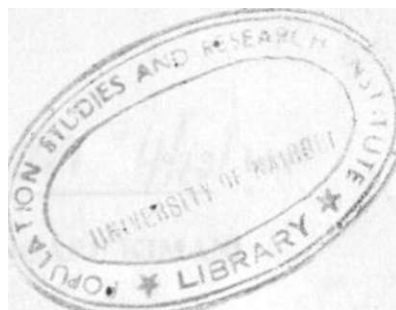


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**THE DETERMINANTS OF FERTILITY AMONG URBAN AND RURAL
WOMEN IN KENYA //**

BY

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**A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF ARTS (M.A.) IN POPULATION STUDIES AT THE
POPULATION STUDIES AND RESEARCH INSTITUTE, UNIVERSITY OF NAIROBI**

SEPTEMBER. 2001

DECLARATION

This thesis is my original work and has not been presented for a degree award in any other university.

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DEDICATION

To my husband Patrick B. Owiny, my loving sons Stephen Billy Odhiambo and Kevin Ochieng', my father John Ombidi, my mother Paskalia Ombidi, and to the renowned statistician the late Stephen Odhiambo Awino. For the love of God in you for me.

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At some stages, the progress of this work proved rather slow and discouraging. I sincerely thank my husband Patrick Owiny, my father John Ombidi, my mother Paskalia Ombidi and other family members as well as friends for their patience, varied assistance and constant prayers for me throughout these critical times.

Most of all, I thank God for the abundant life and strength He endowed upon me and my family throughout this course.

ABSTRACT

This study is a build-up on the findings of other studies, censuses and surveys in Kenya whose results reveal that rural fertility has been consistently higher than that of the urban (Kangi, 1978; Omagwa, 1985; Osiemo, 1986; Ong'uti, 1987; the 1969 and 1979 National Population Censuses; KDHS 1989 and 1993; KCPS, 1984). Recent findings indicate that the country's TFR is 5.4 children per woman against the expected 3.4 (see table 1.1a), and that on average a rural woman has 5.8 children as opposed to 3.4 for her urban counterpart (NCPD *et al*, 1994:21). The major objective of the study was to determine the factors which contribute to urban-rural fertility differentials, then generate policy and research recommendations based on the findings.

The major source of data for this study was KDHS, 1993. It was one of the latest and most detailed surveys so far conducted in Kenya. The sample size was a total of 7540 women aged 15-49 years of whom 15% lived in the urban areas while the remaining 85% were rural dwellers. A series of important socio-economic, demographic, socio-cultural and Family Planning (FP) factors formed the basis for the independent variables which included female (mothers') education, work status, marital status, age at first marriage, under-five mortality, ethnicity, religion, and access to the nearest FP service out-let in terms of time (minutes) to get to source. The dependent variable was children ever born (CEB) while contraception served as the proximate variable.

The study used various statistical methods ranging from frequencies and percentages, cross tabulations with chi-square, to simple and multiple regression analysis. These techniques, while fairly easy to understand and apply, proved most comprehensive and exhaustive in producing the expected results. All the study variables were tested at 0.05 level of significance.

The study has revealed that fertility differentials exist between urban and rural areas in Kenya and that fertility is higher in the rural. As shown in table 4.1, whereas 24.4% of the rural women had 6+ children, only 9.2% of the urban women had the same number of children. Of the variables which had positive relationship with CEB, age of the mother at 35+ years had the strongest significant influence on CEB followed by under-five mortality and the married category of marital status in both urban and rural areas. Their impact was, however, generally greater in the rural suggesting higher fertility for rural women. Late age at marriage and secondary- education were found to be the major factors in fertility reduction, but with greater influence in the urban explaining the low fertility that characterise urban areas. Contraception had reducing effect on CEB in both areas, but its depressing effect was strongest for women with secondary- education and lived in the urban, while minimal in the rural except among the highly educated. Results indicate that against the initial purpose of spacing births, most Kenyan women tend to use contraceptives basically to terminate births after getting enough children as security against child loss, hence contraception was found more popular among women with many children. It is no wonder that under-five mortality has been singled out by this study as a barrier to success of contraception in fertility reduction attempt.

Most of the independent variables considered in this study tended to have more impact in the rural areas. In the absence of proximate determinant (contraception), the variation in CEB explained by all the independent variables together was 63.9% and 72.8% respectively for urban and rural areas. Together with contraception, the variation explained rose to 65.9% in the urban and 73.4% in the rural, showing greater impact of contraception in the urban. However, demographic variables explained the bulk of the observed explained variations in CEB, 63.3% for urban and 72.3% for rural. It is an interesting finding of this study that while urban areas had the advantage of better education, late age at marriage, fewer incidences of child loss and limited attachment to ethnic dictates which are characteristic of low fertility, the scenario was relatively

different in the rural where fertility was found higher and attributed to low level of education, greater concentration of the married and high parity women (aged 35+ years), early age at marriage, more deaths to children aged below five years, affiliation to ethnic and religious beliefs and practices, being far (60+ minutes) away from the nearest FP outlet, and minimal use of contraception.

One major conclusion that can be derived from the study results is that secondary+ education is paramount in fertility reduction. Thus, this study recommends increase in school enrolment for girls, and creation of more employment and training opportunities in the rural areas. Further, efforts should be made to promote Reproductive Health Education in schools to enable the youth to understand the dangers of high population and to develop a more positive attitude towards limitation of family size as a primary step to development.

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 INTRODUCTION

The human race has sustained itself over the decades through the mechanism of fertility. However, the question of numbers vis-a-vis development has been a major concern of many countries - developed and developing. Half the world has made the demographic transition. In the other half, rapid population growth is deteriorating the environment and lowering living standards (Lester and Jodi, 1987:38-47). It is of course true that high fertility and the consequent high population growth is not the primary cause of lack of economic development and low levels of living which characterize much of the third world, but high fertility levels do exacerbate underdevelopment and make the prospect for development and enhancing the quality of human life much more remote. Naturally, governments' attitudes towards fertility levels and trends vary with their own demographic, economic, political and cultural circumstances. However, for many world developing countries, the paramount challenge is to check population growth and bring it into balance with resources.

Various findings indicate that developing and sub-Saharan African countries have the highest fertility levels by world comparison, with an accompanying low development standards. In Kenya, the rate of population growth increased from 3.3 percent per annum between 1948 and 1962 to 3.9 in 1979 (CBS, 1979). It was one of the highest in the world. Studies carried out in Kenya indicate that fertility is high (Som, 1968; Blacker, 1971; Mwobobia, 1982). The various surveys and censuses conducted in Kenya have also revealed high fertility level though with a declining trend, as shown in Table 1.1a below.

Table 1.1a: Total Fertility Rates (TFR) for Kenya from 1977-1993 Censuses and Surveys

Year	Survey/Census	TFR
1977	NDS	8.0
1978	KFS	7.9
1979	CENSUS	7.6
1984	KCPS	7.7
1989	KDHS	6.7
1993	KDHS	5.4

Source: NCPD *et al*, 1994, Table 6.8, p. 82.

On the basis of census statistics, Kenya's population increased from 5.4 million in 1948 to 15.3 million in 1979 and to 21.4 million in 1989 (NCPD *et al*, 1994:2). Results of the 1989 census indicate that the intercensal population growth rate for Kenya is 3.4 percent per annum. This represents a modest decline from the growth rate of 3.9 percent per annum estimated from the 1979 population census. This figure is however, still above the target of the five year (1974-1978) Family Planning Programme whose goals were to reduce the high annual rate of natural population increase from 3.3 percent (in 1975) to 3.0 percent (in 1979), and to improve the health of mothers and their children under age five as an aspect of the achievement of "Health for all by the year 2000" as stipulated in the Alma Ata Declaration of 1978. If the population continues to grow at this rate, the population of Kenya will increase to 30 millions by the year 2000 (NCPD *et al*, 1994:2-3).

Any country is heterogeneous in terms of her sub-regions; the country's population is no exception. Type of place of residence, for example, could influence people's way of life as well as their reproductive performance. In Kenya, residence can be categorised broadly as urban and rural. The categories of people who inhabit each of these areas could also be isolated on account of various characteristics such as age.

A general overview of Kenya's population by age and residence from the point of view of

a sample of 7540 women of reproductive age (15-49 years) interviewed in KDHS 1993 (and used as the sample for this study) portrays Kenya as a country of youthful majority, dominated by rural residence. According to the sample, 1161 (15.4 percent) women of reproductive age lived in the urban areas while 6379 (84.6 percent) were rural residents.

With respect to fertility, the question of uniformity in birth rates among the various population segments is asked almost universally. In many countries, however, variability in fertility has been a reality. In Kenya, according to KDHS 1993 report (NCPD *etal*, 1994:21), the total fertility rate (TFR) was estimated at 5.4 births per woman. However, the rates are not uniform across regions and groups in the country. Fertility differentials are experienced between and within the country's various regions, and may be attributed to socio-economic/cultural, demographic and biological factors among others. As this source reveals, differentials have been particularly pronounced between urban and rural areas, with rural areas exhibiting higher fertility (5.8 births per woman) compared to 3.4 for urban. This pattern has proved persistent in the various earlier studies, censuses and surveys that have been carried out in the country (KFS 1977/78; CPS 1984; the 1969 and 1979 census; NCPD *etal* 1990; Kangi (1978); Omagwa (1985); Osiemo (1986); Ong'uti (1987), among others. However, compared to earlier findings reported in table 1.1b below, the present estimates reveal a decline, but fertility is still higher in the rural areas.

Table 1.1b: Estimates of Total Fertility Rates for urban and rural areas, Kenya, 1977-1993

Surveys	Year	Urban	Rural	Total
KFS	1977/78	6.8	8.4	8.2
KCPS	1984	5.3	8.1	8.1
KDHS	1989	4.8	7.2	6.7
KDHS	1993	3.4	5.8	5.4

Source: KDHS 1989 and 1993 reports; KFS 1977/78 report, KCPS 1984 report.

This study is a build-up on the findings of the above named studies, censuses and surveys which maintain that more children are born in rural than urban areas. The study is an attempt to find out the factors which account for the variations in birth performance among urban and rural women in Kenya. The influence of the following factors on urban-rural fertility differentials has been investigated: education of the mother, work status, age of the mother, age at first marriage, marital status, under-five mortality, ethnicity, religion, access to family planning (FP) service (time to get to source), and use of contraception.

1.2 THE STATEMENT OF THE PROBLEM

The concern for Kenya has been to reduce the level of her fertility for better development and health for the people. This is a concerted effort towards attainment of the World Health Organization's goal of "Health for all by the year 2000" as stipulated in the 1978 Alma Ata Declaration in Russia and anticipated through the working of the elements of primary health care. Among the major intervention procedures are the dissemination of information on Reproductive Health and use of birth control methods. Although a declining trend is evidenced over the years (Table 1.1a), the minimum target has continued to be elusive. Fertility level is still high with total fertility rate (FTR) of 5.4 children per woman against the desired rate of 3.4 (NCPD *et al*, 1994:82). The implication is a retarded development despite the government's effort to improve the standard of living using the available limited resources.

Based on this problem, the major question addressed in this study is: "Are all segments of the population bearing children at the same rate, or do some segments have higher birth rates than others?" Viewing this question from the perspective of related findings, fertility is higher in the rural than urban areas. According to KDHS 1993, which is the data source for this study, total fertility rate (TFR) was reported as 5.4 for the country, 3.4 for urban, and 5.8 for rural. In a juxtaposed analysis of urban and rural areas, this study investigates the contributing factors to the

differences in birth performance between urban and rural women in Kenya. This approach is intended to promote a more realistic view for planners, policy makers and researchers not only in appreciating the similarities and /or differences between the two areas but also in addressing fertility issues in the country as an aid to improved development.

Findings from other parts of the world have tended to give a clear-cut difference between rural and urban fertility levels. In the developed countries, low levels in urban fertility have been associated with a complex process of industrialization, modernization and economic development (United Nations, 1973: 81). Studies done in Africa, however, reveal inconsistencies in rural-urban fertility levels; some have shown higher fertility in the urban than rural areas, others have indicated the reverse while a few have found no such variations (Cohen, 1975:38-56).

One problem lies with the definition of **urban** and **rural** hence the difficulty of accurate placement of data to determine the exact urban and rural fertility levels. Although the existing findings in Kenya have consistently revealed higher rural fertility, it might be futile to conclude that Kenya suffers no urban-rural spatial definitional problem, hence the need for more studies in this area.

1.3 OBJECTIVES

The aim of this study is to examine the factors which account for the differentials in fertility among rural and urban women in Kenya, and produce an appropriate report for planning purposes.

The specific objectives of this study are:

1. To determine the various socio-economic, social-cultural, demographic and family planning factors which account for fertility differentials among rural and urban women in Kenya.
2. To show the direction and strength of the relationship between each selected independent variable and the dependent variable.

3 To provide population planners and policy makers with appropriate recommendations based on the findings.

1.4 RATIONALE

Fertility levels and differentials in Kenya have been studied by many scholars. At the University of Nairobi's Department of Population Studies and Research Institute, for example, Kangi (1978) studied it with reference to Nairobi and Central Province; Osiemo (1986) generally looked at fertility differentials at National, provincial and district levels; Omagwa (1985) studied the same with reference to Nairobi; while Onguti (1987) looked at general estimates in the country. Although these studies have revealed lower fertility levels in the urban than rural areas, these conclusions have only been based on generalizations. So far it is apparent that very minimal attention has been paid on the specific circumstances which surround urban and rural life *per se* and their contribution to such differentials. This study is an attempt to compare rural and urban fertility by analysing the effect of selected independent variables on birth performance of urban and rural women so as to provide a basis for explanation of the existing differences.

The above named studies have used various data sets to analyse fertility levels and differentials in Kenya. Kangi, Osiemo, Omagwa, and Ongu'ti (ibid) used data from 1969 census, 1969 and 1979 censuses, 1969 census, and KCPS 1984 respectively. However, since fertility is dynamic in nature, no single study and/or data set can claim to be exhaustive enough in fertility analysis. This study, therefore, seeks to analyse the determinants of urban-rural fertility differentials using one of the most recent data, KDHS 1993.

Many studies done on fertility levels and differentials in Kenya have been general on regions without focusing on the specific sex of the population whose behaviour and attitude could be more detrimental in fertility motives. This study targets urban and rural women concurrently and examines how their varied backgrounds influence their child-bearing

performance.

Fertility, being a dynamic phenomenon, is of interest to planners, policy makers as well as demographers. The knowledge of the factors which account for the differentials in urban-rural fertility is a necessary basis for development strategies. Such a study would therefore be an aid to focused resource allocation. This study is useful for this purpose since its findings would determine the most deserving area liable for further attention in relation to fertility reduction attempts aimed at improved standards of life.

1.5 SCOPE AND LIMITATION OF THE STUDY

1.5.1 Limitation of the Data

A major limitation of the data is incomplete coverage. The 1993 KDHS, though national in nature, did not cover three districts in North Eastern Province, two in Rift Valley and two others in Eastern Province, which form 4 percent of Kenya's population. Although this proportion is minimal and may not grossly effect the result of urban-rural fertility differentials, the survey data cannot claim total representation.

1.5.2 Scope and Limitation of Analysis

The variables which are useful in the analysis of urban-rural fertility differentials are many and varied. It is not feasible to investigate all of them in a single study of this nature. The study therefore focuses on the major variables namely; female education, work status, marital status, age at first marriage, under five mortality, ethnicity, religion, family planning availability and accessibility, and contraception as basic for this analysis. The exclusion from the study of such complementary variables as duration of marriage and duration of residence could be a short-coming of this study. However, this is a necessary gap for future investigators should there be inadequacies in any present studies which have perhaps considered them.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Literature Review

The number of births is an important component of population growth rate as are deaths and international migrants. However, in the Kenyan context, fertility is the main contributor to population growth. Various studies and available literature indicate that high fertility is one of the major problems of mankind today. It is seen as the main cause of slackened economic and social development, poverty, low level of living and a wide array of social problems that characterise many developing countries. They point out that many less developed countries have exhibited, during the last decades, similar or even higher rates of economic growth than those exhibited by the currently industrialized countries when they began the process of socio-economic development. Nevertheless, rapid population growth resulting from high fertility has nullified such economic growth and many such countries have had to "run fast to stand still" in order to provide the same basic services to a large number of people (UN, 1993:19).

In view of the above picture, most world countries are struggling to reduce their fertility levels and some have actually made a transition. However, experience has shown that even within one country, fertility change has never been uniform in all sections of the population.

This chapter presents a brief literature on what different findings have revealed about fertility experience of various world countries and how fertility is seen to relate to other variables to elicit the observed variations. The emphasis, however, is on the contributing factors to the existing differentials in fertility levels in urban and rural areas.

2.1.1 Fertility differentials - a Global view

From a global context it has been observed that urban-rural fertility differentials exist in

both the developed and the less developed countries (Kuznets, 1974). Kuznets however points out that the difference is minor in the less developed countries than it is in the developed regions.

He attributes this to the fact that most of the urban areas in the less developed countries are not as urbanised as those in the developed countries, and therefore they are not very different from their respective rural areas. Besides, urban centres in the developing world consist of recent migrants who still retain ties with their rural homes which is not the case in the developed world (Robinson 1961: 218-234; Iutaka et al, 1971:62)

2.1.2 Urban-Rural Fertility Differentials in the Developed Countries

A review of urban-rural fertility differentials in the developed countries reveal a long period of persistence. Johnson (1960:36-76) argues that differences in the reproductive behaviour between rural and urban women were evident in Sweden as far back as mid 18th century, while in England and Wales it has been in existence since 1950. In the United States urban-rural fertility differentials were observed as far back as the colonial times.

Studies done on urban-rural fertility differentials in the West have tended to associate lower urban fertility with modernization. According to the UN (1989:81), the historical decline of fertility in the West is generally attributed to a complex set of factors related to the process of modernization, economic development, industrialization and urbanization. Thus it is believed that urbanization is associated with certain life styles that tend to initiate and promote the desire for smaller families.

2.1.3 Urban-Rural Fertility Differentials in the Developing Countries

Studies done in the developing world have shown that an urban-rural fertility differential exists. In Latin America, various findings indicate that rural women are more fertile than the urban women (U.N. 1973). The same also holds true for most studies done in Asia, with a

conclusion that fertility in these regions are subject to the differential effect of urbanization in as much the same way as in the industrialized countries of the west

In Mexico, Burnight (1956:3-8) showed that differences in fertility existed between the rural and urban communities with the urban centres having lower fertility than the rural areas. The same conclusion was also arrived at by Robinson and Robinson (1960:77-81), but with a demonstration which revealed that the gap between rural and urban fertility differentials in Mexico had narrowed considerably due to the increase in fertility in the urban centres. Similar findings were also made by Feraado (1974) in a study of Sri Lanka using data from 1963 and 1970 censuses. He found urban women to have lower fertility than rural women.

Findley and Orr (1978) studied urban-rural fertility variations using World Fertility Survey data. The result was lower urban fertility (4.95 births) as opposed to the high rural fertility (6.35 births per woman). As part of their findings, they also discovered that the larger the city, the lower the level of fertility in Asia and Latin America but not in Africa.

2.1.4 Urban-Rural Fertility Differentials in Africa

Findings from Africa still reveal high fertility in most countries, although with a declining trend. A review of World Fertility trends indicate that among the less developed regions, total fertility rate for the period 1990-95 is highest in Africa (5.8) followed by Latin America and the Caribbean (3.1) and Asia (3.0) (UN, 1995:7). Earlier projections had indicated that Africa's total fertility rate (TFR) for the period 1985-1990 was 6.2 compared to 3.9 and 1.9 for the less developed and the more developed countries respectively (UN, 1989:150). This implied that the fertility for Africa was about 3.3 times higher than that of the more developed regions.

Further analysis show that sub-Saharan African countries contribute more to high fertility levels in Africa, with Eastern and Western Africa having the highest levels. Kenya's fertility rate, for example, though on the decline, is still quite high with a total fertility rate of 5.4 children

per woman (NCPD *et al*, 1994:82).

Despite the existing fertility declines in Africa, differences exist both among the countries and within each individual country. With reference to urban-rural fertility differentials, the existing studies are rather inconsistent. While some studies have found higher fertility in the rural than urban areas, the reverse has been true in a few other studies, and others have even found no difference in fertility between urban and rural areas. For example, Cohen (1975:38-56), using data from French speaking countries of Africa, identified Congo, Gabon and Upper Volta as countries with higher urban than rural fertility; Chad and Senegal as having similar rural and urban fertility; and Mali, Guinea and Togo as those with lower urban than rural fertility. However, most studies have shown higher fertility in the rural than urban areas.

Most of the pioneer work in Africa on urban-rural fertility differentials was done by Caldwell (1967) mainly in Ghana. In one of his studies, Caldwell identified that fertility in various female age groups varied in urban areas from one-half (1/2) to one fifth (1/5) below the fertility found in rural areas (Caldwell, 1967:96-99). He also observed that lower fertility in urban areas could be attributed to the fact that many migrant mothers tended to leave their children in the rural areas. However, he treated this as a minor cause, and emphasised delayed female marriage and use of contraceptives by urban females as the two salient factors responsible for lower urban fertility in Ghana.

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Olusanya (1969:363-378), in a study of Nigeria, found that rural women were more fertile than urban women, with the mean number of children ever born of 2.21 and 2.47 for each urban and rural woman respectively.

In Tanzania, it was observed that the averaged parities for different age groups were apparently lowest in Dar-es-Salam, higher in the rural areas and only moderately higher in small urban settlements (U.N, 1979:244). Similar findings were made in a study of Ghana revealing higher rural than urban fertility (Gaisie, 1979:13).

In Kenya, Anker and Knowles (1977) found that the total fertility rates in urban areas were reasonably lower than they were in the surrounding rural areas. They showed that Nairobi had a total fertility rate of 5.5 while the surrounding areas of Central Province had 8.5. In their study, they also noted that the mean ideal family size for Kenyan urban areas was 6.79 children compared to 6.84 for the rural areas. They then concluded, based on their study findings, that Kenya has a definite urban-rural fertility differential.

Another study of Kenya by the Central Bureau of Statistics found that urban women were 16 per cent less fertile than the rural women (CBS, 1984:46). The same source found a higher mean parity for rural than urban women. By implication, it is evidenced in these studies that modernization and/or urbanization influences fertility negatively.

2.1.5 The Relationship between Fertility and Other Variables

Differences in fertility as among urban and rural women have been attributed to the existing differences in the demographic, socio-economic, socio-cultural and environmental conditions found in these areas (Ocholla-Ayayo, 1991). In specific, such variables as educational level, work status, contraceptive use, place of residence, age at marriage, marital status have been considered in such analysis. In this unit, a brief review of the literature which relates fertility with some of these variables is presented.

2.1.5.1 Fertility and Female Education

Many studies have revealed an inverse relationship between female education and fertility. In a study of United States, Blake (1967) found out that education is inversely related to fertility. In her study, a comparative analysis of fertility performance of women with a college education and those with elementary education, revealed that the latter group had completed families that were about 50 per cent larger than that of the former. Even after controlling for age,

religious affiliation and farm or non-farm residence, she still found that in all groups the respondents with a grade school education preferred larger families than those with more education.

In a similar study carried out in Turkey by Farooq and Tuncer (1972), it was found that the level of education of married female had the greatest effect in depressing fertility

In Brazil, a study by Kogut (1974) and Rodgers (1975) also confirmed that an inverse relationship exists between female education and fertility.

In view of the above findings, the main argument in favour of education has been that education delays entry into marriage and reduced permanent exposure to the risk of childbearing. It also promotes favourable attitudes towards birth control, quality children and better communication between husband and wife (Cochrane, 1979:4). Cochrane however observes that a clearer inverse relationship between education and fertility is evidenced more in the developed than developing countries. Nevertheless, many studies in the developing world have confirmed existence of an inverse relationship between education and fertility. For instance, in Kenya, findings from the 1969 population census, and the Kenya Fertility Survey 1977/1978 indicate that fertility varies according to the woman's level of educational attainment (KFS 1977/78:34). An inverse relationship between the high level of education and fertility in Kenya is also evidenced in studies carried out by Anker and Knowles (1983).

A number of studies have also realised a positive relationship between low education and fertility. In Tanzania for instance, Henin (1973) found that more years of education results in lower fertility for single women even when women were classified by religion, but when education for all women was considered, those women with 1-4 years of education had higher fertility than women with no education. Fertility only declined after the fourth (4th) year of education. Similar observations were made in a study done by Tawiah (1984) on determinants of cumulative fertility in Ghana in which it was evidenced that illiterate women have 13 more

children than their counterparts with post-middle education while those with primary education had virtually the same fertility as the illiterate women.

Despite the above cited variations, clear evidence of inverse relationship between education and fertility exists. In Ghana, for example, Gaisie (1979) confirmed existence of a negative relationship between educational status and fertility in both rural and urban areas. According to his study, urban women with some primary education had fewer children than their counterparts with no formal education. He further noted that the primary school level women residing in the rural areas had higher fertility levels than those women with no formal education. This implies that there is a significant role played by place of residence with relation to how certain factors such as the ability to read and write effect fertility performance of various categories of women.

2.1.5.2 Fertility and Work Status

Numerous studies have shown an inverse relationship between women's participation in the labour force and fertility but it is not known whether such a relationship result from the selectivity of women with fewer children who find it easier to work outside home, or from deliberate action by women who reduce their reproduction in order to be able to find jobs (El-Badry 1981.7). In effect, several arguments have been advanced.

According to UN (1993:22) study on Women's Status and Fertility in Pakistan, it is indicated that employment is expected to mediate some of the effects of education on fertility-related behaviour, mainly by delaying marriage (in the case of prenuptial employment), and also by increasing access to contraception through greater mobility outside the home. The same source refers to a study based on the 1987 Karachi survey which found that employment affected fertility only when it involved higher status occupations. According to this study, both professional women and teachers, in the two main categories of employment in the formal sector

had much lower recent fertility and lower desired family size than women who worked in the informal sector or were not employed. Other results of this study indicate that pre-nuptial employment was positively associated with education and has been found to influence attitudes and actual fertility performance profound in Karachi.

Some studies have hypothesized that an inverse relationship will only emerge in situations where childbearing and employment cannot be realistically combined. Otherwise, compatibility of the two may negate such a relationship. In Karachi, for instance, much of the available literature indicate that while it is true that most of the work undertaken by women are neither recorded nor nationally assessed and valued financially, modern-sector employment in 77 professional or white collar jobs receive recognition and do seem to affect both the demand for children and fertility behaviour itself. Although not all educated women may be able to enter high status jobs, employment of this kind was found to retain an independent effect on fertility in the study of Karachi women. The type of farm employment and household related work undertaken by most rural women does not, by and large, affect fertility behaviour (UN, 1993 op.cit p.26).

