"EVALUATION OF THE IMPACT OF FAMILY PLANNING PROGRAMMES ON FERTILITY IN KENYA: AN APPLICATION OF PREVALENCE MODEL".

BY

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DECLARATION

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

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DEDICATION.

To my Parents (Washingtone and Alice Ogola), brothers (John, Maurice, and Martin) and sisters (Millicent and Pamela).

ABSTRACT.

A lot of family planning programmes have been set up by the Government and other Organizations in the Country, hence the need to evaluate the impact of these programmes on fertility. This is the major objective of this study.

There are at least nine methods that have been recommended by the United Nations for the evaluation of the impact of the programmes on fertility. In this study, only one method was used in evaluating the impact of family planning programmes on fertility in Kenya in 1989. This is the Prevalence Model which is the latest technique of evaluation of the programme impact using Survey data developed by Bongaarts. It has two versions namely the Age specific prevalence model which is for the estimation of the births averted in each age group and method specific prevalence model for the estimation of the contribution of each of the methods to the total births averted. These two versions have been applied to Kenya Demographic and Health Survey (1989) data to evaluate the programme impact in Kenya in 1989. This was done for various differentials namely place of residence, work Status of women, education, ethnicity and religion.

The findings show that in Kenya, programme contraception averts more births per woman in all age groups than non-programme contraception except in Eastern Province and among the Kamba women in particular in 1989. For fertile Kamba women non-programme contraception averts more births per woman than programme contraception in all age groups. Most births averted per woman are in the age groups 25-29 to 35-39; with the highest estimates being in the age group 35-39. The results show that there exists a disparity between the births averted per woman by programme

contraception in each age group by regions. The estimates of births averted per woman in each age group are highest in Central Province and lowest in Nyanza and Western Provinces. The estimates of births averted per woman in each age group for each tribe also follow the same pattern. The estimates of births averted per woman in each age group by various variables considered show that there exist variations between the different categories of each variable; especially with respect to place of residence, work status of married women, and education of married women.

The results from the method specific prevalence model showed that, Periodic Abstinence which is a non-programme method contributes more to the total births averted per woman than any other method, although in Kenya programme contraception averts more births per woman than non-programme contraception . This is also the case for the fertile Kamba women. It also show that for the various variables considered as mentioned above there exists a set of methods, that averts most births in Kenya. This set comprises of Pill, IUD, Injection, Female Sterilization, and Periodic Abstinence. The methods avert more births per woman for fertile women who are having Secondary plus level of education, married women who are currently working and those staying in Urban areas. The male oriented methods contribute less to the births averted per woman for all these variables considered.

Therefore, an increased impact of family planning programme on fertility in Kenya may be achieved if approached in several ways. It should be varied, and should include ways of reducing economic disparities between regions and individuals.

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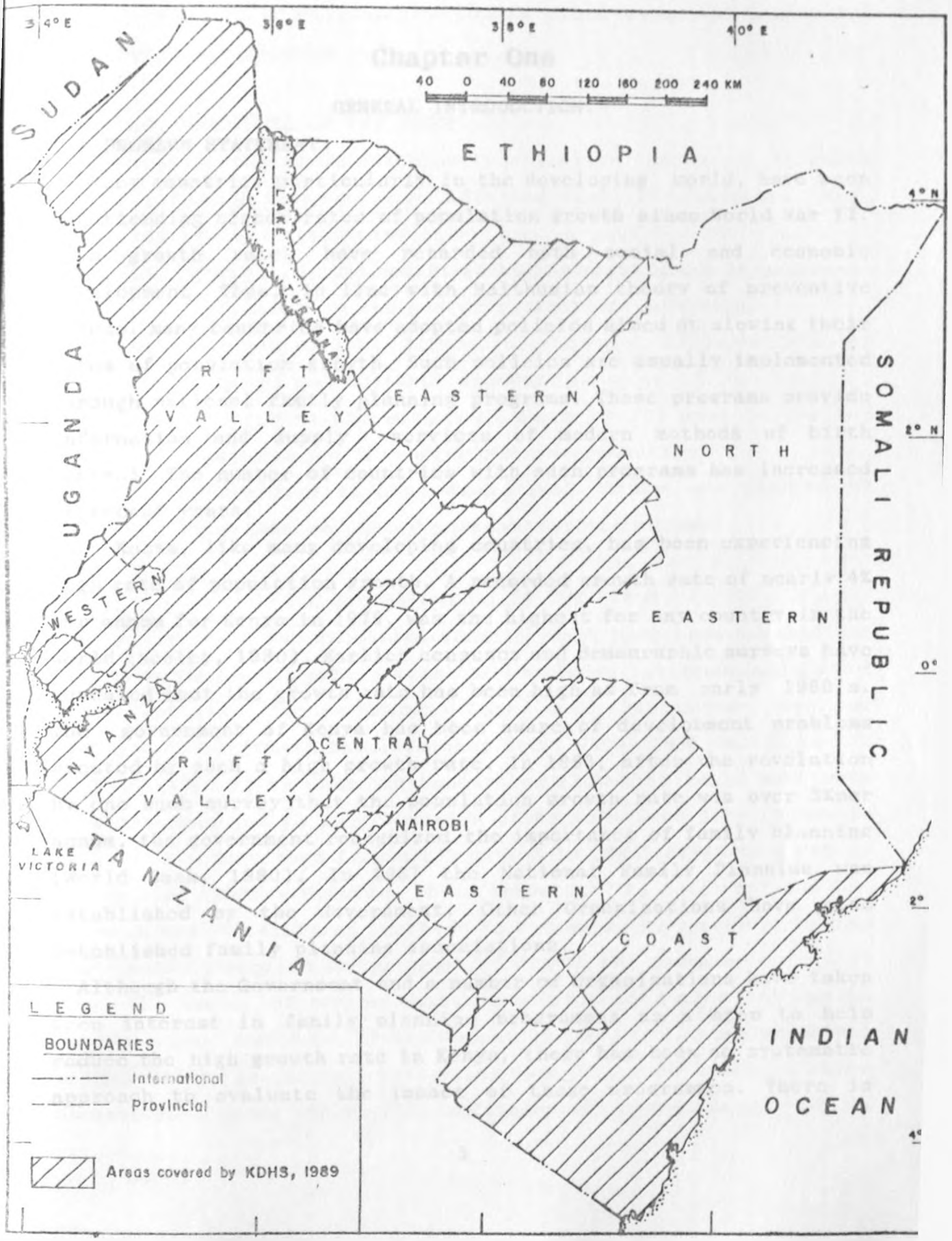


Fig. 4 : KENYA DEMOGRAPHIC AND HEALTH SURVEY BY PROVINCES

Chapter One

GENERAL INTRODUCTION.

1.1 PROBLEM STATEMENT.

Many countries particularly in the developing world, have been experiencing higher rates of population growth since World War II. Such growth rates have retarded both social and economic development. Thus, in line with Malthusian theory of preventive checks, many countries have adopted policies aimed at slowing their rates of population growth. Such policies are usually implemented through national family planning programs. These programs provide information and supply services of modern methods of birth control. The number of countries with such programs has increased in recent years.

Kenya, like many developing countries, has been experiencing high rate of population growth. A recorded growth rate of nearly 4% per annum for Kenya in 1979, was the highest for any country in the world (Mosley, 1980). Earlier censuses and demographic surveys have revealed that the growth rate has been high as from early 1960's. The government of Kenya has been aware of development problems created by such a high growth rate. In 1963, after the revelation by one such survey that the population growth rate was over 3%per annum, the government recognized the importance of family planning (World Bank, 1980). In 1967 the National Family Planning was established by the Government. Other Organizations have also established family planning associations.

Although the Government and a number of Organizations have taken keen interest in family planning programmes as a step to help reduce the high growth rate in Kenya, there has been no systematic approach to evaluate the impact of these programmes. There is

therefore a need to evaluate the impact using the latest techniques on large scale surveys.

1.2.0 OBJECTIVES OF THE STUDY.

Broadly, the study attempts to establish the extent to which family planning programs have affected fertility in Kenya. More specifically, the study aims at:-

(a) determining the amount of births averted due to programme contraception and non-programme contraception.

(b) determining the births averted by differentials of economic and cultural aspects.

(c) determining the method(s) which averts most births for programme and non-programme contraception

(d) determining at what ages. most births are averted by programme and non-programme contraception.

1.3.0 JUSTIFICATION OF THE STUDY.

A number of contraception studies which have been carried out in Kenya, have dealt mainly with the knowledge. attitude and use of contraceptives. The studies, have used percentage use of contraceptives (which has increased from 17% in 1984 (KCPS) to 27% in 1989 (KDHS)), to make the assumption that this could have been a factor that led to the reduction of Kenya's fertility (which is said to have decreased from a TFR of 7.7 in 1984 (KCPS) to a TFR of 6.7 in 1989 (KDHS). However, it is important to note that use has not been made of different methods to estimate the number of births that could be averted in the year 't' due to the prevalence in that year. The number of births that are averted in a year 't' can be used as a good indicator of the impact of family planning programme on fertility in Kenya. This was done in this study which identified , among others, the influence and magnitude of each of

the background variables such as education, place of residence, work status of women, ethnicity and religion on fertility through contraception.

Knowing what factors act on contraception to greatly affect fertility may allow policy makers and implementers to allocate scarce resources in the most efficient way. This is especially important where the resources are scarce and at the same time fertility is high as in Kenya. Knowing which regions in Kenya have the lowest impact of the programme on fertility in Kenya may also allow them to know the regions where to start more programme centres. This may help in increasing the impact of the programme on fertility in these regions and in Kenya.

1.4.0 SCOPE AND LIMITATION OF THE STUDY.

In the study, the female population covered were women of childbearing ages 15-49. The population interviewed were picked from Central Bureau of Statistics (CBS) sample survey programme. The survey covered all the provinces except North Eastern province. The survey covered all tribes in Kenya. In the provinces, the tribes covered were those who are permanent residents of the region. By religion, the least covered were the Muslims.

Asking a respondent the current method she is using to avoid pregnancy, is subject to certain errors in that a fertile woman may give a dishonest information about the contraceptive method she uses. This may either inflate or reduce the prevalence rates of certain methods.

Another limitation which is equally observed is that modern methods can also be found outside the programme, for example, from private clinics, private doctors etc, although fewer people got the services outside the programme. It was however assumed that all modern methods were offered by the programme and were termed programme methods; and all traditional methods which do not require

clinical services were termed non-programme methods. Although this assumption is fairly reasonable in that modern contraceptives such as Pill, and IUD are widely distributed through the programme, it might inflate the prevalence rates of programme contraception and hence, lower the prevalence rates of non-programme contraception. This may affect the births that could be averted by either programme or non-programme contraception. The other limitation the methodology has is that it assesses the impact of the programme on fertility by only looking at married women only. Single, Divorced and Separated women also contribute to the fertility of a given place. Thus in assessing the impact of the programme on fertility, women in these marital status should also be included to give a complete impact of the programme on fertility of a given area. This is not done in this study.

1.5.0 DATA SOURCE.

The source of data which has been used in this Study was the 1989 Kenya Demographic and Health Survey (KDHS) by National Council for Population and Development (NCPD). The intention of the survey was to collect information on knowledge, availability, attitude and also number of current users of family planning methods in the country. The survey data also has substantial data on fertility behaviour, mortality and nuptiality of the Kenyan Population.

Using the probability sampling, three questionnaires were administered in the Survey. The first one was to list members of the selected households (household questionnaire); the second one was for recording information from all women aged 15-49 who were present in the selected households the night before the interview (women's questionnaire); and the third one was for recording information from the husbands of the interviewed women in a subsample of households (husband's questionnaire). The expected

size was 9,836 households of which 8,343 were identified as occupied households during the fieldwork and 8,173 were successfully interviewed. The Sampling procedure adopted was Kenya's National Sample Survey and Evaluation Programme (NASSEP) master sample which is a two-stage design stratified by urban-rural residence, and within the rural stratum, by individual districts. It was felt that reliable estimates could not be produced from the KDHS for all 13 districts in NASSEP unless the sample was expanded to an unmanageable size. However, it was felt that reliable estimates of certain variables could be produced for rural areas in the 13 districts that have been initially targeted by NCPD: Kilifi, Machakos, Meru, Nyeri, Muranga, Kirinyaga, Kericho, Uasin Gishu, South Nyanza, Siaya, Kakamega and Bungoma. Thus, all 24 rural clustered in the NASSEP were selected for the inclusion in the KDHS sample in these 13 districts. About 450 rural households were selected for the inclusion in each of these districts, just over 1000 rural households in other districts, and about 3000 households in the Urban areas, for a total of almost 10000 households. Sample weights were used to compensate for the unequal probability of Selection between strata. The selected clusters were then mapped and listed by CBS field staff. In rural areas, household listings made between 1984 and 1985 were used to select the KDHS households, while KDHS pretest staff were used to relist households in the selected Urban clusters, this was to update the frame.The Provinces were clustered as Nairobi, Central, Coast, Eastern, Nyanza, Rift Valley and Western.

From the total population of the sampled households, 7,424 eligible women were identified and 7,150 were successfully interviewed for a response rate of 96 per cent. Eligibility of the individual interviewed was defined on de facto basis for all women aged 15-49 years, who stayed in the house the previous night.

The information collected from women's questionnaires included background characteristics of the respondent: place of residence (survey time and child hood); education status: tribe: religion; work status and marital status. Respondents were then asked whether they are polygamous or Monogamous unions: age at first marriage; contraceptive use. and availability and about the husband's education attainment: occupation and employment. The husbands were asked of their views about contraception. Information was also collected about the children ever born: the number of the children that were still living including current pregnancy: data of the last birth; children dead by sex: breastfeeding and parental care of the last born and desire for more children.

2.0.1 The data that has been used.

From the KDHS data file. the following data has been used for the analysis:-

1) Current contraceptive method used by a respondent to avoid being pregnant by five year age group for the married women.
2) The number of births in the past year by five year age group for married women.
3) Total number of children ever born by married women.
4) The data in 1,2 and 3 have been cross-tabulated for national and by the 7 provinces which have been assessed.
5) The information in 1,2 and 3 by various differentials at National and Provincial level has also been assessed. These are place of residence; work status of women: education status; religion and ethnicity.

These are categorised as follows in the KDHS file:-

Place of residence: was classified into:-

a) Urban and b) rural

Education: this was classified as:-

a)no education b) primary c) secondary d) higher and e) university

Ethnic group: respondents were grouped into 9 ethnic groups namely:-

1) Kalenjin, 2) Kamba, 3) Kikuyu, 4) Kisii, 5) Luhya, 6) Luo, 7) Meru-Embu, 8) Mijikenda -Swahili and 9) Others.

Work Status of women: all women were classified into:-

a) currently working b)worked in the past and c) never worked

Contraception: were classified into:-

a) currently using to avoid being pregnant and b) not using

1.6.0 DATA QUALITY.

Usually the results from sample surveys are affected by two types of errors: 1) non-sampling error and 2) sampling error. Non-sampling error is due to mistakes made in carrying out field activities, for example failure to locate and interview the correct household, errors in the way questions are asked, data entry etc. This type of error can only be minimized in the surveys. The sampling error is a measure of the variability between possible samples. It is usually measured in terms of the "Standard error" of a particular statistics (mean,percentages,etc) which is the square root of variance.

Therefore to improve the quality of the KDHS (1989) data, proper training of field workers was held for almost a month. Computers were also used in data processing for more accuracy by trained staff.

The relative standard error for most of the estimates were found for the whole country not to be large, except for the estimates of very small proportions. The magnitude of the error increased as the estimates of the sub populations such as for particular provinces and districts are considered.

Thus the estimates of births averted per woman in each province and by each differential at National and provincial level have been given allowance of such errors.

1.7.0 LITERATURE REVIEW.

Studies on the evaluation of the impact of family planning programmes on fertility in many Developing Countries have shown that different results have been obtained from different methods. Nine different methods exist for use in the evaluation of the impact namely:- Standardization Approach, Component Projection 1&2. Couple Years of Protection (CYP).Experimental Designs. Regression (Multivariate areal analysis), Simulation, Prevalence model which is the new approach that has been recommended by second group of experts meeting for use. The availability of data is what determines a method to be used in any given country. This has resulted into application of different methods in different third World countries. From "Studies to Enhance the Evaluation of Family Planning Programmes", which was a collection of papers done by United Nations (1985), countries considered were:- Columbia Costa Rica, Sri Lanka, Mexico, Pakistan, and Tunisia. These were works done by the following Demographers: Ochoa, Denton, Devendra, Rukanuddin, Soomro, Faroquin, Ann, Cabrera, Jemia and Carlos. The results were as given below:

Ochoa,(1985) applied the Standardization Approach on Colombian data of 1974-1979, with interests focused on the number of births averted by change in marital fertility component which reflects the practice of birth regulation resulting from both programme and non-programme contraception. The 1974 data was taken as the base population. He found out that marital fertility greatly contributed to the births averted than marital status. Age structure of female population of reproductive ages during the period accounted for an

increase in the number of births in the absence of other changes.

Another scholar by the name Denton,(1985) also applied the standardization Approach on Costa Rican data to assess the impact of the Costa Rican family planning programme during the period from 1973-1981. The purpose of this procedure was to ascertain the observed fertility decline and attempt to attribute the changes in crude birth rates, (CBR), and general fertility rates, (GFR), to the specific demographic components namely;

(a) Age structure of the female population of reproductive ages;

(b) Marital status distribution of women aged 15-49 years;

(c) Marital fertility of the same age group;

(d) The effect of proportion of women of reproductive ages in the total population.

He found that marital fertility was responsible for the decline in the natality which is otherwise assumed to have been brought about by birth control practices. He further noted that, in the absence of birth control, age structure and marital distribution are favourable to higher fertility.

Mauldin,(1981) used similar formula in the decompositions of changes in crude birth rates. He found that changes in marital patterns and primary increase in age at marriage contribute significantly to fertility decline in many high fertility countries.

Devendra,(1985) applied the Standardization Approach on the Sri Lankan data and found that the crude birth rate decreased from 30.4 per 1000 in 1971 to 28.0 per 1000 in 1981. Then he assessed the contribution of the four factors of decomposition to the fertility changes in Sri Lanka for the periods 1971 to 1976 and 1971 to 1981. The component of major interest here, was marital fertility. It is assumed to describe the part of the decline in the crude birth rate

which may legitimately be attributed to the practice of birth control. It was found that marital status and marital fertility accounted for a decrease of 162.0 per cent. in the first five years (1971-1976), of which marital fertility alone accounted for 126.2 per cent. Over the 10 year period (1971-1981), marital status and marital fertility accounted for a 223.7 per cent decline, of which marital fertility accounted for 150.8 per cent. He notes therefore that marital family planning practice in both periods counterbalanced effectively a potential crude birth rate increase due to age structure of the female population and proportion of women of reproductive ages which had the effect of increasing the birth rate.

Rukanuddin, et al,(1985) applied Standardization Approach on Pakistan data of 1965 and 1975 with the objective of finding the contribution of the changes occurring during that period in the following four factors: (a) proportion of female population of the reproductive ages in the total population; (b) marital status distribution of the females; (c) age structure of the female population of reproductive ages; and (d) marital fertility rates on the absolute difference between the crude birth rates corresponding to the years 1965 and 1975. They found that change in marital fertility had the greatest contribution to the decline in the crude birth rate during the period, while change in the age structure of the female population had the least contribution to the decline in the crude birth rate during the period.

Prevalence Model.

Devendra,(1985) applying Prevalence model to calculate the number of births averted in Sri Lanka in 1981 found that 70% of the averted births were as a result of the national family planning programme. Nearly two thirds of the estimated number of births averted by programme contraception have been in age-group 25-34.

The overall pattern is somewhat similar for non-programme contraception with only slight differences. A look at the contribution made by each method, showed that about a quarter of the births averted by the programme contraception were as a result of male and female sterilization, which could have been due to the sharp increase in acceptance of sterilizations in 1980 resulting from the introduction of incentive payments to sterilization acceptors. The other greater contributions were made by Oral contraception and IUDs. Ann,(1985) applying the method on Malaysian data (1976) found that the number of births averted were higher than for any other method. He further noted that non-programme contraception contributed between 25 and 50 percent of the total births averted.

Hanoomanjee,(1985) applying the method on Mauritius data (1972), found that the number of births averted by non-programme contraception accounted for only about 10.4 per cent of the births averted by programme contraception. She found that Oral contraception has the highest contribution to the births averted.

Cabrera,(1985) applying the method on the data from Mexico found that a much higher number of births were averted by the method, than by standardization approach. It was found that it is only component projection 1 which yields results from programme effect similar to those of Prevalence model. There seems to be some overestimation in the prevalence rates of the non-programme users which would account for the comparatively higher estimates of births averted outside the programme.

Jemai,(1985) using the same method on the Tunisian data of 1979 found that prevalence model compared with other methods of evaluation has proved very easy to apply because few assumptions are made and few computations were required in the Tunisian case. Programme contraception averted more births than non-programme

contraception. IUD contributed most to the number of births averted by programme contraception followed by sterilization, Pill while the other remaining programme methods had the least contribution.

Rukanuddin, et at,(1985) used the model on Pakistans' data of 1975, and found that the majority of the births are averted by young fertile women. They noted that the births averted by programme contraception are concentrated among women aged 30-39 years. The age pattern of births averted by non-programme contraception revealed that highly fertile groups of women aged 20-24 years practiced non-programme methods to avoid pregnancy.

Other methods have also been used by various people for evaluation:-

Denton, (1985) applying Component Projection Approach 2 with the objective of estimating the number of births averted in 1981 through the use of birth regulation methods, provided by family planning programme during the preceding years. found that the number of births averted by this method are very close to the number of births averted by the converse approach in the year.

In Pakistan, the method gives a higher value for the number of births averted in the same year (1975) than Standardization approach. But it is noted that this could have be due to the weakness of this approach such as assumption of 100% effectiveness for all methods .

In Kenya, Murungaru, (1982) using Converse and Tabrap methods noted that to achieve a given demographic goal in Kenya. more female acceptors needs to be recruited. For example, in order to achieve a given goal in 1989, about 6 times of those who were recruited during the 1969-1979 decade need be recruited during the period 1979-1989 decade. Thus recruiting staff were required to be increased by about 6 times if this number was to be attained. He

also found that if the programme was to concentrate on improving continuation rates the supplies of the contraceptive at each moment would be required to be more than if the programme concentrated mainly on recruitment. He also noted that at low discontinuation rates, slightly more users among married women of reproductive ages (MWRA) are required. He further noted that introduction of new methods which are not popular among young women would require more acceptors. For example, he asserted the introduction of Sterilization increases the acceptors load by 35 percent during the period 1979-1989. Such methods need to be introduced only if they would be quite popular among the old women.

Feeney (1988) applied Parity Progression Technique on Kenyan census data for 1962, 1969 and 1979 and found no meaningful impact of family planning programme on fertility.

In Nepal, regression analysis showed that 10% increase in contraceptive prevalence is associated with a 4.4% decline in crude birth rate. The use of converse method showed that crude birth rate in Nepal to have declined from about 46% to 43% due to an estimated 286,300 births averted by programme contraception during the period 1972 - 1981.

1.8.0 THEORETICAL FRAMEWORK.

Intermediate determinants of fertility.

Fertility is determined directly by a set of factors which are referred to as the intermediate determinants of fertility. These factors, include programme factors such as contraceptive use and non-programme factors such as sterility. Davis and Blake in 1956 proposed the classification of these factors but Bongaarts later reclassified these factors into three broad categories as is summarized below:-

I Exposure Factors

1) Proportion of married women

II. Deliberate Marital Fertility Control Factors

2) Contraception

3) Induced abortion

III. Natural Marital Fertility Control Factors

4) Lactation infecundability

5) Frequency of intercourse

6) Spontaneous intra-uterine mortality

7) Duration of fertile period

Variations in fertility results from variations in one or more of the above factors. The degree of influence of these factors on fertility varies from a society to another and also differs over time within societies. The influence of these factors on fertility is discussed below:-

According to Bongaarts (1978) marriage has for along time been recognized by demographers as one of the principal intermediate determinants of fertility. Marriage affects fertility through the number who marry, the proportions of those who stay in stable unions and the age at which they marry. Women who marry late have less time to produce and their fertility is lower. In Asia, for instance, TFR is low where women marry late and high where they marry early. The effect of age at marriage is supported further by the fall in fertility in countries where age at marriage has risen.

Prolonged lactation is associated with longer periods of postpartum amenorrhea, which is the period of infertility following birth. In developing countries prolonged lactation is common and hence birth intervals are longer. Therefore, one can conclude that, in developing countries natural fertility is lower than in developed countries where prolonged lactation is not common.

Proportion of couples who are sterile is an important

determinant of fertility (Bongaarts 1978). Data on sterility is scarce, however, sterility is known to have a significant depressing effect on fertility in some developing countries.

Fertility is also influenced directly by coital frequency. Fecundity, the power to produce, has been observed to increase with coital frequency. A survey in U.S.A. showed that fecundity increases with coital frequency (Louis,1976).

Within marriage, contraceptive use is currently responsible for the wide range in the levels of fertility. In developing countries contraceptive practice is virtually absent and marital fertility is comparatively high. In developed countries on the other hand, about half of married women of reproductive ages are users of contraceptive (Bongaarts, 1978).

CONCLUSION.

Bongaarts, (1982), noted that it is not necessary to devote same effort to analyzing and measuring each of these variables because they are not of equal interest in studies of fertility levels and differentials. He found the four principal intermediate variables to be a) proportion of married women; b) breastfeeding; c) induced abortion and d) Contraception (programme and non-programme).

The method to be used for analysis developed by Bongaarts only isolates the effect of contraception (both programme and non-programme) on fertility. Thus among the four principal intermediate variables named above, only the effects of contraception on fertility have been looked at in this thesis.

Indirect determinants of fertility:-

The intermediate determinants of fertility discussed earlier are acted upon by a host of Socio-economic and Cultural factors, which are referred to as indirect determinants of fertility because they exert their influence through the intermediate variables.

Several of these factors are discussed below:-

One of the factors that influence fertility is income. According to the basic version of the economic theory of fertility, income and fertility should be positively related as the higher the income, the higher the capacity to support more children. Findings on the relationship between these variables are, however, inconsistent since some fertility surveys show negative relationships, while others show positive relationships.

Fertility is also influenced by education of the parents. Education may, for instance, increase parents preference for consumption of items which are not related to children and also reduce preference for more traditional life styles, which include a larger family size. Education can also increase an individual's willingness to accept new technologies and to use them more effectively. For example education can reduce fertility by increasing acceptance and effectiveness of contraceptives. Gaisie (1984), found that the differential of use of modern methods of contraception are more pronounced between the educational groups than residential groups, while studying the proximate determinants of fertility in Ghana. Education can also increase a woman's earning potential, thus the opportunity cost of withdrawing from the labour force in order to care for the children, is subsequently increased. The above consideration would suggest that education level and fertility have negative relationships.

