THE EFFECTS OF SELECTED PROXIMATE DETERMINANTS AND SOCIO-ECONOMIC FACTORS ON FERTILITY RATES OF RURAL WOMEN IN NORTH SHEWA: THE CASE OF TWO DISTRICTS

A Thesis Presented to
The School of Graduate Studies
Addis Ababa University

In Partial Fulfillment
of the Requirements for the Degree
of Master of Science in Demography

By

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June, 1994

ADDIS ABABA UNIVERSITY
School of Graduate Studies

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ACKNOWLEDGEMENT

First of all I would like to thank God for helping me to begin and finish this program. I wish to express my appreciation to all individuals who directly or indirectly helped in preparation and completion of this research work. Specially, I would like to express my deepest gratitude to my advisor Dr. Aklilu Kidanu without whose guidance, suggestions, and comments this thesis wouldn't have taken the present form.

I would like to thank Dr. Tesfayesus Mehary for his comment on the draft proposal of the thesis and Dr.Assefa Hailemariam, chairman of Demographic Training and Research Center (DTRC), for his valuable encouragement throughout my study. I would like to thank Ato Gebre Egziabher Kiros for his comment on the statistical part of the draft thesis and Ayne Umer, secretary of DTRC, for her cooperation during my study.

My thanks goes to Mr. Svein Ege for his very important advice on the selection of the study areas, and Ato Addisu Asmare and his wife Werkinesh and my friend Eshetu Gurmu for their cooperation during data collection in the field.

Acknowledgement is also due to the Institute of Development Research and School of Graduate Studies whose financial support made this study possible.

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ABSTRACT

Population growth is a prominent issue in rural Ethiopia where about 85 percent of the population resides. Therefore, simply put, the determinants of the effects of the various factors on fertility rates in rural Ethiopia is a relevant policy oriented research. This paper looked at selected proximate determinants and socio-economic factors and their effects on fertility in a rural setting.

The study collected information on 2063 women in Mafud and Kewet districts, and used various techniques including oneway analysis, multiple classification analysis and the Bongaarts model to look at the relative effects of the selected variables. The findings include that land-holding, literacy program, livestock value, marital disruptions, infant- child mortality and spontaneous miscarriages had positive effect on fertility. On the other hand, formal education, contraceptive use, breast-feeding and age at first marriage showed negative effects on fertility in the studied rural areas of Ethiopia. The results also indicated that among the rural areas studied, fertility levels varied by the rate of infant-child mortality, the levels of infecundity and contraceptive prevalence.

In conclusion this study identified areas of policy concentration in relation to reducing fertility levels as well as areas of future research to better understand the dynamics of fertility behavior in rural Ethiopia.

CHAPTER I: INTRODUCTION

This section discusses briefly the statement of the problem, the importance, the objectives, the methodology, and the organization of the study.

1.1 The Statement of the Problem

Prior to the 1950s, population estimates of Ethiopia were based on mere guesses and speculations by various foreign travellers and visitors which came to the country at different times. A systematic data collection began with the establishment of the Central Statistical Office (CSO) in 1960. Since then a number of national and sub-national surveys have been conducted, and the first national census was taken in 1984.

The 1984 census indicated a total population size of 42,616,876 of which the rural population was 37,747,587 (OPHCC, 1991). Based on estimates for 1970, the rural population of Ethiopia increased by more than a million per year between 1970 and 1984 (CSO, 1974:1). The census and demographic surveys conducted so far revealed that, as in most developing countries, population growth is rapid. The trend showed a rapidly increasing population over time, from annual growth rate of less than one percent at the beginning of this century to about two percent in the mid 1950s and three percent in 1984 (OPHCC, 1991).

The three major components of population changes are fertility, mortality and migration. Fertility has attracted the focus of many researchers from various disciplines. High fertility rates have persisted in much of the sub-Sahara African countries. Ethiopia, being one of the sub-Sahara African countries, showed a rising trend of fertility between 1970 and 1984. During this period, the estimated crude birth rate for the entire country increased from 42.8 per 1000 population in 1970 to 46.4 in 1984. The total fertility rate also increased from 5.8 children per woman in 1970 to 7.5 1984. Fertility rates in rural areas also showed similar trend (CSA, 1988;OPHCC, 1991).