In a study of Nigeria Ohadike (1968:385) found that women in the professional and white collar occupations are more favourably disposed towards the use of contraceptives and have lower mean parity of 3.2 compared to 5.3 of the unskilled workers. Another study of Nigeria by Acsadi (1978:136) revealed that women in the professional and clerical jobs start planning their families with fewer children than housewives, service and craft-workers. However, some authors feel that caution should be taken in interpretation of work-fertility relationship in developing countries because the relative under-developed nature of the modern industrial sector in these societies, the restricted range of employment opportunities for women and the consequent, still unclear emergence of modern industrial ethic seem to suggest that it is not simply female employment *per se* which is crucial for fertility reduction but the nature of

employment.

In Kenya many studies suggest an inverse relationship between fertility and the mother's occupation. In one study (UN, 1979:264), women who were currently working had experienced considerable lower marital fertility than the non-working ones. In another study of Kenya Muinde and Mukras (1979) found that education, female labour force participation and family income were all negatively related to fertility.

Some studies have also noted, with concern, the seemingly contrary findings in view of work-fertility relationship. Arowolo (1976:36), for instance, found that in Ibadan unemployed women actually had less number of children ever born than those in gainful employment. A similar finding was by Taha and Abdelghany (1981) in a study of Egypt whose results showed that the fertility of women classified as top-white-collar group was higher than that of women classified as blue collar group. Fertility of the low white-collar group was found to be higher than that of blue-collar women, farmers, and service workers. This was however attributed partially to the difference in childlessness among occupational groups and partially to defective data. Generally, however, women in highly developed professions seem to have fewer children than those in low calibre professions.

Work status also determines one's income, another salient factor that influences fertility. Several arguments have been advanced by different researchers as to whether income influences fertility negatively or positively. Bernhardt (1972), in a study of Sweden, observed that a varied relationship exists between fertility and potential family. She found that in families where the wife was contributing to the family income fertility seemed to be much lower. However, the Swedish data used for this study indicated that families in lower income bracket had relatively larger families than those in higher income brackets.

In Singapore, Chang (1976) found that couples give importance to the financial factor while deciding the number of children they would like to have, and that this seemed to be more

pronounced in families with higher parity. Thus, couples in Singapore tended to plan their families according to their assessed financial capabilities. However, a few couples also aimed at Family size that would definitely strain their family income.

In the United States, family income did not seem to affect the preferred ideal family size (Blake 1967: 185-206). In all income categories, American white couples were not motivated enough to lower their ideal family size to less than three children.

In the developing countries, Simon (1969) investigated the effect of income on fertility and concluded that the total effect of income on fertility can either be positive or negative. However, she postulated that fertility would decline as the average family income increased but that this might not be quite evident in the early stages of economic development. A study done in Zaire, for instance, showed a positive correlation between fertility and income (McCabe, 1974). The question of fertility and income therefore depends on the individual's aspiration and the expected family size.

2.1.5.3 Fertility and Age of the mother

Age describes the life-cycle of a person from birth to death in censuses and surveys, and may be defined as the number of completed years from birth by making reference to the last birthday. According to U.N.(1991:31-32), age is one of the most important variables characterising individual participants in the reproductive process and thus is included, in some form, in almost all studies of fertility. The same source explains that age structure of a population has a great impact on the aggregate birth rates of a society as it determines the proportion of a population in the reproductive years. The source adds that at both the individual and societal levels, age is closely related to the proximate variables and plays an important role in fertility outcomes due to its association with menarche, marriage, widowhood, divorce, frequency of intercourse, fecundity and menopause. Age is also viewed in this source as related to social and

economic variables which may affect fertility and which are characterised by life-cycle patterns, such as income or dependence on children, or by development efforts, such as availability of education.

Farooq and Simmons (1985:75) have also noted the close relationship of age to many of the economic variables such as income. They further remark that age is so closely related to fertility that many authors suggest researchers should analyze the determinants of fertility within age groups.

The age and sex structure of a population is the joint product of the forces of fertility, mortality and migration. However the distribution of individuals in the different age groups is basically a consequence of past fertility trends, and age composition also determines future fertility trends such that a young population is a potential for high fertility (Acsadi and Acsadi 1990:25; Schnell and Monmonier 1983:266).

In a report of WFS of nine countries (U.N. 1987:97) age is portrayed as a better differentiator of fertility rates than duration since first marriage. The report explains that the age pattern of fertility rates also appear to reflect the degree of voluntary fertility control more closely than did increasing duration of marriage.

Fertility is seen to increase with age of the mother. According to U.N. (1981:56) mean desired family-size generally increases steadily with the age of the respondent, possibly reflecting a rationalization of achieved fertility, which increases with age, rather than trend towards ideals of a smaller family-size among the younger cohorts.

Another source (U.N. 1985:48-49) views age as an important demographic factor in the study of fertility, as childbearing has a simple, direct relationship with age through its relationship with a woman's physical ability to bear children and is, for the most part, confined within some socially recognised union. According to this source the age structure of a population influences crude birth rate, which is an important component of the natural increase of

population, and the crude birth rate is influenced by the proportion of women in childbearing ages (usually 15-49 years) in relation to total population, as well as the distribution of women in these ages. A high proportion of women in these age groups would mean more births in the population at any given level of child bearing per woman.

In a study of fertility using the 1974 HO/University of Nairobi Household survey data, Anker (1985:283) portrayed fertility as a positive and significant function of wife's age, among other factors.

2.1.5.4 Fertility and Marital Status

Studies done in Africa show higher fertility for married than for all women (Henin,1972:78). Marriage denotes the exposure to child-bearing especially in societies such as among the Muslims where pre-marital birth is discouraged by Islamic law. In Kenya today, both marital and non-marital fertility contribute to increases in overall fertility levels. However, fertility of the married is still found to be higher (Ochola-Ayayo, 1991:79). The same source explains that fertility of the monogamous women have been found to be very high because of higher coital frequencies brought about by joint sleeping arrangements. The source adds that stable marriage life among most Kenyan women have also contributed to high fertility because most Kenyan women marry early and continue in reproduction longer.

Marital instability has been found to reduce fertility performance of women particularly due to introduction of infertile periods as a result of absence of the partner. This fact is evidenced in the 1977/78 KFS data. Similar findings were shown in a study of Ghana where married women exhibited the highest fertility of 7.4 children per women while the divorcees had an average parity of 4.3 children per woman (Page, 1975:25-57).

2.1.5.5 **Fertility and Age at First Marriage**

It has been argued that age at marriage is the most significant variable accounting for the observed urban-rural fertility differential (McGreevey, 1974). Age at marriage has been shown to be inversely related to fertility (Hassan et al, 1971). A later age at marriage is often associated with low fertility

A study carried out in Pakistan (U.N. 1993:14) noted that as the age at marriage rises the proportion married falls and many women begin to remain single for a long duration of time, reducing the level of fertility. The same source explains that age at marriage is highest in the major cities and among the educated women. This may account for the lower levels of fertility experienced in the urban areas.

A study conducted in Kenya on the proximate determinants of fertility (Ferry et al., 1984) found that fertility has been rising in Kenya because childlessness is quite rare and ten (10) percent of the eligible women start childbearing as early as 14 or 15 years. The more educated and the more urbanized younger women were found to have a slightly later starting pattern as well as later age at marriage. The study also found that the traditional practices that used to suppress fertility such as birth spacing, breast-feeding, post-partum amenorrhoea and more especially post-partum abstinence have become relatively short by African standards while contraception has not yet been widely adopted.

2.1.5.6 **Fertility and Under-five Mortality**

Many studies have concluded that under-five mortality is positively related to fertility, that fertility tends to be high in areas with high infant and child mortality. Farooq and Simmons (1985:77) make reference to a study done in Egypt among Christian families by Hassan (1971) which showed that the loss of at least one child was enough motivation for the couple to have more children to replace the lost one and as security against anticipated further losses. The same

fact is stated by Ocholla-Ayayo (1991:158). He says that a family that has lost a child will always retain the fear of losing another. Such fear may compel many families to have as many children as possible, without saying why. He adds that this fear of infant and child mortality is justifiable from the fact that Africa still has one of the highest infant and child mortality rates in the world. He explains that while Africa's average infant mortality stands at 110 for every 1000 live births, that of North America is 10 for every 1000. Those regions with high infant or child mortality also have high total fertility rates.

In Kenya, Heisel (1968) carried out a study which showed that the desired family size decreased with increased survival rates of children. Other findings indicate higher under five mortality in the rural than urban areas of Kenya. According to NCPD *et al*, 1994:8, the under-five mortality was rated at 95.6 percent for rural and 75.4 for urban. This fact may be used to explain the observed high fertility in the rural areas.

High infant and child mortality could also be used to explain contraceptive failure in some parts of Africa and in Kenya. When a child is lost through death, the belief that the dead child may come again, makes it a near compulsion for a bereaved couple to have at least one other child as a replacement. This practice, together with the fear of losing a child, makes the idea of contraceptives meaningless. This is evidenced in the Family Planning Survey of 1978 and the KCPS Survey of 1984 (see Ochoila Ayayo, 1991:89).

2.1.5.7 **Fertility and Ethnicity**

The ethnic community to which one belongs has a great deal of impact on one's overall performance as a member of that community. This is particularly true in matters which pertain to reproductive decisions. Many studies have shown differences in fertility among ethnic groups. In view of this, Anker and Knowles (1980:19) rightly stated that any analysis of fertility differentials in Kenya would be incomplete if the effect of ethnicity were not considered. This is

because in the African society children belong to the lineage or community and not only to the parents. Different tribes have different cultural norms or patterns of life which affect fertility. The positive effects include early age at first marriage, the naming system, and preference for male children (Ocholla-Ayayo, 1991:79).

In a study of Ghana Gaisie (1979:5) observed fertility differences among Ghanaian ethnic groups which he categorized as high, moderately high and low fertility. Mosley et al (1982), using the KFS data of 1978, indicated that the highest levels of fertility were observed among the Kalenjin and Kisii, while the Mijikenda had the lowest fertility because they had the longest birth intervals and breast-feeding periods. They also found that polygyny was most prevalent among the Luhya, Kisii, Luo and Mijikenda while it was lowest among the Kikuyu.

Data from 1984 KCPS Survey indicated that the Kikuyu married much later than the Luos. Whereas 91.9 per cent of the Kikuyu were not married between ages 15 and 19, only 41.9 per cent of the Luo were in this category. The proportion not married between ages 20 and 24 among the Kikuyu and Luo were 36.7 and 14.4 per cent respectively. According to this source, the Luhya and Kisii show almost similar fertility levels of 9.11 and 9.66 respectively. The Kamba is observed to have lower fertility level compared to other ethnic groups. This could be attributed to the poor ecological conditions of the Eastern part of Kenya which is (semi-arid area) where the Kamba people are most concentrated. The source also rates the fertility of the Kalenjin among the highest, followed closely by that of the Kisii and Luhya. This is due to improved nutrition, low age at marriage, negative attitude towards small family size, and low child mortality. The Mijikenda had the lowest fertility of all the ethnic groups considered. This could be attributed to relatively lower education levels, higher divorce rates, a longer breast-feeding duration and, perhaps differing religious norms.

2.1.5.8 Fertility and Religion

Religion is a major cultural determinant of a people's way of life and overall behaviour. Fertility, for example, has been known to vary with religious affiliation the world over. In a study of U.S.A. by Potts et al (1979:162), the Roman Catholic were found to exhibit higher fertility than the protestants. A similar study of Bombay revealed that Moslem women exhibited higher fertility than Hindu and Christians (Rele et al 1976:371).

Findings from Africa also show variations in fertility according to religion. Ohadike (1968:385), in a study of Lagos, observed higher fertility among Moslem women than their christian counterparts: 7.3 and 6.5 children per woman for Moslems and Christians respectively.

In Kenya, data from KCPS 1977/78, 1984, and KFS 1978 showed no significant fertility difference between Catholics and Protestants. The KCPS 1977/78 data analysis, for example, indicate TFR of 8.0 and 8.1 for protestants and Catholics respectively. There is, however, a big difference in fertility between Christians and Moslems. Fertility of the Moslems is slightly lower, 7.1 children per woman. This could be due to their religious and urban influence. Ocholla Ayayo (1991:81) refers to a study of Tanzania by Henin (1981) which had similar findings. The low fertility of Moslems in Tanzania was due to high proposition of childlessness, less secular education and higher level of polygyny. Ocholla-Ayayo (ibid) adds that low education implies high fertility.

2.1.5.9 Fertility and Access to Family Planning (FP) Outlet

The social climate in which a Family Planning Campaign is conducted is able to influence greatly the degree of success or failure (Bogue, 1970:73). Some forces, conditions and situations can help to generate interest in Family Planning Practice while other conditions can greatly retard or suppress it. These include availability and accessibility of the source of the service.

Many communication programs spend a huge proportion of their time on motivation for Family planning and forget to provide the simple facts of family planning logistics that potential adopters need: where the services are located; what days of the week and hours of the day they open; how much the services cost; which methods are available; who is eligible to go; and what the procedure is for obtaining the services (Bogue, 1975:31).

Some family planning sources are quite inaccessible to the intended users in terms of distance. Objective evaluation studies have shown that the official family planning programme is responsible for only pan of the total family planning practised in a given country. Many family planning communicators take a very narrow view of their task to promote only the services of their own organization irrespective of the distance to the point of the services. They ignore the availability of alternative sources of family planning services such as private physicians, village pharmacy or other outlets for non-clinical contraceptives, yet these sources tend to be more accessible to clients because they are located closer to their residences. Also the cost to the program of service provided through these channels is very low because they operate as private enterprises (Bogue, *ibid* pp.32-33). Prolonged distance to the clinics increase the cost of the service in terms of money and time spent to reach the source of the service. This could be a discouraging factor to contraception and a promotion to high fertility in the affected areas. Varied sources should therefore be made available to the people, and the public should be encouraged to go to the source they trust most or which is most convenient and accessible.

According to Ocholla-Ayayo (1991:78), the residential factor plays a role in fertility level. Referring to the KDHS 1979 data, he argues that the urban fertility level is slightly lower than that of rural because the urban women have the advantage of greater knowledge of, accessibility to, and use of contraception. Ocholla-Ayayo(*Ibid* p.34) cites the scarcity and inaccessibility of health centres used as distribution centres for contraceptives as among the major failures of family planning practice. Where such centres are limited in number many

clients have to travel long distances to reach them and may spend long hours waiting for service. This factor demoralizes family planning acceptors and discourages contraceptive use. Such conditions are quite common in rural areas in Kenya, and may also be found elsewhere.

In a study of Zimbabwe (UN, 1996:80) it was found that government institutions which include medical and educational facilities are generally located closer to communities in urban clusters, yet these are the fairly subsidised and affordable facilities.

2.1.5.10 Fertility and Contraception

Use of contraception has been considered as a major factor in fertility reduction attempt by many governments especially in the developing countries. However, many researchers argue that contraceptive use must be dependent upon certain factors which enhance its effectiveness.

A study carried out in Tunisia and Morocco (Leocomte and Marcoux, 1976) found that the acceptors of contraception married later than non-acceptors, and most of their children also tend to survive. In a conclusion, the two researchers noted that such acceptors practice contraception for terminating childbearing rather than for spacing births. In another study, Rizk (1976) found that in Jordan, the highest percentage of acceptors of contraception, regardless of marital status or marital duration, were university graduates, then secondary graduates, primary school graduates and finally the illiterate. The effectiveness of use of contraception therefore depends on the woman's level of education. A possible explanation here is the fact that educated women are better placed in terms of information about availability of contraceptives, correct use, side effects and costs, among others. Some studies have also shown that the place of residence affects contraception use and the level of fertility. In effect, rural-urban residence is considered. A study done in Pakistan (UN, 1993:16) shows that there is extremely low levels of contraceptive use in the rural areas. The source notes that there may be appreciable use among rural women aged 25 or more who had more than secondary education, but since such women

represent a tiny proportion of all women residents, the overall impact of fertility control in rural areas is likely to be minor. On the other hand, substantial proportions of urban women aged 25 or more with less than secondary school were using contraception, and even higher rates prevailed among those who had gone beyond secondary school. Urban fertility is therefore likely to be lower than rural fertility due to more use of contraception in the former.

2.1.5.11 Summary of the Literature Review

From the foregoing literature review, marked differences in fertility can be clearly depicted among the various world regions as well as within individual countries. In Kenya, for instance, the literature review reveals differentials in fertility between urban and rural areas, and indicates higher fertility in the rural. There is sufficient evidence that the differentials in urban-rural fertility are generally determined by various factors like socio-economic, demographic, socio-cultural, and family planning. All these factors interplay to bring about the observed differences in urban-rural fertility.

It is also evidenced in the above literature review that greater exposure to schooling for girls and women does, in the long run, result in declining fertility. Many studies referred to in the literature have come to a common consensus that an inverse relationship exists between high level of education and fertility not only in Kenya but also in other countries (Blake, 1967; Kogut, 1974; Rodgers, 1975; Cochrane, 1979). In Kenya, findings from the 1969 population census and the KFS 1977/78, as well as a study by Anker and Knowles (1983) have confirmed that fertility varies according to the woman's level of education, and that fertility is lowest among the highly educated.

The literature review also indicates a strong positive relationship between the number of children ever born and under-five mortality and suggests existences of higher fertility in areas with high rates of infant and child mortality. There is evidence of higher under-five mortality in

the rural than urban areas of Kenya (NCPD *et al*, 1994). In a study of Kenya, Heisel (1968) has shown the importance of increased children survival in decreasing the desired family size. Results of Family Planning Survey (1979) and KCPS (1984) indicate that higher infant and child mortality could also be used to explain contraceptive failure in some parts of Africa and in Kenya, hence differentials in fertility. Age of the mother, age at first marriage, access (travel time) to Family Planning source, and contraceptive use have also been singled out to be among the major determinants of urban-rural fertility differentials.

2.2 THEORETICAL FRAMEWORK

A theory is a general statement that summarizes and organizes knowledge by proposing a general relationship between events. A good theory will cover a large number of events and predict events that have not yet occurred or been observed (Colins, 1973:18). Theories are important because of their essential role as part of the scientific process and also because they provide a framework for explaining the phenomena and within which policies and programmes are formulated. There is a general consensus among theorists that a theory should be logical in terms of the relationships that exist among its component statement. However, great variations are still found in theories in the degree of detail and tightness with which the hypotheses making up the theory are related to each other. Yet all are agreed that the theorems derived from any theory should be testable.

Various theories of fertility have been formulated by theorists from different disciplines to investigate fertility differentials and change. These theories include mathematical, sociological, psychological, economic and biological. Although the Economic Theories had dominated fertility studies for the better part of the 1960s and 1970s, other theoretical models have gained prominence in this area in the 1980s and 1990s. These include, Bongaarts fertility model (Bongaarts, 1978).

2.2.1 Economic Theory of Fertility

The most widely tested theory in explaining fertility differentials in the developing countries is the economic theory postulated by Becker (1960) and Schultz (1973). In this theory, households are seen as rational decision making units trying to maximise utility given various constraints. The central argument in this theory is that fertility decisions are economic as they involve a search for an optimum number of children in the face of economic limitations. This theory suggests that parents have three arguments in their joint utility function: the number of children that they have, the quality of those children, and the quality of other goods which they consume. They face a lifetime constraint, and their problem is to maximise utility given that income constraint.

This approach, sometimes called the "New Home-economics" treats the child as both a produced (investment) and consumer good (Schultz, 1974). Fertility is the result of rational economic choice within the household. Children, or more properly put, "child services" are consumed by the household, and because children are seen as non inferior goods, increased income increases the demand for them. Child Services are also produced in the household through inputs of parents' time and goods bought in the market, such as housing, formal education and health services. Children may also be an investment, short term if they work during their childhood, long term if they support parents in old age. This demand oriented theory, which is based on the particular circumstances facing the individual and which looks at the direct benefit to parents, relates closely to the African context. In Africa, children are viewed from the context of their economic and social benefits. Whereas girls may be desired for marriage benefits, boys are better preferred for property inheritance, care-takers for parents in old age, and for security purposes.

In Africa, children are not valued in terms of such measures as educational standards; they are just a beautiful sight and what matters is the absolute number. Children are a source of

happiness and companionship to parents. They continue the lineage of their individual families and community, hence a woman's value in Africa rests on her childbearing capacity and barren women are often despised (Ocholla-Ayayo, 1987:2). However, children in Africa are also seen as a source of labour (Oppong, 1978). In addition, Caldwell (1977) explains that in Africa children belong to the lineage rather than to individual parents, hence decisions which pertain to children may not be an individual affair

Although the Economic theory of fertility apes the African view in demand context, its applicability in the present life situation has been the subject of a great deal of interest on the part of economists and other social scientists. If increased income increases the demand for child services, how do the new home economists explain the apparent fact that fewer children are "purchased" by higher income couples in high income societies? In view of these concerns, Becker's original deduction that the number of children born to a family should be positively associated with family income has been remedied by Becker himself and others, and other factors have been incorporated. In particular, Farooq and Simmons (1985: 38-39) cite the work of the individual authors (Becker 1965 and 1974; Mincer, 1963; Willis, 1973; Becker and Lewis, 1973; Schulz, 1974) whose contributions have come out with two answers. First, though the income effect increases demand for children, the price or substitution effect reduces demand by increasing the price for children relative to other goods, inducing high income couples to substitute other goods for children. The price effect operates chiefly through the increasing opportunity cost of the mother's time as women increase their educational attainment and employment opportunities. Second, with increasing income, parents opt for "high quality" children rather than greater quantity, devoting more of their own time and income to children's health and education. This explains the use of the term "child services"; the demand for more child services can be satisfied with fewer but high quality children.

In essence. Economic development increases the cost of children by increasing the value

of parents' time and the cost of education, health and housing; at the same time it reduces the benefits of children as they work less in the market and as institutional forms of old age insurance substitute for support by children. By this approach the new home economics of the family explains the apparent link between economic growth and the so-called demographic transition

This economic model thus concludes that for poor families in developing countries, children entail low net costs and, in the extreme case, may actually be a net benefit. In the extreme case, parents would have as many children as they could and have a definite number of children only because of "supply" constraints, limited fecundity and high foetal and infant mortality (Tabbarah, 1971). The rationale for high fertility among poor families may be strengthened by high rates of child mortality if parents in high mortality communities insure themselves against possible child loss by having more children than they would want. As for poor families the cost of procuring modern contraceptives or using traditional ones can be high relative to the low cost of raising children. World Fertility Survey results indicate that in many countries family planning services are not available to the poor particularly in rural areas.

2.2.2 Bongaarts Fertility Model

The relationships among the determinants of fertility have been recognized since the pioneering work of Kingsley Davis and Judith Blake in the mid 1950s. However, efforts to qualify the link between a set of intermediate fertility variables and fertility have proven difficult and have thus far only resulted in highly complex reproductive models (Bongaarts, 1978:106).

Bongaarts (1978) presents a simple, but comprehensive model for analysing the relationship between intermediate fertility variables and the level of fertility. This model is based on the theoretical proposition that any change in background characteristics such as social, economic, cultural, demographic and environmental variables is bound to cause corresponding

changes in a set of intermediate or proximate determinants of fertility thereby causing a change in fertility performance. For example, the level of education of women is a socio-economic indicator that is frequently found to be negatively related to fertility. A more detailed analysis may show that among educated women marriage is relatively later or the use of contraception more frequent thus clarifying the relationship between education and fertility.

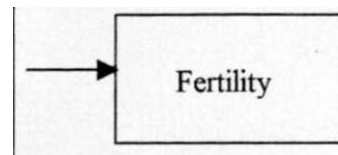
The intermediate fertility variables are the biological and behavioural factors through which socio-economic, cultural, demographic and environmental variables affect fertility. The primary characteristics of an intermediate fertility variable is its direct influence on fertility; the effect of the intermediate variables is directly exerted on fertility without further interference from other factors. If an intermediate fertility variable such as the prevalence of contraception changes, then fertility necessarily changes also (assuming the other intermediate fertility variables remain constant) while this is not necessarily the case for an indirect determinant such as income or education. Consequently, fertility differences among populations and trends in fertility over time can always be traced to variations in one or more of the intermediate fertility variables. The following simple diagram summarizes the relationship among the determinants of fertility.

Indirect Determinants

Socio-economic
Cultural and
Environmental Variable

Direct Determinants

Intermediate Fertility
-if variable i.e Biological
and Behavioural



Source. John Bongaarts (1978) Model for Fertility Analysis

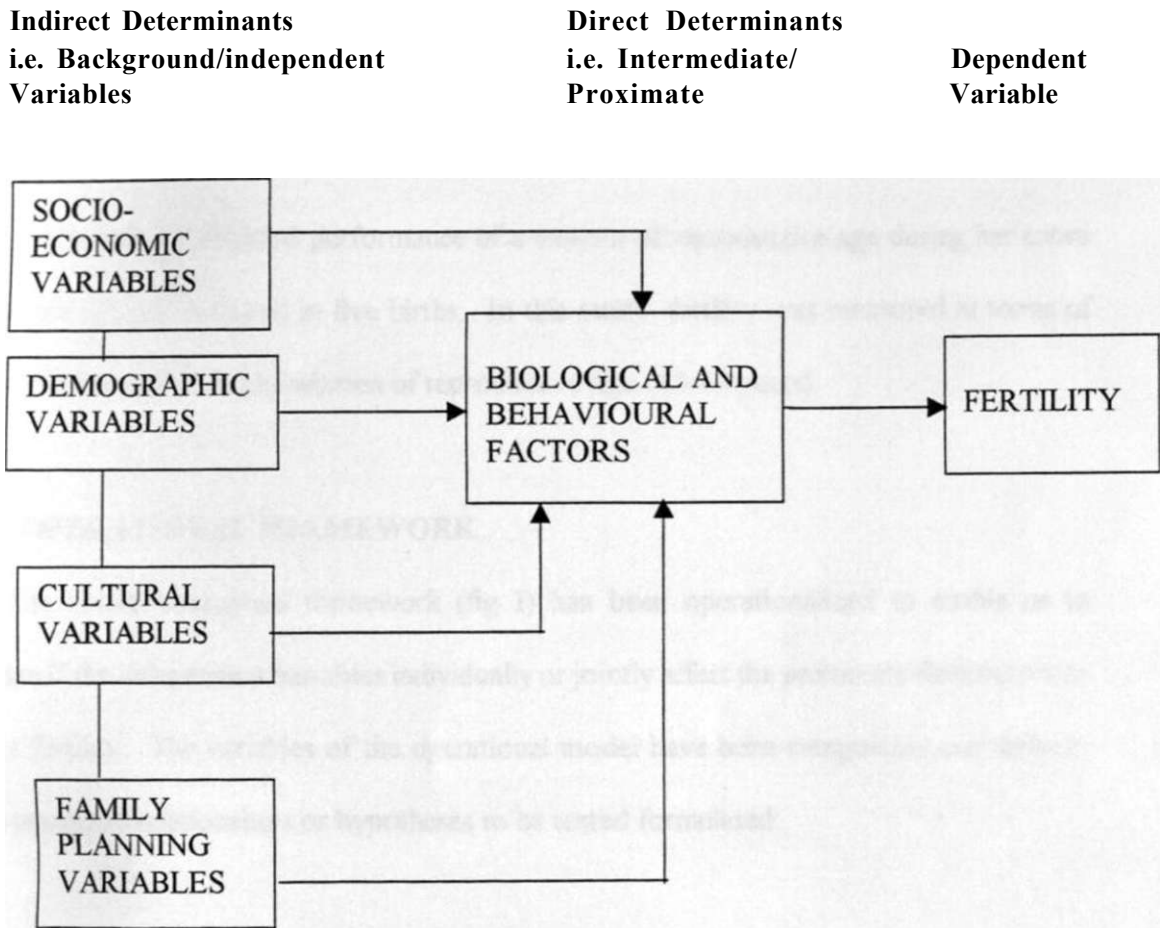
2.2.3 FRAMEWORK FOR DATA ANALYSIS

In this study, a modified form of Bongaarts (1978) model is used to provide framework for explaining fertility levels and differentials with respect to how the independent variables affect the dependent one through the working of the proximate determinant.