Other consideration would, on the other hand, suggest a positive relationship between fertility and education. Educated women, for instance, have higher income potential, therefore they can have high fertility since they have the ability to support more children. Education may also affect the health of the mothers, which can in turn affect fertility, as educated women are more knowledgeable about hygiene and can afford proper diets, they may

be more fecund.

Rapid increases in the proportion living in cities have often been suggested as being closely linked with fertility decline. Rural-Urban fertility differentials have been cited in support of this suggestion. The relationship between urbanization and fertility is, however, believed to be complex. Most authors believe that the modern cities have provided, particularly, favourable environment for the development of attitudes motivating family size limitation. Increased costs of children in cities and their decreased economic usefulness have been mentioned as factors leading to lower fertility in cities.

Mortality affects fertility in a number of ways. Infant and child mortality affect fertility through their effect on the lactation period. A reduction in infant and child mortality , for instance lengthens the average period of lactation which implies a longer period of postpartum amenorrhea. Child and infant mortality also affects fertility through the number of surviving children desired, thus in areas with high mortality levels more children would need to be born to achieve a desired number. Adult mortality may also affect fertility especially through marriages. Thus a reduction in adult mortality may increase the number of marriages and the period of reproduction. Improvement in health conditions, which is usually accompanied by a reduction in mortality, may also affect fertility through the reduction of sub-fecundity and infertility.

Fertility may also be affected by the type of family structure. In joint families fertility is usually high. Several reasons are advanced to explain this. In joint families children's care is usually a collective responsibility. Thus mothers might be encouraged to have more children. The economic usefulness of children in joint families, may also tend to influence fertility

increase.

Cultural practices also influence fertility. In societies where a mans social position is judged by the number of children he has, fertility is likely to be higher. Other Cultural practices may on the other hand, constrain reproduction and hence reduce it below biological maximum. Polygamy is one such behaviour.

The relationship between polygamy and fertility is not well researched. There are however several reasons why polygamy and fertility should be negatively related. First the frequency of sexual relations should be lower on the average for the polygamous couples as compared to monogamous couple. Secondly polygamous couples can easily follow traditional practices by abstaining from sexual relations, for example during extended periods of lactation. Since demand for children is usually determined by the husband, an average women in polygamous unions would expected to have fewer children. In Kenya Ochola Ayayo and Ottieno (1988) found that fertility is generally lower for women in polygamous unions than for those in Monogamous unions.

In other Cultures, spouses are separated when the woman gets pregnant. She continues staying away from her husband for some time even after giving birth. This reduces coital frequency which may eventually lower fertility.

By Religion, the use of contraceptives has been conceived differently by various sects Worldwide. Catholicism has, for instance, retarded contraceptive practice in Spain, Italy and Canada (Alfred,1966). Chamie (1981), theory maintains that the moral philosophy of all religions promotes a pro-natalist ideology. He notes that the differences in fertility among religious groups arise mainly from two sources which are fuelled by polygamy and education. Adegbola (1988), noted that the incidence of sterility and sub-fecundity is high in zones heavily populated by Muslims in

Cameroon (north), Nigeria (north), Sudan (Darfur), Senegal, Kenya(Coast) and Ghana (Upper), and also that there are other sterility regions in Africa inhabited by non muslims. Ochola Ayayo and Osiemo (1989) noted that the Protestants fertility is a bit lower than the Catholics fertility and the Muslims fertility is Lower in Kenya.

1.9.0 THEORETICAL STATEMENT.

From the foregoing literature review and theoretical framework the following conceptual Statement can be developed:-

"Socio-economic and cultural factors are likely to affect fertility of any given society'

1.9.1 Conceptual hypothesis:-

The following conceptual hypotheses can be developed from the above theoretical framework:-

(a) that socio-economic factors are likely to affect the fertility of any given society.

(b) that cultural factors are likely to affect the fertility of any given society.

1.9.2 Definition of Key Concepts:-

(1) Socio-economic factors.

These are similar to the indices of Socio-economic status: education, work status and place of residence are the only indices used in the study to measure the influence of socio-economic on fertility.

(2) Cultural factors.

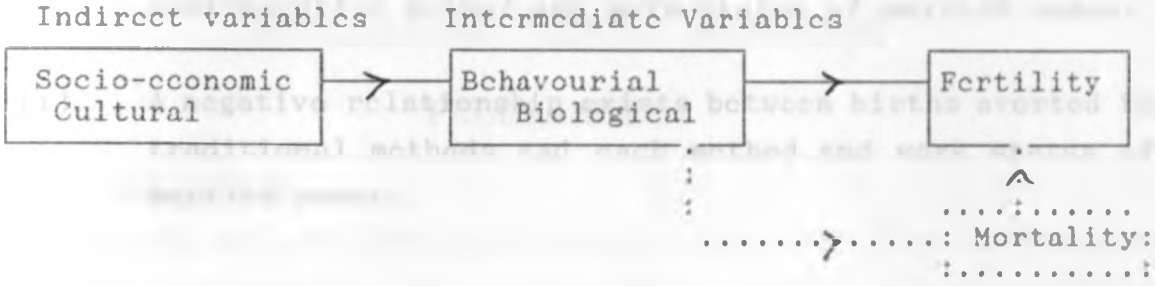
These are factors that govern the way of life of people in a society. In this study only ethnicity and religion have been used to measure how culture influences fertility through contraception.

(3) Fertility.

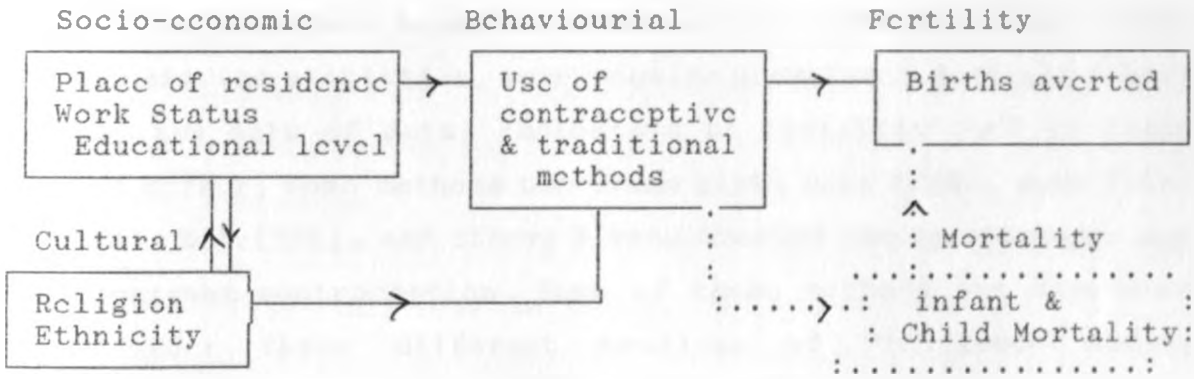
This is defined herein as the births averted by programme (use of modern contraceptives), and non-programme contraception(use of traditional methods), as well as each of the methods.

1.9.3 Conceptual model:-

fig. 1.1: Modified Bongaarts model for Analyzing the Proximate Determinants of fertility (1978).



1.9.4 Operational Model



The operational hypotheses developed out of the model include the following:-

(a) That births averted by use contraceptives are positively related to education of women.

(b) That births averted by traditional methods are negatively related to education of women.

(c) That births averted by a particular method is positively related to education of women.

(d) Births averted by use of contraceptives and traditional methods differs for each sect.

(e) That there exists a positive relationship between the births averted by use of contraceptives in each age group and each method and place of residence.

(f) That there exists a negative relationship between births averted by traditional methods and each method and place of residence.

(h) A positive relationship exists between births averted by use of contraceptives in each age group and each contraceptive method and work status of married women.

(i) A negative relationship exists between births averted by traditional methods and each method and work status of married women.

Chapter two.

VARIOUS METHODOLOGIES FOR EVALUATING FAMILY PLANNING PROGRAMMES.

2.0.0 INTRODUCTION

Several methods for assessing the impact of family planning programmes on fertility now exist. Such methods differ in their procedures, data requirements and assumptions. Some of these methods are aggregate based while others are individual based. Some require service statistics, some require prevalence data and others require two sets of data. Indicators of fertility used by these methods differ; some methods use Crude birth rate (CBR), some Total Fertility Rate(TFR), and others Births averted due to programme and non-programme contraception. Some of these methods are discussed below under three different headings of Prevalence Model. Standardization Approach and Other methods:

2.1.0 THE PREVALENCE MODEL.

This is a new methodology which is used for estimating the fertility impact of contraception obtained through a family planning programme. This approach is called the "Prevalence Model" because the principal data required for the application are estimates of the prevalence of contraceptive use at a given point in time. The development and use of the prevalence model have become feasible in recent years because prevalence data are now routinely available from fertility surveys. This method assesses the Impact of family planning programme on fertility using only married women who are exposed to comparable risk of becoming

pregnant (comparable coital frequencies). In contrast, in the 1960s and early 1970s most countries with family planning programme relied primarily upon service statistics, such as the number of acceptors, for the purpose of assessing the progress of the programme. Many of the existing methods for evaluating programme impact therefore rely upon acceptor statistics.

It is the objective of the prevalence method to estimate the number of births averted as well as the reduction in the crude birth rate. A single application of the procedure produces these estimates for one year, but repeated application for different years can yield a time series of births averted or other impact measures.

BASIC CONCEPTS.

Before proceeding with the description of the methodology, it is helpful to summarise the basic concepts and variables used in the prevalence procedure:-

a) Observed fertility: This is simply the rate of childbearing measured in the year in which the method is applied. The principal fertility indicator used here is the age specific fertility rate expressed in births per 1000 women in a given age group.

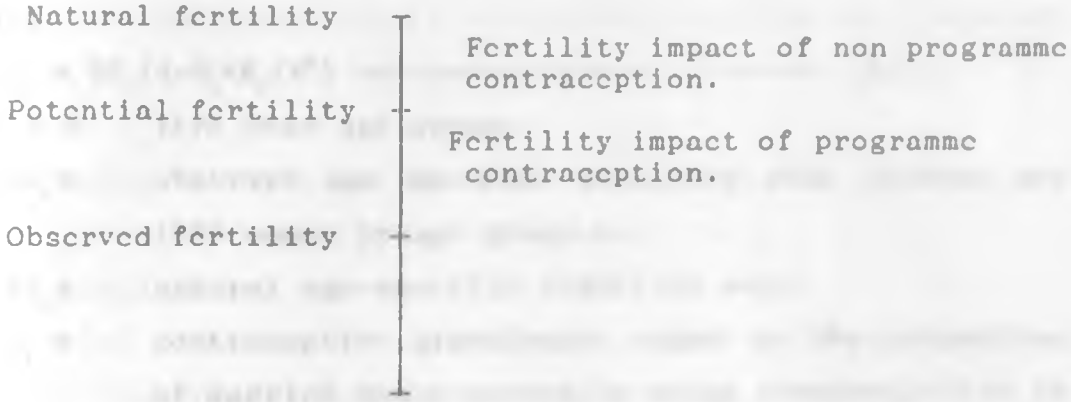
b) Natural fertility: This is the level of fertility that would prevail in the absence of contraception (and induced abortion).

c) Potential fertility rate (gross): This is the level of fertility that would prevail in a population if all programme users stopped contracepting. Since there are significant numbers of users of non programme contraception in most countries, the level of potential fertility will be less than the level of natural fertility level.

The relationship between these different types of fertility

are as summarized below in figure 2.1.

figure 2.1: Types of fertility



a) Fertility impact of programme contraception, which is estimated as the difference between potential and observed fertility .

b) Fertility impact of non-programme contraception, which equals the difference between natural fertility and potential fertility.

Of course, the total impact of all contraception, from both programme sources is given by the difference between natural and observed fertility.

The procedure for calculating births averted by programme users consists of obtaining estimates of : a) natural fertility , b) potential fertility ; c) fertility impact of programme use; d) births averted , e) birth rate impact and f) method specific results. Each of these steps is described below in some detail. All age specific fertility variables are measured in births per 1000 women.

(a) Natural fertility.

The following equation forms the basis for estimating natural fertility:

$$OF_a = NF_a(1-U_a*E_a/F^a) \quad \text{---------- (2.1).}$$

where a = five year age groups

OF_a = observed age specific fertility rate (births per 1000 women in age group a);

NF_a = natural age-specific fertility rate;

U_a = contraceptive prevalence, equal to the proportion of married women currently using contraceptives in age group a;

E_a = effectiveness of contraception in age group a;

F_a = proportion of women reported fecund in age group a;

Equation (2.1) simply states that observed fertility is lower than natural fertility by a proportion U_a*E_a/F_a. As expected, this proportion increases with greater prevalence and effectiveness. The parameter F_a is included to take account of the fact that contraceptive use is concentrated among fecund women.

In equation (2.1) the proportion $E_a/F_a = C_a$ -----(2.2).

where C_a =elasticity coefficient, by age which are a function of sterility and use effectiveness levels.

So substituting equation (2.2) in equation (2.1) gives

$$OF_a = NF_a(1-U_a*C_a) \quad \text{---------- (2.3).}$$

Rearranging this equation gives

$$NF_a = OF_a/(1-U_a*C_a) \quad \text{---------- (2.4).}$$

From this equation natural fertility can be estimated if the estimates of OF_a, U_a and C_a are available for each age group.

In equation (2.4), the variable U_a measures the prevalence of contraceptive use, including all methods from both programme and non programme sources. Because of this, then U_a is the sum of

prevalence of contraception from the two sources:-

So if U'_a = the prevalence of contraception from programme sources at age group "a".

U^*_a = the prevalence of contraception from non-programme sources at age group "a".

Thus $U_a = U'_a + U^*_a$ ---------- (2.5).

Therefore substituting equation (2.5) in equation (2.4) gives:-

$$NF_a = OF_a/[1-(U'_a+U^*_a)*C_a] \text{ ---------- (2.6).}$$

Potential Fertility:-

Potential fertility is usually lower than natural fertility due to the use of non-programme contraception, so that:

$$PF_a = NF_a*(1-U^*_a*C_a) \text{ ---------- (2.7).}$$

This equation is similar to equation (2.6) except that now only the fertility inhibiting effects of non programme contraception is taken into account. Thus the calculation of PF_a therefore requires only the values of NF_a, U^*_a and C_a.

Impact of programme contraception and non-programme contraception:

Once the levels of natural and potential fertility are known, the fertility impact of programme and non-programme contraception is estimated as:

$$FIP_a = PF_a - OF_a \text{ ---------- (2.8).}$$

$$FIN_a = NF_a - PF_a \text{ ---------- (2.9).}$$

That is, FIP_a, the age-specific fertility impact of programme use, equals the difference between potential and observed fertility, and FIN_a, the age-specific fertility impact of non-programme use equals to the difference between natural fertility and potential fertility (just as is indicated above in figure 2.1).

BIRTHS AVERTED:-

Translating the fertility impact measure, FIP_a and FIN_a, into number of births averted in each sector is accomplished by multiplying by the number of women in the age group to which the calculation is applied.

That is

$$BAP_a = FIP_a * Wa/1000 \text{ ---------- (2.10).}$$

$$BAN_a = FIN_a * W_a/1000 \text{ ---------- (2.11).}$$

Where BAP_a = births averted by programme contraception in age group "a".

BAN_a = births averted by non-programme contraception in age group "a".

W_a = number of women in age group "a".

REQUIRED INPUT DATA

The following input data are required for an application of the prevalence method in a given year:

a) Contraceptive prevalence (proportion of married women currently using contraception by age and method for both programme and non-programme sectors (U'_a and U''_a), at the beginning of the year).

b) Observed age specific fertility rates (OF_a)

c) Number of women in each five age group from 15 - 19 to 45 - 49 (W_a)

d) Use-effectiveness of different contraceptive methods (E_{aa})

e) Age-specific proportions of fecund women F_a.

f) Total population size (pop) and

g) The elasticity coefficient by age which is a function of sterility and use effectiveness. They are not generally available. Instead, the following standard values can be used as an approximation:-

Table 2.1 The coefficients C_i, which are function of sterility and contraceptive use-effectiveness.

C(15 -19)	= 0.620
C(20 -24)	= 0.620
C(25 -29)	= 0.823
C(30 -34)	= 0.940
C(35 -39)	= 1.022
C(40 -44)	= 1.309
C(45 -49)	= 1.898

Source: Studies to enhance the Evaluation of Family Planning Programmes. U.N.(1985)

METHOD SPECIFIC PREVALENCE MODEL

This procedure allows the estimation of the contributions made by each method to the total births averted by earlier programme or non-programme contraception. It is assumed here that the estimates of BAP, the total births averted by programme contraception and BAN , the total births averted by non-programme contraception, are already available from the application of the aggregate model.

Definitions of the terms used are as given below:-

BA_i=the births averted by method m obtained from programme sources;

BAN_i=births averted by method m obtained from non programme sources

U'_i=prevalence of programme method m;

U''_i=prevalence of non-programme method m;

c'_i=use effectiveness of programme method m;

c''_i=use-effectiveness of non-programme method m;

Thus then we have:-

$$BA_i = BAP*U'_i*c'_i/(U'*c') \quad \text{---------- (2.12).}$$

$$BAN_a = BAN * U'_a * c'_a / (U' * c') \quad \text{---------- (2.13).}$$

where

$$U' = \Sigma U'_a; \quad \text{---------- (2.14).}$$

$$U'' = \Sigma U''_a; \quad \text{----------(2.15).}$$

$$c' = \Sigma U'_a * c'_a / U' \quad \text{----------(2.16).}$$

$$c'' = \Sigma U''_a * c''_a / U'' \quad \text{----------(2.17)}$$

Application of these equations requires estimates of U'_a, U''_a, c'_a and c'' in addition to BAP and BAN. The prevalence rates, U'_a and U''_a, can be obtained from surveys or other sources but estimates of use-effectiveness are often not available. In that case the following standard method-specific use effectiveness levels may be used as an approximation;-

Table 2.2 Use-effectiveness levels utilized.

Method	Use effectiveness
Sterilization	= 1.00
Intra uterine device (IUD)	= 0.95
Pill	= 0.90
Other	= 0.70

Source: Studies to Enhance the Evaluation of Family Planning Programmes. U.N (1985)

The age-specific and method version of the prevalence model presented here provide a simple and robust procedure for the estimation of births averted in different age groups and/or by different methods. Contraceptive prevalence estimates, by age/or method and by sector (programme versus non-programme) are the principal data required by this method. Use-effectiveness estimates, which are also needed, are more difficult to obtain. Fortunately, the results of the prevalence model are not very sensitive to small variations in use-effectiveness and standard

values of use-effectiveness can therefore generally be used with good approximation.

2.2.0 STANDARDIZATION APPROACH:-

The Standardization approach is a preliminary step in evaluation, in that it may be used to narrow the possible sources of change, if any ,in fertility ,when the general fertility rate or crude birth rate is the measure used to indicate fertility. One of the main reasons for focusing on the crude birth rate is that programme impact is often perceived in terms of population growth, of which the crude birth rate is the fertility component. This measure is often used , even when other fertility measures are available. It is the composite nature of the crude birth rate that makes it necessary to sort out or to standardize for the amount of change in it that is due to the influence of either of its four major components namely;

(1) proportion of women of reproductive ages in the total population.

(2) age structure of women reproductive ages .

(3) proportion of married women of reproductive ages , and

(4) marital age-specific fertility rates.

So Standardization determines the contribution of these four demographic components to changes in the magnitude of the observed crude birth rate; in the evaluation, the method can be made to yield an estimate of the change in the crude birth rate that is attributable to changes in marital fertility. The role of marital fertility and changes brought about by this variable may then be attributed to the family planning programme, if evidence is sufficient to warrant such a conclusion. But further analysis could distinguish the part of the change in marital fertility that could be credited to the programme and that part that may be due to non-

programme factors. However, the Standardization approach does not go beyond assessing the magnitude of changes in marital fertility, and it cannot account for the specific role of the programme.

As stated above, four components of the crude birth rate have been selected for standardization. The relationship between the birth rate and these components is multiplicative, owing to the basic relationship:-

$$CBR = B/P \quad \text{---------- (2.18).}$$

where CBR = crude birth rate;

B = number of births in the past year;

P = total population;

As a first step, equation (2.18) is decomposed into a multiplicative function, where the variables are the four components selected for standardization. In second step the multiplicative function is translated into an additive function so that change in the birth rate can be accounted for by adding the effects of the four components. A formula for computing the role that individual changes of each separate component have in the change of the crude birth is derived.

There are a variety of standardization techniques. The procedures followed are more elaborate in some techniques than in others, and some are more appropriate for specific objectives than others.Also,data requirements vary among the different techniques.The approach illustrated has some simplicity and straight forward frame of reference.

The crude birth rate (CBR), equation (2.18) can be decomposed into desired components in two successive phases. First, the crude birth rate becomes a function of the general fertility rate (GFR) and proportion of women of reproductive ages in the total population. Secondly, the general fertility rate is decomposed into its three main elements, age structure; marital status; and marital

fertility.

From equation (2.18) emerges:

$$CBR = B/W*W/F*F/P. \quad \text{----------(2.19).}$$

where

W =number of women of reproductive ages;

F =number of females in the total population;

Hence,

$$CBR = B/W*W/P \quad \text{---------- (2.20).}$$

but $B/W = GFR$ ---------- (2.21).

thus $CBR = GFR*W/P$ ---------- (2.22).

Whereby the crude birth rate is the cross-product of the general fertility rate and the proportion of women of reproductive ages among the total population.

Then the general fertility rate is decomposed into its three components. For that purpose, the following values are defined, with i equal to the age groups of women of reproductive ages:-

$$B = \Sigma B_i \quad \text{---------- (2.23).}$$

where B_i = number of births to women in age group i:

$$W = \Sigma W_i \quad \text{----------(2.24).}$$

where W_i = number of women in age group i;

$$F = \Sigma F_i \quad \text{---------- (2.25).}$$

where F_i = age-specific fertility rate in age group i:

and hence

$$B_i = W_i*F_i \quad \text{---------- (2.26).}$$

and $B = \Sigma W_i*F_i$ ----------(2.27).

Assuming further that the number of illegitimate births is negligible, there is,

$$F_{mi} = B_i/N_i \quad \text{----------(2.28).}$$

where N_i = number of married women in age group i;

F_i = marital age-specific fertility rate in age group i;

Hence one has,

$$B_i = N_i * F_i \quad \text{----------(2.29).}$$

and $$B = \Sigma N_i * F_i \quad \text{----------(2.30).}$$

one also has

$$N_i / W_i = M_{pi} \quad \text{----------(2.31).}$$

where M_{pi} =proportion of married women among all women in age group i;

Thus equation (2.28) and (2.31):

$$F_{gi} = B_i / W_i * M_{pi} \quad \text{----------(2.32).}$$

$$B_i = W_i * M_{pi} * F_{gi} \quad \text{----------(2.33).}$$

and $$B = \Sigma W_i * M_{pi} * F_{gi} \quad \text{----------(2.34).}$$

assuming that all births are legitimate and occur only to the women in the specified age groups i.

So replacing B in equation (2.27) by equation (2.34) yields a decomposition of the crude birth rate into three of its components:-

$$CBR = \Sigma W_i * M_{pi} * F_{gi} / P \quad \text{----------(2.35).}$$

and replacing B in equation (11) by equation (24) gives a decomposition of the general fertility rate as below:-

$$GFR = \Sigma W_i * M_{pi} * F_{gi} / W \quad \text{----------(2.36).}$$

Thus by substituting equation (2.36) in equation (2.22), it is possible to derive

$$CBR = (\Sigma W_i * Mp_i * F_{gi} / W) * W / P \quad \text{----------(2.37).}$$

or $$CBR = (\Sigma A_i * M_{pi} * F_{gi}) * W / P \quad \text{----------(2.38).}$$

where $A_i = W_i / W$ represents the age structure component. i.e, the proportion of women in each age group i among women of reproductive ages.

Equation (2.38) is thus the formula for decomposition the crude birth rate into four of its main components:-

(1) age structure of women of reproductive ages;

(2) proportion of married women;

(3) marital fertility;

(4) proportion of women of reproductive ages out of the total population.

Equation (2.38) serves two purposes:-

(a) it tests the consistency of the data, from purely algebraic standpoint, and (b) it assesses the proportion change in crude birth rate that can be accounted for by changes in each component.

MEASUREMENT OF CHANGE IN STANDARDIZATION APPROACH:-

The notations used in the preceding section are some-what modified to allow for a simpler presentation of the standardization model. This is because of the two points in time which constitute the reference for measuring changes in natality.

Accordingly:-

t_1 = initial point in time ,

t_2 = end of the time period for which change in the crude birth rate is measured.

CBR_1 = crude birth rate at time t_1,

CBR_2 = crude birth rate at time t_2,

GFR_1 = general fertility rate at time t_1,

GFR_2 = general fertility rate at time t_2,

i = age group of women in their reproductive ages.

A_{1i} and A_{2i} = age structure components in age group i at times t_1 and t_2 respectively.

M_{1i} and M_{2i} = marital status distribution in age group i at times t_1 and t_2, respectively ;

F_{1i} and F_{2i} = age-specific marital fertility rates in age group i at times t_1 and t_2 respectively;

W_1/P_1 and W_2/P_2 = proportion of women in the total population at times t_1 and t_2 respectively. Thus the equation (38), written for crude birth rate at times t_1 and t_2

becomes:-

$$CBR_1 = (\Sigma A_{1i} * M_{1i} * F_{1i}) * W_1/P1 \quad \text{---------- (2.39).}$$

and $$CBR_2 = (\Sigma A_{2i} * M_{2i} * F_{2i}) * W_2/P2 \quad \text{---------- (2.40).}$$

The change in crude birth rate may be formulated as;

$$CBR2 = CBR_1 + \blacktriangle CBR_1 \quad \text{---------- (2.41).}$$

$$\blacktriangle CBR_1 = CBR_2 - CBR1 \quad \text{---------- (2.42).}$$

Following equation (2.22) and (2.42) one obtains:

$$\blacktriangle CBR_1 = (GFR_2 * W_2/P_2) - (GFR_1 * W1/P_1) \quad \text{---------- (2.43).}$$

and substituting equation (2.39) and (2.40) in equation (2.43) one obtains:

$$\blacktriangle CBR_1 = (\Sigma A_{2i} * M_{2i} * F_{2i}) * W_2/P_2 - (\Sigma A_{1i} * M_{1i} * F_{1i}) * W_1/P_1 \quad \text{--(2.44).}$$

where the terms in the parenthesis of each right hand side product represents the general fertility rates at times t_2 and t_1 respectively .