The phenomenon of rapid population growth is, however, more prominent in rural areas where close to 85 percent of the Ethiopian population resides. Existing literature indicates that, in rural societies where the majority of the population is dependent on subsistent farming, uncontrolled population growth can contribute to the deterioration of the limited natural resources (Van de Walle,1972) and hence hinders economic progress.

Hence the social and economic as well as the environmental consequences of rapid population growth, has been the concern of

national and international policy planners and population researchers. As a consequence, there is a growing need for the study of the determinants of fertility behavior and possible means for their control in less developed countries (UN, 1979:5)

In spite of this need and the fact that a vast majority of the population in Ethiopia resides in rural areas, there are few demographic researches that have particularity investigated the relationship between socio-economic and demographic variables and the level of fertility in rural Ethiopia. Among these are (CSO, 1974; Genet, 1987; Kebede, 1986; Alemtsehay, 1988; Betemariam, 1991; Assefa, 1990; Abdulahi, 1988).

Although these studies have greatly contributed to the knowledge of fertility in rural Ethiopia (its levels, trends and differentials), they are not conclusive primarily due to the lack of appropriate data for analysis. This study attempts to fill some gaps by collecting and analyzing primary data on selected socio-economic conditions and demographic variables of two rural districts in North Shewa.

1.2 The Importance of the Study

The results that would be derived from this study hopefully will have a direct relevance to socio-economic planners and policy makers in Ethiopia. In view of the present high fertility rates in rural areas of Ethiopia (a total fertility rate of 8.2 of children per woman of childbearing age CSA, 1993:193), it is highly desirable that an effective population policy be formulated as part of an overall economic policy. This study may indicate some measures that have to be initiated to bring about attitudinal change among the rural population towards lower family size. In addition to its contribution to the existing knowledge of fertility in the study areas, this study, would also indicate some areas of intervention on the current fertility

trend and initiate further in-depth and large scale studies in the field of the determinants of rural fertility.

1.3 The Objectives of the Study

The main objectives of this study, therefore, is to examine the effects of selected proximate determinants and socio-economic variables on the fertility rates of two rural districts, Mafud and Kewet, located in Yifat and Timuga Awraja part of North Shewa. The study also examines the different effects of these determinants and variables on the two districts that currently show contrasting levels of fertility.

The findings of this study would hopefully shade light on the general social and economic consequences of high fertility rates in rural areas and suggest appropriate actions of policy and planning interventions.

1.4 The Organization of the Study

Including the introductory chapter, this study is organized into six chapters. Chapter II presents the literature review in which the theoretical context of the study is laid out. It reviews studies conducted on the subject and the specific studies conducted on the variables used in this study. The discussion of the literature review also identifies the departure point of the study from existing studies.

Chapter III discusses the methodology of the study, where the selection of the study areas, the hypothesis, sampling design and data collection, method of data analysis, method of data evaluation, and the limitations of the study are emphasized.

Chapter IV presents the adjustment of the data and level of fertility in the study areas and Chapter V provides the analysis of the findings of the study. Finally, in Chapter VI, a summary of the major findings of the research, their policy implications and areas for further research are indicated.

CHAPTER II: LITERATURE REVIEW

The literature review provides the context of the study. It is divided into two parts: the general literature and the literature specific to the proximate determinants and socio-economic variables that are used in the study.

2.1 The General Literature

Studies of fertility, its levels, trends and differentials, have been one of the most interesting areas that have attracted the minds of many scholars. It was some 36 years ago that Kingsley Davis and Judith Blake (1956) identified three main categories of variables that influence human reproduction and that exist in all societies in varying degrees. These were:- (1) Intercourse, (2) Conception and (3) Gestation and successful parturition. These three broader categories of variables that affect human reproduction were further outlined into 11 factors which they called "Intermediate variables", in the sense that these variables have direct effects on fertility.