2.2.3.1 CONCEPTUAL FRAMEWORK

The modified conceptual model may be represented diagrammatically as below

Figure 1: Modified Bongaarts Conceptual Model



Source: A modification of Bongaart's Model

CONCEPTUAL HYPOTHESIS

Background factors individually or jointly operate through proximate determinants of fertility to influence fertility outcome.

DEFINITION OF KEY CONCEPTUAL CONCEPTS

Background Factors:

These are societal characteristics such as social, demographic, cultural, environmental,

and Family planning variables whose effect on fertility is indirect that is, it has to be exerted through the instrumentality of proximate determinants of fertility

Proximate Determinants

Direct variables through which any societal determinants necessarily exerts its effect in order to influence fertility.

Fertility

The actual reproductive performance of a woman of reproductive age during her entire reproductive life, as measured in live births. In this study, fertility was measured in terms of children ever born (C.E.B.) to women of reproductive age (15-49 years).

2.2.3.2 OPERATIONAL FRAMEWORK

The above conceptual framework (fig I) has been operationalized to enable us to investigate if the independent variables individually or jointly affect the proximate determinant to influence fertility. The variables of the operational model have been categorized and defined, and the presumed relationships or hypotheses to be tested formulated.

CATEGORIES OF OPERATIONAL VARIABLES

(a) Independent Variables

Female education

Work status

Age of the mother

Marital status

Age at first marriage

Under-five mortality

Ethnicity

Religion

Access to Family planning services (Time to get to source)

(b) Proximate Variable

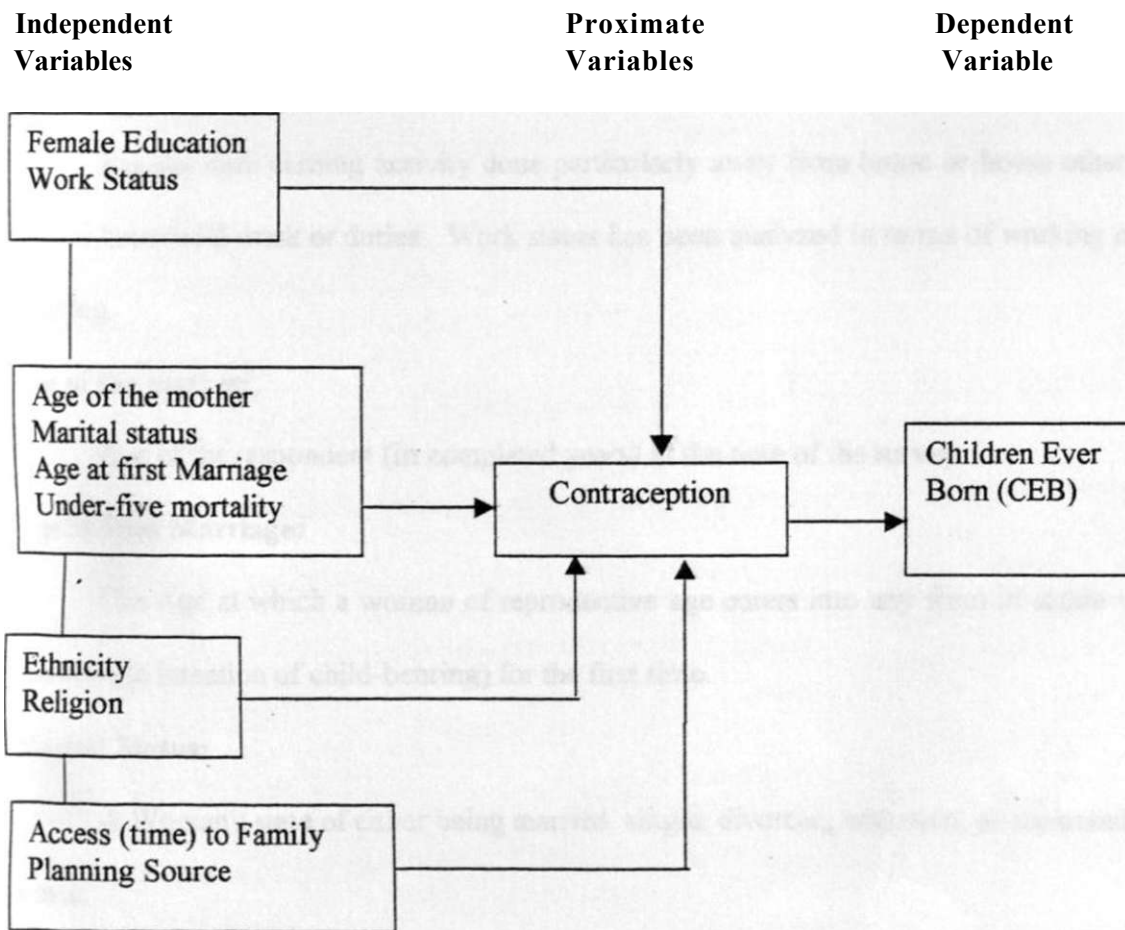
Contraception

(c) Dependent Variable

Children ever born (C.E.B)

The operational variables can be diagrammatically illustrated as shown in Figure 2 below:

Figure 2: Diagrammatic Presentation of operational Model



Source: Adopted from Bongaarts (1978).

The operational frame (Figure 2) presupposes the relationships among the operational variables. For example, the level of education of women may affect age at marriage or the use

of contraception, and consequently influence fertility. High level of education is known to affects fertility negatively. However, the actual interaction between the dependent and the independent variables has been explained in the study analysis.

DEFINITION OF OPERATIONAL VARIABLES

Independent Variables

Education Level:

The highest level of formal schooling reached by the individual woman. This was grouped as none, primary and secondary^.

Work Status:

Regular cash earning activity done particularly away from home or house other than normal household work or duties. Work status has been analyzed in terms of working or not working.

Age of the mother:

Age of the respondent (in completed years) at the time of the survey.

Age at First Marriage:

The Age at which a woman of reproductive age enters into any form of stable social union (with intention of child-bearing) for the first time.

Marital Status:

A Woman's state of either being married, single, divorced, widowed, or separated with a man.

Under-five Mortality:

Deaths among children who were born alive but have since died below age five.

Ethnicity

The ethnic community to which the woman belong. The major ethnic groups considered in this study were Kalenjin, Kikuyu, Luhya and others.

Religion:

Religious faith or group to which one is affiliated. Religion was categorized as Catholics, Protestants and other Christians, Muslims.

Access to Family Planning Services

This refers to the duration of time (minutes) taken to reach FP services, which is indicative of distance.

Intermediate Variable**Contraception:**

Any form of conscious/deliberate practice or method aimed at delaying or avoiding pregnancy and childbirth. It was also defined as the deliberate prevention of conception by a fecund woman without necessarily interfering with coital frequency.

Dependent Variable**Children Ever Bom (C.E.B.)**

Total number of children since born alive to a woman of reproductive age at the time of the survey.

2.3 OPERATIONAL HYPOTHESES

Based on the literature review and the theoretical framework, the following hypotheses were drawn to be tested in order to establish the determinants of rural and urban fertility differentials.

- 1 Education has a negative effect on children ever born. Fewer children are born to women with secondary education and above.
2. Work status of women has a depressing effect on children ever born. Working women have fewer children than the non-working.
- 3 Marital status has an influence on children ever born. Women in stable marital unions are likely to have more children than the never married and women in other marital unions.
- 4 Age at first marriage is associated with children ever born. Early age at first marriage promotes high number of births.
- 5 Under-five mortality has a positive effect on children ever born. Areas with high under-five mortality experience higher births than those with low under five mortality.
6. Ethnicity has an influence on children ever born.
7. Religious affiliation has effect on children ever born.
- 8 Access to Family planning services has an influence on children ever born. Women who spend more time to get to source are more likely to have many children.
- 9 Contraceptive use is not positively associated with children ever born. Women who contracept are less likely to have many children.

CHAPTER THREE

DATA AND METHODOLOGY

This section presents a discussion of the sources of data used and also describes the methods of data collection and data analysis.

3.1 DATA AND METHODOLOGY OF DATA COLLECTION

3.1.1 Data Source

This study is based on secondary data. The data source for the study is the 1993 Kenya Demographic and Health Survey (KDHS) conducted by the National Council for Population and Development (NCPD) and the Central Bureau of Statistics (CBS). The survey was funded by the United States Agency for International Development (US AID) and the Government of Kenya. Macro International Inc. provided the technical assistance.

The KDHS is part of the worldwide Demographic and Health Surveys (DHS) program, which is particularly designed to collect data on health related areas, focusing on the levels and trends of fertility, infant and child mortality, AIDS/STD prevalence, maternal and child health, and Family Planning Knowledge and use among others, for policy makers and research undertaking.

3.1.2 Sample Design

The 1993 KDHS sample is national in scope, with the exclusion of all three (3) districts in North Eastern Province and four (4) other Northern districts (Samburu and Turkana in Rift Valley province and Isiolo and Marsabit in Eastern Province). Together the excluded areas account for less than 4 per cent of Kenya's population.

The KDHS utilized a two-stage, stratified sample consisting of 536 sample units

(clusters). Samples were drawn from 15 districts; in addition, Nairobi and Mombasa were also targeted as they were generally the larger districts in their provinces.

3.1.3 The Survey Sample Frame

The survey contained Female and Male respondents. A total of 8,805 households were selected for the survey of which 7,950 were successfully interviewed. The shortfall was primarily due to dwellings being vacant or in which the inhabitants had left for an extended period at the time they were visited by the interviewing teams. Of the 8,185 households that were found, 97 percent were interviewed in clusters.

To collect information related to fertility 7,952 women aged 15-49 years were identified within these households as eligible for individual interview. Of these 7,540 or 95 percent, were interviewed. The number interviewed in the urban area was 1161 as opposed to 6379 in the rural. Eligible women response rate was higher in the rural (95.4 percent) than urban 91.7 percent) - KDHS 1993:6.

3.1.4 Data Collection Technique: The Questionnaire

Four types of questionnaires were designed and used to collect data namely; **the Household, the Woman's, the Man's** and the **Service Availability** questionnaires. The questionnaires were developed in English by the task forces established in Kenya. All except the Service Availability Questionnaires were translated into and printed in Kiswahili and eight of the most widely spoken local languages in Kenya (Kalenjin, Kamba, Kikuyu, Kisii, Luhya, Luo, Meru/Embu, Mijikenda). To get fertility related information, the Woman's Questionnaire was basically utilized; it was composed of 709 questions and filter questions

The woman's Questionnaire was used to collect information, on a *de facto* basis, from all women aged 15-49 years who might have stayed in the house the previous night. Apart from

background characteristics (such as age, place of residence, educational level, religion, tribe, work status, marital status, and contraceptive use and availability), the women were asked about the number of children ever born, the number of children who are still living including current pregnancy, dates of last birth, children dead by age and sex, breastfeeding and parental care for last born, and on desire for more children. Information was also sought on the type of house occupied, the duration of residence and on the availability and accessibility of basic facilities such as toilets, water, and health institutions. In addition, the interviewing teams measured the heights and weights of mothers and of all her children under age five.

3.1.5 Field work

The fieldwork was carried out by 12 interviewing teams each consisting of one supervisor, one field editor, 4-7 female interviewers, one male interviewer and four drivers. The Woman's questionnaire took 42 minutes on average. Of the 536 clusters of eligible women sampled for coverage, 520 clusters were successfully covered while 16 others were inaccessible for various reasons. A total of 7540 women aged 15-49 years were covered.

3.1.6 Quality of Data

Like all other sampling estimates, the KDHS (1993) was affected by sampling and non-sampling errors. To calculate sampling errors for the KDHS, the computer software sampling Error Module (ISSAS) was used. This module uses the Taylor Linearization Method of variance for survey estimates. Sampling errors were calculated for selected variables considered to be of primary interest. In general the relative standard error for most estimates for the country as a whole was small. For instance, for the variable children ever born (CEB) to women aged 15-49, the estimated relative standard error was 1.3 percent for the whole country implying 98.7 percent efficiency. The data for KDHS 1993 was therefore fairly accurate.

3.2 **METHODOLOGY OF DATA ANALYSIS**

Data used in this study were drawn from the KDHS 1993 report. Statistical techniques were used for data analysis. These were frequency distribution and percentages, cross-tabulation and chi-square (X^2) distribution and Linear Regression analysis.

The analysis of urban-rural fertility differentials was based on the information on children ever born (CEB). The actual number of children ever born (CEB) was used as a measure of fertility performance. Fertility differentials were determined by cross-tabulating children ever born (dependent variable) with the various independent variables and the resulting relationships determined by use of chi-square and regression analysis.

This section presents the description of the above named techniques of data analysis and their computation procedures. However, due to the large sample size (7540) and for ease of computation, the statistical package for social sciences (SPSS) computer software was used.

3.2.1 **Frequency Distribution**

Frequency distribution, the first stage in data analysis, is a statistical tool for summarizing data by grouping it into class intervals for ease of management. Grouped frequency distribution show the variable values and the number of occurrences (i.e. the frequency) of each value, or more commonly, of each class of values. Class intervals are selected in such a way that they are mutually exclusive and exhaustive such that each value in the set of data can be placed in one and only one of the intervals. The results can either be displayed as tabular (in numbers and/or percentages) or graph form and is called a frequency distribution. A frequency distribution is therefore any device such as a graph or table that displays the values that a variable can assume along with the frequency occurrences of these values, either independently or as they are grouped into a set of mutually exclusive and exhaustive intervals. This method may be tedious in its computation, but its advantages include condensation of the information without loss of salient

features, and clarity and ease of management of data especially if graphically presented. For successful results, however, frequency distribution should not have too few or too many class intervals as this may, respectively, lead to loss of information or simply defeat the purpose of **summarization.**

3.2.2 Cross-tabulation and Chi-Square

Cross-tabulation is a useful method for studying the distribution and the association between two variables, that is, the dependent and the independent variables. Cross-tabulation was used in this study for the same purpose. However, since the row and the column percentages do not allow for quantification and testing of the relationship between variables, an index that measures the extent of association as well as statistical tests of hypotheses is needed, hence use of chi-square (X^2) test.

Chi-square (X^2) test is used in this study to measure the significance of the association, and in the statistical test of the null hypothesis that a relationship does not exist between the two variables (dependent and independent) of cross-tabulation, that is, the two variables are independent. By definition, two variables are independent if the probability of a case falling into a given cell is simply a product of the marginal probabilities of the two categories defining the cell.

The chi-square (X^2) test, an important extension of hypothesis testing, is used when it is wished to compare an actual, observed distribution with a hypothesised, or expected distribution (Lucey, 1996:97). This method is sometimes called Pearson's chi-square, after its inventor, and is used to test whether or not frequencies which have been obtained empirically differ significantly from those which could be expected under a set of theoretical assumptions. The chi-square value is calculated by summing over all the cells of the squared residuals divided by the expected frequencies. The formula for the calculation of chi-square (X^2) is as follows:

$$X^2 = \sum \frac{(O-E)^2}{E}$$

where O is the observed frequency

E is the expected frequency

The chi-square is obtained by first taking the difference between the observed and the expected frequencies in each cell. The difference is then squared, and divided by the expected number of cases in each cell to standardize it so that the biggest contributions do not always come from the largest cells. The sum of these non-negative quantities for all cells is the value of chi-square. The expected value for each cell is calculated as follows:

$$\text{Expected} = \frac{(\text{Row Total}) (\text{corresponding column total})}{\text{Total Sample}}$$

The calculated chi-square value is compared to the critical points of the theoretical chi-square distribution to produce an estimate of how likely or unlikely the calculated value is if the two variables are actually independent, since the value of the chi-square depends on the number of rows and columns in the table being examined, the degrees of freedom should be known. The degrees of freedom are defined as the number of cells of the table that can be arbitrarily filled when the rows and the column tables are fixed. Thus for an RxC table, the degrees of freedom are (R-1)(C-1) since once (R-1) rows and (C-1) columns are filled, the frequencies in the remaining row and column cells must be chosen so that the marginal totals are maintained.

In this study, chi-square was used to test the relationship between the dependent and independent variable

Conditions for Application of Pearson's chi-square

In order for chi-square to be applied the following conditions must be met.

- (1) Experimental data must be independent of each other.
- (2) Sample data must be drawn from the target population

- (3) Data must be expressed in original units.
- (4) The sample should contain at least 50 observations
- (5) There should be no less than five observations in each cell.

Interpretation of Chi-square

The chi-square is used to test the null hypothesis that there exists no relationship between the dependent and the independent variables. The chi-square test for this study was set at a 0.05 significance level. Due to enormous size of data, SPSS/Pc+ computer package was used in this work with the condition that if the observed (calculated) significance level is less than 0.05 we reject the null hypothesis and accept the alternative hypothesis that there exists a relationship between the dependent and the independent variables. If the calculated value is greater than 0.05 then we accept the null hypothesis. The closer the calculated significance level value is to zero the stronger the relationship between the variables.

3.2.3 THE LINEAR REGRESSION MODEL

Several factors are assumed to play a major role in determining fertility differentials in urban and rural areas. As outlined in the operational model, they include maternal education, contraceptive use, and ethnicity. In this study we used both simple and multivariate linear regression models of data analysis to assess the individual and combined effect of these variables on children ever born (dependent variable) in urban and rural areas. The linear regression model is useful when making inferences on how changes in one or more independent variables are related to changes in the dependent variable. This method implies the estimation or prediction of the unknown value of one variable from the known value of the other variable. It also measures the contribution of different variables to the overall variability observed in the dependent variable. Regression analysis is basically useful for determining the probable form (nature or

direction) of the relationship between variables. It is a very important tool used to study the relationship between two or more variables

In the words of MM. Blair, Regression analysis is a mathematical measure of the average relationship between two or more variables in terms of the original units of the data (Gupta and Gupta, 1994:479).

The aim of the regression model is to select the particular straight line or surface that best describes the trend of the data (Ferguson, 1976 in Onguti, 1987). This is done by the method of least squares which involves fitting a line through a set of points that minimises the sum of the squares of the differences or deviations between the observed and the predicted Y values for each value of X. From this best fitting line or surface one can predict the values of the dependent variable.

The linear regression model assumes that the explanatory or independent variable(s) or predictors) X affect(s) the dependent variable Y in a systematic way that is distorted by more or less random scatter or disturbances. In other words, the observed trend of the data would have been perfect if there were no disturbances. The linear regression model can either be simple or multiple in form.

3.2.3.1 The Simple Linear Regression Model

The regression analysis confined to the study of only two variables (dependent and independent) at a time is termed as simple linear regression. Here, one attempts to predict a dependent variable Y from only one independent variable X. Regression between two variables is said to be linear if corresponding to a unit change in one variable there is a constant change in the other variable over the entire range of values.

In a simple regression model, it is assumed that the variability in a dependent variable is accounted for partly by a single explanatory variable and partly by a disturbance or error term

that might result from the data, or partly by the effect of the unconsidered variables. The simple linear regression equation is expressed as:

$$Y = a + bx + e$$

where Y is the dependent variable (which is children ever born (CEB) in this study),

a is the intercept or constant (value of Y intercept).

b is the regression coefficient/slope of the line of best fit. It represents the increment in the value of the dependent variable Y for a unit change in the value of the independent variable X.

x is the independent variable,

e is the disturbance or error term.

3.2.3.2 The Multiple Linear Regression Model

In most social studies, there is interest in getting the relationship between several independent variables (X) against one dependent variable (Y) hence the use of multiple linear regression model. This model was used for the same purpose in the study

Multiple regression can be defined as a general statistical technique through which one can analyze the relationship between a dependent or criterion variable and a set of independent or predictor variables. Multiple regression may be viewed either as a descriptive tool by which the linear dependence of one variable on others is summarized and decomposed, or as an inferential tool by which the relationships in the population are evaluated from the examination of a sample data. This model is applicable in situations whereby the expected value of the dependent variable Y depends upon two or more values of the independent variables $X_1, X_2, X_3, \dots, X_k$. It is, therefore, a useful tool for statistically estimating a functional relationship between two or more independent variables and the dependent variable. The most important uses of the multiple linear regression technique are: to find the best linear prediction equation and evaluate its prediction

accuracy; to control for other confounding factors in order to evaluate the contribution of a specific variable or set of variables; and to find structural relations and provide explanation for seemingly complex multivariate relationships.

A standard multiple linear regression model is represented by:

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_kX_k + e$$

Where Y = the dependent variable (children ever born (CEB) in this study).

- a = the value of the Y intercept/constant value.
- $b_1 \dots b_k$ = regression coefficients for the independent variables.
- $X_1 \dots X_k$ = independent variables.
- e = error component/term in the model, assumed normally distributed with mean zero.

The multiple linear regression analysis stems from the simple regression analysis based on the speculation that if one can predict the value of a variable on the basis of knowledge of one associated variable, one might be able to make an even better prediction of the value of a variable given knowledge of several associated variables. The multiple regression model is represented by multiple R. The linear model may be quantitative in nature, that is, the independent variables assume only numerical values such as one (1) or zero (0) and they are called dummy variables.

If all independent variables are categorical then the linear model is an analysis of variance model and if only part of the independent variables are categorical, the model is an analysis of a covariance model.

3.2.3.3 Obtaining the coefficients (a and b) of the regression equations

The objective of regression analysis is to estimate the regression coefficients a and b in order to make inferences regarding the true line of regression of y on x. The values of these coefficients can be estimated using either the matrix techniques (such as scatter diagrams, the least squares method), or the computer print out which not only provides adjusted b values but

also tests for significance of b values using the t-test.

The scatter diagram method involves plotting the dependent variable as dots along the Y-axis in the X,Y Cartesian Plane. The free-hand drawn lines are then observed to give a rough idea about the basic nature if any relationships exists between the variables. However this method is subjective as it is affected by vision and judgement defects. A more objective method is use of least squares.

Use of Least Squares Method

This method is basic to both simple and multiple linear regression models. In simple linear regression, the method determines the best fitting line based on the principles of least squares. It consists of minimising the sum of square of the residuals or the errors of estimate, that is, the deviation between the observed values of the variable and their corresponding estimated values are given by the line of the best fit. The smaller the sum of squares of the deviations between observed data and the fitted line, the better the fit of the regression line. The line drawn using the least squares method is best in the sense that the sum of the squared deviations of the observed data points from the least squares line is smaller than the sum of squared deviations from the data points from any other line that can be drawn through the data. The least square method for estimating the regression co-efficients in simple linear regression use the following formula

$$a = \frac{\sum Y - Sx}{n}$$
$$b = \frac{\sum X_i - x \sum Y_i - V}{\sum (x_i - x)^2}$$

The least square line is therefore defined as the choice of a and b for which the sum of squares of deviation is minimum.

Just as we can describe the linear relationship between two variables (simple linear) by a

straight line, we can describe the linear relationship between several variables (multiple linear) by some regression surface, a plane when three variables are involved, or a hyperplane in the case of more than three variables (Torrel, 1979:344-345). For **multiple linear regression** the sum of the squared deviations of the observed values from the regression surface is minimised.

The standard error estimate for a multiple linear regression is defined as:

$$Se = \frac{\text{unexplained variation}}{\text{Degree of freedom}} = \frac{SSE}{D.F.}$$

3.2.3.4 The Coefficient Of Determination

After determining the regression equation(s), it must be evaluated to find out whether or not it adequately describes the relationship between the dependent and the independent variable(s) and whether we can use it effectively for prediction and estimation purposes. One method of evaluation is to compare the scatter of the points about the regression line (for simple linear regression) or surface (for multiple linear regression) with the scatter about \bar{Y} , the mean of the sample values of Y . This is done through use of the coefficient of determination, R^2 . The coefficient of determination is the square of the regression coefficient R . It calculates what proportion of the variation in the actual values of Y (dependent variable) may be predicted by changes in the values of X (independent variables). It thus gives the ratio of the explained variance to the total variance.

The coefficient of determination provides an objective measure of the goodness of fit. If the dispersion of the points about the regression line or surface is less than the dispersion about the \bar{Y} line, then the regression line or surface provides a good fit for the data. If the opposite is true then the regression line or surface is unsuitable.

R^2 can be generally expressed in the equation:

$$R^2 = \frac{\text{Explained variance}}{\text{Total variance}} = \frac{\text{SSR}}{\text{SST}},$$

and $\text{SST} = \text{SSR} + \text{SSE}$

Where $\text{SST} =$ Total sum of squares

$\text{SSR} =$ Sum of squares due to the regression (explained sum of squares)

$\text{SSE} =$ error sum of squares (unexplained sum of squares)

Each of the terms used in this equation is a measure of dispersion. **The total sum of squares** (SST) measures the dispersion of the observed values of Y about their mean \bar{Y} , that is, this term is a measure of the total variation in the observed values of Y.

The explained sum of squares (SSR) is a measure of the amount of the total variability in the observed values of Y that is accounted for by the linear regression between the observed values of X and Y.