But since $GFR_2 = GFR_1 + GFR_1$ ---------- (2.45).

and $W_2/P_2 = W_1/P_1 + W_1/P_1$ ---------- (2.46).

so substituting equations (2.45) and (2.46) in equation (2.44), gives:

$$\blacktriangle CBR_1 = [(GFR_1 + \blacktriangle GFR_1) * (W_1/P_1 + \blacktriangle W_1/P_1)] - GFR_1 * W_1/P_1 \quad \text{--- (2.47).}$$

and subsequently this reduces to:

$$\blacktriangle CBR_1 = GFR_1 * \blacktriangle W_1/P_1 + \blacktriangle GFR_1 * W_1/P_1 + \blacktriangle GFR_1 * \blacktriangle W_1/P_1 \quad \text{----- (2.48).}$$

whereby the change in the crude birth rate results from a change in the proportion of women of reproductive ages in the total population $\blacktriangle W_1/P_1$, a change in the general fertility rate, GFR_1, and the combined effect of the two preceding factors. The change in the general fertility can be further decomposed into three of its essential components from equation (2.45), one obtains:

$$\blacktriangle GFR_1 = GFR_2 - GFR_1 \quad \text{---------- (2.49).}$$

Replacing GFR by its components ,one has ,following equations (2.37) and 2.38):

$$GFR_1 = \Sigma A_{1i} * M_{1i} * F_{1i} \quad \text{---------- (2.50).}$$

$$GFR_2 = \Sigma A_{2i} * M_{2i} * F_{2i} \quad \text{---------- (2.51).}$$

and $$A_{2i} = A_{1i} + \blacktriangle A_1^1 \quad \text{---------- (2.52).}$$

$$M_{2i} = M_{1i} + \blacktriangle M_{1i} \quad \text{---------- (2.53).}$$

$$F_{2i} = F_{1i} + \blacktriangle F_{1i} \quad \text{---------- (2.54).}$$

Thus substituting equations (2.52), (2.53) and (2.54) in equation (2.51) and equation (2.49) becomes:

$$\blacktriangle GFR_1 = \Sigma[(A_{1i} + \blacktriangle A_{1i}) * (M_{1i} + \blacktriangle M_{1i}) * (F_{1i} + \blacktriangle F_{1i})] - \Sigma(A_{1i} * M_{1i} * F_{1i}) - (2.55)$$

After developing the multiplicative terms, the following additive components are obtained:

$$\blacktriangle GFR_1 = \Sigma \blacktriangle A_{1i} * M_{1i} * F_{1i} + \Sigma A_{1i} * \blacktriangle M_{1i} * F_{1i} + \Sigma A_{1i} * M_{1i} * \blacktriangle F_{1i}$$

$$+ \Sigma \blacktriangle A_{1i} * \blacktriangle M_{1i} * F_{1i} + \Sigma \blacktriangle A_{1i} * M_{1i} * \blacktriangle F_{1i} + \Sigma A_{1i} * \blacktriangle M_{1i} * \blacktriangle F_1^1$$

$$+ \Sigma \blacktriangle A_{1i} * \blacktriangle M_{1i} * \blacktriangle F_{1i} \quad \text{---------- (2.56).}$$

implying that general fertility rate can be accounted for by a sum of terms, of which the first three show the independent role of changes in age structure $\blacktriangle A_1$, in marital status $\blacktriangle M_1$ and in marital fertility $\blacktriangle F_1$, the last four terms show the role of these three same components as joint effects. These joint effects are usually ignored or are assumed to be of negligible magnitude. But it should be borne in mind that the first three terms only do not permit a precise accounting of the total change.

Substituting equation (2.56) for $\blacktriangle GFR$, in the second term of equation (2.48) and putting the joint effect terms in the brackets at the end of the equation gives:-

$$\blacktriangle CBR_1 = GFR_1 * \blacktriangle W_1/P_1 + W_1/P_1 (\Sigma \blacktriangle A_{1i} * M_{1i} * F_{1i} + (\Sigma A_{1i} * \blacktriangle M_{1i} * F_{1i}) + (\Sigma A_{1i} * M_{1i} * \blacktriangle F_{1i})$$

$$[\ W_1/P_1\ (\Sigma \blacktriangle A_{1i} * \blacktriangle M_{1i} * F_{1i} + \Sigma \blacktriangle A_{1i} * M_{1i} * \blacktriangle F_{1i} + \Sigma A_{1i} * \blacktriangle M_{1i} * \blacktriangle F_{1i} +$$

$$\Sigma \blacktriangle A_{1i} * \blacktriangle M_{1i} * \blacktriangle F1i) + \blacktriangle GFR_1 * \blacktriangle W_1/P_1) \quad \text{----------(2.57)}$$

And on leaving out the interaction terms which are enclosed in the brackets then we get :-

$$\blacktriangle CBR_1 = GFR_1 * \blacktriangle W_1/P_1 + W_1/P_1 (\Sigma \blacktriangle A_{1i} * M_{1i} * F_{1i} + \Sigma A_{1i} * \blacktriangle M_{1i} * F_{1i}$$

$$+ \Sigma A_{1i} * M_{1i} * \blacktriangle F_{1i}) \quad \text{---------- (2.58).}$$

whereby the change in the crude birth rate is expressed as a

function of the changes occurring in four components of the crude birth rate.

Here population at t_1 has been used as the base population and the equation attempts to answer the questions:-

a) what the crude birth rate would have been if only the first, second ,third and fourth component had changed ;

b) how much of the difference can be accounted for by each of the individual components.

The role of each component can then be assessed according to the following formulae:-

Change in the crude birth rate due to:-

1) proportion of women of reproductive ages in the total population is given as,

$$GFR*(W_2/P_2 - W_1/P_1) \text{ ---------- (2.59).}$$

2) age structure of women of reproductive ages is given as,

$$W_1/P_1[\Sigma(A_{2i}-A_{1i})*M_{1i}*F_{1i}] \text{ ---- (2.60).}$$

3) marital status distribution is given as,

$$W_1/P_1[\Sigma A_{1i}*(M_{2i}-M_{1i})*F_{1i}) \text{ ----- (2.61).}$$

4) marital fertility is given as,

$$W_1/P_1[\Sigma A_{1i}*M_{1i}*(F_{2i}-F_{1i})] \text{ ------- (2.62).}$$

And the change in the GFR due to change in its three components are given as:

1). change in the age structure:

$$\Sigma(A_{2i}-A_{1i})*M_{1i}*F_{1i}. \text{ ----------(2.63).}$$

2) change in marital distribution:

$$\Sigma A_{1i}*(M_{2i}-M_{1i})*F_{1i}. \text{ ---------- (2.64).}$$

3)change in the marital fertility:

$$\Sigma A_{1i}*M_{1i}*(F_{2i}-F_{1i}). \text{ ---------- (2.65).}$$

with population P_1 as the standard population:

ASSUMPTIONS MADE IN THE DERIVATION OF THE METHOD:-

The first assumption when performing standardization procedure relates to additivity, or the hypothesis that the four components of the crude birth rate for which the standardization is undertaken can be legitimately added (and subtracted) in order to assess the individual effect of each component. However the fact is that the "true" relationship between the crude birth rate and its components is multiplicative, as is described by the formula:

$CBR = W/P(\Sigma A_{ij} * M_{ij} * F_{ij})$ = crude birth rate.

where these constants have their definitions as before.

But the role of each component in the change of the crude birth rate is obtained as the result of a product.

Second assumption is that of functional independence of the components of the crude birth rate. Specifically, it is that the proportion of women of reproductive ages is not associated with the age structure of women of reproductive ages or with any other component; that age structure is not associated with the other factors etc. This assumption permits the summation of the role of the individual components without too great a risk of adding overlapping effects, but this is not valid under all conditions.

Third assumption is that any component of crude birth rate which is not standardized for, had no role in the observed change, for example, by not including illegitimate fertility as a component, it is automatically assumed that this factor did not contribute to the change in the crude birth rate. Likewise, if marital status had not been included, it would mean that changes in the proportion of women married were considered to be too negligible to have affected the magnitude of the crude birth rate. This assumption is particularly important when socio-economic variables are

considered, especially when standardization is undertaken for short periods of time.

Assumption in relation to evaluation of programme impact is that the family planning programme is assumed to affect age-specific fertility only through birth control and is not assumed to affect any other non-programme factors.

Standardization approach has a number of advantages over some of the other evaluation methods. One of its major advantages being its simplicity of use and calculation. Another advantage is that standardization of crude birth rate or the general fertility requires demographic data that are more readily available than the data needed for the application of other techniques. The other advantage is that there are no true constraint which impair the results obtained by the method, such as specification of the relationships (e.g. linearity), nature of the variables (e.g. normality). Another advantage is that the results are provided interms of calendar years which conform with the need of programme administrators for information as to programme impact.

The disadvantages are that the impact of family planning programme cannot be directly assessed by decomposition into components. Another factor is that the estimates of changes determined from standardization components are primarily hypothetical information, based on specific assumptions regarding the components chosen and the population selected as point of reference.

2.3.0 OTHER METHODS.

Apart from the two methods discussed above, there are other methods which used to assess the Impact of family planning on fertility; these are as discussed below:-

One of the methods used to assess the impact of the programme on fertility is path analysis. This is one of the special type of

regression analysis which has been used to assess the impact of family planning programme on fertility. The approach is based on an implicit model where all variables are ordered in a line and the direction of the relationship is also clearly explained or stated. The direct and the indirect effects on the dependent variable are also specified. Path analysis is based on the standard multivariate regression technique and designed to asses the magnitude of indirect effects in addition to the direct effects.

Another method used in assessing a programme impact on fertility is through the analysis of the reproductive process. This method obtains the births averted by comparing the mean duration of pregnancy interruption due to acceptors use of contraceptives with the mean duration of the expected birth interval (U.N, Department of Economic and Social Affairs 1978).

Shown below is the formula used for the estimation of births averted by the users of IUD. This method was developed by Potter.

$$I = F(R-A-P_w) \quad \text{---------- (2.66)}$$

$$B = I/D \quad \text{---------- (2.67)}$$

where

F = proportion of non sterile acceptors at the time of insertion;

R = mean time of retention of device among fertile couples at the time of insertion;

A = allowance for postpartum amenorrhea;

P = proportion becoming pregnant while believed to retain the device;

w = penalty for accident pregnancy;

B = births averted by first segment of IUD use;

D = average duration per birth;

I = average duration that childbearing is interrupted;

The computation of R is performed using the usual life table analysis recognizing pregnancy, expulsion and removal as reasons for discontinuing use of the intra-uterine device. This has been expanded to include extra competing risks of marital dissolution by death of spouse and onset of secondary sterility (U.N., Department of Economic and Social Affairs , 1979). The expected birth interval is obtained by taking the reciprocals of the birth rates observed among IUD acceptors three years before acceptance (U.N., Department of Economic and social Affairs, 1979).

The analysis of the reproductive process requires the following data:-

a) average birth interval per birth in the absence of contraceptive use

b) proportion of couples non-sterile at the time of acceptance

c) mean time of contraceptive use among non-sterile couples and

d) mean over lap of contraceptive use with postpartum amenorrhea

e) estimation of the IUD terminations by age class attributable to accidental pregnancy

f) estimate of mean number of fecundable months required per contraception in the absence of IUD by age.

For the many disadvantages of the method, among them is that it cannot be used for target setting quotas of acceptors needed to achieve a designated reduction of population birth rate or growth rates. Its data demands are also heavy as can be seen from above.

The impact of family planning programme on fertility can also be assessed through fertility projection/or trend analysis. The method assesses the impact by comparing the indicators of observed fertility over a specified time with the same indicator projected

over the same period of time (U.N.,Department of Economic and Social Affairs 1978). The indicators can be crude birth rate or the number of births averted. Thus the impact of the programme at year t is given as a difference between the projected fertility indicator over a period and the observed fertility indicator over the same period.

i.e $B_t - B$ ----------(2.68)

where B_t can be the projected crude birth rate to a given period

B can be the observed crude birth rate over the same period.

Several procedures for comparing actual and projected fertility trends exist. One such procedure compares the rate of decline of fertility after the programme with the rate before the programme. Birth rates are plotted on a graph and point at which the family planning programme was introduced is noted (Reynolds 1972). So an increased rate of decline in the birth rate is then taken as evidence of the programme's impact.

The programme's impact on fertility can also be estimated just by comparing the expected births with actual births. First the actual births are plotted and the point of entry of family planning programme is noted. The expected births are then estimated. Then by comparing the actual births with the expected births , births averted are obtained.

This is then taken as evidence of programme impact. This kind of analysis can be applied to the entire population or the acceptors only. Trends analysis requires the following set of data: a) crude birth rate, b) general fertility rates c) marital age specific fertility rates d) gross reproduction rates e) distribution of women by the number of children born (parity) and f) age distribution of the population during the period of the programme and before the start of the programme (U.N.,Department of

Economics and Social Affairs, 1978).

A major disadvantage of the method is its failure to consider the influence of non programme factors on fertility.

Simulation models have also been developed for assessing the impact of family planning programmes on fertility. In assessing the impact the usual process is to simulate the natality process of two or more populations in which one operates in the absence of a programme. By comparing the resultant fertility of say two Cohorts of women similar in all respects except for the practice of planning an indication of births averted by programme may be obtained.

There exists various types of simulation models for the assessment of programme impact on fertility.

One of these simulates period populations. Such models can thus, be used to relate birth control to crude birth rates. POPREP, a general purpose montecarlo micro simulator of periodic populations known as POPSIM to which family planning module was added, is one such example. The model was developed in 1973 as an extension of POPSIM.

This model generates the reproductive histories of hypothetical female population of all ages. The model provides for demographic factors of marriage, marital dissolution, remarriage and death. The biological factors included are:- fecundability, the postpartum infecundability, non susceptible period, various outcomes of pregnancy including induced abortion and sterility. Additionally it provides for the use of contraceptive surgical sterilization.

Another model is the stochastic model of C.J.Mode (1975) which simulates period populations. The model treats the reproductive process as terminating non-homogenous semi-markov renewal process, which is embedded into a branching process to obtain the equivalent

population projection.

The other class of simulation models simulates cohort population . REPSIM-B is one of such models. The model simulates the detailed reproductive history of hypothetical cohort of women aged between 15 and 50 years (U.N., Department of Economics and Social Affairs 1979). It cannot thus be used for studying the effect of family planning programme on fertility within a particular period of time. The model provides for a woman marrying, dying, becoming sterile, becoming pregnant and varying out comes of pregnancy including abortion. Provision is also made for the adoption of contraception. In case of contraceptive use two different modules are provided for in the computer programme. These are a developing country module and a developed country module. But in particular, on simulation only one family planning module can be used.

There are also other models such as couple years of protection and component projection approach which obtain the impact as a product of the potential fertility of users and their effective use.

Couple years of protection determines the programme's impact on fertility from the data on birth control methods and acceptors. The impact is then determined in two steps. First, the number of couples who are protected from the risk of pregnancy is determined. This then yields the couple years of protection index. The index is calculated by estimating the length of time each couple is likely to be protected by each application of family planning method. The index can be obtained through various methods such as Wishiks prevalent index.

Component projection approach like couple-years of protection approach estimates the births averted by using acceptors as the

basis of computation. To find the estimates of the prevented births estimates of users in each age group and their potential fertility are obtained. Births averted are then estimated using the equation below:-

Births averted by users in age group i at time t = $Q_{i,t} x g_i$ -(2.69).

where $Q_{i,t}$ = Number of acceptors belonging to age group i who are practising totally effective contraception during the period April 1 of year t-1 and April 1 of year t.

g_i = the potential fertility of women in age group i.

Computerized Models:-

Sophisticated computerized models are now available for assessing the impact of family planning programmes on fertility. These models may be classified into two classes. One class consists of target setting models. Such models translate a given demographic target into acceptor recruitment requirements. PROJTARG and TABRAP are examples of such models. The other class consists of models which translate a given contraceptive use to demographic impact. CONVERSE is one such example.

PROJTARG was developed by Bogue,et al in 1973. This model calculates the contraceptive protection required to achieve a specified fertility reduction. The role of non-programme factors such as women of child bearing ages who are protected from pregnancy by natural sterility or sexual inactivity, age specific marital status, mortality and migration is also considered.

It is based on a linear fertility-contraceptive function that links the proportion of fecund women who are protected to the level of the current birth rate (Teachman,Hogan and Bogue, 1978). This may be represented symbolically as below:-

Observed birth rate = M-Y(P-K) ----------(2.70).

where M is the maximum birth rate which human species is actually

capable of attaining under realistic conditions.

K is the estimated percentage of all fecund women years of experience that are protected from pregnancy and non-exposure under conditions of maximum fertility.

P is the percentage of all fecund women years of experience that are protected from all sources. It ranges from 1 to 100.

Y is the slope of the straight line linking M and P as follows:-

Y =M/(100-K). implying that observed birthrate =

M -(M/(100-K))*(P-K). ---------- (2.71).

Thus 100 percent is required to reduce fertility to zero.

And assuming linearity between the two values, the linear equation linking protected women and fertility becomes:-

TFR = 12700 - 12+P ---------- (2.72).

So PROJTARG computes the value of P which results from the TFR assumed for a particular year. This value is then applied by the model to the number of fecund women it has calculated for that year, subtracts the number of women who are not exposed (unmarried or not in sexual unions) and leaves the residual number of married women (i.e. sexually exposed women who are being prevented from getting pregnant by contraception or abortion in order for the birth rates to be at the desired level (Teachman, Hogan and Bogue 1978).

The assumptions PROJTARG is based on are:-

1) Age specific fertility rates associated with a demographic goal are assumed as uniform reductions of the initial age specific fertility rates;

2) The relationship between fertility and fecund women is taken as an average experience of many populations;

3) Protected women are converted into acceptors by using the mean duration of practice for each contraceptive with all years of use (but with less adjustment for contraceptive failure).

TABRAP model like PROJTARG is computerized and provides a direct solution to the number of annual acceptors required to achieve a desired crude birth rate through a prescribed path. The version developed by Nortman in 1972 specifies annual crude birth rates and thus acceptor quota was reduced to one equation with one unknown. In this model acceptance rates were assigned to all age groups except age group (20-24) because of the few acceptors who were required to meet even modest declines in fertility. This group was allowed to recruit the remaining acceptors to meet the required number.

TABRAP has three distinct phases. The first project is for the female population , one year at a time in five year age groups over the target interval in accordance with the given crude birth rate path postulated trend. And the two projections take crude birth rate into account.

CONVERSE like TABRAP also has three phases. Its phase one projects female population without considering the influence of contraceptive use. Its first projection is the same as the one for TABRAP.

Projection in the presence of contraceptive use requires the estimation of births averted by the acceptors during the period of projection. The births averted by each acceptor is obtained and is multiplied by the number of acceptors in each age group to find the number of births averted in that age group. Summing over the age groups gives the births averted.

TABRAP and CONVERSE uses a simplifying assumption that facilitates algebra, that family planning programme acceptors enter

the programme simultaneously at mid- year.

Another method is the Parity Progression Technique which is used to calculate the parity progression ratios which answers the questions, i) what proportion of women born ever become mothers? ii) of those who become mothers, what proportion go on to have two or more children? iii) of those who have a second child what proportion go on to have a third one?. The Technique uses census or survey data for atleast two periods on women distributed by the number of children ever born. It is completed fertility that is used here which applies to women who have reached end of childbearing. Thus any decrease in the paritics is attributed to family planning programme.

2.4.0 Choice of Methodology for Data Analysis:-

Although there are several approaches, that can be used for analysis in this study, the following arguments from UN secretariat makes some few methods to be chosen for analysis as will be stated later.

Researchers have developed several methods currently used to determine how much effect family planning programmes have had on fertility within a given segment of time evidently in response, among other things , the needs of administrators for the information, the type and amount of data at hand,the degree of technical expertise that could be marshalled for the purpose and urgency attached to finding an answer. The data availability and amount of technical expertise or familiarity with a given method, are among the principal reasons why a researcher chooses a particular method as a tool for evaluation. The question concerning which method to be used is faced by any evaluator who has minimum data required and the technical competence to execute more than one method. But even if all conditions for utilizing all of these

methods are met, selection of an evaluation approach is still not a simple matter. This is because first, there is lack of agreement among scholars as to relative efficiency of various approaches; each approach has certain advantages and disadvantages. Further, some methods are applicable in some circumstances and not in others. Thus there is no consensus as to when each method is to be preferred or as to the meaning and relative validity of the results obtained. Thus a researcher should, to a possible extent, become thoroughly familiar with all methods before making a choice, and Manual IX is designed to facilitate this undertaking.

Some of the principle questions determining the choice of methods are:-

(a) what it is desired to measure

(b) the population for which the evaluation is needed.

(c) whether it can separate program from non program effects.

(d) the time period to which the measurement relates, and

(e) the independence and reliability of the method.

(1) According to what the evaluation is desired for (objective of the evaluation) different approaches can be chosen; eg in determining either the impact of the program on acceptors' fertility or in the total effect of the program, projection/trend analysis is a means of assessing total program effect, for it attributes a close association between projected fertility and the movement of measures of actual fertility to the effects of family planning program.

Standardization, which generally speaking, should be a first step in evaluation, is capable of establishing how much of the change in fertility was due to demographic factors of age structure and marital status, and thus also to changes in marital fertility. The latter should indicate whether further analysis is warranted; then a method should be chosen to determine how much of the change

in marital fertility could be attributed to the program. Methods dealing with the acceptors only, such as experimental design are an aid to assessing the direct impact of the program.

(2) For the period to be covered, couple-years of protection (CAP) method has been indicated as method suited for short period evaluation.

When evaluation covers periods of upto five years, the standard couple-years of protection approach is appropriate.

When period covered is in excess of five years, both the standardization approach and the component projection are, particularly, appropriate. Regression analysis may be applied whenever the time period is at least one year.

(3) The population for whom the evaluation is needed, is also a factor determining the evaluation approach to be used in a study. For example if the evaluation is to deal with acceptors of a specific methods, several approaches are possible such as component projection approach which treats the behaviour of the acceptors only as does the standard couple-years of protection.

If interest is in the evaluation of the effect of program by analysing the behaviour of the entire national population, approaches such as Standardization, fertility projection/trend analysis, multivariate or other areal analysis may be applied by the researcher.

(4) Several methods are designed to separate program and non-program factors. For example Standardization approach, by which it is possible to separate the effects of age structure and nuptiality and to determine how much change is due to changes in marital fertility, which may possibly, but not certainly, be due to the program. Multivariate areal analysis can be applied to separate changes due to social and economic improvements or by either factors including cultural changes that may be indicative of

modernization etc .

(5) It is well established that the developing countries, among which are the majority of the countries with national family planning programmes, do not possess adequate demographic and related data. Thus, making the researcher to use an approach, even if it is theoretically and technically less suitable but for which most of the required data are available.

(6) It is suggested that two or more evaluation approaches should be used and as a rule of the thumb '--- two methods may be viewed as independent if they utilize different frames of reference in assessing programs impact'.

Parity Progression Technique, assesses the impact of family planning programme using married women in the age groups from 40-44 and above, thus not allowing us to know what effect family planning programme has in the lower age groups than 40-44. It also requires more than one set of data. These therefore did not allow the technique to applied in the study.

And the validity of the results that an approach produces depends not only upon the postulate embodied in the method but upon the assumption that the researcher makes in order to accommodate data deficiencies and to estimate parameters that are lacking (UN, Manual IX).

Thus from the above discussion about the choice of the approach to be used in a particular study, it is clear that all the nine approaches that exist can not be applied at once, more so in developing countries.

Kenya, just like other developing countries, experiences this short-coming. Therefore in this study, following the above arguments, the following approach will be used for data analysis:-

Prevalence model - The study uses the prevalence rates from KDHS

1989), because there are less assumptions made when using the method , the ease in applying this model which has been evident in several countries (eg Tunisia), the availability of the data required and also the fact that the study separates the effects of the program methods from the effects of non-program methods on fertility in a particular year. This makes the model the most appropriate to use. One very important assumption made while using the model in Kenya is that, there is no overlap between contraception and other factors such as post-partum amenorrhea or spousal seperation.

This method of analysis and others have been discussed earlier in this Chapter.

Chapter three

AN APPLICATION OF PREVALENCE MODEL

AT NATIONAL LEVEL.

3.0.0 Introduction:-

In this chapter we wish to apply the prevalence model to the KDHS data at the National level. The method has two versions namely age specific and method specific model. We shall estimate births averted by programme and non-programme contraception for all cases combined and by differentials of socio-economic and cultural aspects.

The socio-economic differentials considered are; Place of residence categorized as (urban and rural), Work Status which is categorized (as currently working and not working), Education which was classified as (none, primary, and secondary+). The cultural aspects considered are ethnicity (9 tribes), and Religion which is categorized as (Protestant, Catholics and Muslims).

3.1.0 BIRTHS AVERTED FOR ALL CASES COMBINED

3.1.1 Age Specific Prevalence Model.

Here we are looking at the data of married women currently using contraceptives to avoid pregnancy without classifying the women by differential at National level.

The first step is to estimate the prevalence rates at each age group. These estimations are shown in table 3.1 below. The table represents the age groups 15-19 to 45-49 in column(1), followed by married women currently using programme method in column(2), column (3) is the number of married women currently using non-programme contraception, and column(4) is the female population. Column(5) of table 3.1 is the prevalence rate due

programme contraception which is obtained by dividing column(2) by column(4) and multiplied by 100. Column(6) is for the prevalence rate s due to non-programme contraception which is obtained by dividing column(3) by column((4) multiplied by 100.

Table 3.1:
Estimating the prevalence rates for programme and non-programme contraception:

Age group	Married women currently using prog Contraception	non-prog	FPOP	Prevalence rates due to programme contraception	non programm
15-19	17	13	224	7.6	5.8
20-24	84	47	729	11.5	6.4
25-29	179	85	999	17.9	8.5
30-34	166	53	752	22.1	7.0
35-39	169	68	706	23.9	9.6
40-44	118	45	540	21.9	8.3
45-49	65	13	341	19.1	3.8

Table 3.2
Estimation of observed fertility, Natural age specific fertility,potential age specific fertility rates

Age grp (1)	Births in the pastyear (2)	Elasticity Coefficients C_a (3)	observed fertility OF_a (4)	Natural fertility NF_a (5)	Potential fertility PF_a (6)
15-19	82	0.620	0.268	0.292	0.282
20-24	288	0.620	0.245	0.276	0.265
25-29	325	0.823	0.209	0.267	0.248
30-34	219	0.910	0.191	0.263	0.247
35-39	267	1.022	0.235	0.357	0.322
40-44	58	1.309	0.061	0.101	0.090
45-49	12	1.898	0.018	0.032	0.030

The observed fertility is calculated by using Coale Trussell P/F ratio technique to give the adjusted age specific fertility rates(ASFR) in each age group for married women. The procedures for the estimation of age specific fertility rate (ASFR) are as shown appendix 1. Then using the prevalence rates at each age group (U_a and U'_a) and C_a the elasticity coefficients for developing countries, the natural and potential fertility are calculated. For example natural fertility (NFa) is calculated by the formula:-

$NF_a = OF_a/(1-(U'_a + U''_a)*C_a)$ e.g for a=1

then $NF_1 = 0.268/(1- 0.620*(7.6+5.8)/100)$

$= 0.2922829$(.292 to 3 dec places).

and for a=6,then

$NF_7 = 0.061/(1-1.898*(19.1+3.8)/100)$

$= .1008795$ (.101 to 3 dec places).

The values are as given in table 3.2 column(6)

The Potential fertility rate (PFa) is given by the formula

$PFa = AFa(1-C_a*U''_a)/[1-C_a(U'_a + U''_a)]$.

Thus a = 2.

