medium class	21.1	26.3
High class	39.8	61.0

**Table 2: Percentage Distribution of Determinants of Fertility in Nyanza and Central Provinces (continued)**

Variables of Study	Nyanza Province (n=1318) Percentage	Central Province (n=973) Percentage
<b>Place of Residence</b>		
Rural	22.4	16.3
Urban	77.6	83.7
<b>Work Status</b>		
Not Working	34.0	32.6
Working	65.3	67.1
<b>Work Status</b>		
Monogamy	76.3	96.1
Polygamy	23.7	3.9

36 percent of women in Central province who have given birth at ages less than or equal to 19 years. On the other hand, the number of women giving birth at 25 years and above is two times more in Central than in Nyanza province. Age at first sexual debut also reveal significant differences between the two regions. The proportion of women who had their first sexual debut at the age of 15 years and below are three times more in Nyanza province compared to their counterparts in Central province. The proportion of women who had their first sexual debut at age of 20 years is twice higher in Central province compared to Nyanza province. Nearly one-fifth of women in Central province have not had sex compared to only one-tenth of women in Nyanza province. These significant variations in exposure to sexual intercourse can already give an indication why there is high fertility in Nyanza province compared to Central province.

Contraceptive prevalence rate is high in Central province with more than two - thirds of women reporting ever used modern contraceptive compared to slightly more than a half of women in Nyanza province. The proportion of women who have never used any contraceptives is higher in Nyanza province compared to Central province. These

variations in contraceptive prevalence use or non-use can partly explain differentials in children ever born between the two regions. Child mortality is more severe in Nyanza province than in Central province. The proportion of women who have experienced child mortality is twice higher in Nyanza province than in Central province. Preference for male child is also one of the characteristic that was examined. According to the findings, the proportion of women who prefer to have three or more sons is four times higher in Nyanza province compared to Central province. On the other hand, the proportion of women who have no child sex preference is higher in Central province compared to Nyanza province. In terms of marital status, proportion of currently married women is almost similar in the two regions. In the same vein, the proportion of women who have never been married is almost similar in the two regions.

The socio-economic characteristics that were considered for the study are level of education, place of residence, wealth index and labour force participation. In terms of education, the two regions reported variations in the level of education. For instance, the proportion of women with secondary education and above in Central province is two-fifth compared to Nyanza province which has one-third. On the other hand, Nyanza province has a higher proportion of women with primary education (two-thirds) compared to Central province which has less than two-thirds of women with primary education. This is a clear indication that women in Central province are more educated than their counterparts in Nyanza province.

In terms of wealth index, Central province has more wealthy women (nearly two-thirds) compared to Nyanza province which has two-fifth. Poverty is three times more severe in Nyanza province than in Central province. In terms of place of residence, the



findings reveal that Central province has more women living in the urban areas (84 per cent) compared to 78 percent of women in Nyanza province. In terms of labour force participation of women, there is no wide variation between the two regions. The percentage of women working in Nyanza and Central provinces were almost similar.

In terms of socio-cultural characteristic, only one factor was considered; type of marriage. According to the study findings, the proportion of women in polygamous unions in Nyanza province is six times higher compared to Central province - thus, a possible explanation for the differences in children ever born in the two regions.

#### **4.2 Association between CEB and study variables in Nyanza and Central provinces**

Demographic, socio-economic and cultural variables were correlated with children ever born using simple linear regression analysis (bivariate analysis) results of which are reported in table 3 below. The results show gross effect of a unit change in independent variable on children ever born. All the demographic, socio-economic and cultural factors were found to be significantly related to CEB in both Nyanza and Central province.

Women's current age is significantly associated with children ever born. The relationship between children ever born and women's current age is statistically significant at  $p \leq 0.001$  levels for both Nyanza province and Central province for all the age categories. Children ever born depend on the age of a woman. In Nyanza and Central provinces children ever born is highest among women aged 25 years and above in both regions. Women aged 25 years and above in Nyanza province have 4.2 more children ever born than women aged 15-19 years, while their counterparts in Central province have 3.8 more children ever born.

**Table 3: Results of Bivariate Analysis for Determinants of Fertility in Nyanza and Central Provinces**

Variables of Study	Nyanza Province		Central Province	
	B	Std. Error	B	Std. Error
<b>Women's Current Age</b>				
(Constant)	.334	.121	.071	.121
15-19 Years (Ref.)				
20-24 years	1.312***	.168	.769***	.174
25+ years	4.244***	.143	3.308***	.137
<i>R-Square</i>	0.440		0.435	
<b>Age At First Birth</b>				
(Constant)	4.090	0.082	3.530	0.085
≤ 19 Years (Ref.)				
Never given births	-4.090***	0.149	-3.530***	0.130
20-24Years	-0.718***	0.166	-.570***	0.126
≥25 Years	-1.532***	0.315	-1.179***	0.229
<i>R-Square</i>	0.369		0.455	
<b>Age at First Sex</b>				
(Constant)	2.977	.192	2.474	.118
≥20 Years (Ref.)				
No sex	-2.977***	.286	-2.474***	.182
≤15 years	.675***	.222	.798***	.203
16-19 years	.044	.225	.446***	.148
<i>R-Square</i>	0.149		0.266	
<b>Ever Use of Contraceptive</b>				
(Constant)	2.201	0.115	.746	.115
Never used a method (Ref.)				
Used traditional method	1.016***	0.413	1.863***	0.417
Used modern method	1.270***	0.153	2.219***	0.137
<i>R-Square</i>	0.025		0.231	
<b>Child-Death Experience</b>				
(Constant)	1.933	.072	1.972	.067
No (Ref.)				
Yes	3.692***	.137	2.843***	.191
<i>R-Square</i>	0.354		0.184	
<b>Ideal Number of Sons</b>				
(Constant)	2.494	.173	2.467	.131
No son (Ref.)				
1-2 sons	.027	.195	-.362**	.154
3 sons +	2.225***	.239	1.982***	.328
<i>R-Square</i>	0.097		0.055	
<b>Marital Status</b>				
(Constant)	0.306	.123	0.324	.102
Never married (Ref.)				
Currently married	3.418***	.147	2.876***	.125
Formerly married	4.133***	.212	2.684***	.189
<i>R-Square</i>	0.322		0.360	