The **Unexplained sum of squares (SSE)** measures the dispersion of the observed Y values about the regression line, and is sometimes referred to as the sum of squares of deviations from linearity. The unexplained sum of squares is the quantity that is minimized when we obtain the least squares line, and is usually called the error sum of squares.

R^2 value shows the amount of variation in the dependent variable Y that is explained by the independent variable(s). We may interpret R^2 as a measure of closeness of fit of the regression equation to the sample data. The value of R^2 lies between zero (0) and one (1). However, $0 < R^2 < 1$ is normally used. The better the fit of the regression line or surface the closer R^2 will be to one (1). In other words if the regression line or surface provides a perfect fit, the total variation in Y is completely explained and R^2 is exactly equal to one (1).

R^2 may also be interpreted as a measure of linearity of the data points. When the fit of

If the regression line or surface to the data is good, the data points will be such that their scatter diagram gives the impression of a straight line. On the other hand, when the fit is not good the points will be so widely scattered that the diagram will not suggest a straight line. A value of $R = 0$ means no linear relationship between Y and X values, hence no meaning.

The coefficient of determination R^2 (the square of the correlation coefficient, R) is a much more useful measure especially of linear covariation of two variables. For example, for a given value of $R = 0.8$, we cannot conclude that the variation in the dependent variable is 80% but instead the coefficient of determination $R^2 = 0.64$ is better used. This means that only 64% of the variation in the dependent variable has been explained by variation in the independent variable while the remaining 36% of the variation is due to other factors.

3.2.3.5 Testing of Statistical Significance: t and F - test

In order to know if a sample data provide sufficient information to justify the conclusion that a set of variables is correlated, we test the null hypothesis against the alternative one.

The simple linear regression model appropriately utilizes the student's t - test to determine if any relationship exists between the dependent variable and each of the independent variables (relationship between individual variables).

The student t - test is computed as follows:

$$t = \frac{\bar{x} - \mu}{s / \sqrt{n}} \cdot \sqrt{n-1}$$

where $n-1$ = Degrees of freedom

n = total number of observations (sample size)

s = sample standard deviation

\bar{x} = sample mean

μ = population mean.

Inhere is no relationship between the dependent variable and the independent variable, then the value of b is zero (b=0) and the Null hypothesis (HO) in the simple linear regression is confirmed by the t - test.

For Multiple linear regression model the F - test was used to test the overall goodness of fit of the regression equation. F - test uses the statistical inference procedures to test the null hypothesis that the multiple correlation in the population from which the sample was drawn was equal to zero. If this is true, then there would be no relationship between the dependent variables and the independent variables in a multiple linear regression model implying that the value of bi s for all the variables entered into the model would be zero (bi's = 0). F - test for multiple regression would therefore test the Null hypothesis (HO) so as to determine the goodness of fit of the model.

The F values are computed using the equation: $SST = SSR + SSE$, and expressed in the following formula.

$$F = \frac{SSR/K}{SSE/N-K-1} = \frac{R^2/K}{[(1-R^2)/N-K-1]}$$

where SST = Total sum of squares

n = Sample size (7540 for this study)

k = The number of regressors, and it shows the sum of squares explained by the entire regression equation.

SSE = Squared sum of errors (deviations)

K, N-K-1 = Degrees of freedom

The F ratio is approximately distributed as F distribution with degrees of freedom k and N-K-1.

Both t-test and F-test have been applied in this study.

If the calculated F or t value is equal or exceeds the critical (tabular) value of F or t from the F or t distribution tables at a specific level of significance (0.05) and appropriate level of

degrees of freedom, the null hypothesis that

HO: $h_i = 0$ (for t-test) or

HO: $b_1 = b_2 = b_3 = b_k = 0$ (for F-test) is rejected and the alternative one (HI) that y is related to x is adopted. If the F or t value falls short of the critical value of F or t ratio, the Null hypothesis is not rejected

However, from the computer print out, we have directly tested the hypothesis with the following conditions: If the observed significance level is less than the test level (0.05) we reject the Null hypothesis (HO) and accept the alternative (HI). If the observed significance is greater than the test level (0.05) we reject HI and accept HO.

3.2.3.6 Assumptions underlying the linear regression model

The validity of the Linear Regression model lies on the fulfilment of the following assumptions:

1. The values of the independent variables X or X_i may be either non-random (fixed) or random. Because of their role in explaining the validity of and also predicting the dependent variable Y, they are referred to as explanatory or predictor variables. This assumption means that the values of X can either be selected in advance (fixed) so that during data collection X value are controlled, or they may be random such that the X values may be obtained without any restrictions.
2. For each combination of X or X_i values, there is a normally distributed sub-population of Y values.
3. The variance of the sub-population Y values are all equal.
4. The dependent variable must be a linear function of the explanatory (independent) variable(s) This means that the means of the sub-populations of Y all lie on the same straight line. This assumption is known as the assumption of linearity.

The Y values are statistically independent such that drawing the sample, the value of Y selected for one value of X does not depend on the value selected for another value of X.

- 6 The random error (e) is assumed to be uncorrelated with any of the independent variables. This means that the variable X is measured without error, that is, the magnitude of the measurement of error is practically negligible. As the specific model violates this assumption, it is bound to produce biased estimates.

The error (e) is normally and uncorrelated distributed with mean 0 and variance σ^2

- 8 The dependent variable must not be dichotomous, but it can be in interval or ratio form.

3.2.3.7 Problems of Multiple Linear Regression and how they were overcome in this study

The basic problem with multiple linear regression is that of multi-collinearity, defined as the intercorrelation of the independent variables. It usually arises when independent variables overlap. Their individual influence and effects on the dependent variable become unreliable. The intercorrelation of the explanatory variables is measured by the simple correlation coefficient between the variables. The greater the overlap of the independent variables, the lower the reliability of the regression coefficients. If the intercorrelation of the explanatory variables is high, the assumptions of the ordinary least squares method that the disturbance terms are (i) normally distributed with zero expectation and (ii) homoskedastic, that is they have the same variance, are violated

In this study, multicollinearity could arise where the dummy variables each representing the presence or absence of a characteristic are all included in the regression and the dummies include all possibilities. For example, suppose the regression includes the dummy variables representing education of the mother such that the dummy is one (1) where the mother has no education and zero (0) where otherwise, so that no education = 1, std 1-4 = 0, std 5-8 = 0, Form 1-

2=0, Form 3-4=0, If all the dummy variables of education are included in the regression there will be perfect multi-collinearity. Odhiambo (1991:126) refers us to Intriligator's (1978) recommendation that one of the dummy variables must be dropped to avoid this problem of linear dependence.

In this study, one dummy variable for each of the explanatory variables was treated as a reference category so as to avoid the problem of linear dependence. Since the sample for this study was selected by simple random sampling, the variance of the error term is normally distributed. Furthermore, the normality assumption may not present a critical problem because the sample size considered here was large enough (7540 women). The criteria, normally is that the sample size should be greater or equal to thirty (30).

CHAPTER FOUR

BACKGROUND CHARACTERISTICS AND THE ASSOCIATION BETWEEN CHILDREN EVER BORN AND INDEPENDENT VARIABLES

While presenting data comparatively for urban and rural areas, the purpose of this chapter is double-fold. First, it gives an insight into the study population by unfolding their background (basic) characteristics. Secondly, this chapter analyses the association between the dependent variable, children ever born (CEB), and each of the independent variables.

4.1 BACKGROUND CHARACTERISTICS OF THE STUDY POPULATION

Variations in birth performance among women is a practical reality. This phenomenon can possibly be attributed to the existence of individual differences with respect to their background characteristics, hence the disparity in the actual number of children born to each individual. The study was based on a total sample of 7540 women of reproductive age (15-49 years) of whom 1161 (15.5 percent) lived in the urban while the remaining 6379 (84.6 percent) were rural residents. The background characteristics of the study population included the respondents' age and residence, education, work status, age at first marriage, marital status, under-five mortality, ethnicity, religion, access to FP service (time to get to source), contraception and children ever born. These have been categorised as dummy variables and summarised in Table 4.1 below for urban and rural areas separately, then discussed.

Table 4.1: Percent Distribution of Respondents by Background Characteristics and Urban-Rural Residence.

Background variables	URBAN		RURAL		OVERALL TOTAL	
	No. Of Women	Percent (%)	No. Of Women	Percent (%)	No. Of Women	Percent (%)
Education level						
So education	125	10.8	1172	18.4	1297	17.2
Primary	531	45.7	3918	61.4	4449	59.0
Secondary +	505	43.5	1289	20.2	1794	23.8
Total	1161	100	6379	100	7540	100
Work status						
Not working	560	48.3	3223	50.6	3783	50.2
Currently working	599	51.7	3152	49.4	3751	49.8
Total	1159	100	6375	100	7534	100
Age of Respondent						
15-24	565	48.7	2828	44.3	3393	45.0
23-34	406	35.0	1905	29.9	2311	30.6
35+	190	16.3	1646	25.8	1835	24.4
Total	1161	100	6379	100	7540	100
Percent	15.4		84.6			
Marital status						
Never married (single)	433	37.3	1887	29.6	2320	30.8
Married	584	50.3	3745	58.7	4329	57.4
Stoned	144	12.4	747	11.7	891	11.8
Others	1161	100	6379	100	7540	100
Total						
Age at First Marriage						
Under 15 years	76	10.4	571	12.7	647	12.4
15-19	360	49.5	2633	58.6	2993	57.3
20+	292	40.1	1288	28.7	1588	30.3
Total	728	100	4492	100	5220	100
Number of children ever born						
0 CD	1002	86.3	4893	76.7	5895	78.2
1 - CD	159	13.7	1486	23.3	1645	21.6
Total	1161	100	6379	100	7540	100
Ethnicity						
Kalenjin	31	2.7	1065	16.7	1096	14.6
Kikuyu	267	23.0	1239	19.5	1506	20.0
Luhya	150	12.9	1002	15.7	1152	15.3
Others	711	61.4	3058	48.1	3769	50.1
Total	1159	100	6364	100	7523	100
Religion						
Catholic	341	29.5	1995	31.3	2336	31.1
Protestant/other chnst.	568	49.1	3988	62.6	4556	60.5
Muslims	246	21.4	385	6.1	633	8.4
Total	1157	100	6368	100	7525	100
Access to KP source						
More than 30 minutes	580	59.1	890	16.7	1470	23.3
30-59 minutes	280	28.6	1218	22.8	1498	23.7
60+	121	12.3	3225	60.5	3346	53.0
Total	981	100	5333	100	7525	100
Contraception use						
Non-Use	784	67.5	4842	75.9	5626	74.6
Use	377	32.5	1537	24.1	1914	25.4
Total	1161	100	6379	100	7540	100
Children ever born (CEB)						
	916	78.9	3681	57.7	4597	61.0
	138	11.9	1080	16.9	1218	16.1
	107	9.2	1618	25.4	1725	22.9
Total	1161	100	6379	100	7540	100

Source: K.DHS 1993 Data Sheet
0 CD: No child dead under 5 years.
1+ CD: At least one (1) child dead under 5 years

4.1.1 Education

As shown in Table 4.1 above, information on the respondents' level of education reveals poor educational attainment in the rural areas. The majority (61.4 percent) had primary education while only 20.2 percent had secondary education and above. The rest (18.4 percent) had no education. The high proportion of rural respondent with primary education is a pointer to high fertility in the rural.

A review of the urban areas indicates better educational achievement. 43.5 percent of the urban respondents had secondary education and higher compared to 20.2 percent in the rural areas. The proportion with no education in the urban (10.8 percent) was even much lower than that of the rural areas (18.4 percent). Urban women are therefore more exposed to smaller families.

4.1.2 Work Status

Women employment has been found to relate inversely with fertility (El-Badry, 1981:7). However, this source explains that in Africa and in other developing countries, a clear relationship is hard to determine as a result of the difficulties involved in the definition of the concept especially in rural areas where women engage in a variety of income generating activities, yet still rated unemployed.

Work status is categorized in this thesis as: currently working and not working. The currently working are defined in this study as those at least engaged in salaried employment done away from their regular residential points in non-agricultural occupations. The reverse is true of the not-working category. As shown in the table, the level of unemployment was high in both urban (48.3 percent) and rural (50.6 percent) areas with the rural areas relatively badly hit. However, the percentage of working women in the urban was higher (51.7 percent) than the rural working (49.4 percent) even if the definition of 'employed' might have left out some women

especially in the rural who were engaged in income generating activities not categorized as salaried employment. Even on overall, about half (50.2 percent) of the country's women of reproductive age were not working. This is a pointer to the possibility of high fertility in the country.

4.1.3 Age of the mother

In fertility analysis, age plays an important role in determining the proportion of population in reproductive years (U.N.,1991 op.cit.). In this study, the age of the respondents ranged between 15-49 years.

From table 4.1 above, it is observed that the majority of Kenyan women of reproductive age (75.6 percent) were aged between 15-34 years, the range of ages at which childbearing is most concentrated. This denotes Kenya's susceptibility to high fertility unless some necessary control mechanisms are applied.

In terms of residence, the differences in the composition of urban and rural populations and in their conditions of living and life styles may cause disparities in urban-rural fertility. Information on urban-rural population composition (Table 4.1) shows dominance of rural residence, and this may be a component of high fertility in the rural areas. According to the sample, 84.6 percent of the total population lived in the rural area as opposed to the urban which was only inhabited by 15.4 percent. This is in agreement with the fact that Kenya is basically rural with over 80 percent of her population occupying the rural sector. The table further indicates that the younger ages form the majority of urban residents. 83.7 percent of urban residents were aged between 15-34 years while only 74.2 percent of the rural residents fell in the same age bracket. The preference for urban residence by the younger ages can be attributed in large extent to rural-urban influx (migration) in search of jobs and educational opportunities.

4.1.4 Marital Status

Marriage is a socially recognized and approved union between two individuals of opposite sex made with the expectation of permanence and with the aim of producing offspring. In some societies the union of a man and a woman is not given the status of marriage until the birth of a child, and in many societies failure to have a child is considered valid grounds for divorce (Collier's encyclopedia No. 15, p. 444). In most human societies, therefore, procreation is expected to take place in stable marital unions, hence these unions have great bearing on a people's fertility performance

In Kenya, the marriage institution is still adequately valued. In Table 4.1 above, more than half (57.4 percent) of the women of reproductive age (15-49) were married. However, a comparison of urban and rural population indicates higher percentage of the never married in the urban (37.3 percent) than in the rural (29.6 percent) areas. The percentage married, however, was higher in the rural (58.7 percent) than in the urban (50.3 percent). The implication is fewer children in the urban than rural areas if childbearing is meant to take place mainly in stable marital unions. The 'others' category (which includes the living together, not living together, the widowed, and the divorced) was found in both urban and rural areas but in lesser percentages (12.4 and 11.7 for urban and rural respectively).

4.1.5 Age at First Marriage

Although marriage is a universal institution, people in different parts of the world have varied practices and beliefs associated with it. One aspect of these variations is the age at which marriage takes place. Among higher caste Hindus of Asia, for example, girls are often married at the age of seven or eight, and it is a cause for family alarm if a girl is still unmarried at the age of eleven (Collier's Encyclopedia, Ibid p. 444). This practice is not strange in Africa as marriage in most African societies is early.

Age at marriage determines the period of exposure to the risk of child-bearing and early marriage prolongs the duration of fertility of the married, while late age at marriage lowers fertility (U.N. 1993:14 Op cit). In Table 4.1 above Kenya's situation is examined as per KDHS 1993 data.

The results reveal that on average, Kenya is characterised by early marriage which portrays early exposure to the onset of childbirth. About 70 percent of the country's married women were aged below 20 years at the time of their first involvement in marriage.

The urban-rural comparison has equally revealed a high percentage of early marriage involvement with 49.5 percent and 58.6 percent married between ages 15-19 among urban and rural women respectively. The situation was even worse in the rural areas where 12.7 percent of the women were married off before age 15 as opposed to 10.4 percent in the urban areas.

A further review of the urban-rural situation shows that 71.3 percent of rural ever married women were aged below 20 years as opposed to 59.9 percent in the urban areas. This situation is most likely to subject the rural women to higher fertility performance than their urban counterparts.

4.1.6 Under-five Mortality

Loss of a child to a family creates the fear of subsequent losses, and may impel the affected family to have as many children as possible as security against death (Ocholla-Ayayo op cit 1991: 158). This implies that those regions with high under-five mortality may also have high fertility. Table 4.1 above conveys information on under-five mortality in Kenya according to rural and urban residence.

The table reveals that infant and child mortality (under-five deaths) is an experience of urban and rural alike. However, differential in the intensity of this phenomenon can be observed in the two areas. According to these data 13.7% of the urban women had lost at least a child

Under age five while 86.3% had lost none. In the rural areas, those who had lost one child or more were 23.3%.

On a comparative basis the information contained in the table indicates more incidences of child loss in the rural than in the urban areas. This condition is most likely to subject the rural women to higher fertility than their urban counterparts. This hypothesis is tested in the present study.

4.1.7 Ethnicity

Kenya constitutes various ethnic groups with distant socio-economic/cultural practices which influence their reproductive performance differently. Table 4.1 above presents information on the major ethnic groups in Kenya according to their urban-rural residence. As indicated in the table, the majority (84.6 percent) of Kenyan women of reproductive age (15-49 years) were rural residents compared to 15.4 percent in the urban. However, the various ethnic groups in Kenya who reside in the urban and rural areas varied in numbers. While the "other" category constituted the majority in both urban and rural areas (61.4 and 48.1 percent respectively), the distribution of the individual ethnic groups according to place of residence is less uniform except for the Kikuyu group. As presented in the table, rural residence was dominated by the Kikuyu (19.5 percent). The Kalenjin groups came second with 16.7 percent, then the Luhya, 15.7 percent.

In the urban setting, the Kikuyu were again the majority with 23.0 percent. The Luhya were second with 12.9 percent. The Kalenjin group was the least, constituting only 2.7 percent.

4.1.8 Religion

Religion is one of the major socio-cultural variables that are likely to affect fertility. Religious attitudes and beliefs may affect one's life decisions and choices of which family size is a factor.

Kenya can be said of as a multiple-religion society. From KDHS 1993 data two major religious groups are identifiable namely: Christians (Catholics and Protestants) and Muslims Table 4.1 above presents data on religious affiliation in Kenya according to urban and rural residence. From the table, a general overview of the country by religious affiliation of the respondents shows that the majority (91.5 percent) were Christians (31.1 percent Catholics and 60.5 Protestants), while Muslims constitute 8.4 percent. The table also indicates that the majority of urban residents (78.6 percent) were Christians (29.5 percent Catholics and 49.1 percent protestants). Muslims were only 21.4 percent in the urban area.

In the rural areas. Christians were still the majority; they constitute 93.9 percent (31.3 percent Catholics and 62.2 percent protestants). Muslims only account for 6.1 percent.

The urban-rural comparison, however, shows existence of more christians in the rural (93 9 percent) than urban (78 6 percent), and more Muslims in the urban (21.4 percent) than rural (6.1 percent) areas. The concentration of particular religious groups in certain areas of residence is likely to influence the reproductive behaviour of the area depending on the various beliefs, attitudes and practices exhibited by these groups.

4.1.9 Access to Family Planning Services: Time (Minutes) to get to source

The sources for family planning services constitute public, private or commercial facilities. However, any one of these sources may only be of adequate benefit to the people if they have easy access to it, that is, if located close to their places of residence.

Studies on availability and accessibility of Family Planning service have attempted to obtain information from respondents as to whether they know an outlet for contraceptive services and supplies, have been to one and the amount of time required to reach it, the hypothesis being that women would more readily use contraceptives to plan their families if information, service and supply were easily accessible. Indeed, it has been observed that in some countries, an

inconvenient supply source can inhibit use of contraceptives to plan families. This applies particularly to rural women and may be a determining factor in their use of renewable supplies (IUN, 1986:67). Table 4.1 above presents information on access to Family Planning services in Kenya, in terms of time taken to get to source. The table shows that in Kenya, the majority of the users of family planning services travel and spend some time to reach source. The number served at home through the mobile sources (e.g. by community health workers) may be quite negligible. As indicated in the table, 23.3 percent of the Kenyan women who use Family planning services spent less than 30 minutes to get to source. Another 23.7 percent spent between 30-59 minutes. However, the majority (53.0 percent) took 60 minutes and above to get to the source; this signifies scarcity and may discourage use of such services by the eligible women.

A review of urban and rural situations indicates differentials in time to get to source. In the urban areas the majority of the respondents (59.1 percent) spent less than 30 minutes to get to source, 28.6 percent spent 30-59 minutes, and only 12.3 percent spend 60 minutes and above. This denotes that most urban women have easy access to the sources of Family planning services. These services are most likely to be readily available and/or located closer to the users. The implication is better use of modern birth control methods and subsequent reduction in individual parity.

In the rural areas, only a very small proportion of the users of family planning services (16.7 percent) spent less than 30 minutes to get to source. Another 22.8 percent spent 30-59 minutes. The majority (60.5 percent), however, spent 60 minutes and above, indicating that most rural women travelled long distances to reach the available family planning facility. This factor is a possible constraint to utilization of family planning services by rural women even if the women were motivated and knew where to get the service. Such a condition implies inadequacy of the services and suggests the likelihood of high fertility among the rural women.

4.1.10 Contraception

Contraception is one of the important proximate determinants of fertility. In the present world, the level of fertility of a given region largely depends on the extent of acceptance and use of the modern birth control methods. Table 4.1 below presents data on the status of contraception in Kenya according to KDHS 1993. The table portrays, generally, low level of contraceptive use in Kenya. The country figure shows that only 25.4 percent used contraceptives. The remaining 74.6 percent were non-contraceptors. This fact could be used to explain the low pace of fertility decline in Kenya over the years.

The rural-urban review, according to the table, generally indicates high proportions of non-use in both rural and urban areas. However, this proportion was higher in the rural areas (75.9 percent) than the urban (67.5 percent). The rural contraceptors were only 24.1 percent as opposed to 32.5 percent in the urban areas. This factor may create variation in the rural-urban fertility performances.

4.1.11 Children Ever Born (CEB)

In fertility analysis, the actual number of children ever born (CEB) to a woman is a strong indicator of her individual fertility experience. Children ever born is the cumulative number of live births a woman has had at the end of her childbearing or at the date of the interview if still in her reproductive years. This measure includes children who were born alive but are now dead.

The problem of how many children a couple should have is so widely shared and has many personal and social implications. Different cultures or groups have norms about family size which are likely to be in terms of a range in numbers of children that are permissible or desirable. Many individuals are also quite indecisive and non-committal on the actual number of children they want. While specifying clearly that childlessness is an unspeakable tragedy and an only child very undesirable, the norm for a particular culture, group or individual may be as

vague as 'at least three or four children' or 'as many as possible' (Micklin, 1973:173). This condition may count as one of the contributing factors to the variation in fertility performance among individuals and regions. Such variations are better observed between urban and rural areas. Based on a wide variety of fertility measures, it has been generally observed in developed and many developing countries of the world that the fertility of the rural population exceeds that of its urban counterparts (U.N. 1986:39-40). Table 4.1 above presents data on urban-rural fertility in Kenya in terms of number of children ever born.

From the table, a review of the entire country in terms of fertility experience shows that disparities exist in fertility performance between urban and rural areas. The Table also indicates that 78.9 percent of the urban women had between 0 and 3 children compared to 57.7 percent in the rural area. This denotes fewer births to urban women compared to their rural counterparts.

It is further observed from the table that the proportion of urban women who opt for more than three children continue to decrease as the number of children increase. The urban women with 4-5 children were 11.9 percent while those who had six children and above were only 9.2 percent. A different trend is seen in the rural area where 16.9 percent of the women had 4-5 children, and 25.4 percent had six children and above (6+ children).

A comparison of urban and rural fertility, based on the data contained in Table 4.1 above, shows that the rural women still show preference for large families. While the urban figures decreased from 11.9 percent for women who had 4-5 children to 9.2 percent for those with 6+ children, the rural situation was quite different. There was an increase from 16.9 to 25.4 percent for those who had 4-5 and 6+ children respectively. On the basis of these data, the fertility of the rural women is higher than that of the urban women. For instance, 25.4 percent of the rural women had 6+ children as opposed to 9.2 percent in the urban areas. The feasible factors which account for this variation are the subject of analysis in this work.

4.2 ASSOCIATION BETWEEN CHILDREN EVER BORN AND INDEPENDENT VARIABLES

The focus of this section was presentation of information on the nature of association between children ever born (the dependent variable) and each of the independent variables by use of cross tabulation with chi-square (X^2) analysis. This section also partly incorporates tests of hypotheses as well as verification of objectives. The study objectives are: To determine the factors which account for fertility differentials among urban and rural women in Kenya; to show the direction and strength of the relationship between each selected independent variable and the dependent variable; and to provide planners and policy makers with appropriate recommendations based on the findings.

While cross tabulation was used to show how the women in the study were distributed in the various categories of variables under study, chi-square under cross tabulation was utilized as a useful index that measures significance of the association between variables and also tests the statistical hypothesis that there is no association between variables (null form of the hypothesis). The analysis was done using the SPSS/PC+ computer package and significance level set at 0.05. According to results produced by the analysis done in this package, if the observed significance level of test is small enough, usually less than 0.05, the null hypothesis that the variables are independent is rejected. In other words, the hypothesis is rejected at 95% level of confidence.

The independent or explanatory variables used in this study consisted of continuous variables, (e.g. age at first marriage), variables with some ordering between the different categories (e.g. education), and some with no ordering between the categories (e.g. religion). The differentials (variations) in urban-rural fertility were determined with respect to how the selected independent variables such as mother's education, work status, age at first marriage influenced reproductive behaviour of urban and rural women in terms of number of children ever born (CEB). A total of ten such variables were analyzed in this study in their dummy categories. The

results are contained in tables 4.2 - 4.11 below, and analyzed for urban and rural areas.

4.2.1 Education Differential

This study sought to determine the influence of mothers' education on children ever born separately for urban and rural women. The results are in table 4.2 below.

Table 4.2: Children Ever Born by Mothers' Education and Urban-Rural Residence.