$PF_2 = 0.245*(1-0.620*(6.4/100))/[1-(11.5+6.4)/100]$

$= 0.2648337$ (0.265 to 3 decimal places).

The next step is to calculate the births averted by age group using the values of NF_a and PF_a,by programme and non-programme contraception.

Births averted in an age group by programme contraception (BAP_a) is given by the formula :

$BAP_a = (PF_a - OF_a)* Wa,$

where W_a is the female population in the age group

Thus for a = 15-19(1), then

$BA_1 = (0.282 - 0.268)*224.$

$= 3.08501$ (3.085 to 3dec places).

and for n = 6, then we have

$BAP_6 = (0.090 - 0.061)*540$

$= 15.61638$ (15.616 to 3 dec places).

the values are as given in table 3.3 column(2).

Births averted by non programme contraception at an age group "a" (BAN_a) is given by the formula:

$BAN_a = (NF_a - PF_a)*W_a$,thus for a=2 then,

BAN_3 = (0.276-0.265)*729

= 7.977315 (7.977 to 3 dcc placcs).

and for a = 6,thcn,

BAN_6 = (0.101-0.0090)*540

= 5.91638 (5.916 to 3 dcc. placcs).

Thc valucs arc as givcn in tablc 3.3 column (3).

Thc last stcp is thc calculation of thc births avcrtcd pcr woman in cach agc group by programmc or non-programmc contracccption.

Thc births avcrtcd pcr woman by programmc contracccption is givcn by thc formula:

$BAP'_a = BA_a/W_a$,for a=3 thcn,

BAP'_3 = 39.296/999

= .0393558 (0.0393 to 4 dcc. placcs.).

and for a = 6 thcn,

BAP'_6 = 15.916/540

= 0.0289192 (0.0289 to 4 dcc. placcs.)

and thcsc valucs arc as givcn in column (4).

And lastly thc births avcrtcd pcr by non-programmc contracccption (BAN'_a) is givcn by thc formula:

$BAN'_a = BAN_a/W_a$ thus for a = 4 thc

BAN'_4 = 13.009/752

= 0.0173001 (0.0173 to 4 dcc. placcs.).

and for a = 6 thc

BAN'_6 = 5.919/540

= 0.0109603 (0.0110 to 4 dcc. placcs.)

and thc valucs arc as givcn in column(5) of tablc 3.3.

Table 3.3.
Estimation of the Births averted per woman by either programme contraception or non-programme contraception in each age group and in the total population.

Age grp	Births averted by Program Contraception	Non prog Contraception	Births averted per woman by Programme non-programme Contraception	
	(1)	(2)	(3)	(4) (5)
15-19	3.085	2.354	0.0137	0.0105
20-24	14.459	7.977	0.0198	0.0109
25-29	39.296	18.660	0.0393	0.0187
30-34	41.073	13.010	0.0546	0.0173
35-39	61.623	24.752	0.0873	0.0351
40-44	15.616	5.919	0.0289	0.0110
45-49	7.653	1.523	0.0224	0.0045
Total births averted per woman			0.0497	0.0187

After working out these, the births averted per woman in the total population by either programme or non-programme contraception are calculated. These are used then in the estimation of the contribution of each method to the total births averted by either programme or non-programme contraception using the method specific version of Prevalence model. The values are given in the last row of column (4) and column(5) of table 3.3.

3.1.2 Method Specific Prevalence Model.

The first step is the estimation of prevalence rates of each method (U_a and U'_a ie either non programme or programme). This is done by dividing column(2) by column(3) of table 3.4 and multiplying the result by 100.

Table 3.4

Estimating the prevalence Rates of each method

Method	Number of currently using it	Total FPOP	Prevalence rates due to program contraception	Non programme
(1)	(2)	(3)	(4)	(5)
Pill	231		5.4	0.0
IUD	164		3.8	0.0
Injection	184		3.5	0.0
Diaphragm	18	4291	0.4	0.0
Condom	21		0.5	0.0
F/Steril	214		5.0	0.0
Abstinence	314		0.0	7.3
Withdrawal	11		0.0	0.3

Table 3.5

Estimation of the births averted per woman by each of the methods (programme or non programme method).

Method	(c_m or c_n)	(c' or c'')	Births averted by each method
(1)	(2)	(3)	(4)
Pill	0.90		0.0145
IUD	0.95	c' = 0.889784	0.0108
Injection	0.70		0.0073
Diaphragm	0.70		0.0008
Condom	0.70		0.0010
F/Sterilization	1.00		0.0149
Abstinence	0.70	c" = 0.70	0.0180
Withdrawal	0.70		0.0007

The second step is the estimation of the births averted by each method per woman (either programme or non programme). Births averted per woman by each programme method BA_m is given by the formula:

$BA_m = BA*c'_m*U'_m/(c'*U')$, eg for pill, which is a programme method;

$BA_{pill} = 0.0494*5.4*0.90/(0.889784*18.6)$

$= 0.0145202$ (0.0145 to 4 dec. places)

and for m = abstinence, then

$BAN_{abstinence} = 0.0187*7.3*0.70/(0.70*5)$

$= 0.0179715$ (0.0180 to 4 dec places).

These values are as given in column(4) of table 3.5.

3.2.0 ESTIMATION OF THE BIRTHS AVERTED PER WOMAN BY VARIOUS DIFFERENTIALS AT NATIONAL LEVEL (IN KENYA).

3.2.1 ESTIMATION OF BIRTHS AVERTED PER WOMAN BY PLACE OF RESIDENCE IN KENYA.

Table 3.6
Calculating the births averted per woman by place of residence using age-specific method:

	Urban		Rural	
Age group	Programme contraception	Non prog contraception	Programme contraception	Non prog contraception
15-19	0.00602	0.00301	0.00285	0.01831
20-24	0.03530	0.00670	0.01679	0.01555
25-29	0.06392	0.01570	0.04326	0.02452
30-34	0.06804	0.01312	0.06309	0.02218
35-39	0.08682	0.00385	0.06558	0.03117
40-44	0.01725	0.00136	0.00363	0.00157

The table (3.6) above shows that programme contraception at National level averts more births per woman than non programme contraception. Programme contraception averts more births per woman among fertile women staying in urban centres than those who stay in rural areas. Non Programme contraception averts more births per woman among fertile women staying in rural areas than for those who are staying in urban areas.

All kinds of contraception averts few births per woman in the age group 15 -19 than in all other age groups. Most births are averted by programme contraception among fertile women in the age groups 20-24 to 35-39 staying in urban areas and in the age groups 25-29 to 35-39 for those staying in the rural areas.

A quick glance at table 3.7 shows that each of the methods averts more births per woman among fertile women who stay in the

urban areas than for those staying in the rural areas.

In the urban areas Pill averts most births per woman followed by IUD, female sterilization and periodic abstinence, while Diaphragm averts the least number of births per woman. Abstinence, in the rural areas, averts most births per woman than all other methods followed by female sterilization and pill, while Diaphragm averts the least number of births per woman in Kenya.

Table 3.7
Calculating births averted by each method by Place of Residence in Kenya using method specific method.

Method	Urban Births averted by each method	Rural Births averted by each method
Pill	0.01668	0.01112
IUD	0.01497	0.00782
Injection	0.00350	0.00692
Diaphragm	0.00078	0.00077
Condom	0.00091	0.00096
F/Steril	0.01560	0.01327
Abstinence	0.00803	0.01998
Withdrawal	0.00096	0.00051

3.2.2 ESTIMATION OF BIRTHS AVERTED PER WOMAN BY WORK STATUS IN KENYA

It is observed from table 3.8 that programme contraception averts more births per woman among fertile women who are currently working than for those who are not working. A similar trend is also observed for non-programme contraception. Programme contraception does avert more births than non-programme contraception per woman in all age groups.

Most births are averted per woman by programme contraception in the age groups 25-29 to 35-39 for fertile women who are

currently working and in the age groups 25-29 to 40-44 for women who are working.

In table 3.9 it can be observed that each method averts more births per woman for those women who are currently working than for those who are not working.

The programme methods which avert most births per woman among currently working women are IUD, Periodic abstinence,Female sterilization and Pill, whereas condom averts the least number of births per woman. As regards those who are not working, most births per woman are averted by Periodic abstinence followed by Pill and Female sterilization, and the least births per woman among women who are not working are averted by Diaphragm.

Table 3.8
Calculation of births averted per woman by work status in Kenya using age specific model:-

Age group	Currently working		Not working	
	Programme	Non prog Contraception	Programme	Non prog Contraception
15-19	0.01975	0.02375	0.01734	0.01248
20-24	0.02413	0.01160	0.02430	0.01352
25-29	0.04262	0.02388	0.03715	0.02190
30-34	0.05194	0.01585	0.04164	0.01990
35-39	0.08900	0.02032	0.06177	0.02870
40-44	0.0	0.0	0.00420	0.00530
45-49	0.0	0.0	0.00160	0.00285

Table 3.9
Calculation of the births averted by each method by works status using method specific model.

Method	Currently working	Not working
Pill	0.01392	0.01316
IUD	0.01539	0.00775
Injection	0.00497	0.00630
Diaphragm	0.00150	0.00059
Condom	0.00075	0.00098
F/Steril	0.01125	0.01094
Abstinence	0.01533	0.01353
Withdrawal	0.00043	0.00075

3.2.3 ESTIMATION OF BIRTHS AVERTED BY RELIGION IN KENYA.

Table 3.10
Calculation of the births averted per woman by Religion in Kenya using age specific method.

Age Group (1)	Protestant Programme (2)	Non prog Contraception (3)	Catholic programme (4)	Non prog Contraception (5)	Muslims Prog	Nonprog Contraception
15-19	0.01633	0.0	0.01407	0.00555	0.0	0.0
20-24	0.04121	0.01007	0.02296	0.01297	0.01805	0.0
25-29	0.05290	0.01592	0.04375	0.03641	0.02603	0.0
30-34	0.08267	0.02121	0.02925	0.05800	0.02508	0.00378
35-39	0.10503	0.00900	0.04508	0.03739	0.03194	0.0
40-49	0.04621	0.01052	0.03375	0.03015	0.0	0.0
45-49	0.01332	0.00314	0.01210	0.00382	0.0	0.0

We observe from table 3.10 that the births averted by programme contraception per woman for the three sects are higher than those averted by non-programme contraception in all age groups. Programme contraception averts more births per woman for the Protestant than for the Catholics. Non programme contraception averts more births per woman for the fertile women who are Catholics than those who

are protestants in all age groups at National level.

For the fertile women who are Protestants, most births are averted in the age groups 20-24 to 35-39 and 25-29 to 40-44 for those who are Catholics. As regards non-programme contraception most births are averted per woman in the age group 30-34 for both the Protestants and the Catholics.

Table 3.11 shows that each of the programme methods averts more births per woman among the fertile women who are Protestants than for those who are Catholics and Muslims. Non programme contraception averts more births for the Catholic women than for the Protestant and Muslim women.

Abstinence averts more births per woman than all other methods.Among the programme methods it is female sterilization that averts most births than all other methods for the Protestant, while for the Catholics Pill averts most of the births per woman. Condoms and Diaphragm averts the least births per woman for both the Protestants and the Catholics and Withdrawal averts the least number of births among the non programme methods for the Protestants and the Catholics.

Table 3.11
Calculation of the births averted by each method by Religion in Kenya using method specific prevalence model.

Method	Protestant	Catholics	Muslims
Pill	0.01674	0.00911	0.00632
IUD	0.01246	0.00648	0.00442
Injectio	0.00939	0.00370	0.00580
Diaphrag	0.00085	0.00092	0.0
Condom	0.00085	0.00092	0.00022
F/steril	0.01921	0.00790	0.00532
Abstine	0.01852	0.02154	0.00302
Withdraw	0.00029	0.00087	0.00024

Table 3.12
Calculation of the births averted by Educational Status using age specific model.

age group (1)	No education Prog Contraception (2)	No education Non prog Contraception (3)	Primary Prog Contraception (4)	Primary Non prog Contraception (5)	Secondary+ Prog Contraception (6)	Secondary+ Non prog Contraception (7)
15-19	0.00381	0.0	0.01631	0.01154	0.01839	0.02182
20-24	0.00283	0.00920	0.01714	0.01162	0.02983	0.00994
25-29	0.01668	0.00960	0.04586	0.01902	0.04541	0.02458
30-34	0.02714	0.01471	0.05811	0.01821	0.08551	0.01848
35-39	0.02446	0.01686	0.08497	0.02872	0.84274	0.02413
40-44	0.01152	0.00929	0.05446	0.01558	0.07741	0.00882
45-49	0.00185	0.00071	0.00234	0.00850	0.0	0.0

3.2.4 ESTIMATION OF BIRTHS AVERTED PER WOMAN BY EDUCATIONAL STATUS IN KENYA.

The results from table 3.12 show that, at the National level, programme contraception averts more births per woman among fertile women with secondary+ level of education than for those with other levels of education in all age groups.

Most of the births averted by programme contraception per woman are among fertile women in the age groups 25-29 to 40-44 for all the levels of education. Non programme contraception also averts more births per woman among fertile women in the age group 35-39.

Table 3.13 shows that the births averted per woman by each method at National level increases with the level of education. Periodic abstinence averts most births than all the other methods. Among the programme methods it is female sterilization that averts most births per woman followed by Pill and Condoms averts the least number of births per woman.

Table 3.13
Calculation of births averted by each method by Educational Status in Kenya using method specific model.

Method	No education	Primary	Secondary+
Pill	0.00377	0.01404	0.01704
IUD	0.00225	0.00869	0.01763
Injection	0.00279	0.00828	0.00867
Diaphragm	0.00013	0.00075	0.00158
Condom	0.00039	0.00038	0.00210
F/steril	0.00692	0.01533	0.01937
Abstine	0.01086	0.01662	0.01702
Withdraw	0.0	0.00070	0.00140

3.2.5 ESTIMATION OF THE BIRTHS AVERTED BY ETHNICITY:

3.2.5a Estimation of the births averted per woman for the Kalenjin

Table 3.14.
Calculation of births averted per woman among the fertile Kalenjin women using age specific model.

Age group	Births averted by Programme contraception	Non-prog
15-19	0.0	0.01719
20-24	0.01857	0.04262
25-29	0.03548	0.03540
30-34	0.04235	0.03315
35-39	0.06694	0.00661
40-44	0.03952	0.0
45-49	0.00966	0.00734

As observed in table 3.14, the estimates of the births averted per woman by programme contraception increases gradually with age upto age group 35-39 and then declines in the age groups above this. The estimate of births averted by non-programme contraception also increases with age upto age group 20-24 and then declines in the age groups above this age.

It is in the age group 25-29 to 40-44 where the estimates of the births averted by programme contraception are highest, while

for non-programme contraception they are highest among fertile women in the age groups 20-24 to 35-39. The estimates of births averted per woman by non-programme contraception are generally higher than those due to non-programme contraception among the fertile Kalenjin women.

Table 3.15 reveals that among the fertile Kalenjin women Periodic Abstinence has the highest estimates of births averted per woman than any other method. Among programme methods, it is Female Sterilization that has the highest estimates of births averted per woman, followed by Injection, whereas Condoms and Diaphragm have the least estimates of births averted per woman.

Table 3.15
Calculation of the averted by each method among the fertile Kalenjin women using method specific.

Method	births averted
Pill	0.00725
IUD	0.00278
Injection	0.01308
Diaphragm	0.00051
Condoms	0.00051
F/Steril	0.01282
Abstinence	0.02182
Withdrawal	0.00370

3.2.5b Estimation of births averted per woman among the Kambas'

Table 3.16
Calculation of the births averted per woman among the fertile Kamba women using age specific model.

Age group	Programme Contraception	Non-programme Contracepton
15-19	0.0	0.06780
20-24	0.01999	0.06421
25-29	0.07280	0.12603
30-34	0.09205	0.15119
35-39	0.07852	0.21545
40-44	0.05742	0.12414
45-49	0.01226	0.10913

It can be noticed from table 3.16 that the estimates of births averted per woman among the fertile Kamba women due to non-programme contraception are higher than those due to programme contraception in all the age groups. The estimates of births averted per woman due to non-programme contraception are generally high in the age groups 25-29 to 45-49. As regards programme contraception the estimates are high in the age groups 25-29, 30-34, 35-39 and 40-44, but the estimates of the births averted per woman by programme contraception are highest in age group 30-34. For the two types of contraception the estimates of the births averted per woman are generally lower in the lower age groups and the highest age group of 45-49.

Among the fertile Kamba women as is observed from table 3.17, Periodic abstinence averts more births per woman than any method used by these fertile women. As regards programme methods Pill has the highest estimate of the births averted per woman followed by Female Sterilization and, IUD, while the least number of births are averted by Condoms.

Table 3.17
Calculation of the births averted by each method among the fertile Kamba women using method specific model.

Method	Births averted
Pill	0.02135
IUD	0.01217
Injection	0.00598
Condom	0.00133
F/Steril	0.01518
Abstinence	0.10628
Withdrawal	0.00213

3.2.5c Estimation of births averted per woman among the Kikuyus'

Table 3.18
Calculation of the births averted per woman among fertile Kikuyu women using age specific model.

Age group	Programme Contraception	Non-programme Contraception
15-19	0.07399	0.00839
20-24	0.07528	0.01180
25-29	0.12370	0.03723
30-34	0.16687	0.04281
35-39	0.17974	0.04974
40-44	0.11118	0.02104
45-49	0.08341	0.01733

Table 3.19
Calculation of the births averted by each method among fertile Kikuyu women using method specific model.

Method	Births averted
Pill	0.02817
IUD	0.03227
Injection	0.01202
Diaphragm	0.00187
Condom	0.00294
F/Steril	0.04046
Abstinence	0.03074
Withdrawal	0.00071

In table 3.18, the estimates of the births averted due to programme contraception are higher than those due to non-programme contraception in all age groups. The estimates of births averted per woman due to programme contraception are high for fertile women in the age groups 25-29 to 35-39. A similar trend is observed for the estimates due to non-programme contraception in the age groups 25-29 to 35-39.

A look at the contribution of each method among the fertile Kikuyu women table 3.19, shows that Female sterilization has the highest estimate of the births averted per woman than any other method followed by IUD and Periodic abstinence.The lowest estimates of the births averted per woman are due to Diaphragm as programme method and Withdrawal as a non-programme method.

3.2.5d Estimation of births averted per woman among the Gusii

Table 3.20
Calculation of births averted per woman among fertile Gusii women using age specific model.

Age group	Programme Contraception	Non-programme Contraception
15-19	0.0	0.0
20-24	0.01397	0.02081
25-29	0.06099	0.00659
30-34	0.05988	0.00990
35-39	0.12166	0.02356
40-44	0.01319	0.01319
45-49	0.01856	0.0

Table 3.21
Calculation of the births averted by each method among fertile Gusii women using method model.

Method	Births averted
Pill	0.01026
IUD	0.00908
Injection	0.01493
Diaphragm	0.00077
Condoms	0.00103
F/Steril	0.01949
Abstinence	0.01221

From table 3.20, we observe that among the fertile Gusii women the estimates of births averted per woman due to programme contraception are higher than those due to non-programme contraception in all age groups. The estimates due to programme contraception are generally high in the age groups 25-29 to 35-39, with the highest estimate in the age group 35-39. For non-programme contraception the estimates are high in the age groups 35-39 to 40-44. Although the peaks of the estimates of births averted per woman due to programme and non-programme contraception are in the same age group, the one for programme contraception is higher than the one for non-programme contraception.

In terms of the estimates of births averted per woman by each method among the Gusii women, table 3.21, shows that Female Sterilization has the highest estimate of births averted per woman, followed by Injection and Periodic abstinence. Both Diaphragm and Withdrawal have the least estimate of the births averted per woman as programme and non-programme methods respectively.

3.2.5e Estimation of the births averted per woman among Luhyas'

Table 3.22.
Calculation of the births averted per woman for the fertile Luhya women using age specific prevalence model.

Age group	Programme Contraception	Non-programme Contraception
15-19	0.00488	0.0
20-24	0.01641	0.00198
25-29	0.04682	0.01144
30-34	0.09630	0.00663
35-39	0.07147	0.04779
40-44	0.03186	0.00726
45-49	0.00718	0.0

Table 3.23
Calculation of births averted per woman by each method for fertile Luhya women using method specific model.

Method	Births averted
Pill	0.01833
IUD	0.00528
Injection	0.00933
Diaphragm	0.00181
Condom	0.00052
F/Steril	0.00963
Abstinence	0.01185
Withdrawal	0.00037

We observe from table 3.22 that for the Luhyas, the estimates of the births averted per woman due to programme contraception are higher than those due to non-programme contraception in all age groups. The estimates due to programme contraception are generally high in the age groups 25-29 to 40-44. As regards non-programme contraception the estimates are high in the age groups 25-29 to

35-39.

It is noticed from table 3.23 that among the fertile Luhya women Pill as a method has the highest estimate of the births averted per woman followed by Periodic Abstinence, while Condoms and Withdrawal have the least estimates of births averted per woman.

3.2.5f Estimation of the births averted per woman among Luos'

Table 3.24
Calculation of births averted per woman for fertile Luo women using age specific model.

Age group	Programme Contraception	Non-programme Contraception
15-19	0.00964	0.00524
20-24	0.02315	0.00404
25-29	0.02878	0.00756
30-34	0.05841	0.02221
35-39	0.04395	0.00196
40-44	0.02257	0.00428
45-49	0.00785	0.0

Table 3.25
Calculation of births averted per woman by each method for the fertile Luo women using method specific model.

Method	Births averted
Pill	0.01271
IUD	0.00358
Injection	0.00242
Condom	0.00066
F/Steril	0.01004
Abstinence	0.00760
Withdrawal	0.00030

Among the fertile Luo women, as observed from table 3.24, the estimates of births averted per woman due to programme contraception are higher than those due to non-programme contraception in all age groups. The estimates of births averted

due to programme contraception are generally high in the age groups 20-24 to 40-44. And for non-programme contraception the estimates are high in the age group 30-34.

In terms of the births averted by each method (for the fertile two women, table 3.25), Pill as a method has the highest estimate of births averted per woman followed by Female Sterilization and Periodic Abstinence. The least estimate of the number of births averted per woman are by Condoms as a programme method and Withdrawal as a non-programme method.

3.2.5g Estimation of births averted per woman among Meru-Embu

From table 3.26, it is observed that among fertile Meru-Embu women the estimates of births averted per woman due to programme contraception are higher than those due to non-programme contraception in all age groups. The estimates of births averted per woman due to programme contraception are high in the age groups 25-29 to 40-44. For non-programme contraception the highest estimate of births averted per woman is in the age group 30-34.

Among the fertile Meru-Embu women, table 2.27, Programme methods have the highest estimates of the births averted per woman than non-programme methods. IUD has the highest estimate of the births averted per woman followed by Pill and Female Sterilization. Condoms has the least estimates of the number of births averted per woman among the fertile Meru-Embu women.

Table 3.26
Calculation of births averted per woman for fertile Meru-Embu women using age specific model.

Age group	Programme Contraception	Non-programme Contraception
15-19	0.04655	0.0
20-24	0.06852	0.0
25-29	0.11968	0.0
30-34	0.15921	0.03240
35-39	0.13250	0.0
40-44	0.21620	0.01762
45-49	0.0	0.0

Table 3.27
Calculation of births averted per woman by each method for fertile Meru-Embu women using method specific model.

Method	Births averted
Pill	0.04112
IUD	0.04423
Injection	0.01691
Diaphragm	0.00369
Condom	0.00184
F/Steril	0.02943
Abstinence	0.00885

3.2.5h Estimation of births averted per woman among Mijikenda-Swahili

In table 3.28, it is observed that among fertile mijikenda-swahili women, the estimates of births averted per woman in each age group due to programme contraception are higher than those due to non-programme contraception. It is in the age groups 30-34 to 40-44 that the estimates of births averted per woman due to

programme contraception are high. As regards non-programme contraception the highest estimate of births averted per woman is in the age group 35-39. But non-programme contraception averts very few births per woman among the Mijikenda-Swahili women.

Table 3.29, shows that among the fertile Mijikenda-Swahili women programme and non-programme contraception averts very few births per woman. Among the various methods it is Periodic Abstinence that has the highest estimate of births averted per woman followed by injection etc. IUD has the least estimate of births averted per woman among the Mijikenda-Swahili women.

Table 3.28.
Calculation of births averted per woman for fertile Mijikenda-Swahili women using age specific model.

Age group	Programme Contraception	Non-programme Contraception
15-19	0.00171	0.0
20-24	0.01368	0.0
25-29	0.01042	0.01346
30-34	0.02709	0.00498
35-39	0.01728	0.02012
40-44	0.01627	0.0
45-49	0.00289	0.00196

Table 3.29.
Calculation of births averted per woman by each method for fertile Mijikenda-Swahili women.

Method	Births averted
Pill	0.00312
IUD	0.00183
Injection	0.00405
Diaphragm	0.00027
Condoms	0.00027
F/Steril	0.00617
Abstinence	0.00733
Withdrawal	0.00029

3.2.5i Estimation of births averted per woman among fertile women from Other Tribes. (the tribes included among others are Somalis, Masaai, etc)

Table 3.30
Calculation of births averted per woman for fertile women from other tribes using age specific model.

Age group	Programme Contraception	Non-programme Contraception
15-19	0.05768	0.0
20-24	0.02467	0.01935
25-29	0.04892	0.02771
30-34	0.09995	0.00505
35-39	0.01132	0.0
40-44	0.00504	0.00111
45-49	0.0	0.0

Table 3.31
Calculation of births averted per woman by each method among fertile women from other tribes using method specific model.

Method	Births averted
Pill	0.01065
IUD	0.01249
Injection	0.00621
Diaphragm	0.00092
Condom	0.00138
F/Steril	0.01282
Abstinence	0.00903
Withdrawal	0.00159

Table 3.30 shows that the estimates of births averted due to programme contraception are higher than those due to non-programme contraception in all the age groups. The estimates of births averted per woman by programme contraception are high in the age group 20-24 to 30-34. As for non-programme contraception the estimates of births averted per woman are high in the age groups

0-24 to 25-29, with the highest estimate in the age group 5-29.

In terms of the estimates of the births averted per woman by each method, table 3.31 shows that Female sterilization has the highest estimate of births averted per woman followed by IUD and pill. Diaphragm and Condoms have the least estimates of the number of births averted per woman.

3.3.0 DISCUSSION AT NATIONAL LEVEL.

3.3.1 All cases combined

At the National level for all cases combined programme contraception has affected fertility more than non-programme contraception in all age groups as per 1989 data. The estimates of births averted per woman by programme contraception in the age groups 25-29 to 35-39 confirm the assertion by KDHS (1989) that it is in the age group 35-39 where current contraceptive use is highest in Kenya. Although the estimates of births averted per woman due to programme contraception are higher than those due to non-programme contraception; the estimates of births averted per woman by each method reveals that it is Periodic Abstinence which has the highest estimate of births averted per woman in Kenya. This further confirms the KDHS finding that current contraceptive users mainly use Periodic Abstinence to avoid being pregnant.