Ref.: Reference category \*\*\*p≤0.001, \*\*p≤0.05, \*p≤0.10

**Table 3: Results of Bivariate Analysis for Determinants of Fertility in Nyanza and Central Provinces (continued)**

Variables of Study	Nyanza Province		Central Province	
	B	Std. Error	B	Std. Error
<b>Women's Level of Education</b>				
(Constant)	5.912	0.455	4.500	.648
No Education (Ref.)				
Primary	-2.628***	.464	-1.632**	.654
Secondary +	-1.970***	.236	-1.498***	.328
<i>R-Square</i>	0.078		0.104	
<b>Wealth Index</b>				
(Constant)	3.604	.118	2.829	.193
Low Class (Ref.)				
Medium class	-.478	.200	-.142	.235
High class	-1.423***	.167	-.774***	.212
<i>R-Square</i>	0.052		0.022	
<b>Place of Residence</b>				
(Constant)	3.194	.085	2.393	.076
Rural (Ref.)				
Urban	-1.149***	.180	-.450**	.187
<i>R-Square</i>			0.005	
<b>Work Status</b>				
(Constant)	1.777	.123	1.278	.114
Not working (Ref.)				
Working	1.775***	.152	1.552***	.139
<i>R-Square</i>	0.093		0.112	
<b>Type of Marriage</b>				
(Constant)	2.682	.080	2.268	.069
Monogamy (Ref.)				
Polygamy	1.773***	.212	2.277***	.462
<i>R-Square</i>	0.050		0.023	

Ref.: Reference category \*\*\* $p \leq 0.001$ , \*\* $p \leq 0.05$ , \* $p \leq 0.10$

Age at first birth is significantly related to children ever born in both regions. The relationship of children ever born and age at first birth is statistically significant at  $p \leq 0.001$  level for all categories in all the two regions. For instance, in Nyanza province women who gave birth for the first time at the age of 20-24 years have 0.7 fewer children ever born compared to women who had their first birth before age 20 while women in Central province in the same age group have 0.5 fewer children ever born. In addition, women in

Nyanza province who gave birth for the first time at the age of 25 years and above have 1.5 fewer children ever born compared to women who had their first birth before age 20 while women in Central province in the same age group have 1.2 fewer children ever born. Therefore, younger age at first birth is highly associated with high number of children ever born and this is partly due to long period of exposure to risk of pregnancy.

Age at first sexual intercourse is positively and significantly related to number of children ever born. Women who had their first sex at the age of 15 years and below in Nyanza province have 0.7 more children ever born ( $p \leq 0.001$ ) than women who had their sexual debut at the age of 20 years and above, while their counterparts in Central province have 0.8 children ever born ( $p \leq 0.001$ ). In addition, women who have had no sex in Nyanza province have 3.0 fewer children ever born ( $p \leq 0.001$ ) than women who had their sexual debut at the age of 20 years and above, while their counterparts in Central province have 2.5 fewer children ever born ( $p \leq 0.001$ ). The study did not establish any significant relationship for the category of women who had their sexual debut at the age of 16-19 years old in Nyanza province, though in Central province this category of women have 0.4 more children ever born ( $p \leq 0.001$ ) compared to those who had their sexual debut at the age of 20 years and above.

Concerning ever use of contraceptive and children ever born, the study has revealed some interesting but significant findings. Ever use of contraceptive has a positive and significant relationship with children ever born. Women who have ever used some form of contraceptives (i.e. traditional and modern) have higher number of children ever born than their counterparts who have never used any contraceptives in the two regions. For instance, women who have used modern contraceptives in Nyanza province have 1.2 more

children ever born ( $p \leq 0.001$ ) than women who have never used contraceptives, while their counterparts in Central province have 2.2 more children ever born ( $p \leq 0.001$ ). This relationship is inconsistent with most previous studies. This trend is also similar to those who have ever used traditional methods.

Further results show that child mortality is significantly related to children ever born in the two regions. The relationship between children ever born and child mortality is statistically significant at  $p \leq 0.001$  levels for the two regions. Effects of child mortality are more severe in Nyanza province than in Central province. For instance, results of bivariate analysis show that in Nyanza province children ever born are 3.7 more among women who have experienced child mortality than among women who have not experienced child mortality, while in Central province children ever born is 2.8 more among women who have experienced child mortality.

Results also show that ideal number of sons is positively and significantly related to the number of children ever born in the two regions. In Central province women who prefer three or more sons have 1.9 more children ever born ( $p \leq 0.001$ ) compared to their counterparts who have no sex preference, while in Nyanza province women who prefer three or more sons have 2.2 more children ever born ( $p \leq 0.001$ ) compared to their counterparts who have no sex preference. In Nyanza province it is evident that women still have high preference for boy child. Therefore, a woman in Nyanza province is less likely to stop child bearing before attaining the desired number of sons, hence high fertility in the region.

Marital status has a positive and significant relationship with children ever born in the two regions. Currently married women in Nyanza province have 3.4 more children ever

born ( $p \leq 0.001$ ) than women who have never been married, while in Central province women who are currently married have 2.9 more children ever born ( $p \leq 0.001$ ) than women who have never been married. Women who were formerly married in Central province had 2.6 more children ever born ( $p \leq 0.001$ ) than women who had never been married, while in Nyanza province women who were formerly married had 4.1 more children ever born ( $p \leq 0.001$ ) than women who have never been married. This finding is consistent with other previous studies (Wasao, 2001).

Level of education, place of residence, wealth index and women labour force participation were each regressed with children ever born to determine their gross effects on CEB. To start with, education level was found to have a negative and significant relationship with total number of children ever born in the two regions. The relationship is statistically significant at  $p \leq 0.001$  levels. In Central province women who have primary and secondary plus education have 1.5 and 1.6 fewer children ever born respectively than women who have no education. On the other hand, in Nyanza province women who have primary and secondary plus education have 2.6 and 1.9 fewer children ever born respectively than women who have no education. The most interesting finding of this study is that women with primary education have much lower children ever born than women who have secondary education and above. In a nutshell, the study confirmed that high level of education is associated with low levels of fertility.