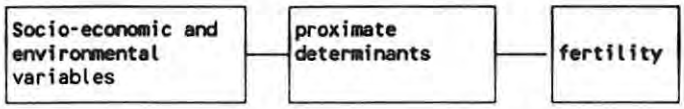
Any other variables such as socio-economic, cultural and environmental variables are considered to have indirect effect on fertility by altering one of the intermediate variables. Hence, the latter provide a mechanism through which the effects of the former on fertility of a particular society can be evaluated.

Although the framework proposed by Davis and Blake is highly important for fertility analysis, it has two major shortcomings. First, it did not provide a method to quantify the effects of the 11 variables. Second, it omitted the role of breast-feeding which is then known to have direct effect on the duration of postpartum amenorrhoea (UN 1987:165).

John Bongaarts (1978:129; 1981:111-126), solving for these problems, presented a simple but comprehensive model which incorporates the effects of breast-feeding and other variables on the level of fertility. He condensed the 11 original intermediate variables into three broad categories of eight variables which he called "Proximate Determinants of Fertility".

Bongaarts (1978, 1982), assuming that most of the variables are invariable across populations, further limited the factors to be considered to only four most important variables: marriage, breast-feeding, contraception, and induced abortion. However, a number of studies indicated that pathological sterility should also be considered as the fifth principal proximate fertility determinant, particularly in sub-saharan African countries where veneral diseases are present. In an attempt to measure the effects of the former four variables on fertility, Bongaarts developed an analytical framework for measuring indexes for each of the variables. The brief description of the components of the model is given later in chapter three under the methodology of data analysis in this paper.

In general, the analytical framework to be used to evaluate the indirect and direct determinants of fertility can be diagrammatically shown as follows:



Kebede (1986:41-43) using the 1980/81 Household Demographic Survey, examined the relationship between socio-demographic variables such as marital status, literacy, religion ethnic group and children ever born in Arssi region. The result of Multiple Classification Analysis (MCA) showed that fertility was more affected by marital status, literacy and religion in that order.

Betemariam (1991:138-151) using the 1984 Population and Housing Census data for Shewa region applied the same method (MCA) but employed eight variables including the four variables used by Kebede. When rural women were taken alone, the amount of variation in fertility explained by explanatory variables was 33.0 per cent. The explanatory variables used in this analysis were: province of residence, residential status, educational attainment, occupation, migration, marital status, religion and ethnicity.

Assefa (1990:242-279) used seven socio-economic and demographic variables to examine fertility differentials among various population groups. The explanatory variables used to investigate fertility differentials were: residence, religion, literacy, ethnicity, age at first marriage, marital stability, and approval of family planning. Each of these variables was divided into sub categories of its own. The study clearly

indicates differentials in fertility among rural women of childbearing age when analyzed by socio-economic and demographic background variables. However, these background variables were not as strong as expected to explain variation in rural fertility.

Abdulahi (1988) examined differentials of fertility in two rural areas of Ethiopia- Mettu and Alemaya in comparison with fertility in Addis Ababa. The factors included in his analysis were: proximate determinants, cultural and socio-economic variables. He analyzed the direct effect of each of these variables on the mean number of children born. However, socio-economic status constructed from livestock holding was related to fertility by cross tabulation of proximate determinants. Although the study clearly indicates the influence of each variable on fertility, it does not show the relative importance of each variable in explaining differences in fertility.

2.2 The Literature Specific to the Variables Used in the Study

A proper understanding of the determinants of fertility requires a variety of detailed data collection on demographic, social and economic variables. These variables can be classified into two major categories. (i) Proximate fertility determinants and (ii) Socio-economic and environmental "background" variables. The following describes the two categories of variables used in this study. Since the proximate determinants explain a large part of the variability in fertility rates, they are discussed in more detail than the socio-economic variables. Their importance

in the literature is also reviewed.

2.2.1 Proximate Fertility Determinants

(i) Age at First Marriage

Age at first marriage is a very important variables in fertility analysis as it marks the beginning of marital exposure. It is often higher in urban than in rural areas, in association with higher level of education, socio-economic opportunities, contraception use etc. Hence, it is usually inversely related with level of fertility of a woman not only because of lost reproductive years of childbearing but also because of deliberate fertility control (UN 1987:90).