3.3.2 Socioeconomic factors

In 1989 Socioeconomic factors seem to have affected fertility in Kenya. Place of residence has a positive relationship with the estimates of births averted per woman due to programme contraception, while a negative relationship exists between the estimates due to non-programme contraception. The estimates of births averted per woman due to programme contraception are higher than those due to non-programme contraception in urban and rural

areas but generally high in the urban areas than in rural areas. The reason that can be advanced for this is that in Urban areas there may be more current contraceptive users than in rural areas. There may also be more programme centres in urban areas than in rural areas. These plus others make the users to have easy access to more modern (programme) methods in urban areas than in rural areas and as a result of this a lower fertility is expected in urban areas than in rural areas. This is supported by Ongutis' finding (1987) that in urban areas in Kenya fertility is lower than in rural areas. Work status also has affected fertility. The estimates of births averted per woman among currently working women in Kenya are higher than for fertile women who are not working. This can be as a result of the low economic value of the children and the high opportunity cost of the wife leaving work to look after the children in the urban areas. It can also be attributed to the fact that there can be easy separation of spouses in Urban centres due to nature of their work than in rural areas. This can be confirmed by the fact that Periodic abstinence is one of the top two methods which have the highest estimates of births averted per woman. This further confirms the earlier findings by Onguti (1987) that currently working women have a lower fertility than those who are not working and; KDHS (1989) and Ikamari (1985) that there are more current users of contraceptives among currently working women than among those who are not working.

Literature on Education and fertility have shown that there exists a negative relationship between education and fertility or contraceptive use and education. Ikamari E.N (1985) found that higher increase of contraceptive use among those with secondary plus level of education than other levels of education. This is further confirmed here where those fertile women with secondary plus level of education are the ones with high estimates of births

than for those with other levels of education in all age groups. It has also been found here that as the level of education increases, the estimates of births averted per woman also increases for each method. The reason that can be advanced for this is the more effective use of the contraceptive methods as the level of education increases. This proves the fact that a positive relationship exists between the estimates of births averted per woman and eduction in all age groups in Kenya. Education seems to make one more knowledgeable about contraceptive methods and use of the most convenient ones.

4.3.3 Cultural factors.

Cultural factors have had at least some effects on fertility. It has been found that no big differential exists by contraceptive use between the Protestants and Catholics although there is a marked difference between the two groups and the Muslims. Here it has been found that estimates of the births averted per woman by programme contraception are higher for protestants than for the catholics and muslims in all age groups. The difference between the estimates for the protestants and catholics in each age group are generally smaller. This fits well within Onguti's (1987) finding that protestants and catholics fertility are almost the same in Kenya. For the Muslims the estimates of births averted per woman are generally lower than those for the protestants and the catholics. The catholics are known to be advocates for the use of natural family planning methods worldwide. This is confirmed here, where the estimates of births averted per woman due to non-programme contraception are higher for the catholics than for the protestants and muslims in all age groups. In fact for the muslims non programme contraception averts no or few births per woman in all age groups.

There exists some differentials by ethnicity in Kenya. The

estimates of births averted per woman is high for the fertile .ikuyu women followed by fertile Meru-Embu women, while fertile luhya and Luo women have the least estimates of births averted per woman. This implies that for those tribes staying far away from Nairobi the estimates of the births averted per woman are lower than those for the tribes staying nearer Nairobi.This can be attributed to the un uniform distribution of the programme centres and the frequency of providing services in various regions. This confirms the KDHS(1989) finding that as the distance from Nairobi increases current use of contraceptive decreases.

Chapter four

ESTIMATION OF THE BIRTHS AVERTED PER WOMAN AT REGIONAL LEVEL

4.1.0 INTRODUCTION

In this chapter an attempt is made to find out if there exists any differential for births averted per woman by programme and non-programme contraception at Provincial levels in Kenya. To arrive at this goal, we have considered all cases combined and the differentials of place of residence, Religion, Education and work status of married women. The procedure for calculating the births averted per woman in each age group and for each method has been explained in chapter three. So we only present the results in tables here.

4.2.0 ESTIMATION OF BIRTHS AVERTED IN NAIROBI.

4.2.1 Births averted per woman in Nairobi for all cases combined

The estimates of births averted per woman by programme contraception are higher than those averted by non-programme contraception in all the age groups as is in table 4.1. In fact the births averted by programme contraception are greater than the estimates at the national level in the age groups 15-19 to 35-39, while the births averted by non programme contraception are lower than the estimates at National level in the same age groups.

It is however, in age group 25-29 to 35-39 that programme and non-programme contraception averts most births per woman among fertile women in Nairobi.

Table 4.1
Calculation of the births averted per woman in Nairobi using age specific prevalence model.

Age group	Prevalence rates due to Programme	Non prog contraception	Births averted by Progamme	Non prog contraception
15-19	7.7	3.8	0.01167	0.00576
20-24	18.6	4.7	0.03281	0.00831
25-29	27.4	6.8	0.05837	0.01449
30-34	36.4	9.1	0.06875	0.01719
35-39	40.6	6.3	0.07889	0.01224
40-44	52.0	4.0	0.0	0.0
45-49	40.0	0.0	0.0	0.0

Table 4.2 shows that in Nairobi, among all methods that are used by fertile women Pill ,IUD , Periodic Abstinence and Female Sterilization averts most of the births per woman while Condom averts the least number of births per woman.

Table 4.2
Calculation of births averted by each method in Nairobi using method specific prevalence model.

Method	Prevalence rates U'm	U"m	Births averted
Pill	11.9	0.0	0.01841
IUD	8.2	0.0	0.01339
Injection	2.3	0.0	0.00277
Diaphragm	1.3	0.0	0.00156
Condom	0.2	0.0	0.00024
F/steril	4.8	0.0	0.00825
Abstine	0.0	4.2	0.00892
Withdrawal	0.0	0.8	0.00110

4.2.2 Births averted per woman in Nairobi by place of residence.

As is observed from table 4.3 Nairobi was classified as being only urban, the estimates of births averted per woman by programme contraception are greater than those estimates of births averted by non-programme contraception in all age groups.

Programme contraception averts most births in the age groups 20-24 to 35-39 among fertile in Nairobi. As regards non-programme contraception most births are averted in the age groups 25-29 to 30-34.

Table 4.4 show that in Nairobi, most of the births are averted by programme methods such as, Pill, IUD, and Female sterilization. For non-programme methods, Periodic abstinence is the one which averts more births than other remaining methods after the programme methods above. The least number of births are by withdrawal.

Table 4.3
Calculation of births averted in Nairobi using age specific prevalence model.

Age group	Urban Births averted by Programme	Non-prog Contraception
15-19	0.01245	0.00243
20-24	0.03264	0.00841
25-59	0.05740	0.01365
30-34	0.06745	0.01570
35-39	0.07309	0.00720
40-44	0.0	0.0
45-49	0.0	0.0

Table 4.4
Calculation of births averted by each method by place of residence in Nairobi using method specific prevalence model.

	Urban
Method	Births averted
Pill	0.01652
IUD	0.01341
Injection	0.00261
Diaphragm	0.00120
Condom	0.00019
F/Steril	0.00800
Abstine	0.00714
Withdraw	0.00102

4.3 Births averted per woman by work status in Nairobi

In Nairobi the estimates of the births averted per woman in table 4.5, indicates that programme and non-programme contraception averts most births per woman among fertile women who are currently working than for those who are not working except in the age group 15-19 where no births are averted by either of the two forms of contraception. Programme contraception averts more births per woman than non-programme contraception among fertile women who are working and those who are not working in all age groups. The difference between the estimates of births averted by programme and non-programme are bigger for women who are currently working than for those who are not working. Among fertile women who are working programme and non-programme contraception averts most births in the age groups 25-29 to 35-39.

From table 4.6, one can notice that each of programme and non-programme methods averts most births per woman among fertile women who are currently working than for those who are not working in Nairobi.

The method which averts most births per woman among women who are currently working is IUD followed by Pill and the least births per woman are averted by Diaphragm. Periodic abstinence averts more births than any other non programme method. As regards those who are not working, Pill averts most births per woman than any other method while Condom averts the least number of births per woman as a programme method.

Table 4.5
Calculation of births averted per woman by Work status in Nairobi using age specific prevalence model.

Age group	Currently working		Not working	
	Programme Contraception	Non-prog	Programme Contraception	Non-prog
15-19	0.0	0.0	0.0	0.0
20-24	0.05620	0.0	0.03264	0.00931
25-29	0.08892	0.05060	0.04053	0.01172
30-34	0.09201	0.08092	0.04406	0.00585
35-39	0.22900	0.01102	0.04848	0.0
40-44	0.0	0.0	0.0	0.0
45-49	0.0	0.0	0.0	0.0

Table 4.6
Calculation of the births by each method by work status in Nairobi using method specific prevalence model.

Method	currently Working	Not Working
Pill	0.03012	0.01629
IUD	0.03507	0.00865
Injection	0.00162	0.00284
Diaphragm	0.00309	0.00098
Condom	0.0	0.00030
F/steril	0.01064	0.00852
Abstine	0.02209	0.00741
Withdrawal	0.004235	0.00129

4.4 Births averted per woman in Nairobi by religion

Table 4.7
Calculation of births averted per woman in Nairobi by Religion using age specific prevalence model.

Age group	Protestants		Catholics	
	Programme Contraception	Non-prog	Programme Contraception	Non-prog
15-19	0.01800	0.0	0.01005	0.01005
20-24	0.05615	0.00971	0.03540	0.0
25-29	0.05628	0.01092	0.01140	0.00709
30-34	0.10042	0.03701	0.0	0.00072
35-39	0.41270	0.00811	0.0	0.0
40-44	0.0	0.0	0.0	0.0
45-49	0.0	0.0	0.0	0.0

Table 4.8
Calculation of the births averted by each method in Nairobi by religion using method specific prevalence model.

Method	Protestants	Catholics
Pill	0.01297	0.01091
IUD	0.00998	0.00935
Injection	0.00830	0.00425
Diaphragm	0.00096	0.00014
Condom	0.00096	0.00014
F/Steril	0.01621	0.00941
Abstine	0.01596	0.02468
Withdraw	0.00027	0.00109

In Table 4.7 we observe that programme contraception averts more births per woman among fertile women in the age group 15-19 to 45-49 than non-programme contraception for the Protestant and Catholics. Non-programme contraception averts more births per woman among fertile women who are Protestants than those who are Catholics in Nairobi.

The estimates of the births averted per woman by programme contraception are generally high in the age groups 20-24 to 35-39 for the Protestant and 20-24 for the Catholics. The estimates due

non-programme contraception are generally high in the age group 30-34 for the protestant and 15-19 for the Catholics.

Table 4.8 shows that in Nairobi each programme method averts more births per woman among fertile women who are Protestant than those who are Catholics. Whereas Pill averts more births than any other programme method followed by IUD, Diaphragm averts the least number of births per woman for the Protestant and the Catholics. Periodic abstinence averts more births per woman than any other non-programme method for the Protestants and the Catholics. The least number of births are averted by Withdrawal for the Protestants. The catholics however uses Abstinence as the only non-programme method.

4.2.5 Births averted per woman in Nairobi by educational status.

Table 4.9
Calculation of births averted per woman in Nairobi by Educational status using age specific prevalence model.

Age group	No education Programme	Nonprog Contraception	Primary Program	Nonprog Contraception	Secondary+ Program	Nonprog Contraception
15-19	0.0	0.0	0.01201	0.0	0.01800	0.01800
20-24	0.00178	0.0	0.01607	0.00223	0.05362	0.01562
25-29	0.03090	0.01390	0.03016	0.00208	0.08012	0.02601
30-34	0.0	0.0	0.04643	0.01401	0.12385	0.03102
35-39	0.0	0.0	0.04270	0.00980	0.13260	0.01062
40-44	0.0	0.0	0.0	0.0	0.0	0.0
45-49	0.0	0.0	0.0	0.0	0.0	0.0

Table 4.10
Calculation of the births averted by each method in Nairobi by Educational Status using method specific prevalence model.

Method	Noeducation	Primary	Secondary+
Pill	0.00254	0.01064	0.04304
IUD	0.00272	0.00602	0.03531
Inject	0.00103	0.00481	0.0
Diaph.	0.0	0.00104	0.03671
Condom	0.0	0.0	0.00109
F/Steril	0.00562	0.00590	0.01512
Abstine	0.00307	0.00482	0.02048
Withdraw	0.0	0.00087	0.00365

The estimates of the births averted per woman in Nairobi as shown in table 4.9, by programme contraception are higher at all levels of education than the estimates due to non-programme contraception in all age groups. The estimates due to programme contraception are high for fertile women with secondary+ level of education than for those with primary and no education. Non-programme contraception also averts more births per woman among fertile women with secondary+ level of education than for those with primary and no education. The estimates of the births averted per woman for those fertile women with secondary+ and primary level of education are high in the age groups 25-29 to 35-39.

The estimates of the births averted per woman by each method as is observed from table 4.10, increased for each method with the level education. The highest increase observed for each method is from primary to secondary+ level of education.

Pill has the highest estimate of the births averted per woman followed by IUD among fertile women with primary and secondary+ level of education. Condoms has the least estimate of the births averted per woman for both levels of education. For the fertile

omen with no education female sterilization has the highest estimates of the births averted per woman, followed by periodic abstinence whereas Injection has the least estimate of the births averted per woman.

4.3.0 ESTIMATION OF THE BIRTHS AVERTED PER WOMAN IN CENTRAL PROVINCE

4.3.1 Births averted per woman for all cases combined in Central Province.

Table 4.11
Calculation of births averted per woman in central province using age specific prevalence model.

Age group	Prevalence rates due to Programme	Non-prog Contraception	Births averted by Programme	Non-prog Contraception
15-19	21.7	0.0	0.05922	0.0
20-24	26.0	5.2	0.04417	0.00883
25-29	26.9	9.0	0.06222	0.02082
30-34	36.3	5.5	0.06576	0.00996
35-39	42.7	9.7	0.09771	0.02220
40-44	32.9	7.6	0.03200	0.00762
45-49	30.9	2.9	0.03853	0.00737

Table 4.12
Calculation of births averted by each method in Central Province using method specific prevalence model.

Methods	Prevalence rates U'm	U"m	Births averted
Pill	8.1	0.0	0.01604
IUD	10.2	0.0	0.02132
Injection	3.8	0.0	0.00585
Diaphragm	0.3	0.0	0.00046
Condom	1.4	0.0	0.00216
F/steril	8.2	0.0	0.01804
Abstine	0.0	6.4	0.01276
Withdrawal	0.0	0.3	0.00060

Looking at the estimates of births averted per woman by programme contraception from table 4.11, we find that they are greater than

those estimates due to non-programme contraception in all age groups. Most of the births are averted per woman among fertile women in the age groups 25-29 to 35-39 by programme while non-programme contraception averts most births per woman in the age groups 20-24 to 35-39. The estimates of the births averted here are generally higher than the estimates at National level in all the age groups. The values of the births averted per woman is highest in the age group 35-39 for both programme and non-programme contraception.

Column 4 of table 4.12 shows that IUD averts most of the births per woman followed by female sterilization and pill, while Diaphragm averts the least number of births among the programme methods. As for the non-programme methods, abstinence averts more births per woman than withdrawal.

4.3.2 Births averted per woman in Central Province by place of residence.

In Central province, as is shown in table 4.13, programme contraception averts more births per woman than non-programme contraception both in urban and rural areas. In the urban areas programme contraception averts more births per woman than in the rural areas in each given age group as is shown in table 3.13. These estimates in urban and rural areas are higher than the estimates at national level in table 3.6. Programme contraception averts most births in the age groups 20-24 to 30-34 in the urban areas and age groups 25-29 to 30-34 in the rural areas. Non programme contraception generally averts more births on the rural areas than in urban areas in all the age groups.

According to the estimates in table 4.14, each of the methods averts more births per woman among fertile women staying in urban areas than for those who stay in the rural areas of Central

Province. In both places of residence most births per woman are averted by Pill, IUD, Injection, Female sterilization and Periodic Abstinence . The least number of births are averted by Diaphragm in both places of residence. The estimates of births averted by each method here are higher than the national estimates in table 3.7.

Table 4.13
Calculation of the births averted by place of residence in Central Province using age specific prevalence model.

Age Group	Urban Programme Contraception	Urban Non-prog Contraception	Rural Programme Contraception	Rural Nonprog Contraception
15-19	0.0	0.0	0.05497	0.0
20-24	0.10400	0.01161	0.03423	0.00925
25-29	0.22700	0.05183	0.04680	0.02002
30-34	0.14962	0.0	0.08190	0.01414
35-39	0.0	0.0	0.14032	0.02419
40-44	0.0	0.0	0.03160	0.00970
45-49	0.0	0.0	0.00764	0.00992

Table 4.14
Calculation of the births averted by each method by place of residence in Central province using method specific prevalence model.

Method	Urban	Rural
Pill	0.04568	0.01407
IUD	0.04342	0.02120
Injection	0.00892	0.00580
Diaphragm	0.0	0.00060
Condom	0.00892	0.00174
F/Steril	0.01526	0.02009
Abstine	0.02800	0.01202
Withdraw	0.0	0.0

4.3.3 Births averted per woman in Central Province by work status

Table 4.15

Calculation of the births averted per woman in Central province by work status using age specific prevalence model.

age group	Currently working Programme	Non prog Contraception	Not working Programme	Non-prog Contraception
15-19	0.0	0.0	0.07342	0.0
20-24	0.0	0.03471	0.08091	0.00396
25-29	0.12074	0.06182	0.09871	0.01440
30-34	0.13372	0.00493	0.09620	0.01218
35-39	0.37803	0.07128	0.11920	0.02617
40-44	0.0	0.0	0.04037	0.00982
45-49	0.0	0.0	0.01038	0.01202

Table 4.16

Calculation of the births averted by each method by work status in Central province using method specific prevalence model.

Method	Currently Working	Not Working
Pill	0.02804	0.02019
IUD	0.04725	0.02067
Injection	0.00890	0.00672
Diaphragm	0.0	0.00098
Condom	0.00089	0.00317
F/steril	0.02028	0.01892
Abstine	0.02102	0.01207
Withdraw	0.00135	0.00056

Table 4.15 shows that births averted per woman by programme contraception is higher for the currently working except for diaphragm and condom as compared to those who are not working. Non-programme contraception averts more births per woman for currently working women than those who are not working. For both working and not working women programme contraception averts more births per woman than non-programme contraception. Programme and non-programme contraception in Central province averts most births per woman among fertile women in the age groups 25-29 to 35-39.

The estimates of the births averted by each method as in table 4.16 indicates that each of the programme methods and non-programme methods in central province averts more births per woman, among those who are currently working than for those who are not working.

In Central province IUD averts more births than any other method followed by Periodic abstinence for those who are working and not working alike. Least births are averted by Condom for currently working women and Withdrawal for those who are not working.

4.3.4 Births averted per woman in Central Province by religion

Table 4.17
Calculation of births averted per woman in Central province by Religion using age specific prevalence model.

Age group	Protestants		Catholics	
	Programme Contraception	Non-prog	Programme Contraception	Non-prog
15-19	0.00971	0.0	0.00901	0.0
20-24	0.04172	0.01192	0.04092	0.00237
25-29	0.05633	0.02012	0.05431	0.02590
30-34	0.06789	0.00872	0.05031	0.01025
35-39	0.09727	0.01941	0.06723	0.02562
40-44	0.04271	0.00846	0.02161	0.00621
45-49	0.04071	0.00865	0.01872	0.0

Table 4.18

Calculation of the births averted by each method in Central Province by Religion using method specific prevalence model.

Method	Protestants	Catholics
Pill	0.01720	0.01532
IUD	0.02012	0.01971
Injection	0.00586	0.00586
Diaphragm	0.00027	0.00009
Condoms	0.00197	0.00025
F/Steril	0.02010	0.01800
Abstine	0.01787	0.01821
Withdraw	0.00038	0.00089

Table 4.17, shows that, as regards the estimates of the births averted per woman by programme and non-programme contraception, programme contraception averts more births per woman than the non-programme contraception for the protestants and the Catholics. The estimates of the births averted per woman by programme contraception are generally higher for the Protestants than for the Catholics. Comparison of the births averted per woman by non-programme contraception reveals that more births averted per woman, for the Catholics than for the Protestants.

Most of the estimates of the births averted by programme contraception are generally in the age groups 25-29 to 35-39 for both Protestants and Catholics. For non-programme contraception most of the estimates of the births averted are in the age groups 20-24 to 35-39 for Protestants and Catholics.

Table 4.18, shows that in Central Province, estimates of the births averted per woman by each of the programme methods are higher for the Protestants than for those who are Catholics, and each of the non-programme methods averts more births per woman among fertile women who are Catholics than for those who are Protestants.

Among the programme methods, it is IUD that averts most births per woman whereas Condoms averts the least number of births for the Protestants and the Catholics. For the Protestants and Catholics, Periodic abstinence averts more births per woman as non-programme method whereas Withdrawal averts the least number of births per woman.

4.3.5 Births averted per woman in Central Province by educational status.

From table 4.19, it is observed that the estimates of the births averted per woman due to programme contraception in Central province are highest for fertile women with secondary+ level of education than for those with either primary or no level of education. For fertile women with primary and secondary+ level of education the estimates of the births averted per woman are highest in the age groups 25-29 to 35-39. And for those with no education the estimates are high in the higher age groups 35-39 to 45-49 The estimates due to non-programme contraception are also high for those women with secondary+ level of education than for other levels of education. But the estimates due to programme contraception are higher in all age groups than those due to non-programme contraception.

Table 4.20, shows that the estimates of the births averted per woman by each method due to non-programme and programme contraception increases with the level of education, save for Diaphragm and injection which averts the least number of births per woman as level of education increases. In Central province IUD, Female Sterilization, Periodic abstinence and Pill are the methods which have the highest estimates of the births averted per woman, while Condoms has the least estimates of the births averted per

woman in the province.

Table 4.19
Calculation of births averted per woman in Central province by Educational Status using age specific prevalence model.

Age group	No Education Programm Contraception	Nonprog	Primary Program Contraception	Nonprog	Secondary+ Program Contraception	nonprog
15-19	0.0	0.0	0.07370	0.0	0.02782	0.0
20-24	0.0	0.0	0.04379	0.01002	0.10982	0.0200
25-29	0.00912	0.05114	0.09813	0.02052	0.11980	0.0308
30-34	0.01720	0.00525	0.09626	0.01801	0.22416	0.0203
35-39	0.06701	0.01066	0.13345	0.02299	0.35620	0.040
40-44	0.02340	0.01402	0.04018	0.00644	0.0	0.0
45-49	0.02192	0.00323	0.02109	0.00497	0.0	0.0

Table 4.20
Calculation of the births averted per woman by each method in Central province by Educational Status using method specific prevalence model.

Method	No education	primary	secondary+
Pill	0.00168	0.02201	0.05623
IUD	0.01322	0.02672	0.06197
Injection	0.00788	0.01275	0.01421
Diaphragm	0.00099	0.00042	0.00
Condom	0.00974	0.00301	0.00612
F/Steril	0.01523	0.02931	0.02312
Abstine	0.00891	0.01123	0.07234
Withdraw	0.0	0.00016	0.0

4.4.0 ESTIMATION OF THE BIRTHS AVERTED PER WOMAN IN COAST PROVINCE

4.4.1 Births averted in Coast Province for all cases combined.

The estimates of births averted per woman by programme contraception are greater than those averted by non-programme contraception in all the age groups (table 4.21). Programme contraception averts most births in the age groups 20-24 to 30-34,

while non-programme contraception averts more births per woman in the age group 25-29. The estimates of births averted in each age group here are lower than the estimates at National level in table 3.1.

Column(4) of table 4.22, shows that Pill averts more births per woman in coast province than all other methods followed by female sterilization. Periodic abstinence and Condom averts the least number of births per woman . The estimates of births averted by each method in Coast province are lower than the estimates at National level.

Table 4.21
Calculation of the births averted per woman in Coast province using age specific prevalence model.

Age group	Prevalence rates U'm	U"m	Births averted by Programme	Non prog Contraception
15-19	0.0	0.0	0.0	0.0
20-24	8.9	1.8	0.02116	0.00428
25-29	18.6	7.1	0.03067	0.01171
30-34	18.1	2.4	0.04828	0.00747
35-39	10.6	6.1	0.01816	0.01045
40-44	28.1	0.0	0.01687	0.0
45-49	4.5	0.0	0.00336	0.0

Table 4.22
Calculation of births averted by each method in Coast Province using method specific prevalence model.

Method	Prevalence rates U'm	U"m	Births averted by
Pill	5.1	0.0	0.01039
IUD	1.7	0.0	0.00365
Injection	1.7	0.0	0.00269
Condom	0.3	0.0	0.00047
F/steril	3.6	0.0	0.00815
Abstine	0.0	2.9	0.00609
Withdrawal	0.0	0.3	0.00067

4.4.2 Births averted per woman in Coast Province by place of residence.

Table 4.23
Calculation of the births averted by place of residence in Coast province using age specific prevalence model.

age group	Urban Programme	Urban Non-prog Contraception	Rural Programme	Rural Non-prog Contraception
15-19	0.01010	0.0	0.00290	0.0
20-24	0.03032	0.00337	0.00745	0.0
25-29	0.05331	0.00397	0.01769	0.01008
30-34	0.07483	0.00253	0.04039	0.02202
35-39	0.08017	0.0	0.04520	0.01332
40-44	0.0	0.0	0.03339	0.0
45-49	0.0	0.0	0.00201	0.0

Table 4.24
Calculation of births averted by each method in Coast province by place of residence using method specific prevalence model.

Method	Urban	Rural
Pill	0.01906	0.00491
IUD	0.00840	0.00059
Injection	0.00489	0.00604
Diaphragm	0.0	0.0
Condom	0.00096	0.00025
F/Steril	0.01002	0.00684
Abstine	0.00344	0.00600
Withdraw	0.00134	0.00029

Table 4.23 shows that in Coast province, programme contraception averts more births per woman in the urban areas than in the rural areas, especially among fertile women in the age groups 20-24 to 35-39. Non-programme contraception averts more births per woman in the rural areas than in the urban areas in the given age groups. The estimates are lower than the national estimates in table 3.6. Programme contraception averts more births per woman than non-programme contraception in all age groups.

In terms of births averted per woman by each method at the coast, it is observed from table 4.24, that each method averts more births per woman among fertile women staying in the urban areas than for those staying in rural areas. Most births are averted by Pill, IUD and female sterilization. Non-programme contraception averts very few births per woman for those women in Coast province. But the estimates of births averted per woman by each method are lower than the national estimates in table 3.7.

4.4.3 Births averted per woman in Coast Province by work status

Table 4.24 reveals that at the Coast programme contraception averts more births per woman for women who are currently working than for those who are not working in the age groups 20-24 to 35-39. Non-programme contraception averts very few births per woman among fertile women who are not working and no births per woman among currently working women in all age groups. Both programme and non-programme contraception averts no births in the age group 15-19 for those who are working and not working.

In terms of the births averted by each method at the Coast province, programme and non-programme methods averts more births per woman among fertile women who are currently working than for those who are not working.