Wealth index is negatively and significantly associated with children ever born in the two regions. The relationship is statistically significant at  $p \leq 0.001$  levels for the two regions, especially for women belonging to high class of wealth index. Results of the bivariate analysis show that women from high wealth index household in Central province

have 0.8 fewer children ever born compared to their counterparts in low wealth index. In Nyanza province women from higher wealth index household have 1.4 fewer children ever born compared to their counterparts from low wealth index households. Since Central province is the region with higher percentage of households with high wealth index, this explains the variations witnessed in the two regions.

In the two regions, urban residence has a negative and significant relationship with children ever born. The relationship between children ever born and urban residence is statistically significant at  $p \leq 0.001$  levels for Nyanza province and  $p \leq 0.05$  for Central province. Women in Nyanza province living in urban areas have 1.1 fewer children ever born than their counterparts in rural areas, while in Central province women living urban areas have 0.5 fewer children ever born than their counterparts in rural areas. This could be as a result of accessibility to family planning services and information in urban areas compared to rural areas in both regions. These findings confirm the hypothesis that women living in rural areas have a higher fertility than their counterparts in urban areas as shown in other studies. However, urbanization is high in Central province compared to Nyanza province, a possible explanation for fertility differentials in the two regions.

Results of bivariate analysis show that women participation in labour force is negatively and significantly related to children ever born in the two regions. The relationship between children ever born and work status of women is statistically significant at  $p \leq 0.001$  levels for the two regions. Women who are working in Nyanza province are found to be having 1.8 fewer children ever born than women who are not working, while in Central province women who are working are found to be having 1.6 fewer children ever born than women who are not working. These results are consistent

with the theory of “role incompatibility” which states that women who are working are less likely to have more children compared to women who are not working because of time constraints of raising children and working.

The study has also shown that type of marriage is significantly related with children ever born for the two regions. The relationship between children ever born and type of marriage is statistically significant at  $p \leq 0.001$  levels for the two regions. In Nyanza province, women in polygamous unions have 1.7 more children ever born than women who are in monogamous marriages, while in Central province, women who are in polygamous marriages had 2.3 more children ever born than women in monogamous marriages. This is consistent with previous studies (Wasao, 2001 and Ezeh, 1997).

#### **4.3 Determinants of Fertility in Nyanza and Central Provinces**

Two separate multivariate analyses (one for Nyanza province and one for Central province) were performed. When all the independent variables and the number of children ever born were included in the regression model, R-square was 0.681 for Nyanza province and 0.638 for Central province. This means that the variables included in the models can explain the variations in the number of children ever born for Nyanza province by 68 percent ( $p \leq 0.001$ ) and 64 percent ( $p \leq 0.001$ ) for Central province. The F-statistic shows that the general models for the two regions are statistically significant at  $p \leq 0.001$  levels.

Results of multivariate analysis show that the key determinants of fertility in Nyanza province include women’s level of education, wealth index, place of residence, women’s current age, age at first birth, age at first sex, ever use of contraceptive, child-mortality, ideal number of sons, and marital status. In Central province on the other hand, the key determinants of fertility are wealth index, women’s current age, age at first birth,



age at first sex, child mortality, ideal number of sons, marital status, and type of marriage. Work status of women had no effect on fertility in both regions. The coefficients shown in table 4 below represent the net effect of each independent variable.

All the demographic/intermediate variables included in the study turned out to be significant determinants of children ever born in Nyanza province. In Central province, on the other hand, only ever use of contraceptive as a variable did not show significant effect on children ever born. The study reveals that there is a positive and significant effect on women's current age and children ever born. Like other studies, this study also found out that older women have significantly higher number of children ever born compared to younger women (Wasao, 2001; Gwebu, 1997). In Nyanza province women aged 25 years and above have 2.3 more children ever born ( $p \leq 0.001$ ) compared to those aged 15-19 years, while in Central province women aged 25 years and above have 1.3 more CEB ( $p \leq 0.001$ ) compared to women aged 15-19 years. The study did not establish any significant relationship for the category of women aged 20-24 in Central province, although in Nyanza province they have 0.3 more children ever born ( $p \leq 0.10$ ) compared to those aged 15 -19 years. Thus, the number of CEB increases with an increase in the age of the mother.

Age at first birth was also found to be negatively and significantly related to the number of children ever born. Just like had been hypothesised, women who start childbearing at an early age are more likely to have more children ever born compared to women who start child bearing at a later age. In Nyanza province, women who started childbearing at the age of 25 years and above have 1.5 fewer children ever born ( $p \leq 0.001$ ) compared to their counterparts who started child bearing at the age of 19 years and below.

**Table 4: Results of Multivariate Analysis for Determinants of Fertility in Nyanza and Central Provinces**

Variables of Study	Nyanza Province		Central Province	
	B	Std. Error	B	Std. Error
(Constant)	1.921	0.384	2.146	0.544
<b>Women's Current Age</b>				
15-19 Years (Ref.)				
20-24 years	0.300*	0.162	-0.149	0.185
25+ years	2.335***	0.176	1.342***	0.208
<b>Age At First Birth</b>				
≤ 19 Years (Ref.)				
Never given birth	-1.797***	0.175	-1.869***	0.203
20-24Years	-0.716***	0.127	-0.311**	0.115
≥25 Years	-1.499***	0.244	-0.955***	0.206
<b>Age At First Sex</b>				
≥20 Years (Ref.)				
No sex	-1.499***	0.231	0.474**	0.230
≤15 years	0.213	0.155	0.247	0.164
16-19 years	0.060	0.148	0.175	0.118
<b>Ever Use of Contraceptive</b>				
Never used a method (Ref.)				
Traditional method	0.627***	0.246	0.099	0.311
Modern method	0.321***	0.102	-0.041	0.154
<b>Child-Death Experience</b>				
No (Ref.)				
Yes	1.722***	0.114	1.483***	0.137
<b>Ideal Number of Sons</b>				
No son (Ref.)				
1-2 sons	0.238**	0.119	0.013	0.099
3 sons +	1.061***	0.149	1.059***	0.212
<b>Marital Status</b>				
Never married (Ref.)				
Currently married	0.316**	0.168	0.540***	0.170
Formerly married	0.421**	0.206	0.172	0.205
<b>Women's Level of Education</b>				
No education (Ref.)				
Primary	-0.922***	0.282	-0.373	0.440
Secondary +	-0.565***	0.148	-0.299	.224
<b>Wealth Index</b>				
Low class (Ref.)				
Medium class	-0.185*	0.118	-0.125	0.147
High class	-0.218*	0.127	-0.419***	0.137
<b>Work Status</b>				
Not working (Ref.)				
Working	0.017	0.104	0.032	0.108
<b>Place of Residence</b>				
Rural (Ref.)				
Urban	-0.356***	0.137	-0.192	0.121
<b>Type of Marriage</b>				
Monogamy (Ref.)				
Polygamy	-0.010	0.135	0.827***	0.294
<b>R-Square</b>	<b>0.681</b>		<b>0.638</b>	