CE.B	Urban				Rural			
	None	Primary	Sec+	Total	None	Primary	Sec+	Total
0-3	62 49.6%	415 78.1%	439 86.9%	619 78.9%	296 25.3%	2401 61.3%	984 76.3%	3681 57.7%
4-5	24 19.2%	63 11.9%	51 10.1%	138 11.9%	210 17.9	680 17.3%	190 14.7%	1080 16.9%
6+	39 31.2%	53 10%	15 3%	107 9.2%	666 56.8%	837 21.4%	115 9%	1618 25.4%
Total	125 10.8%	531 45.7%	505 43.5%	1161 100%	1172 18.4%	3918 61.4%	1289 20.2%	6379 100%
Chi-square=12.01132 D.F=4 Significance=0.00000					Chi-square=924.33401 D.F=4 Significance=0.00000			

The results show that for women in the urban areas who had no education, 49.6% had 0-3 children, 19.2% had 4-5 children, while 31.2% had 6+ children. For women with primary education, 78.1% had 0-3 children, 11.9% had 4-5 children while 10% had 6+ children. The group of women, still in the urban areas who had secondary or higher levels of education, 86.9% had 0-3 children, 10.1% had 4-5 children while 3% had 6+ children. In total, in the urban area, 78.9% had 0-3 children, 11.9% had 4-5 children while 9.2% had 6+ children.

The urban data further show that as education level increased from none to secondary and higher levels, the proportion of women with 0-3 children increased from 49.6% to 86.9% while those who had 6+ children reduced from 31.2% (no education) to 3% (sec+).

In the rural areas, among the women with no education, one quarter (25.3%) reported that they had 0-3 children. In the same category, 17.9% had 4-5 children, while over half (56.8%) had 6+ children. For women with primary education, 61.3% had 0-3 children, 17.3% had 4-5 children and 21.4% had 6+ children. Over three quarters (76.3%) of women with secondary education or higher, had 0-3 children, 14.7% had 4-5 children while 9% had 6+ children. The data further shows that as the level of education rose in the rural area, the proportion of women with 0-3 children increased while those with 6+ children reduced.

Comparison of fertility levels between rural and urban areas does indicate that rural areas have higher fertility than the urban areas. Whereas 49.6% of women in the urban who had no education reported having 0-3 children, the corresponding proportion for women in the rural area was 25.3%. On the other hand, 31.2% of urban women with no education had 6+ children. In the rural areas, the proportion was over half (56.8%).

The association between education and children ever born was further subjected to statistical test using the chi-square static separately for urban and rural women. The results in table 5.1 show that there is a significant association at 95% level of confidence. This is because the observed level of significance was 0.0000 against a set level of 0.05. The result was observed for both women in the urban and in the rural areas.

4.2.2 Work Status Differential

The work status of a woman may determine her fertility level as already shown in the literature review. In this study, the results show that for women who were not working but residing in the urban areas, 83.9% had 0-3 children, 8% had 4-5 children while another 8% had 6+ children. Among the working women, 74.1% had 0-3 children, 15.5% had 4-5 children while 10.4% had 6+ children. The data is reported in table 4.3

Table 4.3: Children Ever Born by Mothers' Work Status and Urban-Rural Residence

CEB	Urban			Rural		
	Not-Working	Working	Total	Not-working	Working	Total
0-3	470 83.9%	444 74.1%	914 78.9%	2161 67%	1518 48.2%	3679 57.7%
4-5	45 8.0%	93 15.5%	138 11.9%	407 12.6%	672 21.3%	1079 16.9%
6+	45 8.0%	62 10.4%	107 9.2%	656 20.4%	962 30.5%	1618 25.4%
Total	560 48.3%	599 51.7%	1159 100%	3223 50.6%	3152 49.4%	6375 100%
Chi-square=48.6002 D.F=2 Significance=0.00000 a 0.05			Chi-square=529.68498 D.F=2 Significance=0.00000 a 0.05			

In the rural areas, among the women who were not working, 67% had 0-3 children, 12.6% had 4-5 children while 20.4% had 6+ children. For the women who were working but residing in the rural areas, 48.2% had 0-3 children, 21.3% had 4-5 children while 30.5% had 6+ children.

The data show that women living in the rural areas whether working or not still show higher fertility levels than their counterparts in the urban areas. The results further suggest that the working have higher fertility than the non-working in both areas of study.

The relationship between work status and children ever born was significant for both women in the rural and urban areas. In both cases, the observed significance was 0.000 which is less than the set level of 0.05.

IHUVESiVt fIF WAm-

4.2.3 Age of the Mother Differential

Age is an important demographic factor in the study of fertility, as childbearing has a simple, direct relationship with age through its relationship with a woman's physical ability to

•xar children (UN, 1985:48). In this study, the age of the respondent was found to have an -rortant bearing on the trend of childbearing in both urban and rural areas. The results are contained in table 4.4 below.

Table 4.4: Children Ever Born by Respondents' Current Age and Urban-Rural Residence

CEB	Urban			Total	Rural			Total
	15-24	25-34	35+		15-24	25-34	35+	
0-3	557 98.6%	297 73.2%	62 32.6%	916 78.9%	2748 97.2%	750 39.4%	183 11.1%	3681 57.7%
4-5	8 1.4%	70 17.2%	60 31.6%	138 11.9%	79 2.8%	715 37.5%	286 17.4%	1080 16.9%
6+	00 0%	39 9.6%	68 35.8%	107 9.2%	1 0.0%	440 23.1%	1177 71.5%	1618 25.4%
Total	565 48.7	06 35.0%	190 16.4%	1161 100.0%	2828 44.3%	1905 29.9%	1646 25.8%	6379 100.0%
Chi-square =402.61043 DF =4 Significance = 0.000 a =0.05				Chi-square =44.05.83672 DF =4 Significance = 0.0000 a 0.05				

The results show that in the urban areas for those aged 15-24, 98.6% had 0-3 children, 1.4% had 4-5 children while none had 6+ children. Among those aged 25-34, 73.2% had 0-3 children, 17.2 had 4-5 children, leaving the rest (9.6%) with 6+ children. Urban women aged 35+ and had 0-3 children constituted 32.6%, while those with 4-5 children were 31.6 compared to 35.8% for those with 6+ children.

In the rural areas, those aged 15-24 and had 0-3 children were 97.2%. Another 2.8% had 4-5 children. Less than 1% of the women in this age group had 6+ children. For those aged 25-34, 39.4% had 0-3 children. 37.5% had 4-5 children while 23.1% had 6+ children. The fertility analysis of the last category of rural women (those aged 35+) shows that 11.1% had 0-3 children, 17.4% had 4-5 children while the rest, 71.5%, had 6+ children.

The data contained in table 5.3 above indicate that fertility increases with age. The older the woman, the higher the number of children born to her. For instance, 35.8% of the urban women aged 35+ had 6+ children as opposed to 9.6% for those aged 25-34 and none for the lower age group (15-24). A similar trend was true for the rural women where 71.5% of those aged 35+ had 6+ children as opposed to 23.1% for those aged 25-34, and less than 1% for the 15-24 age group.

One pertinent finding of this study is that rural fertility is higher than that of the urban. The table shows that 71.5% of the rural women aged 35+ years had 6+ children while only 35.8% of the urban women of the same age had 6+ children.

The relationship between current age of the mother and children ever born was significant for rural and urban women alike, the observed significance level being 0.0000 for both.

4.2.4 Marital Status Differential

Marital status of women is another important factor that determines the number of children ever born. The data in table 4.5 below show that in the urban areas, 97.9% of women who had never been married had 0-3 children. 1.9% had 4-5 children and 0.2% had 6+ children.

Table 4.5: Children Ever Born by Marital Status and Urban-Rural Residence

CEB	Urban				Rural			
	Never married	Married	Others	Total	Never married	Married	Others	Total
i	424 97.9%	395 67.6%	97 67.4%	916 78.9%	1857 98.4%	1509 40.3%	315 42.2%	3681 57.7%
4-5	8 1.9%	98 16.8%	32 22.2%	138 11.9%	20 1.1%	904 24.1%	156 20.9%	1080 16.9%
6+	1 0.2%	91 15.6%	15 10.4%	107 9.2%	10 0.5%	1332 35.6%	276 36.9%	1618 25.4%
Total	433 37.3%	584 50.3%	144 12.4%	1161 100%	1887 29.6%	3745 58.7%	747 11.7%	6379 100%
Chi-square= 156.93707 D.F=4 Significance=0.00000 a 0.05					Chi-square= 1824.42545 D.F=4 Significance^ .00000 a 0.05			

Among the married women in the urban, 67.6% had 0-3 children, 16.8% had 4-5 children and 15.6% had 6+ children. For those in the other¹ categories of marital status, 67.4% had 0-3 children, 22.2% had 4-5 children while 10.4% had 6+ children.

In the rural areas, among the never married women, 98.4% had 0-3 children, 1.1% had 4-5 children while 0.5% had 6+ children. Among the married women in the rural area, 40.3% had 0-3 children, 24.1% had 4-5 children while 35.6% had 6+ children. For other categories of women in the rural areas, 42.2% had 0-3 children, 20.9% had 4-5 children while 36.9% had 6+ children.

Comparing married women in the rural area and those in the urban area, the data show that those in the rural area had a higher number of children ever born than those in the urban area. Other categories of marital status for women in the rural areas also had higher levels of children ever born compared to those in the urban areas as shown in table 4.5

The association between marital status variable and children ever born was also

significant for both rural and urban women. The observed level of significance was less than the set level of 0.05.

4.2.5 Age at First Marriage Differential

It is normally hypothesized that women who marry early (lower ages) have longer exposure to the child bearing period and hence higher fertility. As revealed in Table 4.6, in the urban areas and for women whose age at first marriage was below 15 years, 40.8% had 0-3 children, 22.4% had 4-5 children while 36.8% had 6+ children. Among the women whose age at first marriage was between 15-19 years, 66.4% had 0-3 children, 17.5% had 4-5 children and 16.1% had 6+ children. For women whose age at first marriage was 20 years and above, 76% had 0-3 children, 17.1% had 4-5 children and 6.9% had 6+ children.

Table 4.6: Children Ever Born by Age at First Marriage and Urban-Rural Residence

C.E.B	Urban				Rural			
	Under 15 yrs	15-19 yrs	20+ yrs	Total	Under 15 yrs	15-19 yrs	20+ yrs	Total
0-3	31 40.8%	239 66.4%	222 76%	492 67.6%	129 22.6%	1043 39.6%	652 50.6%	1824 40.6%
4-5	17 22.4%	63 17.5%	50 17.1%	130 17.8%	135 23.6%	625 23.7%	300 23.3%	1060 23.6%
6+	28 36.8%	58 16.1%	20 6.9%	106 14.6%	307 53.8%	965 36.7%	336 26.1%	1608 35.8%
Total	76 10.4%	360 49.5%	292 40.1%	728 100%	571 12.7%	2633 58.6%	1288 28.7%	4492 100%
Chi-square=50.64307 D.F=4 Significance=0.00000 a 0.05					Chi-square= 164.120975 D.F=4 Significance=0.00000 a 0.05			

In the rural areas, the relationship between age at first marriage and fertility was somewhat similar to that in the urban areas. However, as data in table 5.5 show, women in the rural areas had higher number of children ever born compared to those in the urban areas.

As shown in the table, for women (in the rural areas) whose age at first marriage was under 15 years, 22.6% had 0-3 children, 23.6% had 4-5 children while 53.8% had 6+ children. For those whose age was between 15-19 years, 39.6% had 0-3 children, 23.7% had 4-5 children, while 36.7% had 6+ children. Among those whose age at first marriage was 20+ years, 50.6% had 0-3 children, 23.3% had 4-5 children, while 36.7% had 6+ children.

For the urban women, the relationship between children ever born and age at first marriage was found to be significant at 0.05 level as shown in Table 5.6 below. The relationship was also significant for the rural women.

4.2.6 Under-five Mortality Differential

This study also sought to determine the relationship between children ever born and children dead under age five years for the women covered. The results are in table 4.7 below.

Table 4.7: Children Ever Born by Children Dead Under Five Years and Urban - Rural Residence

CE.B	Urban			Rural		
	0 deaths	1+ dead	Total	0 deaths	1+ dead	Total
0-3	859 85.7%	57 35.9%	916 78.9%	3422 69.9%	259 17.4%	3681 57.7%
4-5	96 9.6%	42 26.4%	138 11.9%	754 15.4%	326 22.0%	1080 26.9%
6+	47 4.7%	60 37.7%	107 9.2%	717 14.7%	901 60.6%	1618 25.4%
Total	1002 86.3%	159 13.7%	1161 100%	4893 76.7%	1486 23.3%	6379 100%
Chi-square=50.64307 D.F=4 Significance [^] .00000 j a 0.05				Chi-square = 1523.30352 D.F = 2 Significance [^] .00000 a 0.05		

In the urban areas for women who had no child dead under age five, 85.7% had 0-3 children, 9.6% had 4-5 children while 4.7% had 6+ children. Of the women who had at least one child dead (1+) under age five, 35.9% had 0-3 children, 26.4% had 4-5 children, and 37.7% had 6+ children. In the urban, it is noted that women who had at least a child dead have a higher proportion of those with 6+ children (37.7%) compared to their counterparts who had no child dead of whom only 4.7% had 6+ children born.

Among the women in the rural areas who had no child dead under age five, 69.9% had 0-3 children, 15.4% had 4-5 children, while 14.7% had 6+. For the rural women who had at least a child dead, 17.4% had 0-3 children, 22.0% had 4-5 children, and 60.6% had 6+ children.

Generally, women in the rural areas had higher fertility than their urban counterparts not only where no under-five deaths were experienced but also where such deaths occurred. Another point worth of note is the promotive effect of under-five mortality on number of children ever born as more children are born to women who have lost children through death than those without such experience. For instance, 60.6% of the rural women who had experienced deaths to children under age five had 6+ children born as opposed to 14.7% for those without such losses.

The relationship between children dead and children ever born was significant for both urban and rural at 95% significance level. The observed significance levels for both areas, as shown in table 5.6, were below the fixed level of 0.05.

4.2.7 Ethnicity Differential

As revealed in the literature review, several findings have shown that fertility varies among different communities. This study sought to determine this variation among the ethnic groups covered by the survey. The results are reported in table 4.8 below for urban and rural areas

Table 4.5: Children Ever Born by Marital Status and Urban-Rural Residence

I Cf B	Urban					Rural				
	Kalenun	Kikuvu	Luhva	Others	Total	Kalenjin	Kikuvu	Luhva	Others	Total
0-3	27 87.1%	223 83.5%	115 76.7%	550 77.4%	915 78.9%	595 55.9%	778 62.8%	574 57.3%	1725 56.4%	3672 57.7%
4-5	2 6.5%	30 11.2%	18 12.0%	88 12.4%	138 11.9%	164 15.4%	213 17.2%	167 16.7%	533 17.4%	1077 16.9%
6+	2 6.5%	14 5.2%	17 11.3%	73 10.3%	106 9.1%	306 28.7%	248 20.0%	261 26.0%	800 26.2%	1615 25.4%
Total	31 2.7%	267 23.0%	150 12.9%	711 61.3%	1159 100%	1065 16.7%	1239 19.5%	1002 15.7%	3058 48.1%	6364 100%
Chi-square=8.75810 D.F=6 Significance^ .1876 a 0.05					Chi-square=28.79209 D.F=6 Significance^ .00010 a 0.05					

As can be observed from the table, the relationship between ethnicity and children ever born was significant for women in the rural areas but insignificant for urban women. The figures, however, indicate that the Kalenjins in the urban had 87% of women with 0-3 children, 6.5% had 4-5 children and another 6.5% had 6+ children. Among the kikuyu in the urban, 83.5% had 0-3 children, 11.2% had 4-5 children while 5.3% had 6+ children. For the Luhya in the urban areas, 76.7% had 0-3 children, 12% had 4-5 children while 11.3% had 6+ children. For women in the other communities, 77.3% had 0-3 children, 12.3% had 4-5 children, while 10.4% had 6+ children.

In the urban areas, Luhya's showed the highest level of fertility. They had the lowest proportion of women with 0-3 children (76.7%) while on the other hand they had the highest proportion (11.3%) of women with 6+ children

In the rural areas, the Kalenjin had 55.9% of their women with 0-3 children, 15.4% with 4-5 children while 28.7% had 6+ children. For the Kikuyu, 62.8% had 0-3 children, 17.2% had 4-5 children while 20% had 6+ children. Among the Luhya, 57.3% had 0-3 children, 16.7% had 4-5 children and 6% had 6+ children. For the remaining ethnic communities (others), 56.4% had 0-

3 children, 17.5% had 4-5 children while 26.1% had 6+ children.

In the rural areas, the Kalenjin women showed higher fertility levels compared to the women from the remaining ethnic communities.

4.2.8 Religion Differential

Fertility has been shown to vary among women in the different religions groups (Oladipe, 1968; Potts et al., 1979). This study sought to determine how this variation manifests itself among the Catholics, protestant/other christians and Muslims in both urban and rural Kenya. The results are reported in Table 4.9 below, and they reveal no significant association between children ever born and religion in the urban since the observed level of significance was higher than the fixed level of 0.05. In the rural, however, the observed level of significance was 0.0281, indicating significant relationship between children ever born and religion.

Table 4.9: Children Ever Born by Mothers' Religion And Urban-Rural Residence

C.E.B	Urban				Rural			
	Catholic	Protest./other	Muslims	Total	Catholics	Protest./other	Muslims	Total
0-3	272 79.8%	450 79.2%	191 77%	913 78.9%	1143 57.3%	2337 58.6%	195 50.6%	3675 57.7%
4-5	39 11.4%	72 12.7%	27 10.9%	138 11.9%	327 16.4%	675 16.9%	74 19.2%	1076 16.9%
6+	30 8.8%	46 8.1%	30 12.1%	106 9.2%	525 26.3%	976 24.5%	116 30.1%	1617 25.4%
Total	341 29.5%	568 49.1%	248 21.4%	1157 100%	1995 31.3%	3988 62.6%	385 6%	6368 100%
Chi-square=3.79417 D.F=4 Significance [^]).43460 a 0.05					Chi-square= 10.86799 D.F=4 Significance [^] . 0281 a 0.05			

From the table, urban results show that 79.8% of Catholics had 0-3 children. 11.4% had 4-5 children while 8.8% had 6+ children. For the protestants/other christians, 79.2% had 0-3 children, 12.7% had 4-5 children, 8.1% had 6+ children. Among the Muslims, 77% had 0-3 children, 10.9% had 4-5 children while 21.1% had 6+ children. Muslims showed higher number of children ever born than women in the other religious groups in the urban areas.

In the rural areas, among the Catholics, 57.3% had 0-3 children, 16.4% had 4-5 children while 26.3% had 6+ children. For the protestants/other christians, 58.6% had 0-3 children, 16.9% had 4-5 children, while 24.5% had 6+ children. Among the Muslims, 50.6% had 0-3 children, 19.2% had 4-5 children while 30.1% had 6+ children. Muslim women in the rural areas still had higher levels of children ever born compared to the women in other religious groupings.

4.2.9 Access (time) to Family Planning Source Differential

Access to Family Planning (FP) sources was analysed with respect to amount of time (minutes) spent by both urban and rural women to get to service providing facilities, and the relationship between access to such sources and children ever born assessed using chi-square test. The results are reported in table 4.10 below for urban and rural areas.

Table 4.10: Children Ever Born by Time (minutes) to get to FP source and Urban-Rural Residence.

C&B	Urban				Rural			
	<30 min	30-59	60+	Total	<30 min	30-59	60+	Total
0-3	463 79.8%	209 74.6%	86 71.1%	758 77.3%	518 58.2%	720 59.1%	1685 52.2%	2923 54.8%
4-5	73 12.6%	38 13.6%	17 14.0%	128 13%	164 18.4%	210 17.2%	607 18.8%	981 18.4%
6+	44 7.6%	33 11.8%	18 14.9%	95 9.2%	208 23.4%	288 23.6%	933 28.9%	1429 26.8%
Total	580 59.1%	280 28.6%	121 12.3%	981 100%	890 16.7%	1218 22.8%	3225 60.5%	5333 100%
Chi-square=8.87000 D.F=4 Significance=.06444 a 0.05					Chi-square=24.93789 D.F=4 Significance=0.0001 a 0.05			

As the table reveals, in the urban areas for women who were 30 minutes away from the nearest source of family planning (FP), 79.8% had 0-3 children, 12.6% had 4-5 children while 7.6% had 6+ children. For those who were 30-59 minutes away from the FP source, 74.6% had 0-3 children, 13.6% had 4-5 children while 11.8% had 6+ children. It is an interesting observation that urban women who were less than 30 minutes away from the nearest FP source showed relatively lower number of children ever born compared to those who were 60+ minutes away from the nearest FP source. The relationship between children ever born and access to FP service providers was, however, insignificant in the urban.

In the rural areas, a significant relationship is observed between children ever born and access to the nearest FP source. Results for rural women who were staying less than 30 minutes away from the nearest FP source show that 58.2% had 0-3 children, 18.4% had 4-5 children and less than one quarter (23.4%) had 6+ children. Still in the rural areas, for women who were staying 30-59 minutes away from the FP sources, 59.1% had 0-3 children, 17.2% had 4-5

children and 23.6% had 6+ children. The lowest proportion (52.2%) of women who had 0-3 children was seen among those who were 60+ minutes from the nearest FP source. Further among these women (who were 60 minutes away from the nearest FP source) 18.8% had 4-5 children and 28.9% had 6+ children. It is again observed that the number of children ever born was higher in the rural than in the urban areas, as 28.9% of the rural women had 6+ children compared to 14.9% in the urban.

4.2.10 Contraception Differential

Use or non-use of contraceptives influences fertility levels of women. This study sought to verify this influence. The data showed that for women residing in the urban areas and were not using contraceptives, 84.2% had 0-3 children, 8.5% had 4-5 children while 7.3% had 6+ children. Among those who were using contraceptives, 67.9% had 0-3 children, 18.8% had 4-5 children while 13.3% had 6+ children, as in Table 4.11 below.

Table 4.11: Children Ever Born By Contraception and Urban-Rural Residence

C.E.B	Urban			Rural		
	Non-use	Using	Total	Non-use	Using	Total
0-3	660 84.2%	256 67.9%	916 78.9%	3060 63.2%	621 40.4%	3681 57.7%
4-5	67 8.5%	71 18.8%	138 11.9%	717 14.8%	363 23.6%	1080 16.9%
6+	57 7.3%	50 13.3%	107 9.2%	1065 22.0%	553 36.0%	1618 25.4%
Total	784 67.5%	377 32.5%	1161 100%	4842 75.9%	1537 24.1%	6379 100%
Chi-square=41.13454 D.F.=2 Significance[^].00000 a 0 05				Chi-square=248.46767 D.F.=2 Significance[^].00000 a 0.05		

1

In the rural areas, among the non-users, 63.2% had 0-3 children, 14.8% had 4-5 children while 22% had 6+ children. Among the users, 40.4% had 0-3 children, 23.6% had 4-5 children while 36% had 6+ children.

The results show that women who were not using contraception had fewer children than those who were using. A possible explanation to this behaviour is that the majority of non-users were those who still wanted more children. This reveals the fact that most women are likely to use contraception only after producing an approximate number of children they want. It is also observable from the table that fertility was higher in the rural than urban areas among non users and users of contraception.

The relationship between children ever born and use of contraceptives was significant for both the urban and the rural women at 95% level of confidence. In each case, the observed level of significance was below the fixed level of 0.05 as shown in Table 4.11 above.

4.2.11 Summary

In this chapter we looked at the characteristics of the study population and the association between children ever born and the independent variables in both urban and rural areas.

Referring to table 4.1 on background characteristics by use of frequency distribution, rural areas are more densely populated with a total population of 6379 (86.4%) compared to 1161 (15.6%) for urban areas. With respect to urban areas the results reveal better education, higher age at marriage, lower under-five mortality and ease of access to family planning service providers. Again, the results indicate better use of contraception in the urban and fewer number of children ever born.

For the rural areas, the scenario is almost a contrast to that of urban. The results show lower level of education in the in the rural. A Similar trend is true for the working category Results also reveal concentration of the married as well as higher parity women (aged 35+ years) in the rural. The rural data also point to higher incidences of under-five mortality, some affiliation to religious and ethnic dictates, minimal use of contraception and high level of fertility. Age at first marriage is also relatively early in the rural. It can also be observed, for rural the problem of accessibility to the available family planning service providers.

On the association between children ever born and the independent variables for urban and rural areas (tables 4.2 - 4.11), the data reveal that except for ethnicity, religion and access variables which showed no significant relationship with children ever bom in the urban, the rest of the independent variables had significant association with children ever born in both areas. In the rural areas, however, the association was significant for all variables and this suggests greater overall impact of the study variables in the rural.

CHAPTER FIVE

RESULTS OF LINEAR REGRESSION ANALYSIS

5.1 Introduction

Several factors are assumed to play a significant role in determining the number of children ever born to urban and rural women, and hence the overall fertility. The factors considered in this study include maternal education, under-five mortality, access to family planning source, age at first marriage, and work status. In this chapter, we have presented results of the **bivariate** and **multivariate** linear regression analysis to assess the individual and combined effect of these factors (independent variables) on children ever born (the dependent variable).

The analysis was based on a total of eleven variables, and done using SPSS/PC+ computer package. Each variable was further specified as dummy variables and assigned numerical values for ease of entry into the regression equations (Appendix 1 A). Each dummy variable was defined to give the range of measurement (Appendix IB). By definition, a dummy variable is any variable in the equation that takes a definite number of values for the purpose of identifying different categories of nominal variables (Kleinbaum *et al*, 1978). All variables were tested at 0.05 significance level.

Based on the operational model for this study (Figure 2) the dependent variable (CEB) is influenced by the independent variables through the proximate variable. This factor has been explained by the regression results.

This chapter also attempts to verify the objectives of the study. The study objectives are:- to investigate the factors which account for fertility differentials among urban and rural women in Kenya, to show the direction and strength of the relationship between each selected independent variable and the dependent variable, and to provide population planners and policy

makers with appropriate recommendations based on the findings.

5.2 Methodology used

Ordinary least squares bivariate and multiple regression analysis was used in this study with the number of CEB per individual woman as the dependent variable. This method of data analysis is used to estimate coefficients of the independent variables of interest when some other variables are controlled. As described in chapter three, the form of the regression equation is:

$$Y_G = A + \sum_{j=1}^k B_j X_j + E$$
, where:

A = the constant term

B_j = the regression coefficient for the independent variable X_j .

E = the error term assumed normally distributed with mean zero.

X_j = independent variable

the number of children ever born for the i th woman in the j th category.

The computation of the regression coefficients of the equation can be accomplished by either using the matrix techniques or by the use of computers. Because of the greater amount of data involved, it was necessary to use the computer facilities. The SPSS package was used to obtain the coefficients and other statistical measures needed in the bivariate and multivariate analysis. The package also produces the best relationship for variables when Enter method is used.