Pill averts more births than any method and its followed by Injection and female sterilization as is observed in table 4.26. Periodic abstinence averts more births per woman than all the non-programme methods for currently working and not working women.

Table 4.25

Calculation of births averted per woman in Coast province by work status using age specific prevalence model.

Age group	currently working		Not working	
	Programme	Non-prog contraception	Programme	Non-prog Contraception
15-19	0.0	0.0	0.0	0.0
20-24	0.16545	0.0	0.01592	0.00191
25-29	0.13763	0.0	0.02400	0.00894
30-34	0.04130	0.03012	0.03021	0.00441
35-39	0.35290	0.0	0.01597	0.00213
40-44	0.0	0.0	0.002726	0.0
45-49	0.0	0.0	0.01083	0.00096

Table 4.26

Calculation of births averted by each method per woman in Coast province by work status method specific prevalence model.

Method	Currently working	Not working
Pill	0.02750	0.00586
IUD	0.02024	0.00186
Injection	0.04610	0.00234
Diaphragm	0.00391	0.0
Condom	0.0	0.00268
F/ateril	0.04253	0.00511
Abstine	0.01476	0.00501
Withdraw	0.0	0.00049

4.4.4 Births averted per woman in Coast Province by religion.

Table 4.27
Calculation of births averted per woman in Coast province by religion using age specific prevalence model.

Age group	Protestants Programme Contraception	Protestants Non-prog Contraception	Catholics Programme Contraception	Catholics Nonprog Contraception	Muslims Prog Contraception	Muslims Nonprog Contraception
15-19	0.0	0.0	0.0	0.0	0.0	0.0
20-24	0.03017	0.01012	0.01951	0.0	0.00989	0.0
25-29	0.12570	0.0	0.01807	0.00400	0.00971	0.00521
30-34	0.19033	0.01056	0.04326	0.02016	0.00867	0.0
35-39	0.03879	0.08723	0.0	0.0	0.03025	0.0
40-44	0.06591	0.02880	0.0	0.0	0.0	0.0
45-49	0.0	0.0	0.0	0.0	0.0	0.0

Table 4.28
Calculation of the births averted by each method in Coast province by religion using method specific prevalence model.

Method	Protestants	Catholics	Muslims
Pill	0.03275	0.00954	0.00601
IUD	0.02031	0.0	0.00141
Injection	0.02431	0.00402	0.00208
Diaphragm	0.00106	0.0	0.0
Condoms	0.00189	0.0	0.00039
F/Steril	0.02017	0.01527	0.00243
Abstine	0.01901	0.01397	0.00400

From table 4.27, it can be observed that the estimates of the births averted per woman by programme contraception for the Protestants are higher than the estimates for the Catholics and the Muslims. Non-programme contraception averts more births per woman for the Protestants than for the Catholics and for the Muslims. In fact for the Muslims it is observed from the table that non-programme contraception averts no births in all age groups.
The estimates of the births averted by programme contraception are

generally greater in the age group 25-29 to 40-44 for the Protestant and the Catholics. Most births per woman are averted in the age group 40-44 for the Protestants and 30-34 for the catholics.

In table 4.28, the estimates of the births averted per woman by each method used by fertile women in Coast Province, shows that each of the programme methods averts more births per woman for the Protestants than for the catholics and the Muslims. Pill averts most births per woman for the Protestants and Muslims while Female Sterilization averts most births for the Catholics. Diaphragm and Condoms avert the least number of births per woman for the Protestants and for the Catholics. It is Injection that averts the least number of births per woman. Periodic abstinence is the only non-programme contraception that is used by the Protestants and the Catholics. It averts more births per woman for the Protestants than for the Catholics.

4.6.3 Births averted per woman in Coast Province by educational status.

In terms of the estimates of the births averted per woman in Coast province, table 4.29, programme contraception has higher estimates of the births averted per woman than non-programme contraception in all age groups. The estimates of the births averted per woman for the fertile women with Secondary plus level of education are higher than for those with other levels of education. The estimates of births averted in province due to non-programme contraception are generally low for fertile women with all levels of education in all age groups.

In table 4.30, we observe that the estimates due to programme and non-programme contraception are high for fertile women with secondary+ level of education than fertile women with other levels

of education. For women with no eduction the estimates of births averted by each method are very low compared with the estimates of the births averted per woman for fertile women with other levels of education. The estimates of the births averted per woman are high for IUD, Female Sterilization and Periodic Abstinence, whereas Diaphragm has the least estimates for those fertile women with primary and secondary+ levels education.

Table 4.29
Calculation of the births averted per woman in Coast province by Educational status using age specific prevalence model.

Age group	No education Program contraception	Nonprog	Primary Program contraception	Nonprog	Secondary+ Program Contraception	Nonprog
15-19	0.00304	0.0	0.0	0.0	0.0	0.0
20-24	0.01482	0.0	0.01401	0.00343	0.04982	0.0
25-29	0.00806	0.00185	0.06174	0.01047	0.03351	0.0
30-34	0.00197	0.00593	0.08116	0.0	0.08342	0.02756
35-39	0.01506	0.00148	0.04632	0.03544	0.00957	0.0
40-44	0.00942	0.0	0.02354	0.0	0.0	0.0
45-49	0.00106	0.0	0.0	0.0	0.0	0.0

Table 4.30
Calculation of births averted by each method in Coast province by Educational status using method specific prevalence model.

Methods	NoEducation	Primary	Secondary+
Pill	0.00197	0.02196	0.03551
IUD	0.00057	0.00187	0.03504
Injection	0.00086	0.01265	0.02644
Diaphragm	0.0	0.0	0.00204
Condom	0.00019	0.0	0.00413
F/Steril	0.00302	0.01649	0.01509
Abstine	0.00143	0.01504	0.01672
Withdraw	0.00028	0.00105	0.0

4.5.0 ESTIMATION OF THE BIRTHS AVERTED PER WOMAN IN EASTERN PROVINCE

4.5.1 Births averted in Eastern Province for all cases combined.

Table 4.31

Calculation of the births averted per woman in Eastern Province using age specific prevalence model.

Age Group	Prevalence Rates due to Programme	Non prog Contraception	Births averted by Programme	Non-prog Contraception
15-19	3.0	30.3	0.00804	0.08120
20-24	10.5	21.0	0.02936	0.05973
25-29	23.6	19.2	0.09175	0.07465
30-34	23.7	12.7	0.09313	0.04991
35-39	24.0	20.5	0.11562	0.09876
40-44	22.3	22.9	0.09079	0.09323
45-49	12.7	7.0	0.0	0.0

Table 4.32

Calculation of the births averted by each method in Eastern Province using method specific prevalence model.

Method	Prevalence rates U'm	U"m	Births averted by
Pill	6.2	0.0	0.02371
IUD	4.8	0.0	0.01937
Injection	3.5	0.0	0.01041
Diaphragm	0.4	0.0	0.00119
Condom	0.4	0.0	0.00119
F/steril	4.7	0.0	0.02000
Abstine	0.0	18.2	0.06840
Withdraw	0.0	0.3	0.00113

The estimates of births averted per woman due to programme and non-programme contraception in Eastern Province are higher the estimates at National level

At age groups 15-19 to 20-24 (table 31), non-programme

contraception averts more births per woman than programme contraception and in the remaining age groups programme contraception averts more births per woman than non-programme contraception. It is in the age groups 25-29 to 40-44 that programme and non-programme contraception averts most births per woman. The estimates for both the rates from both programme and non-programme contraception are higher than the National rates estimated in table 3.1.

In column (4) of table 4.32, it is observed that periodic abstinence averts more births per woman than all other methods used by fertile women in the province. Among the programme methods Pill averts more births than all the other methods per woman, whereas Condom and Diaphragm averts the least number of births per woman.

4.5.2 Births averted per woman in Eastern Province by place of residence

Table (4.33) above shows that among fertile women in the age groups 15-19 to 20-24, non-programme contraception averts more births per woman than programme contraception. And in the remaining age groups programme contraception averts more births per woman than non-programme contraception.

Most births are averted in the age groups 25-29 to 40-44 by programme contraception and in the age groups 15-19 to 40-44 by non-programme contraception among fertile women staying in rural areas in Eastern province.

According to the estimates of births averted by each method in table 4.34, Abstinence averts more births than any other method in Eastern province which was classified as being only rural. Programme methods which averts more births per woman are Pill, Female Sterilization and IUD respectively. Condoms averts the least number of births per woman in the province.

Table 4.33
Calculation of the births averted in Eastern province by place of residence using age specific prevalence model.

age group	Rural Programme Contraception	Non-pro
15-19	0.00701	0.07088
20-24	0.02096	0.06069
25-29	0.09026	0.07440
30-34	0.09862	0.04974
35-39	0.10201	0.09342
40-44	0.09642	0.00742
45-49	0.0	0.0

Table 4.34
Calculation of births averted by each method in Eastern province by place of residence using method specific prevalence model.

Method	Rural
Pill	0.02015
IUD	0.01695
Injection	0.00940
Diaphragm	0.00105
Condoms	0.00105
F/Steril	0.01923
Abstinence	0.06792
Withdrawal	0.00109

4.5.3 Births averted per woman in Eastern Province by work status.

In Eastern province as shown in table 4.35, programme and non-programme contraception averted more births per woman in several age groups for those women who are not working than those who are working. For women who are not working programme contraception only averts more births per woman among fertile women in the age groups 25-29 to 35-39.

The estimates of births averted per woman by method in the Province in table 4.36, shows that Periodic Abstinence averts more births than any other method for women who are currently working and among those who are not working. It is followed by Pill, IUD and Female Sterilization , whereas Condoms averts the least births for both currently working and not working women.

Table 4.35
Calculation of the births averted per woman in Eastern province by work status using age specific prevalence model.

Age group	Currently working		Not working	
	Programme	Non-prog	Programme	Non-prog
15-19	0.00428	0.06275	0.0	0.06077
20-24	0.03043	0.0	0.02429	0.06248
25-29	0.08342	0.10265	0.08353	0.07411
30-34	0.0	0.0	0.08002	0.04510
35-39	0.30979	0.01174	0.08719	0.08208
40-44	0.0	0.0	0.04865	0.07012
45-49	0.0	0.0	0.0	0.0.

Table 4.36
Calculation of the births averted per woman by each method in Eastern Province using method specific prevalence model.

Methods	Currently working	Not working
Pill	0.03622	0.02454
IUD	0.05044	0.01843
Injection	0.00615	0.00242
Diaphragm	0.0	0.00130
Condoms	0.00701	0.00102
F/steril	0.01513	0.01350
Abstine	0.07023	0.07782
Withdrawal	0.0	0.00132

4.5.4 Births averted per woman in Eastern Province by religion.

Table 4.37
Calculation of births averted per woman in Eastern province by Religion using age specific prevalence model.

Age group	Protestants		Catholics	
	Programme Contraception	Nonprog	Programme Contraception	Nonprog
15-19	0.02081	0.02466	0.0	0.0
20-24	0.04272	0.06087	0.01071	0.05412
25-29	0.10896	0.04607	0.07921	0.12685
30-34	0.14433	0.05632	0.03169	0.13929
35-39	0.12092	0.05021	0.07083	0.13021
40-44	0.09301	0.04216	0.01032	0.21450
45-49	0.0	0.0	0.0	0.0

Table 4.38
Calculation of the births averted by each method in Eastern province by Religion using method specific prevalence model.

Method	Protestants	Catholics
Pill	0.02870	0.02081
IUD	0.02488	0.00923
Injection	0.01700	0.00114
Diaphragm	0.00205	0.0
Condoms	0.00123	0.00094
F/Steril	0.02100	0.02351
Abstinence	0.05401	0.11485
Withdraw	0.00105	0.00201

Table 4.37, shows that non-programme contraception averts more births per woman for the Catholics in all the age groups than non-programme contraception,while for the Protestants it averts more births per woman from age group 15-19 to 20-24 than programme contraception. In the other age groups 25-29 to 40-44, programme contraception averts more births per woman than non-programme contraception.

The estimates of the births averted by programme contraception are high in the age groups 25-29 to 35-39 for the Protestants and

also for the Catholics. Non-programme contraception averts more births in the age group 15-19 for the Protestants and 40-44 for the Catholics.

As is in table 3.38, it can be observed that each of the programme methods averts more births for the Protestants than for the Catholics while each of the non-programme methods averts more births per woman for the Catholics than for the Protestants in Eastern province. Pill averts most births per woman followed by IUD for the protestants, while Female Sterilization averts most births per woman followed by Pill for the Catholics. Condom and Diaphragm averts the least births per woman for both the Protestants and Catholics. Periodic abstinence as a non-programme method averts most births per woman than Withdrawal.

4.5.5 Births averted per woman in Eastern Province by educational status.

In Eastern province as indicated in table 4.39, that for those fertile women with no education non-programme contraception has the highest estimates of the births averted per woman in the age groups 25-29 to 40-44 than those for programme contraception. For those with primary and secondary+ level of education non-programme contraception has the highest estimates of the births averted per woman than programme contraception in the age groups 15-19 and 20-24 only.

The estimates of the births averted per woman by programme contraception for fertile women with secondary+ level of education in all age groups are higher than for women with other levels of education. Those with primary level of education have higher estimates of births averted per woman than those with no education. The estimates due to programme contraception is generally high in the age groups 25-29 to 35-39 for all levels of education.

The estimates of the births averted by each method in Eastern province (table 4.40) increase with level of education especially from no education to Primary level of education for all forms of contraception, while from primary to secondary+level of education the estimates of the births averted per woman by non-programme methods decreases with level of education as is seen in table 4.61

For each level of education the highest estimates of the births averted per woman are by Female sterilization, IUD, and Pill at each level of education. The least estimates of the births averted per woman are by Diaphragm and Condoms at all levels of education.

Table 4.39

Calculation of births averted per woman in Eastern province by educational status using age specific prevalence model.

Age group	No Education		Primary		Secondary+	
	Program	Nonprog Contraception	Program	Nonprog Contraception	Program	Nonprog Contraception
15-19	0.0	0.0	0.0	0.06442	0.10445	0.11021
20-24	0.0	0.0	0.02342	0.05009	0.05518	0.12086
25-29	0.03934	0.01064	0.09044	0.07068	0.12090	0.05634
30-34	0.04026	0.04023	0.07412	0.04032	0.18403	0.06022
35-39	0.07156	0.01409	0.11261	0.01002	0.23145	0.0
40-44	0.01431	0.00802	0.04842	0.02431	0.0	0.0
45-49	0.0	0.0	0.0	0.0	0.0	0.0

Table 4.40

Calculation of the births by each method in Eastern province by Educational Status using method specific prevalence model.

Method	No Education	Primary	Secondary+
Pill	0.00923	0.03012	0.06087
IUD	0.00492	0.02917	0.03436
Injection	0.00386	0.01950	0.00650
Diaphragm	0.0	0.00126	0.00304
Condom	0.0	0.00072	0.00751
F/Steril	0.01162	0.03082	0.01922
Abstine	0.06461	0.08261	0.06287
Withdrawal	0.0	0.0	0.0

4.6.0 ESTIMATION OF THE BIRTHS AVERTED PER WOMAN IN NYANZA PROVINCE

4.6.1 Births averted in Nyanza Province for all cases combined.

Table 4.41
Calculation of births averted per woman in Nyanza Province using age specific prevalence model.

Age Group	Prevalence ratesdue to Programme	Non prog Contraception	Births averted by Programme	Non prog Contraception
15-19	4.3	2.1	0.00722	0.00353
20-24	6.7	2.5	0.01489	0.00555
25-29	8.2	1.3	0.01735	0.00275
30-34	15.8	4.5	0.04901	0.01396
35-39	14.0	1.9	0.04288	0.00582
40-44	11.8	5.3	0.01294	0.00581
45-49	7.4	0.0	0.00801	0.0

Table 4.42
Calculation of births averted by each method in Nyanza Province using method specific prevalence model.

Method	Prevalence Rates U'm	U"m	Births averted by
Pill	2.9	0.0	0.00789
IUD	0.5	0.0	0.00144
Injection	2.4	0.0	0.00508
Condom	0.2	0.0	0.00042
F/steril	4.0	0.0	0.01210
Abstine	0.0	2.5	0.00634

The estimates of the births averted per woman which are given in table 4.41 shows that programme contraception averts more births per woman in the province than non-programme contraception in all the age groups. Programme contraception averts most births in the age groups 25-29 to 35-39 for those fertile women using programme contraception in the province. But the estimates of the births averted per woman in each age group are lower than the estimates at

national level for both programme and non-programme contraception.

Female sterilization averts more births per woman in the province followed by Pill and Periodic Abstinence, whereas Condoms averts the least number of births per woman as is shown in table 4.42. But each method in the province averts less births per woman than at national level in all age groups.

4.6.2 Births averted per woman in Nyanza Province by place of residence

In terms of the births averted by programme contraception and non-programme contraception in Nyanza Province, programme contraception averts more births per woman in the urban areas than non-programme contraception (table 4.43). Non-programme contraception averts more births per woman among fertile women staying in the rural areas than for those staying in the urban areas. Nevertheless there is no clear cut difference between the births averted by programme contraception in the urban areas and rural areas. Programme contraception averts most births in the age groups 30-34 to 35-39 in urban and rural areas. Non-programme contraception averts more births in the age group 25-29 in urban areas and 20-24 in the rural areas.

On births averted by each method, table 4.44, shows that in Nyanza province the programme methods averts more births per woman among fertile women staying in urban areas than for those staying in the rural areas. The difference between the births averted in the places of residence is however very small. Periodic abstinence averts more births per woman than any other method in the province in the rural areas. Pill averts most births in the urban areas followed by IUD.

Table 4.43
Calculation of the births averted by place of residence in Nyanza province using age specific prevalence model.

age group	urban		rural	
	Programme Contraception	Non-prog Contraception	Programme Contraception	Non prog Contraception
15-19	0.00824	0.0	0.00426	0.00346
20-24	0.01662	0.00852	0.01548	0.00963
25-29	0.01803	0.01342	0.01756	0.00187
30-34	0.06270	0.0	0.04460	0.01501
35-39	0.06400	0.0	0.04490	0.00432
40-44	0.0	0.0	0.01284	0.00342
45-49	0.0	0.0	0.00456	0.0

Table 4.44
Calculation of the births averted by each method in Nyanza province by Place of residence using method specific prevalence model.

Method	Urban	Rural
Pill	0.00772	0.00780
IUD	0.00698	0.00134
Inject	0.00089	0.00053
F/steril	0.00429	0.00287
Abstine	0.00509	0.01482

4.6.3 Births averted per woman in Nyanza Province by work status.

As demonstrated by the estimates in table 4.45, programme contraception averts more births per woman than non-programme contraception in the given age groups in Nyanza Province. As regards those who are not working programme contraception averts more births per woman than non-programme contraception in all age groups. Programme contraception averts more births in the age group 35-39 for currently working women, and in the age group 30-34 for fertile women who are not working.

In table 4.46, it can be observed that each of the programme methods averts more births per woman for those who are currently

working than for those who are not working. As for the non-programme methods, they avert more births per woman for fertile women who are not working than for those who are working. It should however be noted that the difference between the estimates of births averted per woman for women who are currently working and those who are not working is generally negligible. Most of the births are averted by IUD for currently working women and female sterilization for those who are not working.

Table 4.45
Calculation of the births averted per woman in Nyanza province by work status using age specific prevalence model.

Age group	Currently working		Not working	
	Programme	Non-prog Contraception	Programme	Non-prog Contraception
15-19	0.0	0.0	0.0	0.0
20-24	0.0	0.0	0.01460	0.00733
25-29	0.02942	0.0	0.01694	0.00309
30-34	0.0	0.0	0.04216	0.01302
35-39	0.10372	0.0	0.04362	0.03864
40-44	0.0	0.0	0.01170	0.00647
45-49	0.0	0.0	0.00701	0.0

Table 4.46
Calculation of births averted per woman by each method in Nyanza Province by work status using method specific prevalence model.

method	currently working	Not working
Pill	0.00764	0.00725
IUD	0.00960	0.00249
Injection	0.00138	0.00325
Condom	0.00129	0.00023
F/Steril	0.01408	0.01191
Abstinence	0.00436	0.00708

4.6.4 Births averted per woman in Nyanza Province by religion.

Table 4.47
Calculation of the births averted per woman in Nyanza province by Religion using age specific prevalence model.

Age group	Protestants Programme Contraception	Protestants Nonprog Contraception	Catholics Programme Contraception	Catholics Nonprog Contraception
15-19	0.00361	0.0	0.00541	0.01012
20-24	0.03816	0.00682	0.03754	0.00591
25-29	0.02213	0.00227	0.01302	0.00761
30-34	0.06542	0.01232	0.02728	0.00251
35-39	0.05010	0.00618	0.02189	0.0
40-44	0.02492	0.00738	0.00333	0.00141
45-49	0.01312	0.0	0.0	0.0

Table 4.48
Calculation of the births averted by each method in Nyanza province by Religion using method specific prevalence model.

Method	Protestant	Catholics
Pill	0.01021	0.00421
IUD	0.00357	0.00125
Injection	0.00478	0.00319
Condoms	0.00089	0.00052
F/Steril	0.01428	0.00575
Abstinence	0.00560	0.01011
Withdraw	0.00560	0.00582

As illustrated in table 4.47, the estimates of the births averted per woman by programme contraception are higher than the estimates due to non-programme contraception in all the age groups for the protestants and from age group 20-24 to 40-44 for the Catholics. Non-programme contraception averts more births for the Catholics in the age group 15-19.

The estimates of the births averted by non-programme contraception per woman are higher in the age groups 25-29 to 40-44 with more births averted in the age group 30-34 for the

Protestants and 20-24 to 35-39, with more births averted in the age group 30-34 for the Catholics. Non-programme contraception averts more births per woman in the age group 15-19 for the Catholics and 30-34 for the Protestants.

The estimates in table 4.48, shows that in Nyanza province each of the programme methods averts more births per woman among fertile women who are Protestants than for those who are Catholics, while each of the non-programme methods averts more births per woman for fertile women who are Catholics than those who are Protestants.

For the Protestants and Catholics the estimates of the births averted per woman are higher for Female sterilization. It is followed by Pill whereas Condom averts the least births per woman. Periodic abstinence as a non-programme method averts more births per woman than Withdrawal among fertile women who are Protestants and catholics.

4.6.5 Births averted per woman in Nyanza Province by educational status.

Table 4.49, shows that the estimates of births averted per woman due to programme contraception are generally higher than those due to non-programme contraception for all levels of education at all age groups. The estimates of births averted per woman due to non-programme contraception are high in the age group 20-24 to 35-39 for fertile women with secondary+ level of education than for those with primary and no education. The estimates of births averted per woman due to non -programme contraception are higher for those fertile women with secondary plus level of education than for those with other levels of education.

In table 4.50, we observe that the estimates of the births averted per woman by each method increase as the level of education

increases. The difference between the estimates of births averted per woman is some how negligible for other levels of education. The methods with the highest estimates are Periodic Abstinence, and Female Sterilization among others, while Condoms has the least estimates of births averted per woman at all levels of education.

Table 4.49
Calculation of the births averted per woman in Nyanza Province by Educational Status using age specific prevalence model.

Age group	No Education Program Contraception	Nonprog	Primary Program Contraception	Nonprog	Secondary+ Program Contraception	nonprog
15-19	0.0	0.0	0.00562	0.00302	0.0	0.0
20-24	0.0	0.0	0.00782	0.00829	0.04336	0.01408
25-29	0.00723	0.0	0.01510	0.00418	0.04803	0.01591
30-34	0.01272	0.03210	0.03356	0.00852	0.0	0.0
35-39	0.03281	0.00596	0.03670	0.00706	0.05910	0.0
40-44	0.00226	0.00139	0.03212	0.01502	0.0	0.0
45-49	0.0	0.0	0.02104	0.0	0.0	0.0

Table 4.50
Calculation of the births averted by each method in Nyanza province by Educational Status using method specific prevalence model.

Method	NoEducation	Primary	Secondary+
Pill	0.00296	0.00122	0.00942
IUD	0.00059	0.00187	0.00805
Condom	0.00042	0.0	0.00127
F/Steril	0.01256	0.00748	0.01832
Abstine	0.00621	0.01021	0.01120

4.7.0 ESTIMATION OF BIRTHS AVERTED PER WOMAN IN RIFT VALLEY PROVINCE

4.7.1 Births averted for all cases combined in Rift Valley.

Table 4.51 Calculation of the births averted in Rift Valley Province using age specific prevalence model.

Age Group	Prevalence rate due to Programme Contraception	Non prog	Births averted by Programme Contraception	Non prog
15-19	13.5	2.3	0.03424	0.00583
20-24	10.2	8.0	0.02203	0.01728
25-29	17.2	9.9	0.05411	0.03115
30-34	21.1	11.8	0.05714	0.03196
35-39	26.0	11.7	0.06830	0.03073
40-44	20.9	3.1	0.03829	0.00568
45-49	15.9	7.9	0.00854	0.00461

Table 4.52
Calculation of the births averted by each method in Rift Valley province using method specific prevalence model.

Method	Prevalence rates U'm	U"m	Births averted
Pill	3.5	0.0	0.00952
IUD	2.2	0.0	0.00632
Inject	5.8	0.0	0.01227
Diaphra	0.8	0.0	0.00169
Condom	0.5	0.0	0.00106
F/steril	5.9	0.0	0.01783
Abstine	0.0	8.5	0.02279
Withdraw	0.0	0.4	0.00107

The estimates of the births averted in table 4.51 reveals that programme contraception averts more births per woman than non-programme contraception in all age groups. The difference between the births averted by the two kinds of contraception increases with age upto age group 40-44 and then declines in the age groups above this. Most births are averted by programme contraception in the age

groups 25-29 to 40-44, while non-programme contraception averts most births in the age groups 25-29 to 35-39 per woman.

The births averted per woman by each method in table 4.52 shows that, Periodic abstinence averts more births than any other method in the province followed by female sterilization, whereas withdrawal averts the least number of births per woman in Rift valley province.

4.7.2 Births averted per woman by place of residence in Rift Valley

Table 4.53
Calculation of births averted in Rift Valley province by place of residence using age specific prevalence model.

Age group	Urban Programme	Urban Non prog Contraception	Rural Programme	Rural Non prog Contraception
15-19	0.0	0.01827	0.0	0.00502
20-24	0.07613	0.02000	0.02051	0.01992
25-29	0.08542	0.05662	0.04162	0.03010
30-34	0.13039	0.04269	0.05820	0.03092
35-39	0.13002	0.00667	0.06748	0.04261
40-44	0.0	0.0	0.04280	0.00429
45-49	0.0	0.0	0.01035	0.00562

Table 4.54
Calculation of births averted by each method in Rift Valley by place of residence using method specific prevalence model.