Ref.: Reference \*\*\*p≤0.001, \*\*p≤0.05, \*p≤0.10

In Central province on the other hand, women who started childbearing at the age of 25 years and above have 0.9 fewer children ever born ( $p \leq 0.001$ ) compared to their counterparts who started child bearing at the age of 19 years and below. The complete family sizes appear to be strongly influenced by age at first motherhood. This finding is similar to findings of previous studies (Adhikari, 2010; Ngalinda, 1998). Late age at first birth shortens the reproductive period of a woman, which will consequently reduce the total number of children ever born (and vice versa). The mean age at first birth is lower in Nyanza province (18 years) compared to Central province where the mean age at first birth is 20 years. The differences in mean age at first birth and differences in proportions of women who initiate childbearing at the ages of 19 years and below in the two regions, clearly explains why there are wide variations in fertility levels between Nyanza and Central provinces.

Age at first sex has a negative and significant bearing on the number of children ever born. Results of the study show that women who have had no sex have 1.4 fewer children ever born in Nyanza compared to their counterparts who had their sexual debut at the age of 20 years and above. This is statistically significant at  $p \leq 0.001$  levels. This finding is similar to other previous studies (Mpangile *et. al.*, 1993). Results of the other categories show that women who had their first sexual debut at 15 years and below have more children ever born in both regions compared to those who had their first sexual intercourse at ages 20 years and above. However, this is not significant for both regions. Age at first sex is an important factor influencing fertility in modern world where marriages are no longer arranged and where sex before marriage is a prerequisite. The earlier age at first sexual intercourse exposes a woman to the risk of pregnancy with a

consequence to earlier age at first birth. Nyanza province has three times the number of women engaging in first sexual intercourse at ages below 15 years compared to Central province. On the other hand Central province has twice as many women engaging in sexual debut at the age of 20 years and above than Nyanza province. To this extent therefore, age at first sexual debut is associated with number of children ever born partly because age at first sexual debut determines how long a woman will be exposed to risk of pregnancy.

Results of the study reveal that ever use of contraceptive is a significant determinant of children ever in Nyanza province whereas it is not significant in Central province. Women who have ever used modern methods of contraceptives in Nyanza province have 0.3 more children ever born ( $p \leq 0.001$ ) compared to their counterparts who have never used any method. This positive effect of ever use of any contraceptive method on children ever born was also experienced when current use of contraceptives was included as an independent variable in the multivariate analysis on children ever born. These findings are contrary to findings of previous studies (Robinson, 1996; Kalipeni, 1995). A possible explanation for these results is that women in Nyanza province who ever used contraceptives have been married for a long period of time, are older and may have attained their required family sizes, and thus were using contraceptives to terminate childbearing. In addition, these women who ever used contraception could have been practicing more spacing. Alternatively, these women who have ever used contraceptive might have used the contraceptives and stopped altogether. For the case of Central province, women who have ever used modern contraceptives were having fewer children ever born compared to their counterparts who have never used contraceptives, although this was not significant. The insignificant effect of contraceptives use on children ever born

in Central province is due to the fact that many families and individuals (women) have embraced the culture of small family size.

As had been hypothesized, women who have experienced child death have more children ever born compared to those who have not experienced child mortality. Results of multivariate analysis show that child mortality has a positive and significant effect on the number of children ever born. In those mothers who experienced child death, the risk of having more children ever born increased by 1.7 in Nyanza province compared to 1.4 in Central province. All these are statistically significant at  $p \leq 0.001$  levels for both Nyanza and Central provinces. As the number of children who die increase, the risk of having higher fertility increases proportionally. Similar results have been documented in previous studies (Wasao, 1998). Child mortality is very high in Nyanza province compared to Central province, with current statistics showing that infant mortality is 95 and 42 for Nyanza and Central province respectively, and under-five mortality is 51 and 149 for Central and Nyanza province respectively (KNBS and ICF Macro. 2010). This study reveals that the number of women who have experienced child death is high in Nyanza province compared to Central province. The literature on the relationship between declines in child mortality and fertility posits that the long term effect of declines in child mortality on fertility decline is the acceleration of the latter by the former. This is because general improvements in health improves people's life chances and extend longevity for both adults and children. Where child mortality is high like the case in Nyanza province health care practices and nutritional status are very low, and hence couples tend to have high fertility because parents feel the need to have many children to be sure few survive, or to guarantee support for them during their old age. Women in Nyanza province see around them many child

deaths, and expect a high proportion of their children to die. Therefore, they ensure their family survival by having more children than they would if all children planned had a good chance of survival. This is what is called “insurance effect” of child death. By the same token, women in Central province have reduced their family size goals and use effective measures of fertility control because they practice and have access to good health care service and believe that virtually all children born will reach adulthood. This high child mortality in Nyanza province explains why the region has a high fertility compared to Central province.