To determine the statistical significance, T-test and F-test were used to test the null hypothesis against the alternative one, hence test the goodness of fit between the sample mean (\bar{x}) and the population mean (μ). T-test was used to assess the significance between individual variables while F-test tested the significance of the overall model in multiple regression. The computation procedures for T and F-tests are shown in section 3.2.3.5.

The null hypothesis is: $H_0: b_1 = b_2 = b_3 = \dots = b_k = 0$,

and the alternative is: $H_1: b_1 * b_2 * b_3 * \dots * b_k * 0$.

From the SPSS computer print-out the study hypotheses have been directly tested with the following conditions: if the observed significance level is less than the test level (usually 0.05) we reject H_0 and accept H_1 . Otherwise, if the observed significance level is greater than the test level we reject H_1 and accept H_0 .

5J Definition of variables in the regression analysis

The categories of dummy variables used in the bivariate and multivariate regression analysis are outlined below.

Variables in the analysis

V201 - Number of children ever born (this is the dependent variable)

Education

No education (EDUC0) - this was the reference category in the analysis.

PRI (EDUC1) - Primary education

Sec+ (EDUC2) - Secondary level of education and higher.

Work status

Not working (WRK0) - this was the reference category in the analysis

WRK1 - Working women

Age of respondent (in completed years)

AGE0 - 15-24 years - this was the reference category.

AGE1 - 25 - 34 years

AGE2 - 35+ years

Marital Status

MAR0 - Never married women - this was the reference category.

MAR1 - Married women

MAR2 - Other unions

Age at First Marriage

AGAM0 - Below 15 years -this was the reference category.

AGAM1 - 15-19 years

AGAM2 - 20+ years

Under-five mortality

- No child dead under age 5 years - this was the reference category

CDi

- At least one (1) child dead under 5 years.

Ethnicity

EIHO

- Luhya - this was the reference category.

ETH1

- Kalenjin

ETH2

- Kikuyu

ETH3

- Others

Religion

RELO

- Catholics - this was the reference category.

REL1

- Protestants/other Christians

REL2

- Muslims

Access to Family Planning source (time in minutes)

ACCO

- Less than 30 minutes - this was the reference category

ACC1

- 30- 59 minutes

ACC2

- 60+ minutes

Contraception

CONTRA 0

- Not using - this was the reference category

CONTRA 1

- Using

5.4 BIVARIATE LINEAR REGRESSION ANALYSIS FOR URBAN AND RURAL AREAS

In the Bivariate Linear regression Analysis, attempt is made to assess the individual effect of each independent variable on the dependent variable (children ever born). In undertaking this analysis two regressions were done separately, one for urban and another for rural women. The results are summarized in Table 5.1 below. For the individual full detailed tables, see appendix

2A

Table 5.1: Bivariate Linear Regression Results for Urban and Rural Women

VARIABLE	URBAN		RURAL	
	Coefficient B	SiR-T	Coefficient B	SiR-T
Education				
PRJ (EDUC1)	- 1.906	0.0000*	- 2.893	0.0000*
Sec+ (EDUC2)	- 2.339	0.0000*	-3.888	0.0000*
No educ.l Constant)	3.904	0.0000*	5.947	0.0000*
Work Status				
Working (WRK1)	0.634	0.0000*	1.330	0.0000*
Not working(const)	1.662	0.0000*	2.727	0.0000*
A«t com Dieted vrs»				
25-34 (AGE1)	2.045	0.0000*	3.318	0.0000*
35+ (AGE2)	4.116	0.0000*	6.236	0.0000*
15-24 (Constant)	0.600	0.0000*	0.784	0.0000*
Marital Status				
mamed (MAR1)	2.629	0.0000*	4.298	0.0000*
Other union(MAR2)	2.700	0.0000*	4.141	0.0000*
Never marr.(const)	0.333	0.0000*	0.370	0.0000*
Age at 1st marr.				
15- 19(AGAM2)	2.151	0.0000*	2.995	0.0000*
20+ (AGAM3)	1.349	0.0000*	2.241	0.0000*
Below 15(const.)	0.982	0.0000*	1.696	0.0000*
Under-five morL				
1- child dead(CDI)	3.263	0.0000*	4.033	0.0000*
No CD (constant)	1.542	0.0000*	2.445	0.0000*
F.thnicity				
Kalenjin (ETH1)	-0.541	0.2124	0.129	0.3426
Kikuyu (ETH2)	- 0.268	0.1811	-0.433	0.0010*
Others (ETH3)	-0.199	0.2443	-0.016	0.8850
Luhva (constant)	1.960	0.0000*	3.454	0.0000*
Religion				
Protestant/other christ (REL1)	0.076	0.6117	-0.198	0.0211*
Muslims (REL2)	0.412	0.0374*	- 0.252	0.3354
Catholics(Const.)	1.879	0.0000*	3.515	0.0000*
Access (minutes)				
30-59 mins(ACC1)	0.514	0.0012*	0.596	0.0000*
60+ minutes(ACC2)	0.926	0.0000*	1.146	0.0000*
Below 3(Xconstant)	1.768	0.0000*	2.692	0.0000*
Contraception				
Using(CONTRAl)	1.395	0.0000*	1.599	0.0000*
Nc* using(const.)	1.536	0.0000*	2.999	0.0000*

Source: KDHS 1993 data computer print out.

* significant at 0.05 level of significance.

mi Discussion of Bivariate Linear Regression Results for Urban and

Rural areas.

Table 5.1 presents the bivariate linear regression results for urban and rural areas. For interpretation of these results the regression coefficient B is used basically to predict the relative change in the dependent variable on the basis of some change in each of the independent variables, and also to show the direction of change. T-significance is the level at which the statistic computed was found to be statistically significant given the student's t-test. All the variables were tested at 0.05 significance level.

Bivariate regression results (Table 5.1) show that several independent variables have significant effects on children ever born (CEB) in urban and rural areas. The influence of each of these independent variables on CEB is discussed below for each study area.

5.4.1.1 Education and Children Ever Born

Evidence from various empirical studies has consistently shown an inverse relationship between education and CEB (Acsadi et al., 1990; Heer, 1966; Zarate, 1967; Bogue, 1969; Cochrane, 1979). Through extensive re-tabulations of the data from KDHS 1993, this study's bivariate results reveal significant findings on the influence of education on children ever born (CEB), while comparing urban and rural areas upon the following education categories: no education (reference category), primary education and secondary plus higher education.

The bivariate regression results show that attainment of primary (PRI) or secondary and above (SEC+) education had significant individual negative effect on the number of children ever born in both urban and rural areas. However, secondary education had a more depressing effect on children ever born.

In the urban area, the regression of education on children ever born gave the regression

coefficient B a value of - 2.399 for secondary or more education level, and - 1.906 for primary against a constant of 3.904 for those with no formal education. These results can be interpreted to mean that the urban women with no education had, on average, 3.90 children as opposed to 2.0 for those with primary education and 1.51 for the holders of secondary education and higher. This gives a difference of 2.39 children between women with the highest and those with the lowest levels of education.

In the rural areas, the regression coefficients for education assigned secondary+ education = B value of -3.888 as opposed to - 2.893 for primary against a constant value of 5.947 for the no education category. By implication, the rural women who had no education had an average of 5.95 children compared to 3.05 children and 2.06 children respectively for the holders of primary and secondary+ education. A wider difference of 3.89 children was realized between the highly educated and the uneducated in the rural suggesting the need for more education as one way of reducing rural fertility.

Urban and rural comparison with reference to education generally shows that in both areas, women with secondary and higher education had fewer children than their counterparts with primary or no education. Further observation of these results show stronger negative coefficient for secondary- education for rural (B = -3.888) than urban (B = -2.399). This trend is even true for primary education. However, it would be an oversight to conclude upon these results that high level of education has a more depression effect on CEB in the rural than urban areas. Since education is a very important determinant of a person's earning capacity, the relationship between secondary+ education, for instance and CEB is expected to be stronger in the urban areas where about 44% of the women were educated to secondary* level compared to 20% for rural (Table 4.1), and where jobs requiring education are more readily available and opportunity cost of withdrawal from the labour-force high. The seemingly higher negative coefficient for secondary education in the rural can be explained by the fact that rural women

With secondary+ education are comparatively few and fertility is significantly lower than average for this small 'elite' group of rural women who are relatively well educated. Regardless of reason for these results, however, one gets the impression that increase in education levels for rural women is most likely to cause their desired family-size to change towards smaller numbers.

From a more general perspective, the inverse relationship between education and CEB could be attributed to the fact that most educated women tend to marry relatively late, thus reducing their reproductive period. Education also increases a person's willingness to accept and use efficiently new products and procedures, including modern contraceptives, thus depressing fertility. As Caldwell (1980) argues, educational exposure to modern ideas and social values strongly undermine the traditional norms and familial relationships that favour high fertility. In other words, education serves to change a woman's status and values from traditional life style (which includes a large family size) towards a lifestyle which aspires for higher status, a career and an increasing array of consumer goods.

Education may also increase a woman's income earning potential intensifying the opportunity cost of withdrawing from the labour-force in order to care for children. This fact has been noted by other studies elsewhere. For instance, in a study of Japan, Kono *et al* (1994:90) remarked that education may directly change attitudes, values and beliefs towards a small family norm and a type of childbearing that is relatively costly to the parents in time and money. Further, education empowers women with capacity for own decision-making some of which pertain to family-size, and also enables them to secure well paying jobs such that many are able to afford the cost of contraception.

The fact that urban women have better education than their rural counterparts is a strong factor that can be used to explain the differential in birth performance between the two areas - why fewer children are born to urban than rural women. It is most probable that in rural areas very few women, if any, live and work in settings that would expose them to develop a value

,-vgea afferent from that of the prevailing one, and more conducive to social and economic development that would promote small family norm.

5.4.1.2 Work Status and Children Ever Born

A great number of studies, while borrowing much from the New Home Economic model, have found a negative relationship between the opportunity cost of the mother's time and children ever born (Kono *et al.*, 1994; Muinde and Mukras, 1979). According to this model fertility behaviour which involves childbearing and the subsequent childcare is an important part of households production, hence working women would be expected to depress fertility because working time competes with childbearing and its high opportunity cost.

As shown in Table 5.1 above, this study's bivariate results tend to show reverse of the regular expectation. The results reveal a significant positive relationship between working women (WRK1) and children ever born (CEB) in both urban and rural areas. Among the urban women, the regression analysis of work status to children ever born gave the regression coefficient B a value of 0.634 for working women against a constant value of 1.662. Taking the 'not working' category as a constant, these results imply that while the urban women who were not working had an average of 1.66 children, the working had an average of 2.30 children.

In the rural areas, working (WRK1) had B value of 1.330 against a constant of 2.727 for the 'not working' implying a total of 2.73 children for the not working' and 4.06 for the working category.

Based on these results, it is observed that fertility of the working was higher in the rural than urban areas. The study results also reveal higher fertility among the working than the 'not working' category in both areas of study. This is apparently irregular and inconsistent with the widely held contention that childbearing and rearing competes with a woman's working time resulting in fewer children for the working.

In accordance with these results, working away from home seems to have a very minimal conflict, if any, with childcare in Kenya. This was even true of urban areas where more women worked away from home and where the cost of mother's time was expected to compete with childcare for a negative effect. Work even proved more compatible with childcare in the rural where extended family tends to be stronger and work tends to be closer to home. It is most probable that work alone would not have a significant effect on fertility reduction in Kenya where the cost of having domestic servants is relatively cheap, and where expectant mothers are awarded maternity leave enabling them to resume the same jobs after delivering their children.

The inconsistency of work-fertility relationship as revealed by this study concurs with earlier findings elsewhere. As Acsady and Acsady (1980: 22-23) remark, the relationship between work and fertility is not straightforward. They explain that even where an inverse relationship exists between work and fertility it is difficult to disentangle cause and effect in the relationship. These authors continue to say that it may be easier for a woman who has no children to take a paid job outside the home than for another who has many (and has, perhaps, nobody else at home to take care of them), but sometimes women may deliberately restrict their family size in order to be able to work while others have to work because the large family size makes it necessary. A similar remark was made by El-Badry (*op.cit*). The reliability of work status as a variable for use in explaining urban-rural fertility differential is therefore questionable

5.4.13 Age of the Mother and Children Ever Born

Age is one of the most important variables which characterize individual participants in the fertility process. The age of the potential parent plays an important role in fertility outcomes because fertility is in most cases, accumulative process, closely related to the life cycle of each parent and the family unit (Farooq and Simmons 1985:74). This study's bivariate results (Table >) confirm the importance of age as a determinant of fertility. The results indicate that age is

re constant variable in all the regressions done for women in the reproductive ages in both urban and rural areas.

In the urban areas, the bivariate regression analysis of age with CEB showed stronger positive relationship for women aged 35+ years (AGE 2) with B value of 4.116, than those aged 25 - 34 (AGE 1) for which the value of B coefficient was 2.045. Taking women aged 15-24 with B value of 0.600 as the constant, these results mean that urban women aged 35 years or more had, on average, 4.72 children; those aged 25 -34 had an average of 2.65 children while those in the bracket of 15-24 years averagely had 0.60 children.

The bivariate results for age against CEB was also positive and significant for rural women with B value of 6.236 for AGE2 (35+ years) and 3.318 for AGE1 (25-34 years). Against a constant value of 0.784, the rural results indicate that while women aged 15 - 24 had an average of 0.78 children, those aged 25-34 had 4.10 children as opposed to 7.02 for those aged 35+ years.

A juxtaposed analysis of urban and rural results indicate higher fertility in the rural areas. For instance, women aged 35+ years had an average of 4.72 children in the urban as compared to 7.02 in the rural. There were also marked differences in number of CEB between the eldest and youngest women in both areas, the figures being 4.12 children for urban and 6.24 for rural.

As the results indicate, fertility increases with increase in age of the mother such that women aged 35+ had more children than those aged 25-34 years or below. Referring to frequency analysis (Table 4.1) there was higher concentration of women aged 35+ years in the rural (25.8%) than urban (16.3%). This suggests more CEB to rural women with reference to age qualifying age as a useful variable for determining the difference in urban-rural fertility. These results have also confirmed the hypothesis that a positive relationship exists between age of the mother and CEB, that is, that older women have more children than younger women.

I i-L1.4 Marital Status and Children Ever Born

Marriage remains an important institution in Kenya. The frequency distribution results (Table 4.1) reveal the universality of marriage as 50.3% of the urban women and another 58.7% of the rural were married. The relationship between marital status and CEB was investigated in this study for urban and rural areas separately. The bivariate regression results reveal interesting findings with reference to categories of marital status namely: never married (reference category), married (MAR1) and other marital unions, that is, widowed, divorced or separated (MAR2).

The bivariate results have revealed strong significant positive relationship between the various categories of marital status and CEB in both urban and rural areas. In the urban areas the bivariate analysis of marital status to CEB gave the regression coefficient B a value of 2.629 for married women (MAR1) and 2.700 for women of other unions (MAR2) against a constant value of 0.333. This implies 0.33 children for the never married, 2.96 children for the married and 3.03 for women in other unions. There was a significant statistical difference of 2.63 children between the urban married and single women.

In a related scenario the rural results gave B values of 4.298 for the married, and 4.141 for women in other unions against a constant value of 0.370 for never married. By implication these results mean that while the rural never married had about 0.37 children, the married had an average of 4.67 children while women in other unions had, on average, 4.51 children. This gives a statistical significant difference of 4.3 children between the married and single women in the rural areas. This difference can be explained by the fact that women who are within marital union are more exposed to the risk of pregnancy than those outside it, marriage being the institution where childbearing is expected to take place with maximum freedom. The hypothesis that women in stable marital union have many children has been confirmed by these results. The fact that slightly more women were married in the rural than urban (Table 4.1) is one factor that

re ->ed to explain the high level of fertility that characterize rural areas.

5-L1.5 Age at First Marriage and Children Ever Born

Ei-iiier findings have shown that age at first marriage is directly related to the proportion of a woman's life that is spent on childbearing; that delayed entry into first marriage (marital i-tcc considerably contracts the childbearing period (UN, 1986:94).

^"hile an inverse relationship would be expected between late age at first marriage and TEB, this study's bivariate regression results (Table 5.1) reveal significant positive relationship between entry into marital unions at ages 15-19 (AGAM2) as well as 20+ years (AGAM3) and EB in both urban and rural areas. The relationship was however stronger for AGAM2 than \GAM3 in both areas indicating more children for women who marry early, and implying a depressing effect of late age at marriage on CEB.

In the urban areas, the bivariate results of age at first marriage on CEB gave the regression coefficient B a value of 2.151 for women whose age at first marriage ranged between 15 - 19 years and 1.349 for those who married at age 20 years and above, against a constant of .982. By implication urban women who entered into marital union aged 15-19 had 3.13 children on average compared to 2.33 children for women married at the age of 20+ years, and 0.98 for those married below age 15.

In the rural areas, the coefficients were stronger suggesting higher fertility. The B value were 2.995 for AGAM2 and 2.241 for AGAM3 against a constant value of 1.696. This means that rural women married at 15 - 19 years had an average of 4.69 children, those married at 20 years had 3.94 while those who entered into marital union aged below 15 years had an i r-i^ze of 1.70 children. These figures show higher fertility in the rural than urban areas.

Whereas the fertility of women married below age 15 could have been influenced by social and other factors likely to affect births to very young girls, a comparative analysis of

performance for women who entered into marital union at other ages show more births to women married at 15-19 than those married at 20+ years in both areas of study indicating higher fertility for early marriage. This could be explained by the fact that women who marry early have a prolonged period of reproduction than those who marry late. Late age at marriage not only shortens a woman's reproduction span but also gives opportunities for education and related skills, empowering women with ability to make independent decisions and choices pertaining to reproduction and family size.

Another pertinent observation is that all married women, whether married at age 15-19 or at 20+ years showed lower fertility in the urban than rural, indicating the reducing effect of urbanization and modernization on fertility. However, these results have confirmed the hypothesis that early age at marriage promotes high number of CEB. According to frequency distribution results (Table 4.1) over 70% of the rural married women were married below 19 years. The urban areas, on the other hand, were characterized by late marriage suggesting fewer CEB. The fact that early marriage results in many children was also noted by Ferry et al (1984 op.cit) in a study of Kenya where upon they found that fertility has been rising in Kenya because childlessness is quite rare and 10% of the marriages start as early as 14-15 years.

5.4.1.6 Under-five Mortality and Children ever born

It is generally hypothesized that regions with low fertility, that is around 4-5 or fewer births per woman, usually have lower infant mortality (60 or fewer deaths of infants per a thousand live births), and that fear of anticipated child mortality constitutes an upward pressure on fertility (UN 1986:90).

Testing the hypothesis that under conditions of high child mortality fertility is high for the purposes of securing a desired number of surviving children, this study's bivariate results found a strong significant positive relationship between the number of children dead below age five and

the number ever born in both urban and rural areas (Table 5.1).

For urban women the bivariate regression analysis of children dead under 5 years on CEB gave the regression coefficient B a value of 3.263 against a constant of 1.542. This implies that urban women who had lost child(ren) under age five had an average of 4.81 births compared to 1.54 births for those who had not lost any child at this age.

In the rural areas, the B coefficient value was 4.033 for women who had lost child(ren) against a constant value of 2.445. This means 6.48 CEB to rural women with experience of under-five deaths, and 2.45 CEB to those without under-five mortality experience.

Comparing urban and rural results, the relationship between the number of children dead under age five and CEB was stronger in the rural (B = 4.033) than urban (B = 3.263). These findings indicate that child loss was more pronounced in the rural Kenya, a phenomenon that can be better used to explain reasons why rural women had more children than their urban counterparts. The hypothesis that areas with high under-five mortality experience have higher fertility than those with low or without such experiences is confirmed by these results.

The positive relationship between under-five mortality and number of CEB as revealed in this study tend to agree with earlier findings which asserted that the loss of at least one child was enough motivation for the couple to have more children to replace the lost one and as security against anticipated further child losses (Hassan, 1971; Easterlin et al., 1980). A study done in Kenya (Heisel, 1968 *op. cit*) found that fewer children are born in areas with less child death, and that the desired family-size decreased with increased survival rates of children. In another report (KDHS 1993 *op. cit*), under-five mortality was found higher in the rural areas suggesting higher fertility in the rural.

5.4.1." Ethnicity and Children Ever Born

Studies have shown that ethnicity acts through culture to directly influence fertility, that being a mother of many still remains a mark of prestige in some cultures. For instance, in a study of East African tribes, Molnos (1973) found that traditional customs, beliefs and practices of the ethnic groups are geared to promoting and maintaining high overall fertility for reasons of prestige and old age security. This study has examined the influence of ethnic affiliation on CEB to urban and rural women in Kenya by comparing birth performance among the Kalenjin (ETH1), Kikuyu (ETH2) and other ethnic groups (ETH3), with the Luhya (ETH0) as a constant.

In the urban areas the bivariate regression analysis of Ethnic affiliation to CEB gave the regression coefficient B values of -0.541, - 0.268, and -0.199 respectively for Kalenjin, Kikuyu and other ethnic groups, against a constant value of 1.960. This means an average of 1.96 children for Luhya women, 1.42 children for Kalenjin, 1.69 for Kikuyu, and 2.16 for women of other ethnic groups. Apart from other ethnic groups, the results indicate highest fertility among the Luhya women in the urban. However, the relationship between ethnicity and CEB was insignificant for all the groups in the urban. This could be explained by the high level of education and other forms of development which function to elevate most urban women to a higher social position beyond ethnic bounds, enabling them to make rational decisions upon reproductive behaviour.

In the rural areas, a significant negative relationship was found to exist between Kikuyu and CEB. The relationship was also inverse for the 'others' category but statistically insignificant at the test level (0.05). Kalenjin showed positive but insignificant relationship with CEB in the rural. The B values were 0.129 for Kalenjin, - 0.433 for Kikuyu and - 0.016 for 'others' category against a constant value of 3.454. By implication, Luhya women had 3.45 children as opposed to 3.58 for Kalenjin, 3.02 for Kikuyu and 3.44 for the other ethnic groups. The rural results indicate highest fertility among the Kalenjin, possibly explained by their easy, isolated pastoral life, quite

derived from urban influence

Comparing urban and rural results fertility by ethnicity is still higher in the rural suggesting some degree of affiliation of rural women to ethnic demands on birth performance, the hypothesis that ethnicity has an influence on CEB has, however, been confirmed by these results.

5.4.1.8 Religion and Children Ever Born

In many societies, fertility has been observed among population groups differentiated on the basis of common national heritage, language or religion, and sharing common attitudes and cultural patterns (UN, 1973:102). Based on this observation, religion is spelt out as one of the socio-cultural factors which has a bearing on fertility differentials. In this study, three major religious groups; namely protestants/other christians (REL1), Muslims (REL2) and catholic (reference category) were analyzed so as to investigate the influence of religious affiliation on CEB.

The relationship between religion and CEB in the urban was positive for both protestant and Muslims but only significant for Muslims. The B coefficient values were 0.076 for protestants, and 0.412 for Muslims against a constant of 1.879 for Catholics. These results imply an average of 1.88 children for Catholics, 1.96 for protestants, and 2.29 for Muslims. The result indicate highest fertility among the urban Muslims.

In the rural areas, there was a significant negative relationship between protestants and CEB. The relationship was also negative for Muslims but insignificant at the test level (0.05). The values of B coefficient were - 0.198 for protestant, and - 0.252 for Muslims against a constant value of 3.515. This implies about 3.52 children for Catholics, 3.32 for protestants and 3.26 for Muslims. Catholics in the rural areas had the highest fertility and this could be attributed to their resistance to use of contraception. Protestants came second while the least number of CEB was registered among the Muslims.

Judging by the strength of the co-efficients one would expect higher fertility in the urban

free protestants and Muslims). However, fertility was still higher in the rural confirming the reducing effect of urbanization and modernization on fertility. From the basis of these results, however, it is pertinent to note that whereas religious beliefs and practices still play a major role in social decisions of which fertility is one, religion *per se* is seemingly inadequate in explaining the high number of births that characterize rural areas.

It is worth noting with reference to religion - fertility relationship that the negative relationship found to exist between Muslims and CEB in the rural areas tend to contradict the otherwise widely held contention in tropical Africa that Muslim traditions are more associated with high fertility than other religious groups (Caldwell 1968a, pp. 598 - 619). However, the inverse effect of Muslims on CEB as revealed in this study is not surprising; it has found support in other works (KCPS 1977/78; Onguti 1987, p.122; Henin 1981, pp. 670-671; Ayiamba, 1985 *op.cit*) which generally attribute it to low education, high proportion of childlessness, greater incidence of polygyny, marital instability and high sterility due to childhood betrothal.

5.4.1.9 Access (time) to Family Planning Source and Children Ever Born

Distance to source of Family planning service can serve as a reflection of the 'cost' of such services. The relationship between time (minutes) to get to Family Planning source and CEB was investigated in this study, the hypothesis being that women would more readily use contraception to limit their family size if information, service and supply were readily available. This study's bivariate results (Table 5.1) revealed significant positive relationship between distance to source and CEB in both urban and rural areas. The coefficients were however stronger in the rural indicating higher fertility.

In the urban areas, the bivariate regression analysis of distance to source on CEB gave a coefficient value of 0.514 for women who were 30-59 minutes away from source (ACC1) and 0.26 for those 60+ minutes away (ACC2) against a constant value of 1.768. These results mean

MZ while urban women who travelled less than 30 minutes to source had an average of 1.77 children. Those who were 30 - 59 minutes away had 2.28 children on average compared to 2.69 for those 60+ minutes away. There is a significant difference of 0.92 children between the farthest and shortest distance to source in the urban.

In the rural areas, the B values were 0.596 for ACC1 and 1.146 for ACC2 against a constant value of 2.692. By implication, rural women who were less than 30 minutes away from family planning source had, on average, 2.69 children while those whose travel time was 30-59 minutes had 3.29 children compared to 3.04 for those 60+ minutes away from source. The difference in number of CEB between the longest and shortest distance to Family Planning source for rural women was 1.15 which was higher than that of the urban.

From the basis of the strength of the coefficients, it is observed that fertility increased with increase in distance to source, and the effect of distance on CEB was stronger in the rural singling out distance to source as a viable factor for use in explaining why fertility is higher in the rural than urban. These results pre-empt the likelihood of a reduction in family-size in the rural if family planning sources were located closely (within easy reach) and also confirm the study hypothesis that women who strive (take longer time) to get to family planning source are more likely to have many children.