Method	Urban	Rural
Pill	0.02940	0.00902
IUD	0.05230	0.00309
Injection	0.01774	0.01244
Condom	0.00602	0.00092
F/Steril	0.02704	0.01843
Abstinence	0.02800	0.02265
Withdrawal	0.0	0.0

In both urban and rural areas of Rift Valley Province as can be observed from table 4.53, more births per woman are averted by programme contraception than non-programme contraception except in

the age groups 15-19 to 20-24, where most births per woman are averted by non-programme contraception in both urban and rural areas. The difference between the births averted by programme contraception and non programme contraception is larger in the urban areas than in the rural areas. Programme contraception averts most births per woman in the age groups 20-24 to 35-39 in urban and rural areas.

Table 4.54, shows that each method averts more births per woman among fertile women staying in the urban areas than for those in the rural areas. Most births per woman are averted by IUD, Pill, Female Sterilization and periodic abstinence in both places of residence. In the rural areas, Periodic abstinence averts more births per woman than any other method in Rift Valley province.

4.7.3 Births averted per woman in Rift Valley Province by work status.

Table 4.55
Calculation of the births averted per woman in Rift Valley Province by work status using age specific prevalence model.

Age group	Currently working		Not working	
	Programme Contraception	Non prog	Programme Contraception	Non prog
15-19	0.0	0.0	0.00404	0.00654
20-24	0.01664	0.0	0.02504	0.02561
25-29	0.04501	0.06683	0.03482	0.03162
30-34	0.00892	0.02056	0.08001	0.03406
35-39	0.09284	0.0	0.07027	0.03291
40-44	0.0	0.0	0.04421	0.00807
45-49	0.0	0.0	0.00761	0.00701

Table 4.56
Calculation of the births averted by each method in Rift Valley province by work status using method specific prevalence model.

Method	Currently working	Not working
Pill	0.01622	0.01050
IUD	0.00702	0.00098
Injection	0.01345	0.01200
Diaphragm	0.00291	0.00112
Condom	0.00059	0.00035
F/Steril	0.01342	0.01601
Abstine	0.02407	0.02206
Withdrawal	0.0	0.00106

In Rift Valley, it is observed (from table 4.55) that programme contraception averts more births per woman among fertile women who are working than for those who are not working. For non-programme contraception most births are averted for those women who are not working than for those currently working. Programme contraception averts more births in the age group 25-29 to 30-34 for currently working women and in the age groups 25-29 to 40-44 for those who are not working.

Table 4.56 shows that in Rift Valley province the estimates of the births averted per woman by each programme method among fertile women who are currently working are greater than those for women who are not working. Non programme methods also avert more births for currently working women than for those who are not working.

Female sterilization averts most births in Rift Valley province than any other method followed by Pill and injection for currently working and not working women. Condoms averts the least number of births per woman for the two groups. Abstinence as a non-programme method averts most births per woman among fertile women who are currently working as well as for those who are not working.

4.7.4 Births averted per woman in Rift Valley Province by religion.

Table 4.57
Calculation of the births averted per woman in Rift Valley Province by Religion using age specific prevalence model.

Age group	Protestants Programme Contraception	Protestants Nonprog Contraception	Catholics Programme Contraception	Catholics Nonprog Contraception
15-19	0.01082	0.00967	0.0	0.00592
20-24	0.01587	0.01227	0.00341	0.01874
25-29	0.04159	0.01818	0.00606	0.06432
30-34	0.05148	0.01853	0.00319	0.00987
35-39	0.19870	0.06184	0.01862	0.01542
40-44	0.10076	0.01641	0.00981	0.01859
45-49	0.03251	0.01002	0.00499	0.00320

Table 4.58
Calculation of the births averted by each method in Rift Valley Province by Religion using method specific prevalence model.

Method	Protestants	Catholics
Pill	0.01380	0.00941
IUD	0.00873	0.00242
Injection	0.01778	0.01301
Diaphragm	0.00107	0.00102
Condom	0.00030	0.00023
F/Steril	0.03256	0.01072
Abstinence	0.02192	0.03826
Withdrawal	0.0	0.00390

In table 4.57, as can be observed, programme contraception averts more births per woman than non-programme contraception in all age groups for the Protestants and in certain age groups for the Catholics.

The estimates of the births averted per woman in the lower age groups for example from 20-24 to 30-34, more births per woman are averted for the Catholics than for the Protestants. Most births per woman are averted among fertile women in the age groups 25-29 to

:5-49 for the protestants and 20-24 to 30-34 for the Catholics. More births per woman are averted in the age group 35-39 for the protestants and 30-34 for the Catholics. Non-programme contraception averts more births per woman in the age group 35-39 for the Protestants and 15-19 for the Catholics.

Table 4.58 indicates that each of the programme methods averts more births per woman among fertile women who are Protestants than among those who are Catholics. As for the non-programme methods, each method averts more births per woman among fertile Catholic women than among fertile Protestant women.

Female Sterilization has the highest estimate of the births averted per woman for fertile Protestant women, while Injections has the highest estimate of the births averted per woman for fertile Catholic women. Condoms and Diaphragm have the least estimate of the births averted per woman for both the Protestant and Catholic women. As regards non-programme contraception Periodic Abstinence averts most births per woman for fertile Protestant and Catholic women, while withdrawal averts the least number of births per woman.

4.7.5 Births averted per woman in Rift Valley province by educational status.

Table 4.59
Calculation of the births averted per woman in Rift Valley Province by Educational Status using age specific prevalence model.

Age group	No Education Program	Nonprog Contraception	Primary program	Nonprog Contraception	Secondary+ Program	Nonprog Contraception
15-19	0.0	0.0	0.02531	0.00294	0.0	0.0
20-24	0.0	0.02710	0.04021	0.01462	0.04102	0.0
25-29	0.02630	0.02571	0.05301	0.01432	0.06105	0.09965
30-34	0.02765	0.03077	0.05103	0.03146	0.03996	0.03352
35-39	0.02866	0.02214	0.05467	0.03261	0.06727	0.06633
40-44	0.01727	0.04321	0.03071	0.01251	0.0	0.0
45-49	0.00105	0.00190	0.00377	0.00682	0.0	0.0

Table 4.60
Calculation of births averted by each method in Rift Valley by Educational Status using method specific prevalence model.

Method	No Education	Primary	Secondary+
Pill	0.00302	0.01521	0.02364
IUD	0.00247	0.00523	0.01032
Inject	0.00592	0.01702	0.02144
Diaphragm	0.0	0.00214	0.00297
Condom	0.00204	0.0	0.00205
F/Steril	0.01446	0.02461	0.02639
Abstine	0.01556	0.01962	0.04296

Table 4.59, shows that in terms of the estimates of births averted per woman in Rift Valley province, programme contraception has higher estimates than non-programme contraception in all age groups at all levels of education. The estimates of the births averted per woman by programme contraception are higher in the age groups 25-29 to 35-39 for fertile women with secondary+ level of education than for those with either primary or no education. The estimates of the births averted by non-programme

contraception for fertile women with secondary+ level of education are higher than for fertile women with primary and the non educated.

The estimates of the births averted per woman by each method increases with the level of education. Table 4.60 shows that in Rift Valley province the methods with highest estimates of the births averted per woman are Female sterilization, Periodic abstinence and IUD, while Condoms has the least estimates of the births averted per woman in the province.

4.8.0 ESTIMATION OF BIRTHS AVERTED PER WOMAN IN WESTERN PROVINCE

4.8.1 Births averted in Western Province for all cases combined.

The estimates of births averted by programme contraception per woman, table 4.61, are higher than those averted by non-programme contraception. In the age groups 25-29 to 35-39, programme contraception averts most births per woman among fertile women in the province and for nom-programme contraception most births are averted in the age group 35-39. Births averted per woman in western province are however, generally lower than the national estimates in table 3.1.

In terms of births averted by each method , the estimates in table 4.62 shows that Pill averts more births per woman than any other method that is used by fertile women in the province as shown in table 4.13. It is followed by female sterilization and periodic abstinence, while Diaphragm averts the least number of births per woman.

Table 4.61
Calculation of births averted per woman in Western Province using age specific prevalence model.

Age group	Prevalence rates due to Programme	Non prog Contraception	Births averted by Programme	Non prog Contraception
15-19	3.2	0.0	0.00858	0.0
20-24	4.2	0.0	0.00629	0.0
25-29	8.1	3.0	0.01907	0.00706
30-34	14.0	1.7	0.04832	0.00587
35-39	13.8	4.6	0.05040	0.01013
40-44	5.3	0.0	0.00556	0.00512
45-49	20.4	0.0	0.0	0.0

Table 4.62
Calculation of the births averted by each method in Western Province using method specific prevalence model.

Method	Prevalence rates U'm	U"m	Births averted by
Pill	4.2	0.0	0.00810
IUD	1.5	0.0	0.00306
Inject	1.3	0.0	0.00195
Diaphra	0.2	0.0	0.00030
Condom	0.2	0.0	0.00030
F/steril	3.0	0.0	0.00643
Abstine	0.0	2.4	0.00477

4.2 Births averted by place of residence in Western Province.

Table 4.63
Calculation of the births averted per woman in western province by place of residence using age specific prevalence model.

Age group	Urban Programme Contraception	Urban Non prog Contraception	Rural Programme Contraception	Rural Non prog Contraception
15-19	0.0	0.0	0.0	0.0
20-24	0.03680	0.0	0.00701	0.0
25-29	0.10402	0.00306	0.01880	0.00630
30-34	0.12062	0.00192	0.06055	0.00806
35-39	0.13002	0.0	0.04032	0.01632
40-44	0.0	0.0	0.01204	0.01090
45-49	0.0	0.0	0.00690	0.0

Table 4.64
Calculation of the births averted by each method in Western Province by place of residence using method specific prevalence model.

Method	Urban	Rural
Pill	0.02756	0.01920
IUD	0.06535	0.00109
Injection	0.00273	0.00197
F/Steril	0.01906	0.01492
Abstinence	0.00814	0.00539

From table 4.63,it is observed that in Western province, programme contraception averts more births per woman among fertile women in the age groups 20-24 to 35-39 in urban and rural areas. Non-programme contraception averts more births per woman in the rural areas than in the urban areas in all age groups. The estimates of births averted per woman by programme contraception in Central province are higher than the estimates due to non-programme contraception in both Urban and Rural areas.

As shown in table 4.64, most births per woman are averted by each method in the urban areas than in rural areas. Pill, Female

sterilization and periodic abstinence avert most births per woman in the urban and rural areas than other methods. These estimates are less than the National estimates in table 3.7.

4.8.3 Births averted per woman in Western Province by work status.

Table 4.65
Calculation of the births averted per woman in Western province by Work status using age specific prevalence model.

Age group	Currently working		Not working	
	Programme Contraception	Non-prog	Programme Contraception	Non-prog
15-19	0.0	0.0	0.01172	0.0
20-24	0.01072	0.0	0.00651	0.0
25-29	0.07001	0.01264	0.01572	0.00592
30-34	0.04325	0.00841	0.03448	0.00680
35-39	0.04891	0.0	0.04218	0.01506
40-44	0.0	0.0	0.00621	0.00624
45-49	0.0	0.0	0.00523	0.0

Table 3.66
Calculation of the births averted per woman in Western province by work status using method specific prevalence model.

Method	currently working	Not working
Pill	0.00512	0.00443
IUD	0.01102	0.00148
Injection	0.00265	0.00209
Diaphragm	0.00349	0.0
Condom	0.0	0.00030
F/steril	0.01349	0.00632
Abstinence	0.00712	0.00064

The estimates of the births averted by programme and non programme contraception in Western Province as shown in Table 4.65, reveals that programme contraception averts few births per woman for currently working women than for those who are not working. For those who are working programme contraception averted more per

woman most births in the age groups 25-29 to 35-39.

It is observed from table 4.66, that in Western province each of the methods used by fertile women averts more births per woman for currently working women than for those who are not working. IUD and Female sterilization are the only methods which have reasonable difference between the births averted for currently working women and those who are not working. The remaining methods have small differences between the births averted per woman for those who are currently working and those who are not working. The least number of births are averted by Diaphragm and Condoms for currently working women and those who are not working respectively.

4.8.4 Births averted per woman in Western Province by religion.

Table 4.67

Calculation of the births averted per woman in Western province by religion using age specific prevalence model.

Age group	Protestants		Catholics	
	Programme Contraception	Nonprog	Programme contraception	Nonprog
15-19	0.01585	0.0	0.0	0.0
20-24	0.01150	0.0	0.00439	0.0
25-29	0.02089	0.00532	0.01102	0.00558
30-35	0.05066	0.00541	0.04584	0.01105
35-39	0.04402	0.00765	0.03662	0.01618
40-44	0.00628	0.00427	0.01732	0.01201
45-49	0.0	0.0	0.0	0.0

Table 4.68

Calculation of the births averted by each method in Western province by religion using method specific prevalence model.

Method	Protestants	Catholics
Pill	0.01812	0.01242
IUD	0.00402	0.00403
Injection	0.00301	0.0
Condoms	0.00061	0.00109
F/Steril	0.00954	0.00652
Abstinence	0.00505	0.00802

In western province as is shown in table 4.67, the estimates of the births averted due to programme contraception are higher than those due to non-programme contraception for the Protestant and Catholic Women in all age groups. The estimates of births averted per woman due to programme contraception for the fertile Protestant women are generally higher than those for the fertile Catholic women in all age groups. The estimates of the births averted by programme contraception are high in the age groups 25-29 to 35-39 for fertile women who are Protestants and 30-34 to 40-44 for fertile women who are Catholics. For Non-programme contraception the estimates of the births averted per woman are high in the age group 35-39 for the Protestants and Catholic women.

From table 4.68, we can observe that there is clear difference between the births averted per woman by each programme method among fertile women who are Protestants and those who are Catholics. But among the non-programme methods , Periodic abstinence averts more births per woman among fertile women who are Catholics than those who are Protestants. The programme methods that averts more births per woman is Female Sterilization followed by Pill for both fertile women who are Protestants and those who are Catholics.

4.8.5 Births averted per woman in Western Province by educational status.

Table 4.69
Calculation of the births averted per woman in Western province by Educational Status using age specific prevalence model.

Age group	No Education		Primary		Secondary+	
	Program	Nonprog Contraception	Program	Nonprog Contraception	Program	Nonprog Contraception
15-19	0.0	0.0	0.00210	0.0	0.0	0.0
20-24	0.0	0.0	0.00542	0.0	0.01077	0.0
25-29	0.01891	0.0	0.00436	0.00202	0.04389	0.02063
30-34	0.02600	0.00101	0.07029	0.00372	0.09441	0.00513
35-39	0.03273	0.01211	0.06031	0.01154	0.12360	0.0
40-44	0.00612	0.00445	0.00962	0.01272	0.09612	0.0
45-49	0.0	0.0	0.00900	0.0	0.0	0.0

Table 4.70
Calculation of the births averted by each method in Western province by Educational Status using method specific prevalence model.

Method	No education	Primary	Secondary+
Pill	0.00806	0.00920	0.00967
IUD	0.0	0.00200	0.02406
Injection	0.00654	0.02264	0.02496
Diaphragm	0.0	0.0	0.00304
Condom	0.0	0.0	0.00126
F/Steril	0.00912	0.01312	0.01544
Abstinence	0.00803	0.00816	0.00966

Table 4.69 above, shows that the estimates of births averted per woman in all age groups due to programme contraception are higher than those due to non-programme contraception for all levels of education in Western province. The estimates of births averted per woman by programme contraception are generally high for fertile women with secondary+level of education in the age groups 20-24 to

40-44 than for other levels of education, but for all the levels of education the estimates of the births averted per woman are high in the age groups 25-29 to 40-44. The estimates of births averted by non-programme contraception for fertile women with no education in Western province are higher than for those with higher levels of education.

Table 4.70, shows that the estimates of the births averted by each method per woman increase with the level of education in the province. Periodic Abstinence and female sterilization are the methods in the province which have the highest estimates of the births averted per woman,while Condoms and Diaphragm have the least estimates of births averted per woman.

4.9.0 DISCUSSION.

Programme contraception had more effect on Kenyas' fertility by Province than non-programme contraception in 1989 except for Eastern province. In all the Provinces the estimates of the births averted per woman are high in the age groups 25-29 to 35-39. This confirms further the findings at National level mentioned earlier, and the results of KDHS (1989) that most of the current contraceptive use is high in the age group 35-39. In all the provinces the methods which had the highest estimates of births averted per woman are Pill, IUD, Female Sterilization, Periodic Abstinence and Injection. The other methods have the least estimates of the births averted per woman. The reasons which can be given for this are that there might be a tendency of educating the fertile women about particular methods more than others and that fertile women can resort to using the most convenient methods which may happen to be among a certain group of methods.

4.9.1 Socioeconomic factors.

At provincial level, economic factors seem to have affected fertility through programme contraception more than through non-programme contraception. The estimates of births averted per woman seem to increase by place of residence in each province. This confirms the earlier findings, for example by Onguti (1987), that fertility in urban areas is lower than the fertility in the rural areas and that the difference between fertility in major urban areas and other urban areas is small. This can be due to the fact that in all the provinces, it is in the urban areas where most of the programme clinics are found. The programme methods are mostly used in urban areas than in rural areas.

By work status, it is the currently working fertile women who have higher estimates of births averted per woman than those who were not working in all the provinces. This agrees with the findings at the national level and from other studies. For fertile women who are currently working and not working, the estimates of births averted per woman in all the provinces due to programme contraception are higher than those due to non-programme contraception in all age groups. This shows that for both groups programme contraception has affected fertility more than non-programme contraception in almost all age groups except in the lower age groups in Eastern province. The estimates of the births averted per woman in each province are generally high in the age groups 25-29 to 35-39, confirming the KDHS (1989) result that most of the current contraceptive users are in the age group 35-39. It also agrees with the National finding that the estimates of the births averted per woman are in the age groups 25-29 to 35-39. Equally observed is the fact that particular methods have higher estimates of births averted per woman than others in all provinces.

This implies that work status might be influencing the use of particular methods by fertile women to avoid being pregnant.

By Education it is observed that the estimates of births averted per woman increases with education in all provinces. This confirms Ikamari, (1995) finding that the highest increase in the number of current users of contraceptive was found for those with Secondary plus level of education than for other levels of education and Onguti (1987) finding that fertile women with secondary plus level of education have the lowest fertility in Kenya. The estimates of births averted by each method are higher than for those fertile women with the highest level of education-thus, one can say that education affects the effective use of each of the methods in each province.

4.9.2 Cultural Factors.

Culturally, fertility has been affected more by Programme contraception than by non-programme contraception in all provinces except in Eastern province. The estimates of the births averted per woman due to programme contraception are higher than those due to non-programme contraception for the Protestants and the Catholics in all Provinces. The estimates of the births averted per woman by programme contraception for the Protestants are slightly higher than those due to non-programme contraception in all provinces. This might lead to a bit lower fertility for the Protestants than for the Catholics. This confirms earlier findings by Onguti (1987), Ochola Ayayo and Osiemo (1989), and Ottieno and Ochola Ayayo (1988) that the Protestants have slightly lower fertility than the Catholics in Kenya.

Although it is observed that programme contraception has affected fertility more than non-programme contraception in all the provinces there still exists un uniform distribution in the

estimates of the births averted per woman due to programme contraception by region.

The highest estimates of the births averted per woman were found in Central province followed by Eastern province, while the least estimates were found in Nyanza and Western provinces. This confirms the KDHS (1989) results which asserts that, as the distance increases from Nairobi the use of contraceptives decreases. The regions with low estimates of births averted per woman are found in the high mortality regions of Kenya. Thus one can assume that the high infant and child mortality in these regions are the contributing factors to the low estimates of the births averted per woman in these regions.

Chapter five.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

5.1.0 INTRODUCTION TO SUMMARY.

The main objective of this study was to evaluate the impact of family planning programme on fertility in Kenya by the Prevalence Model.

The study aimed at specifically estimating births averted by programme and non-programme contraception at National and Provincial levels for all cases combined and also by the differentials of Socio-economic and Cultural. For Socio-economic category we considered Place of residence, Work status and Education of married women, while for Cultural category we considered Ethnicity and Religion only.

The data used was the KDHS (1989) conducted by NCPD in collaboration with CBS and Westinghouse. The type of Sampling used in KDHS is basically stratified sampling method, which already had been conducted by CBS under what is called the NASSEP II programme.

The Prevalence model has two versions namely the Age specific prevalence model and Method specific prevalence model. Age specific prevalence model has been used to estimate the births averted per woman in each age-group in Kenya. Method specific prevalence model has been used to estimate the contribution of each method of contraception to the total births averted.

A number of interesting results have come up using the two versions as described below;

5.2.0 THE RESULTS OF AGE SPECIFIC PREVALENCE MODEL:-

It has been found that the estimates of the births averted per woman in the age groups are not the same. The estimates of the births averted per woman due to programme contraception were found

to be higher in the age groups 25-29 to 35-39 and lower in the other age groups in Kenya. A similar pattern has been observed for non-programme contraception, but the estimates of the births averted per woman by non-programme contraception are generally lower than those due to programme contraception. This shows that programme contraception is used more by fertile women in Kenya to avoid being pregnant.

By place of residence, the estimates of births averted per woman in Kenya due to programme contraception are higher in each age group for fertile women staying in the Urban areas than those staying in the Rural areas. For non-programme contraception the estimates of births averted per woman are higher for fertile women staying in the rural areas than for those staying in the Urban areas. It can therefore be concluded that in Kenya programme contraception is used more by fertile women in the Urban areas to avoid pregnancy than by the fertile women staying in the rural areas. Non-programme contraception has affected the fertility of the rural fertile women more than for the fertile urban women.

The estimates of births averted per woman by programme contraception by work status shows that currently working women have higher estimates than those not working. A similar trend is observed for non-programme contraception. This case has also been noticed at the provincial level, but the estimates are higher in certain provinces than in others. The highest estimates were calculated in Central province while the lowest estimates were observed in Nyanza and Western provinces. Infact, the estimates in Nyanza and Western provinces for those women who are currently working are even lower than those for women who are not working in Central province. This indicates that although programme contraception affects fertility of currently working women in all provinces than those not working, the effect is greater in certain

provinces than in others. By religion, the protestants have the highest estimates of births averted per woman due to programme contraception than the Catholics and Muslims. The estimates of births averted per woman by non-programme contraception are higher for the Catholics than for the Protestants and Muslims in all age groups. For the Muslims very few births are averted by non-programme contraception in Kenya. This implies that programme contraception affects the fertility of the fertile Protestant women more than that of the fertile Catholic and Muslim women. Non-programme contraception affects the fertility of fertile Catholic women than that of the fertile Protestant and Muslim women.The difference between the estimates of births averted per woman for the Protestants and the Catholics is very minimal in each age group. The estimation of the births averted per woman at provincial level also agrees with the trend observed above. In all the provinces the estimation has only been done for the Protestants and Catholics except in Coast province where the estimation has also been done for the Muslims.

The estimates of births averted per woman in Kenya increases with the level of education. The highest estimates of births averted per woman are in those fertile women with Secondary plus level of education in all age groups, while the lowest estimates are in those women with no education. The estimates of births averted per woman due to programme contraception are higher than those due to non-programme contraception for all the levels of education. The estimation of births averted per woman at regional level also reveals a similar trend to the one found at the National level; except for Eastern province where the estimates of the births averted per woman due to non-programme contraception in the age groups 15-19 to 20-24 are greater than those due to programme contraception. This shows that in Kenya, as the level of education

increases, the effectiveness of contraception also increases especially programme contraception. In Eastern province the young fertile women in the age group 15-19 to 20-24 effectively use non-programme contraception than programme contraception to avoid pregnancy.

By Ethnicity, it has been found that the estimates of the births averted per woman by programme contraception are higher for certain tribes than for others. The tribes in the low mortality regions in Kenya have the highest estimates of births averted per woman, those in the high mortality regions have lower estimates of births averted per woman. Generally, for almost all tribes in Kenya, the estimates of births averted per woman due to programme contraception are higher than those due to non-programme contraception except for the Kambas who have higher estimates of births averted per woman due to non-programme contraception than those due to programme contraception. This shows that the effective use of the contraceptives varies for tribes in Kenya.

5.3.0 METHOD SPECIFIC PREVALENCE MODEL.

The estimates at National level of the births averted per woman have shown that Periodic abstinence which is a non-programme method has the highest estimate of the births averted per woman than all other methods. This shows that in Kenya non-programme contraception still has a greater effect on fertility. Among the programme methods, it is female sterilization that has the highest estimate followed by Pill and IUD. This shows that female sterilization is a more effective method of contraception than all other programme methods. Condoms and Diaphragm are the programme methods with the least estimates of births averted per woman. This shows that the male oriented methods are the least effective methods in Kenya. At provincial level it has been observed that in Central, Coast and Nairobi provinces the programme methods Pill,

IUD and Female Sterilization have the highest estimates of births averted per woman than the non-programme method (Periodic Abstinence). In the remaining provinces, Periodic Abstinence has the highest estimate of births averted per woman. These estimates of births averted per woman differ by region. The highest estimates due to programme methods are found in Central and the least estimates are found in Coast province. For non-programme methods, the highest estimates are found in Eastern province and the lowest in Coast province. Therefore, it is noted that effective use of each method differs by regions in Kenya.

By place of residence, the estimates of births averted per woman by each programme method are higher for fertile women staying in Urban areas than for those staying in Rural areas, while for non-programme methods the estimates are higher for women staying in the Rural areas than for those staying in Urban areas. In the Urban areas it is Pill which has the highest estimate of births averted per woman followed by IUD and Female Sterilization while in the rural areas it is Periodic Abstinence which has the highest estimate of births averted per woman, followed by female sterilization, Pill and IUD. This shows that in the Urban areas there is more effective use of programme methods than non-programme methods and the reverse is true in the rural areas in Kenya. At provincial level it has been observed that the estimates of births averted per woman by each method are higher in the urban areas than in the rural areas except for Nairobi and Eastern province which were classified as Urban and rural respectively. This is a clear indication that in all the regions except Eastern, programme methods have affected fertility more than non-programme methods in the Urban areas. In the rural areas non-programme methods have affected fertility more than programme methods.

The estimates of the births averted per woman by each method

by work status in Kenya has shown that for currently working women, each method has higher estimate than for those women who are not working. For currently working women IUD has the highest estimate of births averted per woman and it is closely followed by Periodic Abstinence then Female Sterilization and Pill. Condoms and Withdrawal have the least estimates. Among women who are not working, Periodic Abstinence has the highest estimate of births averted per woman followed by Pill, Female Sterilization and IUD while Diaphragm and Withdrawal have the least estimates of births averted per woman. In the provinces a trend similar to the National one described above has been observed. In Central province and Nairobi, programme methods have high estimates of births averted per woman even for women who are not working than non-programme contraception. Generally, however, programme methods affect fertility more for women who are currently working than non-programme methods; but for those who are not working non-programme methods affect fertility more than programme methods.

Although estimates of births averted per woman by each method increase with the level of Education, Periodic Abstinence has the greatest estimate of births averted per woman. Among the programme methods, the methods which have higher estimates of births averted per woman are Pill, IUD and Female Sterilization. These observation are at National level. The estimates of births averted per woman at regional level also show that as the level of education increases the estimates of births averted per woman by each method also increase.In almost all provinces, it was seen that a programme method had the highest estimate of births averted per woman for all levels of education except in Eastern province. This shows that in Kenya Programme and non-programme methods affect fertility more for fertile women with the highest level of education, than for those with low level of education.