The study revealed that ideal number of sons is an important predictor of children ever born. Ideal number of sons of three or more had a positive and significant effect on children ever born. Results from the multivariate analysis show that women who prefer three or more sons in Nyanza and Central province have 1.1 more children ever born than their counterparts who have no sex preference. All these were statistically significant at  $p \leq 0.001$  levels for both Nyanza and Central provinces. Women who prefer 1-2 sons in Nyanza province have 0.2 more children ever born ( $p \leq 0.10$ ) compared to women with no sex preference. However, there is no significant effect on women who prefer 1-2 sons in Central provinces. These findings are similar to other past studies (Susuman, 2006). In Nyanza province, it seems that boys contribute to the satisfaction of a greater number of values and needs than girls such as financial security, carrying on the family name, personal achievements, and being accepted by others. Because of the high poverty levels in Nyanza province, grown up sons are sources of income for the family and also for its stability. This desire for sons discourages women in Nyanza province from discontinuing childbearing after reaching their desired number of children because they have not yet had

their minimum desired number of sons. Central province on the other hand seems to have adopted the western lifestyle where all children are regarded equal and that parents do not have future expectation from their children for old age security. The number of women who prefer to have three or more sons in Nyanza province is four times that of Central province. This therefore, explains why Central province has low fertility compared to Nyanza province's high fertility.

Results of multivariate analysis reveal that marital status has a positive and significant effect on the number of children ever born in the two regions. Women who are currently married have 0.3 and 0.5 more children ever born in Nyanza and provinces respectively compared to women who have never been into any marital union. In the same vein, women who were formerly married in Nyanza province have 0.4 more children ever born ( $p \leq 0.001$ ) compared to women who have never been married. This finding is consistent with Bongaarts framework for analyzing proximate determinants of fertility (Bongaarts, 1978), which highlights that marriage is one of the four key intermediate determinants of fertility. The proportion of currently married women is high in Nyanza province compared to Central province, while the proportion of never married women is high in Central province compared to Nyanza province. Of greatest concern is that in Nyanza province both currently married and formerly married women reported more number of children ever born, while in Central province formerly married women had fewer number of children ever born compared to the currently married women.

In terms of socio-economic factors, wealth is the only determinant of children ever born in Central province; while education, wealth and place of residence are the key socio-economic determinants of children ever born in Nyanza province. A woman's work status

is not a significant determinant of children ever born in the two regions. Results of multivariate analysis show that education level has negative and significant effect on the number of children ever born in Nyanza province. However, it is not significant in Central province. In Nyanza province women who have primary education have 0.9 fewer children ever born ( $p \leq 0.001$ ) compared to their counterparts who have no education. Within the category of secondary and above education, women in Nyanza province have 0.6 fewer children ever born ( $p \leq 0.001$ ) compared to women who have no education. Findings of this study are similar to other previous studies (Adhikari, 2010; Sasuman, 2006; Mboup and Saha 1998; Wasao, 1998). Education exposes women to information, empowers women, makes them more likely to be employed outside their home environment, and makes them more aware of their own health and the health of their children – all of which are negatively associated with the number of children a woman will have during her reproductive life (Adhikari, 2010). Similarly, educated women are more likely to postpone marriage, postpone age at first birth, postpone age at first sex, have smaller family sizes, and use contraception than are uneducated women. The insignificant effect of education on children ever born is because education has permeated the entire Central region and every woman seems to have embraced low family size irrespective of their educational backgrounds. Education levels in these two regions vary with Central province reporting a higher proportion of women with secondary education and above compared to Nyanza province. In the same vein, Nyanza province has a higher proportion of women with primary education compared to Central province. This is a clear indication that women in Central province are more educated than their counterparts in Nyanza province, hence low number of children ever born in Central province compared to Nyanza province. The



hypothesis of “the higher the level of education of a woman, the lower the fertility levels” has been confirmed only in the case of Nyanza province.

Wealth index is also negatively and significantly associated with the number of children ever born. An inverse relationship was observed between wealth index and children ever born, with significantly lower CEB among the rich women compared to poor women. Results of the study reveal that women who belonged to high wealth index in Nyanza province have 0.2 fewer children ever ( $p \leq 0.10$ ) born compared to their counterparts in the low wealth index. In Central province on the other hand, women who belong to high wealth index have 0.4 fewer children ever born ( $p \leq 0.001$ ) compared to their counterparts in the low wealth index. This has confirmed study hypothesis that women from wealthy households have lower fertility than women from poor households. This result is also similar to other past studies (Adhikari, 2010; Karki, 1982). The reason could be that poor women may perceive children as a source of income, thus motivating them to have more children. Another reason could be that the poor women have less access to education and family planning methods. It is evident from this study that the proportion of poor women in Nyanza province is three times higher than that of Central province, a clear indication why fertility is higher in Nyanza province than it is in Central province.

Place of residence also show a negative effect on number of children ever born in the two regions, but is only significant in Nyanza province. That is, the study show that women who live in urban areas in Nyanza province have 0.4 fewer children ever born ( $p \leq 0.001$ ) compared to their counterparts in rural areas. This result is similar to many other empirical studies which have consistently shown that women in urban areas have lower fertility than their counterparts in rural areas (Adhikari, 2010; Wasao, 2001.; Wasao,

1998; Zarate, 1967). The hypothesis that “women living in rural areas have higher fertility than women living in urban areas” has been confirmed in Nyanza province. Urbanization reduces the demand for children by reducing preference for many children and lowering the prices of goods relative to children. In urban areas, the cost of raising children is relatively higher and the labour value of children is lower compared to rural areas because the basic inputs into child rearing (food, clothing, and schooling) are more expensive in urban areas. Urbanization may also translate into changes in fertility desires and outcomes in favour of smaller families because of the exposure to modern ways of thinking and values and better opportunities for individual self-advancement (Wasao, 1998). The other reason could be that urban women are more likely to use contraceptives than are rural women; therefore, the fertility levels in urban and rural areas tend to be different. The proximity of Central province to Nairobi city makes it more urbanized than Nyanza province with majority of the populace embracing the small family size values, hence the low fertility levels in Central province compared to Nyanza province.

Lastly, in terms of the socio-cultural factor (s), results show that type of marriage (the only socio-cultural factor studied) is a significant determinant of children ever born in Central province, whereas it is not a significant determinant of children ever born in Nyanza province. In Central province, women in polygamous marriages have 0.9 more children ever born ( $p \leq 0.001$ ) compared to women in monogamous marriages. This is consistent with previous studies (Wasao, 2001 and Ezeh, 1997). A possible explanation to this scenario is that polygamy places a woman in a bargaining position vis-à-vis each other and the husband, and that the only tool the woman can have to laying claim to property and inheritance from the husband are children (NAS, 1993). In addition, women in high

polygamous areas tend to start sexual intercourse early and have high fertility goals – a situation which is attributed to the competition effect, as young women in polygamous union would like to have as many children as possible to either compete with older wives of the same union or to satisfy the husbands need if the other wife is infertile (Ngalinda, 1998). Proportions of women in polygamous marriage are six times more in Nyanza province than in Central province, hence possible explanation of fertility differential in the two regions.