5.4.1.10 Contraception and Children Ever Born

Use of contraception has been hypothesized to have a reducing effect on CEB. In this study's bivariate analysis (Table 5.1) the results show significant positive relationship between contraceptive use and CEB in both urban and rural areas. In the urban areas, the bivariate regression analysis of contraceptive use to CEB gave the regression coefficient B a value of 1.395 against a constant value of 1.536. This implies that whereas urban women who did not use contraceptives had an average of 1.54 children, the users had 2.93 children on average

For the rural women, the values of B coefficients were 1.599 for use against a constant of 1999 implying about 3.0 children for non-users and 4.60 children for users.

On the periphery, these results seem to suggest higher fertility among the users while the -jverse should be true since increase in family planning acceptance should help reduce fertility (er possibly have no independent effect on it) not increase fertility as would be predicted' based M these results. More accurately interpreted, these results mean that in Kenya (both urban and rural) most women tend to go for contraception only after securing their desired number of children and that the desired family-size is still higher in the rural than urban even among the ccntraceptive users. This implies that the desire for family planning begins earlier in the urban aiter a woman has had at most 3 children as opposed to 5 for the rural women.

A possible explanation for lower fertility among the non-users of contraception is that this group of women is most likely to comprise young women (newly married or single) who have "ad very few or no child(ren) at all, and who have no desire to limit their families by use of contraception because they still need (more) children. It is an interesting finding of this study that in Kenya, acceptors generally practice contraception for terminating childbearing rather than for spacing births in a bid to limiting family-size, hence most Kenyan women who adopt contraception are only those who have had enough children (desired family-size). This factor could account for the generally low pace at which fertility reduction attempt through contraception has been taking effect in Kenya.

5.4.1.11 Summary of Bivariate Regression Results

In this sub-section, we present a summary of bivariate regression results for both urban and rural areas.

5.4.1.11.1 Summary of bivariate results for urban areas

Bivariate results for urban areas reveal significant positive relationship between children first born and women aged 25 - 34 and 35+ years, working women, the married as well as women in other marital unions, and age at first marriage with stronger coefficient for those married at age 15 - 19 than those married at 20+ years. The relationship was also positive and significant for Muslims, access (time) to FP source as well as contraception. However, contraceptive users had lower fertility than the non-users as indicated by B value of 1.395 for users and 1.536 for non-users. A significant but negative relationship existed between children ever born and education variables (secondary and primary education), and all ethnic groups except Luhya. While secondary+ education had the most depressing effect on CEB, children under age five had the highest significant positive effect on CEB. By implication, fertility is most likely to be high in areas with increased incidences of child loss.

5.4.1.11.2 Summary of Bivariate Results for Rural Areas

In the rural areas, the results show significant positive relationship between CEB and the working, women aged 25 - 34 and 35+ years, the married women and women in other marital unions, children dead under age five, the kalenjin community, access to FP source, and age at first marriage but with higher fertility for women who married early. The relationship was also positive and significant for use and non-use of contraception but with greater intensity for non-use. The relationship between children ever born and education was negative, with secondary+ education exhibiting greater depressing effect than primary or no education.

The foregoing discussion on bivariate results has given an insight into the effect of each of the independent variables on the dependent variable. However, such individual one-to-one comparisons without knowledge of combined effects of other variables are liable to inconsistency and unreliability, and may be less adequate to yield dependable accounts upon

^ -jch accurate conclusions can be drawn, hence the need for multivariate regression analysis

55. MULTIPLE LINEAR REGRESSION ANALYSIS FOR URBAN AND RURAL AREAS

The multiple linear Regression analysis was done to assess the combined effect of the ^dependent variables on the dependent variable (CEB). In this study, a total of ten independent variables constituting eighteen dummy variables were used in the multiple regression analysis. The data were processed in SPSS/PC computer package using Enter method, a technique in «nich all the required dummy variables are entered into the regression model all at once.

The study progressed on a concurrent analysis of urban and rural areas. Three Multiple regression models were fitted for urban and rural areas separately as summarized in Table 5.2 below. While model 1 (equation 1) contained only demographic variables, model II (equation II) comprised the demographic, socio-economic, socio-cultural and Family Planning variables. In model III (equation III) all the independent variables were entered together with the proximate determinant. Full results are contained in Appendix Tables 2B - 2D

Table 5.2: Multiple Linear Regression Results for Urban and Rural Areas

WriaWes	URBAN			RURAL		
	quaLl	EquaLll	EquaLlll	EquaLl	EquaUI	EquaUII
3EMOGRAPHIC VUUABIXS						
tfeconpkte yrs)						
2>*(AGE1)	1270*	1.288*	1.125*	2.241*	2253*	2.152*
J5» iAGE2)	3.064*	3.074*	2.901*	4.747*	4.701*	4.579*
Mintal statu Maned(MAR1)	2.413*	2.249*	2204*	2260*	2.167*	2.116*
Other unions (MAR2)	1.715*	1.545*	1.545*	1.499*	1.436*	1.438*
Aft >t 1st marriage U -19 (AGAM2)	-0.693*	-0.606*	-0.685*	-0.548*	-0.541*	-0.565*
AGAM3)	-1.651*	-1.475*	-1.578*	-1.449*	-1.363*	-1.388*
I ader-Ike mortality 1+ <=ud dead (CDT)'	1.642*	1.581*	1.609*	1.613*	1.611*	1.648*
SOCIO-ECONOMIC VARIABLES						
Edatitioa PRirtDUC1)		-0.117	-0.245		-0.095	•0.171*
SEC- (EDC2)		-0.338**	-0.523*		-0.382*	-0.529*
Aort statu Working (WRK1)		0.014	-0.089		-0.089**	-0.116*
SOCIO-CULTURAL VARIABLES						
Etfcaktr Kalenjin (ETH1)		0.449	0.413		0337*	0329*
Kiuyu (ETH2)		0.129	0.002		0.008	-0.107
Othos(ETH3)		0.165	0.183		-0.083	-0.108
Religion Pnxestmts/ otfatx(RHL1)		0.055	0.036		-0.002	-0.010
Muslims (RH2)		0.114	0.078		-0.349**	-0.358*
FAMILY FLANNING VARIABLES						
Access (Minutes) 30 - 59(ACC1)		0367*	0337*		0.255*	0.234*
60+ (ACC2)		0.236	0.224		0.305*	0.279*
PROXIMATE VARIABLE						
f .ntmceptjon Wang (CONTRA1)			0.776*			0.599*
CONSTANT	0.008	-0.040	0.086	0.103	0.126	0.224
R ¹	0.633	0.639	0.659	0.723	0.728	0.734
F-STATISnc	287323	121.842	125.753	2379.378	1005.794	976.280
F-SI(2>JIFICANCE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD ERROR	138	137	133	1.70	1.69	1.67

Source: KDHS 1993 data
Computer print-out

Significance levels of individual variables

* < 0.01

** < 0.05

5.5.1 Discussion of Multiple Regression Results for Urban and Rural Areas

The interpretation of urban-rural multiple linear regression results is based on the following:

1. The coefficient of determination R^2 is used to explain the total variation in the dependent variable (CEB) explained by the corresponding independent variables together, entered in each equation for each study area.
2. The regression co-efficient B serves to predict the relative change in the dependent variable on the basis of some specific change in the independent variables. The B values being partial regression coefficients, may also be used as a measure of the influence of each independent variable on the dependent variable when all the other independent variables are controlled for.

F-test is used as a measure of the significance of the entire model while T-significance computed using student's t-test, tests the significance of the individual variables. The test level has been set at 0.05.

4. Accuracy of the regression equation will be determined by the degree of the standard error of estimate, which indicates how much the actual values of the dependent variable can be expected to deviate from the predicted scores

In the first equation, only the demographic variables were entered into the model. The results are reflected in column one separately for urban and rural areas as shown in Table 5.2 above. In each case, the coefficient of determination R^2 is used to explain the total variation in the dependent variable (CEB) explained by all the independent variables entered in the first model. In both urban and rural areas, the results show that all the demographic variables considered are statistically significant at 0.05 significance level. The results also reveal a fairly accurate regression equation as indicated by the negligible standard errors of 1.4 and 1.7

-especially for urban and rural areas against the enormous data used in the study.

In the urban areas, all the demographic variables included in the model together gave a coefficient of determination R^2 value of 0.6334 which explained about 63.3% of the variation in the dependent variable (CEB). For the rural areas, the R^2 value was 0.7230, explaining 72.3% of the variation in CEB. In view of the variations in CEB explained in each study area one would note the greater impact of demographic variables on fertility in the rural than urban areas.

The overall significance of the models for each study area was estimated using F-test. The resulting F-statistic value of 287.323 for urban and 2379.38 for rural, both significant at 0.000 implies a highly significant model.

In view of the individual variables, the results for urban areas (with reference to model 1) show that with a common B constant value of 0.008 age of the mother being 35+ years (AGE2) had the strongest significant positive influence on CEB with a regression coefficient B value of 3.064, followed by married women (MAR1) with B value of 2.413, other marital unions (MAR2) with B value of 1.715, children dead under age five (CD1) with B value of 1.642, then age of the mother at 24 - 34 years (AGE 1) with B value of 1.270.

In the rural areas, based on a common constant B value of 0.103, again women aged 35+ years (AGE2) had the strongest significant positive relationship with CEB with a B coefficient value of 4.747, followed by the married (MAR1) with 2.260, the 25 - 34 year-old category (AGE 1) with 2.241, children dead under age five (CD 1) with 1.613, then women in other marital unions (MAR2) with 1.499

On the other hand, age at first marriage at 20+ years (AGAM3) had the greatest negative influence on CEB in the urban with a regression coefficient B value of -1.651 followed by those who married aged 15-19 years (AGAM2) with B value of -0.693. A similar scenario was also true for the rural areas where the results indicated a B value of -1.449 for AGAM3 and -0.548 for AGAM2.

Judging by the strength of the coefficients, the results reveal greater positive impact of 35- years (AGE2) in the rural and greatest negative influence of AGAM3 (late age at damage at 20+ years) in the urban suggesting higher fertility in the rural areas. Complementing the bivariate results (Table 5.1), these findings have again confirmed that fertility increases with age of the mother and is higher among women aged 35+ years compared to women of lower ages. The facilitating effect of under-five mortality on children ever born also features strongly in this analysis. Further, the depressing effect of age at marriage at 20+ years than lower ages is again noted, explained by the limited reproduction spun for women who married late and the likelihood of better education for them leading to increased knowledge of contraception and subsequent efficient use. According to one analyst, knowledge is greater among urban and better educated than those with no schooling or live in rural places (UN, 1986:68).

In the Second Equation the demographic variables were entered into the regression model together with socio-economic, socio-cultural and Family planning variables. The results are presented in column 2 of Table 5.2 above for urban and rural areas separately. Together, all the independent variables entered in model two for urban gave the coefficient of determination R^2 a value of 0.639 explaining 63.9% of the total variation in CEB. The value of R^2 for rural was 0.728 indicating 72.8% of the explained variation in CEB. The degree of variation in CEB has increased from 63.3% to 63.9% for urban, and from 72.3% to 72.8% for rural, giving marked differences of 0.6% and 0.5% respectively for urban and rural areas. These differences imply slightly greater effect of the other variables in the urban, but the demographic variables still explain much of the variations in CEB in both areas.

As shown by the values of the standard errors (1.37 for urban and 1.69 for rural) the equation was fairly accurate. The model was also highly significant as indicated by F-statistic value of 121.842 for urban and 1005.794 for rural, both significant at 0.000.

In view of the individual variable clusters, all the demographic variables still had

insignificant effect on CEB at 0.05 significance level in both areas of study irrespective of the observed changes. From the basis of common constant value of - 0.040 for urban and 0.126 for rural age still had significant positive effect on CEB in both areas. As observed in model two for urban, there was significant positive increase in effect of AGE1 (from 1.270 to 1.288) and AGE2 (from 3.064 to 3.074). A similar scenario was also true for AGE1 in the rural (from 2.241 to 2.253). The effect of AGE2, however, declined from 4.747 to 4.701 in the rural. In both areas, other demographic variables namely MAR1, MAR2, AGAM2, AGAM3 and CD1 also showed declining influence on CEB as a result of the confounding effect of socio-economic, socio-cultural and Family Planning (access) variables.

For the socio-economic variables, the urban results show that primary education (EDUC1), secondary+ education (EDUC2) and working women (WRK1) had an inverse effect on CEB. However, the relationship was only significant for secondary+ education with a regression coefficient B value of - 0.338. It was followed by primary education with B value of - 0.117, then WRK1 with - 0.014, but these were not statistically significant at 0.05 significance level. A greater depressing effect is observed for secondary+ education in the urban.

In the rural areas again secondary+ education had greater significant depressing effect on CEB. with B value of - 0.382. The relationship was also significant for working women (WRK1) with B value of - 0.89. Primary education had B value of - 0.095 but like in the urban, the relationship was not significant at 0.05 significance level.

With regard to socio-cultural variables (Ethnicity and Religion), all the ethnicity variables namely Kalenjin (ETH1), Kikuyu (ETH2) and other ethnic groups (ETH3) had positive influence on CEB in the urban but the relationship was not significant at the set level of 0.05. However, Kalenjin showed the highest positive effect (B = 0.449) followed by other ethnic group (B = 1.65), then Kikuyu with B value of 0.129. The religion variables: Protestants/other christians (REL1) as well as Muslims (REL2) had positive relationship with CEB in the urban but the

Relationship was not significant at 0.05 level. The B values were 0.055 for REL1 and 0.114 for **REL2**.

In the rural, Kalenjin had significant positive relationship with CEB with B value of 0.337. The relationship was also positive for Kikuyu (B = 0.008) but insignificant. Other ethnic groups (ETH3) in the rural had negative but insignificant relationship with CEB, with a coefficient B value of -0.083. For the religion variables in the rural, REL2 had a significant negative relationship with CEB (B = - 0.349). The relationship was also negative but insignificant for REL1 with a coefficient B value of - 0.002.

With reference to family planning variable (access to Family Planning source), there was a significant positive relationship between women whose travel time to Family Planning source was 30-59 minutes (ACC1) and CEB in the urban, with B value of 0.3367. The relationship was also positive but insignificant for those who travelled 60+ minutes (ACC2) in the urban. The B value for this group was 0.236. In the rural areas, distance to Family Planning source had significant positive impact on number of CEB. The coefficients were 0.255 for ACC1 and 0.305 for ACC2.

As a last stage of multiple Regression analysis for this work, we wanted to find out what would happen to the second equation if proximate determinant (contraception) was included, hence equation three. In equation three all the independent variables of the study including the proximate were entered into the regression model for urban and rural areas separately. The results are summarized in column three of Table 5.2 for each study area.

The introduction of proximate variable (contraception) gave very interesting findings. We observe from the results that together all the independent variables entered in model three for urban now gave the coefficient of determination R^2 a value of 0.659 which explained 65.9% of the total variation in the dependent variable (CEB). In the rural areas, the value of R^2 was 0.734, explaining 73.4% of the total variation in CEB. Comparing the second and third equation for

and reveal the degree of variation in CEB explained by all the independent variables when contraception is controlled for has increased by 2% in the urban and 0.6% in the rural, confirming the effect of contraception on CEB. However, the results indicate stronger impact of contraception in the urban than rural, suggesting lower fertility for urban women.

The standard error values of 1.33 for urban and 1.67 for rural against the enormous data used in this study confirm the accuracy of the model. The model is also highly significant as shown by the F-statistic values of 125.754 for urban and 976.280 for rural, both significant at 00000

From the basis of a common B constant value of 0.086 for urban and 0.224 for rural, the reducing effect of the proximate determinant (contraception) on CEB was generally observable in both areas of study. As shown in model three, the partial regression coefficients for urban and rural areas generally indicate a marked decline on the impact of all the variables which had positive influence on CEB except under-five mortality (CD1) whose impact increased from 1.581 to 1.609 in the urban, and from 1.611 to 1.648 in the rural. For the variables which had significant but declined positive influence on CEB in the urban as a result of contraception, women aged 35+ (AGE2) still showed the strongest positive relationship with CEB, with a B value of 2.901. This was followed by MAR1 with 2.204, MAR2 with 1.545, AGE1 with 1.125, then ACC1 with 0.337. The relationship, however, remained insignificant for all the socio-cultural variables (Ethnicity and Religion), and travel time to FP source of 60+ minutes (ACC2) in the urban. In the rural areas, for the significant variables which had positive but declined effect on CEB, again women aged 35+ years (AGE2) still showed the strongest significant positive relationship with CEB, with a B value of 4.579 when contraception was controlled for alongside other variables. AGE1 came second with B value of 2.152, then MAR1 with 2.116, MAR2 with 1.438, ETH1 with 0.329, ACC2 with 0.279, then ACC1 with 0.234.

For the variables which showed inverse effect on CEB, their impact was increased as a

of contraception such that these variables exerted more depressing effect on CEB implying higher fertility. Among the significant variables in this category for the urban, entry into marital union at age 20+ years (AGAM3) still showed the strongest inverse effect on CEB but with a stronger B coefficient value of -1.578. It was followed by AGAM2 with B value of -0.685, then secondary+ education with -0.523. The relationship was also negative but insignificant for primary education and the working category with B values of -0.245 and -0.089 respectively. In the rural, again age at first marriage at 20+ years (AGAM3) had the greatest and increased significant depressing effect on CEB with a B coefficient value of -1.388. AGAM2 was second with B value of -0.565, followed by secondary+ education with -0.529, REL2 with -0.358, primary education with -0.171, then WRK1 with -1.116. For ETH2, ETH3 and REL1 in the rural, their relationship with CEB was inverse but insignificant at the set level of not more than 0.05 although they acquired slightly stronger coefficients as a result of contraception.

Taking specific overview of the influence of the proximate determinant (contraception) *per se* on CEB, the results showed significant positive relationship between contraceptive use and CEB in both urban and rural areas when other variables were controlled for, with B coefficient values of 0.776 for urban and 0.599 for rural. Whereas these results may present a false impression of higher fertility for users of contraception, the correct interpretation is that "relatively fecund women with relatively high fertility are the ones in need of contraception, indicating its popularity among women who have had many children. By implication these results show that more urban women (who have had many children) have adopted contraception compared to their rural counterparts, revealing greater impact of contraception in the urban.

Analysis of the various clusters of individual variables with reference to effect of contraception reveal that the demographic variables namely age of the mother, marital status, age at first marriage and under-five mortality persistently showed highly significant effect on CEB in the urban and rural areas. These variables also continued to explain the greatest variation in CEB

' - -oth areas but still with greater impact in the rural. However, the coefficients of all the I

-ic: idual variables used in this study indicate that except for regions which are highly affected I ev under-five mortality, contraception had significant reducing effect on CEB in both urban and rural areas

A brief review of the demographic variables with reference to model three indicates that women aged 35+ years (AGE2) still exhibited the strongest significant positive influence on CEB •n both urban and rural areas, but the impact was stronger in the rural suggesting higher fertility for rural women in this age bracket. Comparatively, the coefficients were lower for women aged 25 - 34 years (AGE 1) in both areas again indicating that fertility increased with increase in age of the mother such that older women are most likely to have more children than younger women. In agreement with other findings on the important role played by age on fertility (Farooq and Simmon, 1985; UN, 1991 op.cit), this study has revealed that age is one of the most important variables in fertility analysis. Worth noting however, is the reducing effect of contraception on the positive impact of age on CEB as shown by the lower coefficients for AGE1 and AGE2 in model three compared to those of model two in both areas. The greater impact of contraception in the urban is again observed.

With reference to marital status, fertility of the married was found higher than that of women of other marital unions as well as the unmarried in both areas, pointing to greater exposure of the married to reproduction forces. However, the reducing effect of contraception on its impact on fertility indicate the possibility of limiting fertility even among the married women with intensified use of contraception. Again the effect of contraception was greater in the urban for this variable.

With regard to age at First marriage, late age at marriage 20+ years (AGAM3) still had greater significant inverse effect on CEB than early marriage in both urban and rural areas, implying lower fertility for women who married late. As can be observed, however, the

—relationship was more depressing in the urban ($B = - 1.578$) than rural ($B = - 1.388$) again suggesting lower fertility in the urban where age at marriage was relatively late (see table 4.1). However, these findings are in agreement with other findings elsewhere. In a study of Pakistan (IUN, 1993 *op cit*) rise in age at marriage was associated with a fall in proportion married leading to increase in single life and subsequent reduction in fertility. This source also found age at first marriage highest in major cities and among the educated women. It is a pertinent observation in this study that all married women whether married at age 15 - 19 (AGM2) or 20+ (AGAM3) showed lower fertility in the urban suggesting presence of certain factors in the urban which interact to reduce fertility. We again observe the increased depressing effect of AGAM2 and AGAM3 on CEB as a result of contraception and other confounding variables, and also note stronger impact of contraception on urban fertility with relation to age at marriage.

Relating under-five mortality (CD1) and CEB in both urban and rural areas when the confounding effect of contraception and other variables were controlled for, the effect was significant and positive in both areas. As shown in model three, the values of B coefficients were 1.609 for urban and 1.648 for rural showing increase compared to values shown in model two. The higher coefficient for rural suggest greater incidence of under-five mortality and subsequent higher fertility for rural women in view of the fact that in areas where child mortality is high women tend to have as many children as possible for replacement purposes and as security against anticipated deaths, and they would only go for contraception when they have had enough children. This factor explains why fertility increases with increase in under-five mortality and the seemingly promoting effect of contraception on CEB, denoting minimal influence of contraception in areas with high under-five mortality. As Ocholla-Ayayo (1991 *op.cit*) remarked with reference to Family Planning survey of 1978 and KCPS 1984 reports, the repeated attempt to replace the dead children makes the idea of contraception meaningless.

Turning to socio-economic variables, education variables show that secondary*

Education significantly had more depressing effect on CEB when contraception was controlled for alongside other variables. The B coefficient values were - 0.338 for urban and - 0.382 for rural. The relatively higher coefficient value for rural simply implies that the very few educated rural women opt for significantly smaller families, and that fertility would be drastically reduced if more rural women were educated to secondary+ level. It is interesting to note that primary education showed significant inverse effect on CEB in the rural as a result of contraception showing that adequate use of contraception would even lower fertility of the lowly educated. However, the reducing effect of contraception was greater for women with secondary+ education who lived in the urban areas.

With regard to work status, the working showed more depressing effect on CEB when contraception was controlled for, with B values of - 0.089 for urban and - 0.116 for rural. However, the relationship was not significant for urban. Again these results suggest significantly fewer number of children likely to be born to the few professional rural women (possibly in the category of school teachers, secretaries) who work away from home because their work affects their status, interest and values. This finding has gained support in earlier studies. Anker (1985) found significantly lower fertility among Kenyan mothers working away from home in the rural areas. However there was no relation found between employment and fertility if work was performed at home or near home. His argument was that employment and income gave women alternative security other than children. It is, however, important to note with reference to work-fertility relationship that from what is generally observed in real life situation, work away from home may even be compatible with CEB in both urban and rural areas of Kenya where other adults in the extended family are present in readiness for childcare. Perhaps this explains the positive relationship found to exist between work and CEB in the bivariate results (Table 5.1) in the absence of the confounding effect of other variables including contraception. Again the reducing effect of contraception was found more pronounced in the urban.

For the **socio-cultural** variables namely ethnicity and religion, all the dummy variables; Kalenjin (ETH1), Kikuyu (ETH2), other ethnic groups (ETH3), protestants/other christians (REL1), and Muslims (REL2) showed positive but statistically insignificant relationship with CEB in the urban. The fact that these variables were insignificant in the urban could be explained by the high level of education and other forms of development which characterize urban areas, enabling urban women to deviate their attention from the traditional cultural dictates for many children and aspire for other values. However, the reducing effect of contraception on the impact of these variables on CEB can be observed.

In the rural areas there was persistent significant positive relationship between the Kalenjin and CEB, with B value of 0.329. even when all other variables were controlled for. This is one indication that adherence to ethnic dictates is characteristics of rural areas and a strong factor that seems to actuate rural fertility. Kikuyu and other ethnic groups had inverse relationship with CEB in the rural but the relationship was insignificant at 0.05 level of significance. Religion variables had inverse relationship with CEB in the rural when all other independent variables were controlled for but the relationship was only significant for Muslim (REL2). The B coefficient value was even higher for Muslims (B = -0.358) than Protestants (REL 1) with B value of - 0.010, suggesting lower fertility for Muslims for reasons already suggested in bivariate analysis (see section 5.3 4.1.8). Again the reducing effect of contraception on CEB with relation to these variables is observed but with greater effect in the urban.

Looking at the Family planning variable (Time to get to FP source) the results showed positive relationship between time to get to source and CEB in the urban. The relationship was significant for women who lived 30 - 59 minutes away from source (ACC1) but insignificant for those 60+ minutes away (ACC2). The B coefficient values were 0.337 for ACC1 and 0.224 for ACC2. showing decline due to use of contraception. On the surface level, these results unexpectedly seem to suggest higher fertility for urban women whose distance to source was

-oner From a realistic basis, these results may be appropriately interpreted to mean that travel time as long as 60+ minutes had very minimal effect on the degree of birth performance of urban women. Possibly for most urban women, the Family Planning sources were either located near their points of residence (so that only very few women took 60+ minutes to get to source) or the means to reach them was easy and available such that even the 60+ minute coverage no longer posed as a problem. However, the fact that urban women whose travel time was 60+ minutes seemed to have lower fertility increase our understanding that distance to source may not be so much a barrier to limitation of family size for women who are exposed to Family Planning services and have made a decision to have small families. Rather, attitude to such services and perhaps individual aspirations would basically account for the better part of the reasons why a woman would still give birth to many children even when the preventive measures are all around her. These results also seem to suggest that once a decision has been made proximity to an outlet would not necessarily represent an incentive but may merely facilitate an action upon the decision.

In the rural areas, it is again observed that the impact of distance to source on CEB declined when contraception was controlled for. Travel time to source being 30-39 minutes (ACC1) and 60+ minutes (ACC2) had significant positive relationship with CEB. The coefficients were 0.234 for ACC1 and 0.279 for ACC2. These results reveal lower fertility for rural women whose travel time was shorter. By implication long distance to source promoted fertility in the rural areas even if other factors such as attitude also played a role. To this extent distance factor is quite sufficient in explaining why rural women tend to have more children than their urban counterparts. With reference to urban results however, it is a finding of this study that other than distance, it is most probable that other confounding factors such as knowledge of the available birth control methods, convenience as to hours of service, and affordability of services may also come into play to constrain constructive attempts to limit fertility. We also

observe the reducing effect of contraception on the positive influence of distance on CEB in both urban and rural areas, with greater impact in the urban

5.5.2 Summary of Multivariate Analysis

In this section, we have looked at the combined effect of independent variables on children ever born in both urban and rural areas. Referring to the multivariate results (table 5.2), it is evident that of all the independent variables used in the analysis, demographic variables explained the bulk of the variations in CEB in both urban and rural areas, but with greater impact in the rural. This is one factor that can be used to explain the differentials in urban-rural fertility.