By Religion, the estimates of the births averted per woman by each programme method are higher for the Protestants than for the Catholics and Muslims while non-programme methods have higher estimates of births averted per woman for the Catholics than for the protestants and Muslims. We should note however that the estimates of births averted per woman for the protestants and the Catholics have no big difference, but they are higher than the estimates of births averted per woman for the Muslims by each method. For the Protestants, Female sterilization has the highest estimate of births averted per woman followed by Periodic Abstinence, Pill and IUD, while for the Catholics , Periodic Abstinence has the highest estimate of births averted per woman followed by Pill, Female Sterilization and IUD. For the Muslims, Pill has the highest estimate of births averted per woman followed by Periodic Abstinence, IUD and Female Sterilization. These patterns are the same both at National and regional levels. Estimates of births per woman by either programme or non-programme methods for the Muslims at the Coast are very low. This indicates that although Programme methods affect the fertility of the Protestants more than that of the Catholics; non-programme methods affect the Catholics fertility more than the Protestants fertility; their fertility are likely to have slight difference. For the Muslims, programme and non-programme methods have not had an effect comparable to that for the Protestants and Catholics on their fertility in Kenya.

At National level, the estimates of births averted per woman by Ethnicity has shown that for certain tribes, programme and non-programme methods have had varying effect on their fertility. It is observed that for the Kikuyu, Meru-Embu, Luo, Luhya and Gusii women, a programme method has the highest estimate of births averted per woman. The methods which have higher estimates of

births averted per woman are Pill, IUD, Female Sterilization and Periodic Abstinence. For the Kamba and Kalenjin, women it is the non-programme method that show the highest estimate of births averted per woman; and the methods, Periodic Abstinence, Pill, IUD, and Female Sterilization are the ones which have higher estimates of the births averted per woman. There seems to exist a similar set of methods which have high estimates of births averted per woman for all tribes in Kenya. The male oriented methods (Condoms and Withdrawal) have the lowest estimates of births averted per woman for all tribes in Kenya. The estimates of the births averted per woman by programme methods are generally higher for the Kikuyu, Meru-Embu women, while the Luo fertile women have the least estimates of the births averted per woman. This gives a clear indication that effective use of each method varies from tribe to tribe.

5.4.0 SUMMARY OF THE RESULTS:

From the study it has been found that:-

(i) The effect of programme contraception on fertility in Kenya is greater than that of non-programme contraception. But Periodic Abstinence as a method features prominently.

(ii) The estimates of births averted per woman are higher in the age groups 25-29 to 35-39, but highest in the age group 35-39 for programme contraception.

(iii) Increased level of Education in Kenya is necessary for higher estimates of births averted in each age group and by each method.

(iv) In the Urban areas in Kenya programme contraception averts more births than non-programme contraception.

(v) Currently working women in Kenya have higher estimates of births averted per woman by programme contraception than

for those who are not working.

(vi) The estimates of the births averted per woman by programme and non-programme contraception for the Muslims are lower compared to those for the Protestants and Catholics.

(vii) Programme contraception affects the fertility of the Protestants slightly more than the Catholics' fertility, while non-programme contraception affects Catholics' fertility slightly more than the Protestants Fertility in Kenya.

(viii) Programme and non-programme contraception have affected the fertility of various tribes differently in Kenya.

(ix) There exists a set of methods which have high estimates of births averted per woman, it is composed of Pill, IUD, Female Sterilization, Periodic Abstinence and Injection, while male oriented methods have the lowest estimates of the births averted per woman.

5.5.0 POLICY ORIENTED RECOMMENDATIONS:

Arising out of the above findings, this Study strongly recommends that:

(i) More encouragement should be given to women participation on development projects (i.e roles and status of women should be recognized and uplifted) as measures to increasing the impact of programme contraception on fertility.

(ii) The Government should also increase the number of Kenyan women with at least Secondary level of education in order to increase the impact of programme contraception on fertility.

(iii) Most births are averted in the age groups 25-29 to

35-39. Thus the Government should intensify the provision of services to women in these age groups as a measure to increase the impact of programme contraception on fertility. Meanwhile, due to the controversy for use of modern methods by the "pressure group", both the Government Organizations (GOs) and Non-Governmental Organizations (NGOs) should try to introduce National Family Planning Programme for the adolescent group of ages less than 24 years.

(iV) From this study it is clear that Periodic Abstinence is most prominent, therefore such methods of non-programme contraception should be encouraged by both (GOs) and (NGOs). So far it is only Catholic Secretariat that has established a number of Natural Family Planning Clinics in the Country.

5.6.0 RESEARCH ORIENTED RECOMMENDATIONS:-

We recommend further research in these areas :-

(i) Since programme and non-programme contraception have little effect on the Muslims fertility, but other studies have shown that the Muslims have a lower fertility, then the use of another method e.g. Standardization Approach which shows other factors responsible for fertility decline will be most appropriate in Kenya.

(ii) Some methods such as Condoms and Pills are usually available outside the programme. In this study all modern methods have been termed as programme methods and traditional methods as non-programme methods. The application of these models with the source of each method properly identified is the most appropriate to isolate the real effect programme contraception on fertility.

(iii) Further research should be done on Male oriented methods.

(iV) Indepth Socio-Cultural study should be looked into examining factors contributing to choices of particular methods.

(V) There should be expansion in the rural areas of programme centres taking into account other factors in the area of Socio-Cultural and Socio-Economic.

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APPENDICES.

APPENDIX 1

COALE-TRUSSELL P/F RATIO TECHNIQUE (1975).

The Coale-Trussell P/F technique seeks to adjust the level of observed age-specific fertility rates, which are assumed to represent the true age pattern of fertility, to agree with the level of fertility indicated by the average parities of women in age groups lower than ages 30 and 35, which are assumed to be accurate. Measures of average parity equivalents, F, comparable to reported average parities, P, are obtained from period fertility rates by cumulation and interpolation (these measures are effectively averages of the cumulated fertility schedule over age groups). Ratios of average parities (P) to the estimated parity equivalents (F) are calculated by age group, and an average of the ratios obtained for younger women is used as an adjustment factor by which all the observed period fertility rates are multiplied. Note that P/F ratios are generally calculated for the entire age range from 15 to 49, even though not all the ratios are used for adjustment purposes. This is recommended because the pattern of the ratios with age may reveal data errors or fertility trends.

The main assumption underlying this technique is that the pattern of fertility has been constant in the past. The method is inappropriate if there have been recent changes in marital fertility or changes in ages at marriage, since it will no longer be valid to assume that the pattern of fertility experienced by the older women was the same as that experienced now.
However, when fertility decline is mainly due to effective contraception at older ages, an adjustment based on the experience of women in their 20's may still be useful.

B. Data Required

(1) Total children ever born classified by five-year age group of mother.

(2) Total births in the last year by five-year age group of mother.

(3) Total female population in each five-year age group (irrespective of marital status)

C. The Computational Procedure

The computation of the total fertility rate using the Coale-Trussell technique involves 6 distinct steps which will be described in details in this section. The 6 steps are: the computation of reported average parities, the calculation of age-specific fertility rates using births in the last year, the calculation of cumulated fertility schedule for a period, estimation of average parity equivalents for a period, calculation of a fertility schedule for convectional five-year age groups and adjustment of period fertility schedule.

To obtain the value of the reported average parity of women in the age group i, denoted by p(i), the total number of children ever born to women in the age group i was divided by the total female population in that age group.

The age-specific fertility rates, denoted by f(i),are obtained by dividing the number of births occurring to women in age group i during the year preceding the interview by the total female population in that age group.

The computation of the cumulated fertility schedule, which was denoted by Q(i), involves adding the age-specific rates computed in step 2 from f(1) to f(i)

Therefore,

$$Q(i)=\sum_{j=1}^{i}(f(j))$$

Average parity equivalents, which were denoted by F(i), are estimated by interpolation using the period fertility rates f(i)

and the cumulated fertility values Q(i) calculated in the previous steps

Therefore F(i) is obtained as,

$$F(i)=Q(i-1)+a(i)*f(i)+b(i)*f(i+1)+c(i)*Q(7)$$

for i=1,2,3,4,.....6

and $F(7)=Q(6)+a(7)*f(6)+b(7)*f(7)$

The values of a(i), b(i) and c(i) were obtained from table 2.1.

Coefficients for interpolation between cumulated fertility rates to estimated parity equivalents.

AGE GROUP	INDEX(i) (1)	a(i) (2)	b(i)	c(i)
15-19	1	2.531	-0.188	0.0024
20-24	2	3.321	-0.754	0.0161
25-29	3	3.265	-0.627	0.0145
30-34	4	3.442	-0.563	0.0029
35-39	5	3.518	-0.763	0.0006
30-44	6	3.862	-2.481	-0.0001
45-49	7	0.392	2.608	

SOURCE: UN, MANUAL X, 1983, P.34.

When age-specific fertility rates have been calculated from births in a 12-year month period classified by age of mother at the end of the period, they are specific for unorthodox age groups that are shifted by six months. A fertility schedule for convectional five-year age groups, f*(i), can be estimated by weighing the rates referring to unorthodox age groups according to equation 2 and 3 and using the coefficients displayed in table 4. It is important to note that when fertility rates have been calculated from births classified by age of mother at the time of delivery, this step is not required.

$$f+(i)=(1-w(i))*f(i)+w(i)*f(i+1).....2$$

Where f(i) and f+(i) are respectively the unadjusted and the adjusted age specific fertility rates, and the weighing factor, w(i), is calculated as

$$w(i)=x(i)+y(i)*f(i)/Q(7)+z(i)*f(i+1)/Q(7).....3$$

Coefficients for interpolation between cumulated fertility rates to estimated parity equivalents.

AGE GROUP	INDEX(i)	x(i)	y(i)	z(i)
15-19	1	.031	2.287	-0.114
20-24	2	.068	0.999	-0.233
25-29	3	.094	1.219	-0.977
30-34	4	.120	1.139	-1.531
35-39	5	.162	1.739	-3.5926
30-44	6	.270	3.454	-21.492
45-49	7			

SOURCE: UN, MANUAL X, 1983, P.34.

The adjustment factor is obtained by dividing p(i) by F(i) and if p(2)/F(2) and p(3)/F(3) are reasonably consistent then either of them can be used as the adjustment factor. If not then a weighted average of the two can be used. However, if the ages of the women are believed to have been pushed up or down then the mean of all the P(i)/F(i) ratios can be used.

The adjusted age-specific fertility rates for convectional age groups (f*(i)), is obtained by multiplying the fertility rates for convectional age groups f(+(i), by k, the chosen adjustment factor.

$$f*(i)=k*f+(i)$$

The total fertility rate is calculated as

$$TFR=5\sum_{i=1}^{7} f*(i).$$

Estimates of fertility using the Coale and Trussell P/F technique.

To compute fertility rates using the Coale-Trussell P/F technique, we required the total female population (FPOP), the children ever born (CEB)and the births in the last year. The raw data required is appears in the appendix 3.

Estimation of the total fertility rate using the Coale-Trussell technique.

NATIONAL

AGE GROUP	INDEX	FPOP	CEB	BLY	P(i)	f(i)
15-19	1	224	229	82	1.022321	.3660714
20-24	2	729	1436	288	1.969822	.3950617
25-29	3	999	4230	325	4.234234	.3253253
30-34	4	752	3923	219	5.216755	.2912234
35-39	5	706	4721	267	6.686969	.3781870
40-44	6	540	4055	58	7.509259	.1074074
45-49	7	341	2849	12	7.768328	.0351906
			6813			9.492334

Q(i-1)	F(i)	w(i)	f(i)+	P/F	f(i)*
0	.8750368	.1239426	.4150364	1.168318	.2680582
1.830357	3.049888	.1015919	.3791472	.6458668	.2448786
3.805666	4.822895	.1058039	.3230875	.8779446	.2086715
5.432292	6.249292	.0939473	.2959405	.8347754	.1911381
6.888409	8.142615	.1906399	.3631335	.8212311	.2345358
8.779344	9.105895	.2293875	.0950036	.8246592	.0613596
9.316381	9.728100		.0271183	.7985453	.0175148

Kmean= .8005037 TFR= 6.130784

K1= .6458668

K2= .8779446 Ka= 0.7619057

In appendix 3, the number of children ever born and children born in the year preceding the survey for married women who were interviewed during the Kenya Demographic and Health Survey and the prevalence rates are partly shown.

Using the two, children ever born and births in the year preceding the survey, parity P(i) and age specific fertility rate f(i) are computed as follows:

$$P(i) = \frac{\text{children ever born}}{\text{female population}} \quad \text{and} \quad f(i) = \frac{\text{births in the last year}}{\text{female population}}$$

Below is an illustration of the above formulation:-

$$P(2) = \frac{CEB(2)}{FPOP(2)} = \frac{1436}{729} = 1.969822 \quad \text{and} \quad f(3) = \frac{BLY(3)}{FPOP(3)} = \frac{325}{999} = 0.3253253.$$

The values of Q(i), the cumulated fertility schedule, are obtained using the following formula:

$$Q(i) = 5 \sum_{j=1}^{i} f(i)$$

For example,

$$Q(4) = \sum_{j=1}^{4} f(j) = 5(0.3660714+0.3950617+0.3253253+0.2912234) = 6.888409$$

The current average parity equivalents, F(i), are computed using the following formula:

$$F(i) = Q(i-1)+a(i)*f(i)+b(i)*f(i+1)+c(i)*Q(7)$$

and $$F(7) = Q(6)+a(7)*f(6)+b(7)*f(7)$$

An example of this is;

$$F(2)=Q(1)+a(2)xf(2)+b(2)xf(3)+c(2)Q(7)$$

$$=1.830357+(3.321)(0.3950617)+(-0.754)(0.3253253)+(.0161)(9.492334)$$

=3.049888

and

F(7)=9.316381+(0.392)(0.1074074)+(2.608)(0.0351906)

=9.728100

The reported period rates, f(i), for convectional age groups using the equation:

f+(i) = (1-w(i-1))*f(i)+w(i)*f(i+1)

Where,

w(i)=x(i)+y(i)*f(i)/Q(7)+z(i)*f(i+1)/Q(7)

and w(i) is the weighting variable.

For example,

f+(2)=(1-w(1))f(2)+(w(2)xf(3))

Since $w(1)=x(1)+\frac{y(1)xf(1)}{Q(7)}+\frac{z(1)xf(2)}{Q(7)}$

$=0.031+\frac{2.287(0.3660714)}{9.492334}-\frac{0.114(0.3950617)}{9.492334}$

=0.1239426

and $w(2)=x(2)+\frac{y(2)xf(2)}{Q(7)}+\frac{z(2)xf(3)}{Q(7)}$

$=0.068+\frac{0.99(0.3950617)}{9.492334}-\frac{0.233(0.3253253)}{9.492334}$

=0.1015919

then f+(2)=(1-0.1239426)x0.3950617+0.1015919x(0.3253253)

=0.3791472

The first step in selecting an adjustment factor, for the converted fertility rates obtained above is to calculate the P/F ratios. These are shown in the table above.

The probable reason for the inconsistency of the ratios is the up

and down pushing of the women ages.Hence four K values were calculated as given below:

K1=P2/F2=0.6458668

K2=P3/F3=0.8779446

Ka=(P2/F2+P3/F3)1/2=0.7619057

Km=(P1/F1+P2/F2....P7/F7)1/7=0.805037

Hence K= (K1, K2, Ka, Km)

f*(i)=Kxf+(i)

=K$_i$Xf+(i)

In this case, an example could be as follows,

f*(1)=0.6458668x 0.4150364

=0.2680582 (ASFR)

The adjusted fertility rates for convectional age groups, f*(i), are obtained by multiplying the f+(i) values by the adjustment factor K.

This is illustrated below,

$$TFR=\sum_{i=1}^{7} f^*(i)$$

=0.8779446x(0.2680582+.2448786+.2086715+.1911381
+.2345358x.0613596+.0175148)x5

=6.130784

Using this detailed computational procedure described above, the age specific fertility rates for all cases combined for Kenya and its regions which were estimated are given in the table below:

	ASFR						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Kenya	0.268	0.245	0.209	0.191	0.235	0.061	0.018
Nairobi	0.227	0.244	0.186	0.115	0.099	0.0	0.0
Central	0.381	0.221	0.198	0.117	0.104	0.036	0.048
Coast	0.206	0.358	0.158	0.228	0.139	0.029	0.039
Eastern	0.343	0.363	0.306	0.275	0.257	0.127	0.0
Nyanza	0.260	0.338	0.237	0.267	0.251	0.065	0.049
R/Valley	0.369	0.309	0.297	0.199	0.158	0.096	0.090
Western	0.421	0.241	0.260	0.313	0.175	0.069	0.0

APPENDIX 2

The Highest Estimates of Births Averted per 1000 Women by Socioeconomic variables (Age Group 35 - 39 unless indicated)

a) Programme Contraception

Region	Place of Residence		Work Status		Educational Level		
	Urban	Rural	C/W	N/W	None	Prim.	Sec+.
Kenya	86 *	67	89	62	24	85	84
Nairobi	73	-	229	48	34***	46*	132
Central	150*	82*	378	119	67	133	356
Coast	80	45	45	31*	15	46	98
Eastern	-	102	309	87	71	113	231
Nyanza	64	45	104	44	33	37	59
R/Valley	130	67	93	70	29	55	61
Western	130*	40	49	42	33	70*	124

b) Non-programme contraception

Region	Place of Residence		Work Status		Educational Level		
	Urban	Rural	C/W	N/W	None	Prim.	Sec+.
Kenya	15	66	20	-	17	29	24
Nairobi	16	-	50*	12*	14*	14	31**
Central	52*	24	71	26	15	22	41
Coast	3	22	30*	9*	6	35	31
Eastern	-	93	103*	82	40**	40**	121**
Nyanza	13*	15**	0.0	39	6	8**	14***
R/Valley	57*	43	67*	34**	43**	33*	86
Western	3*	16	13*	15	12	12	21*

* - age group 25-29
** - age group 30-34
*** - age group 20-24

Highest Estimates of Births Averted per 1000 Women for all Cases Combined in Kenya by:

a) Programme Contraception.

Region	Age grp 35-39
Kenya	87
Nairobi	79
Central	97
Coast	48*
Eastern	115
Nyanza	43
R/Valley	68
Western	48*

* - are in age group 30-34 and not 35-39.

Non-Programme Contraception.

Region	Age grp 35-39
Kenya	35
Nairobi	17
Central	22
Coast	10
Eastern	98
Nyanza	58
R/Valley	56*
Western	51**

* - are in age group 30-34 and not 35-39.
**- are in age group 40-44 and not 35-39.

The Highest Estimates of Births Averted per 1000 Women by Cultural variables (Age Group 35 - 39 unless indicated)

a) Programme Contraception.

Region	Protestants	Catholics	Muslims
Kenya	105	45	32
Nairobi	143	114*	...
Central	97	67	...
Coast	65**	43*	30
Eastern	144***	71	...
Nyanza	65	27***	...
R/Valley	199	19	...
Western	54	37	...

* age group 25-29.
** age group 40-44.
*** age group 30-34.

The Highest Estimates of Births Averted per 1000 Women by Cultural variables (Age Group 35 - 39 unless indicated)

a) Non-programme Contraception.

Region	Protestants	Catholics	Muslims
Kenya	29	68**	27
Nairobi	37**	10****	...
Central	19	26	...
Coast	87	20**	5**
Eastern	61	139**	...
Nyanza	12**	10****	...
R/Valley	62	64*	...
Western	8	16	...

* age group 25-29.
** age group 30-34.
*** age group 20-24.
**** age group 15-19.

APPENDIX 3.

SOME OF THE RAW DATA USED IN APPLYING COALE TRUSSEL P/F RATIO TECHNIQUE IN ESTIMATING AGE SPECIFIC FERTILITY RATES IN KENYA.

KENYA

ALL CASES COMBINED

AGE GROUP	FPOP	BLY	CEB
15-19	224	82	229
20-24	729	288	1436
25-29	999	325	4230
30-34	752	219	3923
35-39	706	267	4721
40-44	540	58	4055
45-49	341	12	2649

EDUCATIONAL LEVEL.

	NONE			PRIMARY			SECONDARY		
AGE GRP	FPOP	BLY	CEB	FPOP	BLY	CEB	FPOP	BLY	CEB
15-19	23	12	29	181	62	179	20	8	23
20-24	85	34	201	442	179	968	201	77	325
25-29	192	60	789	536	179	2086	268	86	845
30-34	302	114	1549	329	84	1768	120	21	459
35-39	294	70	2016	339	84	2299	73	12	394
40-44	266	34	1981	252	23	1987	22	1	109
45-49	202	3	1571	129	9	1073	9	0	43

PLACE OF RESIDENCE

	URBAN			RURAL		
AGE GRP	FPOP	BLY	CEB	FPOP	BLY	CEB
15-19	61	17	51	163	66	176
20-24	177	70	314	552	219	1182
25-29	173	48	492	827	276	3234
30-34	115	21	459	636	198	3459
35-39	75	11	402	631	156	4277
40-44	41	1	21	499	58	3874
45-49	25	2	139	315	10	2518

WORK STATUS

	CURRENTLY WORKING			NOT WORKING		
AGE GRP	FPOP	BLY	CEB	FPOP	BLY	CEB
15-19	7	2	6	217	80	223
20-24	52	27	75	672	259	1406
25-29	123	33	379	975	291	3320
30-34	102	12	424	643	206	3043
35-39	74	12	424	622	155	4218
40-44	44	0	299	494	158	3775
45-49	31	0	202	309	12	2454

RELIGION.

	CATHOLICS			PROTESTANTS			MUSLIMS		
AGE GRP	FPOP	BLY	CEB	FPOP	BLY	CEB	FPOP	BLY	CEB
15-19	78	24	71	127	51	139	5	2	3
20-24	241	92	481	434	279	955	28	9	42
25-29	327	108	1261	581	188	2187	33	11	105
30-34	257	8	1291	411	113	2205	37	10	172
35-39	254	53	1641	398	105	2724	26	6	170
40-44	193	27	1524	297	30	2220	14	0	103
45-49	122	7	943	187	5	1517	15	0	108

REGIONAL LEVEL ALL CASES COMBINED (ALL CASES COMBINED).

NAIROBI

AGE GROUP	FPOP	BLY	CEB
15-19	26	7	23
20-24	86	31	149
25-29	73	20	200
30-34	55	9	232
35-39	32	5	158
40-44	25	0	135
45-49	10	0	55

	CENTRAL			COAST			EASTERN		
AGE GRP	FPOP	BLY	CEB	FPOP	BLY	CEB	FPOP	BLY	CEB
15-19	23	13	36	22	4	9	33	10	35
20-24	96	39	215	56	23	103	105	40	195
25-29	134	46	480	70	12	246	182	57	658
30-34	91	18	453	72	18	358	118	33	583
35-39	103	19	702	66	11	400	146	39	938
40-44	79	5	642	32	1	231	118	18	891
45-49	68	6	504	22	1	173	71	0	546

	NYANZA			R/VALLEY		
AGE GRP	FPOP	BLY	CEB	FPOP	BLY	CEB
15-19	48	13	43	43	18	47
20-24	125	53	277	137	57	291
25-29	174	50	660	232	91	951
30-34	143	46	763	152	40	808
35-39	118	38	679	154	32	1050
40-44	92	7	614	129	18	1096
45-49	58	4	525	63	1	429

WESTERN

ALL CASES COMBINED

AGE GROUP	FPOP	BLY	CEB
15-19	31	17	34
20-24	123	45	288
25-29	135	49	518
30-34	121	55	625
35-39	87	23	622
40-44	76	9	609
45-49	49	0	405

THE PREVALENCE RATES IN EACH AGE GROUP NEEDED FOR THE APPLICATION OF PREVALENCE MODEL FOR KENYA ARE AS GIVEN BELOW.

KENYA.

	ALL CASES COMBINED.		PLACE OF RESIDENCE.			
			Urban.		rural.	
	U'a	U"a	U'a	U"a.	U'a	U"a.
15-19	7.6	5.8	4.2	2.1	9.0	7.2
20-24	11.6	6.4	19.3	3.8	8.1	7.5
25-29	17.9	8.5	28.8	7.1	15.7	8.9
30-34	22.1	7.0	32.3	7.3	20.2	7.1
35-39	23.9	9.6	36.9	2.5	22.3	10.6
40-44	21.9	8.3	39.2	3.1	20.4	8.8
45-49	19.1	3.8	37.8	0.0	17.1	4.1

WORK STATUS.

	C/W		N/W	
	U'a	U"a	U'a	U"a
15-19	13.3	16.0	7.5	5.4
20-24	12.9	6.2	11.5	6.4
25-29	25.7	14.4	18.8	7.8
30-34	41.3	12.6	19.2	6.2
35-39	46.0	10.5	21.1	9.8
40-44	50.5	7.2	19.0	8.5
45-49	50.8	3.9	15.5	3.8

EDUCATIONAL LEVEL.

	None		Primary		Secondary+.	
	U'a	U"A	U'a	U"a	U'a	U"a .
15-19	1.7	0.0	8.2	5.8	10.7	12.7
20-24	1.9	7.5	8.7	5.9	21.6	7.2
25-29	9.2	5.3	18.1	7.5	24.2	13.1
30-34	10.7	5.8	23.3	7.3	47.5	10.0
35-39	13.2	9.1	28.7	9.7	44.0	12.6
40-44	9.8	7.9	31.2	9.1	56.2	6.4
45-49	10.2	3.9	28.6	3.9	64.5	0.0

REGIONAL LEVEL.

	Nairobi		Central		Coast	
	U'a	U"a	U'a	U"a	U'a	U"a
15-19	7.7	3.8	21.7	0.0	0.0	0.0
20-24	18.6	4.7	26.0	5.2	8.9	1.8
25-29	27.4	6.8	26.9	9.0	18.6	7.1
30-34	36.4	9.1	36.3	5.5	18.1	2.8
35-39	40.6	6.3	42.7	9.7	10.6	6.1
40-44	52.0	4.0	32.9	7.6	28.1	0.0
45-49	40.0	0.0	30.9	2.9	4.5	0.0

	Eastern		Nyanza		R/Valley	
	U'a	U"a	U'a	U"a	U'a	U"a
15-19	3.0	30.3	4.3	4.1	13.5	2.3
20-24	10.5	21.0	6.7	2.5	10.2	8.0
25-29	23.6	19.2	8.2	1.3	17.2	9.9
30-34	23.7	12.7	15.8	4.5	21.1	11.8
35-39	24.0	20.5	14.0	1.9	26.0	11.7
40-44	22.3	22.9	11.8	5.3	20.9	3.1
45-49	12.7	7.0	7.4	0.0	15.9	7.9

	Western	
	U'a	U"a
15-19	3.2	0.0
20-24	4.1	0.0
25-29	8.1	3.0
30-34	14.0	1.7
35-39	13.8	4.6
40-44	5.3	5.3
45-49	20.4	0.0