## CHAPTER 5

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.0 Introduction

This chapter presents the summary of the study findings, conclusion and recommendations for policy and further research.

#### 5.1 Summary

The general objective of the study was to examine determinants of fertility differentials among women aged 15-49 years living in Nyanza and Central provinces of Kenya. Specifically, the study was focused on investigating the effects of demographic, socio-economic and cultural factors in determining fertility in Nyanza and Central provinces. Data from the 2008-09 Kenya Demographic and Health Survey (2008-09 KDHS) of 1,318 and 973 women aged 15-49 years from Nyanza and Central provinces respectively were used. The study population consisted of all women aged 15-49 drawn from Central and Nyanza provinces; who had given numerical response to the question of total children ever born. The study was premised on John Bongaarts' (1978) framework for analyzing proximate determinants of fertility, which was adapted to suit the study objectives.

The dependent variable was total children ever born (CEB), while independent variables were women's education level, wealth index, place of residence, work status, women's current age, age at first birth, age at first sex, ever use of contraceptive, child-mortality, ideal number of sons, marital status, and type of marriage. Simple bivariate and multivariate linear regression analyses were the main methods of data analysis.

Results from bivariate linear regression analysis show that all the demographic, socio-economic and socio-cultural factors were significantly associated with children ever born in Nyanza and Central province. Results of multivariate analysis established that all the demographic/intermediate variables included in the study turned out to be significant determinants of children ever born in Nyanza province. In Central province, on the other hand, only ever use of contraceptive as a variable did not show significant effect on children ever born. In terms of socio-economic factors, wealth was the only determinant of children ever born in Central province; while education, wealth and place of residence were the key socio-economic determinants of children ever born in Nyanza province. A woman's work status as a socio-economic variable was not a significant determinant of children ever born in the two regions. In terms of the socio-cultural factor (s), results show that type of marriage (the only socio-cultural factor studied) was a significant determinant of children ever born in Central province, whereas it was not a significant determinant of children ever born in Nyanza province.

One of the interesting findings of this study was that, results from the Nyanza province showed that women who have ever used modern contraception were associated with higher fertility compared to those who have never used contraceptive. This could be because such women would be at a stage where they have attained their desired family size or are practicing more spacing.

## **5.2 Conclusion**

The comparison of determinants of fertility between Nyanza province and Central province was important because it cast light on the role of demographic, socio-economic and cultural factors on fertility levels in these two regions. From the results of this study,

the determinants of fertility in Nyanza and Central provinces are as would be expected from theoretical assumptions of fertility and from previous studies. However, distinctions have been observed as regards variables whose expected influence did not conform to previous studies. Even for studies that had been conducted in Kenya, it has been seen that not all variables conformed to expectations. For instance, Wasao (2001) found that women with higher fertility were significantly associated with higher use of modern methods of contraception than those with lower fertility.

None-the-less, the study established that factors such as education level, place of residence, wealth index, women's current age, age at first birth, age at first sex, ever use of contraceptive, experience of child death, ideal number of sons, and marital status are important and strong predictors that affect fertility in Nyanza province. While in Central province wealth index, women's current age, age at first birth, age at first sex, child-mortality, ideal number of sons, marital status, and type of marriage are significant predictors of fertility. Therefore, it can be concluded that programs should aim at reducing fertility by focusing on all these identified predictors so that fertility as well as infant and maternal mortality and morbidity can be decreased and the overall well-being of the family maintained and enhanced.

### **5.3 Recommendations**

The population growth rate of Kenya is 3.0 percent per annum. This population growth if not checked has serious implications for the country's long-term development. If not checked in time, it could negate the government's efforts to improve the living conditions of its citizens and make the realization of Vision 2030 a mirage. However much the government has developed population policies and boast of being the first sub-Saharan

African country to develop a population policy, much more remains to be done to fully comprehend and tackle problems related to population in Kenya. Individuals and couples need to be provided with more information and services to determine freely and responsibly the number and spacing of their children consistently with their needs, economic responsibilities and aspirations. But, above all, population factors have to be given greater attention and emphasis in development planning.

### **5.3.1 Policy Recommendations**

There are many policy issues that the government of Kenya needs to consider if it wants to reduce the high levels of fertility, especially in Nyanza province, in view of its overall socio-economic development. In order to reduce the high levels of fertility, the government should consider some specific measures that will incorporate integrated component of socio-economic development strategy.

The current contraceptive prevalence rate (CPR) of Central province stands at 67 percent of married women using some family planning method, compared to 37 per cent in Nyanza province (KNBS and ICF Macro, 2010). To increase the CPR of Nyanza province in an effort to reduce fertility levels in the region, the government should embark on a series of campaigns to create awareness, educate the masses, and persuade the population to accept the benefits of small family sizes. In a nutshell, the government needs to implement a strong family planning program in Nyanza province with vigour and political commitment to effect substantial fertility reduction.

Child mortality is one of the factors that stand out as a powerful predictor of total number children ever born. Measures taken to decrease childhood mortality will indirectly help in reducing fertility, especially in Nyanza province where infant and child mortality is

high as well as fertility. Special attention should also be given to provision of mass education to the populace on the benefits of child spacing as a way of curbing high infant and child mortality, which are important determinants of fertility.

This study also found that education has a negative and significant effect on total number of children ever born. Gains in female higher education lead to bigger gains in fertility reduction. This implies that a policy approach aimed at increasing the opportunities in higher education for girls, especially in Nyanza province would go a long way in ensuring that fertility decline is realized. Though efforts in regards to this area have been made during the last few years, there is still a wide gap in promoting women's empowerment at the grass root level. To this extent therefore, the government should improve girl child education if the goals of the current population policy have to be realized. Women should be given more opportunities to continue with education to higher levels. This will lessen early childbearing, as is the situation in the present case in Nyanza province. In addition, adequate education among women would act as a catalyst in changing their attitudes which currently favour large families.