In both urban and rural areas, the relationship between the independent variables and CEB was also found persistently significant for all the demographic variables, secondary+ education, travel time to source of 30 - 59 minutes and contraception. It is most probable that these variables independently affect fertility. Another observation is that except for under-five mortality, contraception had a suppressing effect on CEB with relation to the rest of the independent variables in both areas of study, showing its instrumental role in fertility reduction. Its influence was however, greater in the urban suggesting comparatively lower fertility for urban women

One of the major findings revealed in this section is that secondary+ education and late age at marriage (20+ years) have significant negative effect on CEB in both urban and rural areas, but with greater intensity in the urban. We also note that women aged 35+years, under-five mortality and the married category of marital status had very significant positive influence on children ever born in both areas but with stronger coefficient in the rural suggesting higher fertility.

Throughout the multivariate analysis, the socio-cultural variables namely religion and ethnicity showed no significant effect on CEB in the urban, yet the relationship was

; -nificant for a few dummy categories in the rural suggesting noticeable affiliation of rural women to religious and ethnic dictates.

.Another important finding is that although inclusion of the proximate determinant (contraception) resulted in observable reducing effect on the number of CEB with respect to most of the independent variables, the positive relationship between under-five mortality and CEB gained more strength with stronger coefficient in the rural. By implication, contraception has very minimal effect, if any, on birth performance of women in areas which are affected by under-five mortality and where most women would only think of using contraception after acquiring enough children as security against child loss.

Of interest, again, is the fact that distance of 60+ minutes to the nearest FP service provider seems to be more of a rural problem. The results also suggest greater overall impact of the explanatory variables in the rural, since the total variation in CEB explained by all the independent variables together was 65.9% for urban and 73.4% for rural.



CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to give summary and conclusions on the major findings of the study, and make policy and research recommendations based on the findings.

6.1 Summary of Results

This study is a build-up on earlier findings of other studies and surveys done in Kenya which consistently revealed higher fertility in the rural areas compared to urban areas (KFS 1977/78; the 1969 and 1979 National Population census; KCPS 1984, KDHS 1986, Kangi, 1978; Omagwa, 1985; Osiemo, 1986; Onguti, 1987). The major objective of the study was to determine the factors which account for urban - rural fertility differentials and suggest remedial procedures for lowering rural fertility as a way of complementing the government's concerted effort to reduce overall fertility to the minimum so as to elevate the level of development in Kenya. The source of data was KDHS 1993. The sample size was a total of 7540 women aged 15-49 years of whom 6379 (84.6%) lived in the rural areas while 1161 (15.4%) were urban dwellers. The influence of the following independent variables on the dependent variable (CEB) was investigated: Education of the mother, Work status, age of the mother, age at first marriage, marital status, Under-five mortality, ethnicity, religion and access to FP services (time to get to source). Contraception was used as the intervening (proximate) variable. The analysis was done using various statistical methods which ranged from frequency distribution and cross tabulation with chi-square to simple and multiple linear regression analysis (see Ch. 3). All the variables were tested at 0.05 level of significance.

Using frequency distribution results (Table 4.1) the study has confirmed the existence of higher fertility in the rural than urban areas: 25.4% of the rural women had 6+ children as opposed to 9.2% for urban women. The chi-square test revealed that except for socio-cultural variables (ethnicity and religion) and access variable (time to get to FP source) which showed no significance in the urban, all the independent variables considered in the study had some significant association with CEB in both areas.

The results of bivariate regression analysis showed significant positive relationship between CEB and the working category (WRK1), age of the mother being 25-34 (AGE1) and 35+ (AGE2), married women (MAR1) and women in other marital unions (MAR2), age at first marriage at 15-19 years (AGAM2) and 20+ years (AGAM3), under-five mortality (CD1), time to get to FP source being 30-59 minutes (ACC1) and 60+ minutes ACC2), and contraceptive use (CONTRA 1) in both urban and rural areas. Fertility was found higher among the married women, women whose age at marriage was early, the working, those with under-five mortality experience, women who lived 60+ minutes away from FP source, women aged 35+ years as well as women who used contraception, but with greater intensity in the rural. Attainment of primary or secondary+ education had significant negative relationship with CEB in both areas but the latter had greater depressing effect.

.Analysis of the multiple regression results revealed strong significant relationship between demographic variables and CEB in both urban and rural areas, explaining 63.3% of the total variation in CEB in the urban and 72.3% in the rural, hence greater impact in the rural. Their effects were however slightly reduced when the confounding effect of the socio-economic, socio-cultural and access variables were controlled for. Contraception showed significant positive influence on CEB implying its popularity among women who had had many children, and its impact was greater in the urban. With reference to individual independent variables, contraception had significant positive influence on the impact of under-five mortality on CEB

indicating minimal use in areas with high incidence of child mortality where most women would want as many children as possible for purposes of replacement and as security against anticipated losses. Otherwise, contraception had significant reducing effect on the number of CEB in both urban and rural areas for all the other independent variables, but its suppressing effect was generally greater in the urban, and specifically greatest among women with secondary+ education who lived in the urban areas. In both areas, all the demographic variables, secondary+ education, time to get to FP source of 30-59 minutes, and contraception persistency showed significant relationship with CEB for all the models, suggesting their independent effect on fertility. Women aged 35+ years (AGE2) consistently showed strongest positive influence on CEB with greater impact in the rural, indicating higher fertility for rural women in this age bracket. Age at first marriage at 20+ years (AGAM3), on the other hand, exhibited the strongest depressing effect on CEB, but the influence was more in the urban suggesting lower fertility for urban women. Secondary+ education also had significant depressing effect on CEB but the effect was again greater in the urban. In both areas, an inverse relationship was found to exist between work and CEB but only significant in the rural, albeit attributed to the effect of small sample of rural women who worked away from home. The socio-cultural variables had no significant bearing on CEB in the urban; their effects were more felt in the rural but religion still proved inadequate in explaining the high rural fertility. Long distance to FP source was found more of a problem in the rural. The total variation in CEB explained by all the independent variables (together) used in this study was 65.9% in the urban and 73.4% in the rural, generally indicating greater impact in the rural.

6.2 Conclusions

From the basis of the study findings there is evidence that differences in fertility exist between urban and rural areas, and fertility is still higher in the rural. The fact that fertility was

consistently higher in the rural even when both areas were studied upon similar characteristics such as age of the mother gives the impression that urban areas are endowed with certain elements which serve to reduce fertility. One such element could be modernisation whose effect puts pressure upon urban women to have small families. However, the specific advantages found to surround urban life include better education, adequate contraceptive use, late age at marriage, lesser attachment to cultural dictates on fertility, and lower incidence of under-five mortality. The high level of fertility that characterise rural areas can be attributed to low education, greater concentration of women of high ages (35+ years) as well as the married women in the rural, early age at marriage, higher incidence of under-five deaths and subsequent minimal use of contraception, strong affiliation to ethnic dictates on reproduction, and long distance to FP service outlet. While the inadequacy of religion and work status in explaining urban-rural fertility differentials featured strongly in this study, the greater impact of demographic variables in the rural areas could serve as one justifiable explanation to the high rural fertility. For instance, the study has singled out under-five mortality as a barrier to success of contraception and found such deaths more rampant in the rural. Based on the results, it is also logical to conclude that the general impact of all the independent variables used in the study was greater in the rural as indicated by the higher degree of the overall variation in CEB they explained.

C

6.3 RECOMMENDATIONS

Having low fertility and elevated development has been a priority and the primary focus in many developing countries. As a consequence, every country has progressively developed population policies on which clear and specific intervention action can be implemented. In Kenya, the population policies geared towards attainment of small family norm have seemingly not worked uniformly in all areas. This study has shown that despite the government's incessant effort for overall reduction in fertility, variations still characterise regions, groups and

individuals. In particular, rural women are found to give birth to more children than their urban counterparts.

The findings of this study add considerably to our understanding of the factors, which are responsible for urban-rural fertility differentials. These results would be useful to policy makers and planners in Kenya in the establishment, distribution and implementation of essential services especially those intended for fertility reduction. The study will also serve as a valuable academic contribution to students in the field of population and demography, and other related fields not only where it functions to fill some hitherto missing academic gaps but also by exposing certain ideas which promote research interest especially in human fertility.

6.3.1 Recommendations for Policy Making

The findings of this study have generated the following policy recommendations for attention of policy makers and implementers.

1. Of all the factors included in the study, secondary and higher education, and late age at marriage, were found to be the major factors suppressing fertility. In agreement with other studies (UN, 1987:214-215), this study found low education levels among rural woman. The government of Kenya should ensure that more rural women attain secondary and above education possibly by increasing school enrolment for girls each year, intensifying measures to curb school drop-out for girls, and also making available education facilities without taxing parents for their children's education. Adult education programs should also be strengthened in the rural with the aim of capturing most of the rural women still in their reproductive ages whose level of education is primary or no education at all. It is anticipated that acquisition of high levels of education will enable rural women to seek job and training opportunities which in turn delay marriage and shorten reproduction period, leading to low fertility. Education will also enable the

women to increase their knowledge, awareness and affordability of contraceptives, and also empower them with decision making abilities some of which pertain to limitation of family size.

The study found high incidence of under-five mortality in Kenya, with the rural areas more affected. This phenomenon was also found detrimental to success of contraception. This is a signal to planners of the need for concerted efforts to ameliorate the environmental, social and public health conditions that facilitate mortality among very young children. Rural parents should be exposed to activities that increase their confidence and assurance in child survival. These may include intensified health education on childcare and pre-natal care, and expansion of affordable health facilities. More social workers should be trained to deliver advisory services to rural women on importance of immunization and better nutrition among others.

Policy targeted for fertility reduction should pay more attention to rural areas. In particular, FP sources should be within easy reach of the prospective users. Again there is need to inculcate in women, early in time, the appropriate knowledge and attitude to contraception as a necessary intervention to fertility limitation so as to motivate them to voluntary use. Young women with few or no children who are the 'hard core' resisters to contraception should be targeted and educated on the role of contraception as a means of spacing other than preventing births. Further, reproductive health and other studies of demographic concern should be incorporated into the school curricula to enable the youth to learn issues dealing with responsible parenthood, the cost of child bearing and rearing, and the biological aspect of reproduction among others so as to expose them to problems of rapid population growth and enable them to appreciate the need for smaller families.

- 4 Traditional beliefs and practices, which promote large families such as early marriage and dependence on children as old age security should be carefully addressed. Young women should be engaged in meaningful activities and roles in order to avoid undesirable or inadmissible premarital relationships that lead to early marriage. These include acquisition of education to secondary+ level, active participation in youth group activities especially those geared to income generation, and also religious as well as recreational activities such as games. To curb old age dependence on children for provision of security, a policy geared to the establishment of welfare schemes for the elderly as security should be adopted.
5. This study found consistently lower fertility in the urban even when both urban and rural areas were compared upon similar characteristics such as age of the mother. It is apparent that urban areas are endowed with certain factors which promote small families. Features associated with development such as improved education, adequate health and training institutions, factories, good infrastructure and others as found in the urban should also be located to the rural in equal capacity.

6.2.2 Recommendations for Further Research

It would be unrealistic and an academic oversight to assume that a study of this nature and size could be extensive and exhaustive enough to investigate all the factors that have contributed to urban and rural fertility differentials. The author therefore wishes to recommend the following to interested future researchers on this very exciting area of study.

- I. The study found long travel time (60+ minutes) a significant constraint to limitation of family size in the rural areas. In the urban areas, however, its effect was minimal and urban women in this category even had fewer children. There is need for a research to identify reasons why access to FP source is more of rural than urban problem, and also

ascertain the extent to which this factor promotes rural fertility.

Urban fertility was consistently low even in a juxtaposed analysis of the two areas based on similar characteristics such as time to get to FP source, and age of the mother among others. Future researchers should investigate the factors, which contribute to low fertility in the urban (impact of urbanization on fertility) so that rural areas can borrow from such findings in order to lower their fertility

The actual relationship between work and fertility is still unclear. In this study, the bivariate results reveal significant positive influence of work on CEB in both urban and rural areas. For multivariate analysis, the relationship was inverse in both areas but insignificant in the urban, yet it is in the urban where work is expected to significantly reduce fertility since majority of urban women were highly educated and worked away from home. This area still needs more research.

This study has revealed that more children aged below five years died in the rural areas. The contributing factors to this phenomenon should be investigated.

Contraception was found more popular among women who had acquired their desired family size. Future researchers should investigate reasons why most Kenyan women tend to treat contraception as a mechanism for terminating births as opposed to spacing (limiting family size).

The relationship between socio-cultural variables and CEB was insignificant in the urban but significant in the rural. In particular, fertility was highest among the rural kalenjin (for ethnicity) and lowest among the rural muslims (for Religion). The contributing factors to these observations should be further investigated.

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APPENDICES

APPENDIX 1: CATEGORIES AND DEFINITIONS OF VARIABLES

APPENDIX 1A: CATEGORIES OF VARIABLES

Variable: Dummy categories and values

Independent variables

- Education None=0, Primary=1, Sec+=2
- Work Status Not-working=0, Currently working=1.
- Age (in completed yrs) 15-24=0, 25-34=1, 35+=2.
- Marital Status Other unions=2, Never-married=0 Married=1
- Age at First Marriage Below 15=1, 15-19=2, 20+=3.
- Under-five mortality No child dead <5 years=0, At least 1 child dead <5 years= 1
- Ethnicity Luhya=0, Kalenjin=1, Kikuyu=2, Others=3
- Religion Catholics=0, Protestants/ other christians=1, Muslims=2.
- Access to FP source
(Time in minutes) Less than 30 minutes=0, 30-59=1, 60+=2.

Proximate Variable

- Contraception None-use=0, Use= 1.

Dependent Variable

- Children Ever Born (CEB) 0-3=1, 4-5=2, 6+=3.

APPENDIX IB: DEFINITIONS OF DUMMY VARIABLES

In this study a total of eleven variables were used. These variables were sub-grouped into finite categories (called dummies) for ease of analysis, and are defined as follows:

1. Education

The education variable is divided into three categories:

- None: The women who had no formal education
- Primary: The women who had primary school education, complete or otherwise.
- Secondary+: The women who had secondary education and above.

2. Work Status

Work status is divided into two categories:

- Not working: Women who are not engaged in regular salaried employment.
- Working: Women who are employed and are on regular salary. This category refers particular to women who work a way from 'home'

3. Age of the Mother

- 15 - 24: Women who were aged between 15 and 24 years at the time of survey.
- 25 -34: Women who were aged between 25 and 34 years at the time of survey.
- 35+: Women who were aged 35+ years at the time of survey.

4. Marital status

Marital status variable is sub-divided into three categories:

- Never married: The women who had never involved themselves in any form of marital union at the time of the survey.
- Married: The women who were currently in steady marital relationship at the

time of the survey.

- Others: The women who were divorce, widowed or separated at the time of the survey.

5. Age at first Marriage

The age at first marriage of the respondents has been grouped into three categories:

- Under 15 years: The women who entered marriage before attaining the age of 15 years.
- 15- 19 years: The women who entered into marital union aged between 15 and 19 years.
- « 20 +: The women who entered into marriage aged twenty years and above.

6. Under-five mortality

This variable is sub-divided into two categories.

- 0: Women who had no child dead below age five.
- 1+: Women who had at least one child dead below age five.

7. Ethnicity

This variable is categorized into four groups.

- Kalenjin. The women belonging to the Kalenjin ethnic group
- Kikuyu: The women belonging to the Kikuyu ethnic group
- Luhya: The women belonging to the Luhya ethnic group.
- Others: The women belonging to other ethnic groups.

& Religion

This variable is categorized into four groups.

- Catholics: Christian women who belong to the catholic church.
- . Protestants: Christian women who belong to the protestants church.
- . Muslim: Women who are affiliated to Islam.
- . Others: Women who belong to other religions.

9. Access to Family Planning :Time (minutes) to get to source

This variable is categorized into three:

- Less than 30 minutes: Women who take less than 30 minutes to reach Family Planning facility.
- 30 - 59: Women who take between 30 and 59 minutes to reach Family Planning facility.
- 60 +: Women who take one hour and more to reach Family Planning facility.

10. Contraception

This variable is categorized into two:

- Non - use: Women who not are using modern contraceptives to control births.
- Using: Women who are using modern contraceptives to control births.

11. Children ever born (C. E. B.)

The number of children ever born is divided into three categories.

- 0 - 3 : Women who have between none and three children.
- + 4 - 5: Women who have given birth to between four and five children.
- 6 +: Those women with six or more children.

APPENDIX 2: REGRESSION RESULTS

2A: Bivariate regression results for urban and rural women

variable	URBAN			RURAL		
	Coeff. B	T-Stat.	Sig. T	Coeffot B	T-SUL	Sig-T
Education	-1.906	-8.809	0.0000*	-2.893	-29.185	0.0000*
Noeduc. (Constant)	-2.339	-11.035	0.0000*	-3.888	-32.356	0.0000*
	3.904	20.057	0.0000*	5.947	68.383	0.0000*
Work Status						
Working (WRK)	0.634	4.764	0.0000*	1.330	16.755	0.0000*
NC worksins (constant)	1.662	17.397	0.0000*	2.727	48.872	0.0000*
ACT (ip coimple??4 w;ars)						
25-34 (AGE 1)	2045	18.392	0.0000*	3.318	56.493	0.0000*
35* (AGE 2)	4.116	28.713	0.0000*	6.236	101.525	0.0000*
15-24 (Constant)	0.600	8.344	0.0000*	0.784	21.048	0.0000*
Nlantal Status						
mamed (MAR 1)	2.629	22.039	0.0000*	4.298	59.520	0.0000*
Other union (MAR 2)	2.700	13.846	0.0000*	4.141	32.268	0.0000*
Never married 1 constant)	0.333	3.648	0.0000*	0.370	6.229	0.0000*
Age at first mamage						
15 - 19 (AGAM 2)	2.151	14.973	0.0000*	2.995	36.357	0.0000*
20+ (AG AM 3)	1.349	8.815	0.0000*	2.241	22.184	0.0000*
Below 15 (constant)	0.982	10.624	0.0000*	1.696	28.621	0.0000*
I nder-five mortality						
1+ child dead(CD 1)	3.263	19.188	0.0000*	4.033	49.434	0.0000*
No CD (constant)	1.542	24.500	0.0000*	2.445	62.102	0.0000*
Ethnicity						
Kalenjin (ETH 1)	-0.541	-1.248	0.2124	0.129	0.949	0.3426
Kikuyu (ETH 2)	-0.268	-1.338	0.1811	-0.433	-3.297	0.0010*
Others (ETH 3)	-0.199	1.165	0.2443	0.016	-0.145	0.8850
Luhya (constant)	1.960	13.683	0.0000*	3.454	36.751	0.0000*
Religion						
Proteslant other chnst	0.076	0.508	0.6117	-0.198	-2.307	0.0211*
(REL1)	0.412	2.084	0.0374*	-0.252	-0.963	0.3354
Muslims (REL 2)	1.879	16.280	0.0000*	3.515	51.222	0.0000*
Catholics (ConsUnt)						
Vcess (in minutes)						
30 - 59 mins (ACC 1)	0.514	3.245	0.0012*	0.596	5.090	0.0000*
60* minutes (ACC 2)	0.926	4.174	0.0000*	1.146	12.450	0.0000*
Below 30 (constant)	1.768	21.526	0.0000*	2.692	37.006	0.0000*
(ontraceulion						
Using (CONTRA 1)	1.395	10.160	0.0000*	1.599	17.255	0.0000*
Not using (constant)	1.536	19.623	0.0000*	2.999	65.916	0.0000*

Significant variables at 0.05 level of significance

\PPENDIX 2B: Multiple regression results for urban and rural areas when only demographic variables are entered in the equation

Variables	URBAN			RURAL		
	Coeff.B	T. Stat	Sig. T	Coeff.B	T. Stat	Sig.T
A ^{efin} completed years)						
24-34 (AGE 1)	1.270	12.200	0.0000*	2.241	36.922	0.0000*
35+(AGE 2)	3.064	23.037	0.0000*	4.747	71.401	0.0000*
15-24 years (AGE 0)	RC			RC		
Marital Status						
Mamed(MAR 1)	2.413	12.588	0.0000*	2.260	24.170	0.0000*
Other unions (MAR 2)	1.715	7.727	0.0000*	1.499	12.955	0.0000*
Never married	RC			RC		
Age at First Marriage						
15-19 (AGM 2)	- 0.693	- 3.887	0.0000*	-0.548	- 6.884	0.0000*
20+ (AGM 3)	- 1.651	- 8.932	0.0000*	-1.449	-16.673	0.0000*
Below 15 (AGAM 1)	RC			RC		
Under-five Mortality						
1+child dead (CD 1)	1.642	12.739	0.0000*	1.613	28.715	0.0000*
No child dead (CD 0)	RC			RC		
CONSTANT	0.008			0.103		
R ²	0.6334			0.7230		
Standard Error	1.4			1.7		

RC - Reference Category

* Significant variables at 0.05 level of significance

APPEINDEX 2C: Multiple regression results for urban and rural areas when all the variables except proximate are entered into the Regression Model

VARIABLE	URBAN			RURAL		
	Coeff. B	T. Stat.	Si.R.T	Coeff. B	T. Stat.	Si.R.T
Education PRJ (EDUC 1) Sec+(EDUC2) None (EDUC 0)	-1.117 -0.338 RC	-0.791 -2.179	0.4293 0.0295*	-0.095 -0.382 RC	- 1.508 -4.858	0.1316 0.0000*
Work Status Wotting (WRK 1) Not working (WRK 0)	-0.014 RC	-0.159	0.8735	-0.089 RC	-1.972	0.0487*
Aae (connieted vears> 23-34 (AGE 1) 35+(AGE 2) 15-24 (AGE 0)	1.288 3.074 RC	11.893 22.162	0.0000* 0.0000*	2.233 4.701 RC	36.652 67.369	0.0000* 0.0000*
Mtfltl Status mimed (MAR 1) Othen (MAR 2) Never mimed (MAR 0)	2.249 1.545 RC	11.517 6.835	0.0000* 0.0000*	2.167 1.236 RC	22.575 12.145	0.0000* 0.0000*
Ag? »t fim nwpjg: 15- 19(AGAM2) 20+ (AGAM 3) Below 15 (AGAM 0)	-0.606 -1.475 RC	-3.386 -7.775	0.0007* 0.0000*	- 0.541 -1.363 RC	-6.763 -15.364	0.0000* 0.0000*
1 Mortality At least 1 CD (CD 1) No CD (CD 0)	1.581 RC	12.165	0.0000*	1.611 RC	28.533	0.0000*
Ethnicity Kalenjin (ETH 1) Kikuvu(ETH2) Other. (ETH 3) Luhvi (ETH 0)	0.449 0.129 0.165 RC	1.687 1.047 1.597	0.0919 0.2955 0.1105	0.337 0.008 -0.083 RC	4.666 -0.108 -1.413	0.0000* 0.9138 0.1578
Religion Protestant/other chnst (REL 1) Muslims (REL 2) Catholics (REL 0)	0.055 0.114 RC	0.598 0.918	0.5500 0.3588	-0.002 -0.349 RC	- 0.050 -Z521	0.9602 0.0117*
Access (in minutes 1 30-59 (ACC 1) 60+ (ACC 2) Blow 30 (ACC 0)	0.367 0.236 RC	3.803 1.722	0.0002* 0.0853	0.255 0.305 RC	4.080 6.094	0.0000* 0.0000*
Constant R ² Std. Error	-0.040 0.6391 1.4			0.126 0.7281		

RC = Reference category

*** Significant variables at 0.05 level of significance**

APPENDIX 2D: Multiple regression results for urban and rural areas when all the study variables including Proximate are entered into the Regression Model

variable	URBAN			RURAL		
	Coeff. B	T-SUL	SigT	Coeff. B	T-SUL	Sig. T
Education PRKEDUC 1) Sec- (EDUC 2) None (EDUC 0)	-0.245 -0.523 RC	- 1.693 -3.430	0.0907 0.0000*	-0.171 -0.529 RC	-2.713 -6.708	0.0067* 0.0000*
Work Status Working (WRK 1) Not working (WRK 0)	- 0.089 RC	- 1.046	0.2958	-0.116 RC	-2.585	0.0098*
A«(completed years) 25-34 (AGE 1) 35* (AGE 2) 15-24 (AGE 0)	1.125 2.901 RC	10.514 21.270	0.0000* 0.0000*	2.152 4.579 RC	35.002 65.509	0.0000* 0.0000*
Marital Status mimed (MAR 1) Others (MAR 2) Never mimed (MAR 0)	2.204 1.545 RC	11.609 7.036	0.0000* 0.0000*	2.116 1.438 RC	22.241 12.285	0.0000* 0.0000*
Age at fipi mamage 15- 19IAGAM2) 20+ (AG AM 3) Below 15 (AGAM 1)	-1.685 -1.578 RC	-3.930 -8.546	0.0001* 0.0000*	-0.565 - 1.388 RC	-7.138 -15.791	0.0000* 0.0000*
< 5 Mortality At least ICIXCD 1) No CD (CD 0)	1.609 RC	12.736	0.0000*	1.648 RC	29.429	0.0000*
Hthnicity Kalenjin (ETH 1) Kokuvu(ETH2) Others (ETH 3) Luhva (ETH 0)	0.413 0.002 0.183 RC	1.596 0.020 1.819	0.1108 0.9840 0.0692	0.329 -0.107 -0.108 RC	4610 - 1540 - 1.851	0.0000* 0.1236 u «
Religion Protestant other chnst (REL 1) Muslims (REL 2) Catholics (REL 0)	0.036 0.078 RC	0.406 0.647	0.6845 0.5179	-0.010 -0.358 RC	-0.232 -Z604	0.8169 0.0092*
.Access (in minutes) 30-59 (ACC 1) 60+ (ACC 2) Below 30 (ACC 0)	0.337 0.224 RC	3.594 1.688	0.0003* 0.0917	0.234 0.279 RC	3.782 5.627	0.0002* 0.0000*
<"ontraceptpn Using (CONTRA 1) Non-use (CONTRA 0)	0.776 RC	8.307	0.0000*	0.599 RC	11.375	0.0000*
CONSTANT Std. En	0.086 0.6594 1.3			0.224 0.7335 1.7		

RC = Reference Category

*** Significant variables at 0.05 level of significance**

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