The government should support programs that are aimed at integrating population issues into development process to foster rapid socio-economic development which ultimately results into wealth creation in these two regions. A lot of emphasis should be put on deliberate effort to skew resource allocation to Nyanza province. This will improve the living standards and trigger decline in number of children ever born.

Finally, it should be noted that another policy option is to address population momentum, which accounts for the bulk of future population growth in the developing world, Kenya in particular. The age structure cannot be changed quickly, but by delaying



number children preferred should be done and a comparison drawn with results of young women since our society is patriarchal and women's decision is over ruled by men, hence ensuring concerted efforts by both men and women applied in reducing total number of children ever born.

## References

- Adhikari, Ramesh (2010). Demographic, Socioeconomic, and Cultural Factors Affecting Fertility Differentials in Nepal. *BMC and Childbirth* 10:19
- Agadjanian, V. (2001). "Religion, Social Milieu, and the Contraceptive Revolution". *Population Studies* 55(1): 135-148.
- Arnold, F. and A. K. Blanc (1990). Fertility Levels and Trends. DHS Comparative Studies No. 2, Columbia, Maryland, IRD/Macro Systems Inc.
- Anyara, E. and Hinde, A. 2006. *Fertility Transition in Kenya: A Regional Analysis of the Proximate Determinants*. Southampton Statistical Sciences Research Institute Application & Policy Working Paper A06/03
- Askew, I.; Alex, E.; John, B. and John, T. (2009). *Kenya's Fertility Transition: Trends, Determinants and Implications for Policy and Programs*. Population Council. Nairobi
- Backer, G. S. (1960). An Economic Analysis of Fertility. *Demographic and Economic Change in Developed Countries*. Princeton, NJ: Prince University Press and NBER.
- Becker, G. S. and Lewis, H.G. (1974). Interactions between Quantity and Quality of Children. *Economics of the Family*, ed. T. W. Schultz. Chicago: University of Chicago Press.
- Bauni, E., Gichuhi, W. and Wasao, S. (2001). "Ethnicity and Fertility in Kenya" *Working Paper 7* APHRC
- Beguy, D. (2009). "The Impact of female employment on fertility in Dakar (Senegal) and Lome (Togo)", *Demographic Research* 20(1):97-128
- Blake, J. (1979). Is Zero Preferred: American Attitudes Toward Childlessness in the 1979's. *Journal of Marriage and the Family*, 4: 245-257
- Bongaarts, J. (1982). "The Fertility-Inhibiting Effect of the Intermediate Fertility Variables". *Studies in Family Planning*, 13(6/7):179-188.
- Bongaarts, J. (1978). "A Framework for Analyzing the Proximate Determinants of Fertility". *Population Development Review* 4(1): 105-132.
- Bongaarts, J. (1993). "Trends in unwanted fertility in Developing Countries". *Studies in family Planning* 28 (4): 267-277.
- Bongaarts, J.; Frank, O. and Lesthaeghe, R. (1984). "The Proximate Determinants of Fertility in Sub-Saharan Africa". *Population and Development Review* 10(3): 511-537
- Bongaarts, J. (2006). "The causes of stalling fertility Transition". *Studies in Family Planning* 37(1): 1-6.

- Bongaarts, J. and Watkins, S.C. (1996). "Social interactions and Contemporary Fertility Transitions". *Population and Development Review* 22(4): 639-682.
- Bumpass, L., R. Rifuss and R. Jonosik (1978): "Age and Marital Status at First Birth and Pace of Subsequent Fertility". *Demography* 15(1):75-80.
- Caldwell, J.C (1992). "Fertility Decline in Africa: A new type of Transition?" *Population and Development Review* 18(2): 211-242
- Caldwell, J. (1976): Toward a Restatement of Demographic Transition Theory. *Population and Development Review*, 2(3/4):321-366.
- Central Bureau of Statistics (CBS) [Kenya], Ministry of Health (MOH) [Kenya], and ORC Macro. 2004. *Kenya Demographic and Health Survey 2003*. Calverton, Maryland: CBS, MOH and ORC Macro
- Central Bureau of Statistics (CBS) [Kenya], Ministry of Health (MOH) [Kenya], and ORC Macro. 1999. *Kenya Demographic and Health Survey 1998*. Calverton, Maryland: CBS, MOH and ORC Macro
- Chan, Y. H. (2004). "Biostatistics 201: Linear Regression Analysis". *Singapore Med J* 45 (2): 55-61.
- Cohen, B. (1993). The Emerging Fertility Transition in Sub-Saharan Africa. *World Population* 26(8): 1431-1461.
- Davis, K. and J. Blake (1956): "Social Structure and Fertility: An Analytical Framework". *Economic Development and Cultural Change* 4(2):211-235.
- Dejene, N. (2000). Impacts of some socio-demographics on fertility in urban Addis Ababa: OLS and Tobit analysis. *JESA*, 1:49-77.
- Ezeh, A.C. (1997). "Polygyny and Reproductive Behaviour in sub-Saharan Africa: A contextual Analysis". *Demography* 34(2): 355-368
- Easterlin, Richard A. (1978). The Economics and Sociology of Fertility: A Synthesis in C. Tilly (ed.), *Historical Studies of Change in Fertility*. Princeton University Press.
- Gujarati, D. (1992). *Essentials of Econometrics*. McGraw-Hill, Inc. Singapore
- Gwebu, T.D. (1997) "Intra-Rural Fertility Determinants in Zimbabwe: A Path Analysis" Department of Environmental Science, University of Botswana, Gaborone.
- Hassan, K. E (1996). *Regional Differentials in Fertility: Current and Cumulative Level Analysis*, Egypt, 1980-1993
- Kalipeni, E. (1995). "The Fertility Transition in Africa". *Geographical Review*, 85(3) 286-300

Karki, Y.B. (1982). "Fertility and the value of children: A study of rural and urban populations in Nepal". *A Ph.D.Thesis: London School of Economics, London.*

Kenya National Bureau of Statistics (KNBS) and ICF Macro. 2010. *Kenya Demographic and Health Survey 2008-09*. Calverton, Maryland: KNBS and ICF Macro.

Kenya National Bureau of Statistics (KNBS) 2010. *2009 Kenya Population and Housing Census: Population Distribution by Administrative Units*. Nairobi: KNBS.

Kenya National Bureau of Statistics (KNBS) 2008. *Well-Being in Kenya: A Socio-Economic Profile*. Nairobi: KNBS.

Khasian, S. A. and Ayiemba, E. (2005). "Socio-economic Correlates and Determinants of Fertility and Contraceptive Use in Kenya 1993-2003". *Working Paper 3 NCAFD*

Kimani, M. (2005). "Fertility Change in Kenya, 1998-2003: The Role of Socio-economic Change and Proximate Factors". *Working paper 1 NCAFD*

Mboup, G. and T. Saha (1998), *Fertility Levels, Trends and Differentials*. DHS Comparative Studies, No. 28. Calverton, MD: Macro International.

Mhloyi, M. M. (1986). Fertility Determinants and Differentials: The Case of Kenya and Lesotho. *Zambezia*, 13 (2): 81-107

Mpangile, G.S., M.T. Leshabari, and David J. Kihwele (1993). Factors Associated with Induced Abortion in Public Hospitals in Dar es Salaam, Tanzania. *Reproductive Health Matters* (Oxford), 2(1): 21-31

Munro, B.H. (2005). *Statistical Methods for Health Care Research*. Philadelphia. Lippincott Williams & Wilkins.

Mturi, A. J, and Hinde, A. (2001). "Fertility Levels and Differentials in Tanzania". A paper presented at the Workshop on Prospects for Fertility Decline in High Fertility Countries, New York, 9-11 July 2001.

National Academy of Sciences (NAS). (1993). *Demographic change in sub-Saharan Africa*. Washington DC. National Research Council

National Coordinating Agency for Population and Development (NCAFD) 2010. *State of Kenya Population 2009. Population Dynamics and Climate Change: Implications for the Realization of the MDGs and the Goals of Vision 2030*. Nairobi. NCAFD.

Ngalinda, I. (1998). Age at First Birth, Fertility and Contraception in Tanzania. *Unpublished PhD Thesis* University of Berlin

Onuoha, N. (1992). Contributions of the Proximate Determinants to Fertility Changes in Senegal. *Soc Sci Med*, 35(100): 1317-1320

- Oucho, J. O. (1994). "Kenya's Population Policy and Programmes: From Skepticism to Credibility". Paper presented to the First Conference of the Population Association of Kenya (PAK) on Demographic Prospects for Kenya in the 1990s, 1-9 November 1994, Machakos, Kenya.
- Park C., Han S. and Choe M. (1979). The effect of infant death on subsequent fertility in Korea and the role of family planning. *American J Pub Health*, 69(6):557- 565.
- Peng, T. N (2002). "Social, Economic and Ethnic Fertility Differentials in Peninsular Malaysia" Paper presented at the IUSSP Conference on Southeast Asia's Population in Changing Asian Context, held at the Siam City Hotel, Bangkok, Thailand, 10-13 June 2002
- Population Reference Bureau (2011). *2011 World Population Data Sheet*. Washington
- Poston, D.L. and Micklin, M. (ed.) (2005). *Handbook of Population*. Kluwer Academic/Plenum Publishers, New York.
- Preston, S. (1975). Health Programs and Population Growth. *Population and Development Review* 1(2): 189-199
- Ranson, Gillian (1998). Education, Work and Family Decision Making: Finding the Right Time to Have a Baby. *Canadian Review of Sociology and Anthropology*, 35(4): 517-533
- Regassa, N. (2007). "Socio-economic Correlates of High Fertility among Low Contraceptive Communities of Southern Ethiopia". *J. Hum. Ecol.*, 21(30): 2003-213
- Robey, B., S.O. Rutstein and L. Morris (1992). Reproductive Revolution: New survey Findings. *Population Reports* (Maryland, Series M, Number 11.
- Robinson, W. C. (1992). Kenya Enters the Fertility Transition. *Population Studies* 46(3): 445-457
- Siripirom, C. (1982). "Fertility Studies and Influence of Wife's Employment on Family Decesion-making Patterns: A Family Planning Perspective". *Research Report 90* SEAPRAP Research
- Shapiro, David and Tambashe B.O. (1997). Education, Employment and Fertility in Kinshasa and Prospects for Change in Reproductive Behavior. *Population Research and Policy Review*, 16(3):257-287
- Sherris, J.D., K.A. London, S.H. Moore, J.M. pile and W.B. Watson (1985). The Impact of Family Planning Programs on Fertility. *Population Reports* (Maryland), Series J, Number 29.
- Susuman, A. S. (2006). "Son Preference and Contraceptive Practice Among Tribal Groups in Rural South India". *Stud. Tribes Tribals*, 4(1): 31-40

Tesfaghiorghis, M. (1995): "Fertility Change and Differentials in Kiribati." *Working Papers in Demography* 55. Research School of Social Science, The Australian National University

United Nations (1983). *Manual X: Indirect Techniques for Demographic Estimation. Population Studies, No. 81. New York*

Van Ginneken, J. K. (1974). Prolonged Breast-feeding As A Birth Spacing Method. *Studies in Family Planning* 5: 177-206

Wasao, S. (2001). "A Comparative Analysis of the Socio-economic Correlates of Fertility in Cameroon and the Central African Republic". A paper presented at the Workshop on Prospects for Fertility Decline in High Fertility Countries, New York, 9-11 July 2001.

Wasao, S. (1998). "Some Socioeconomic Correlates of Fertility in Kenya – A District Level Analysis". APHRC. New York: Population Council

Weeks, R. John (1999). *Population: An Introduction to Concepts and Issues*. Wadsworth Publishing Company, Belmont, California.

Weerasinghe, D. P. and Nicholas, J. P. (2002). Effects of Wealth on Marital Fertility in Sri Lanka. *J Health Popul Nutr*, 20(2): 112-119.

Whelpton, P.K., Campbell, A.A., Patterson, J.E. (1966). *Fertility and Family Planning in the United States*. Princeton University Press. Princeton.

Zarate A.O (1967). Some Factors Associated with Urban-Rural Fertility Differential in Mexico. *Population Studies*, 21(3): 283-293.