Malthus (1798) was among the earliest population theorists who understood the relationship between age at first marriage and fertility. He argued that delayed marriage is an essential "preventive check" of excessive population growth. Contemporary demographers have also undertaken several researches to provide a detailed insights about this relationship (Bongaarts and Potter, 1983; Yang, 1987).

Mcdonald (1981) argues that age at first marriage occupies a prominent place as one of the proximate determinants of fertility while Kasarda et al., (1986) tend to appreciate age at first birth more than age at first marriage because they agree that many confounding factors like use of contraception, occurrence of births out-of-wedlock and incidence of high rates of marriage dissolution and frequency

of remarriage make the analysis of age at first marriage complicated.

Rindfuss et al., (1983), contend that, even within marital union, exposure to conception is different among populations depending on the coital frequency. They report that increase in early marital fertility is a sign for an increase in coital frequency associated with modernization, urbanization and industrialization. Hence, they conclude that there is more sexual intercourse in romantically arranged marriage than traditionally arranged marriages.

Related to age at first marriage is the prevalence of marriage and its association with fertility. Mauldin and Berelsson (1978:87-147), for example, point out that as a general rule we should expect crude birth rates to be below 35 per 1000 population if at least 80 per cent of females aged 15-19 are single. Mauldin (1981) also suggests that increase in age at first marriage tends to decrease the crude birth rate by 5-6 per cent in a country characterized by high fertility rate.

While age at first marriage is generally low in the third world it varies from one country to another. If child marriage and catch-up effect for the time lost are non-existent, it can be concluded that as age at first marriage increases the number of completed fertility decreases.

In India, however, analysis of age at first marriage shows insignificant links with fertility (Hattia et al., 1984). Bhatia (1984) examined the determinants of age at first marriage in rural Ghana. In this study some of explanatory variables, such

as age at menarche, education and occupation are found to be statistically significant.

(ii) Marital Status

In all societies almost four categories of marital status are known to exist with highly detailed descriptions of the appropriate role for the persons in each status: single (never married), married, widowed and divorced. Each status has deep religious and legal as well as general social significance in every society (Bogue, 1969:312).

Marriage is usually early and universal in most sub-Saharan Africa. Marital disruption due to both voluntary dissolution (divorce) and involuntary dissolution (widowhood) is very high in sub-Sahara Africa. But because of the high rates of remarriage and prevalence of polygyny, very few women are without unions at any point in time (Bongaarts, 1984).

The literatures indicate that marital instability due to divorce is specific to cultural phenomenon. Haskey (1987) who analyzed samples of over 1000 married couples during 1979 in England and Wales reported that three factors-age at marriage, previous marital status, and social classes (unskilled) - were amongst the strongest predictors of early divorce. Murphy (1985) on the other hand, found that factors such as number of siblings, social class and religion are less powerful predictors of marital break-down than factors such as length of time spent in union without disruption, childbearing patterns and the type of ceremony

at marriage. Most of the literatures that focus on the relationship between marital instability and level of fertility show that marital instability has a fertility depressing effect.

Lee and Pol (1988) applying multivariate analysis on the data obtained from 1978 Cameroon World Fertility Survey (CWFS) concluded that fertility rates for women married more than once are significantly lower than those for continuously married women. They found that even after, the control of the time lost there was an inverse relationship between the number of marriage and fertility. In general, a negative relationship exists between number of times of marriage, mean age at marriage and mean number of children ever born. A similar result was obtained by Abdulahi, (1988:176) in Mettu, Alemaya and Addis Ababa after differences for age were standardized.

There are several reasons why women with marital disruption show a lower fertility rate than the continuously married women:

(a) women with marital disruption might have a fecundity problem in which cultural norms of a society might entail divorce, (b) anticipation of unstable marriage between the spouses might result in lower fertility, and (c) if the marriage of a woman with many children is disrupted once the woman might not be attractive for a potential husband.

(iii) Breast-feeding

Besides its nutritional importance in providing infants with a complete ingredient of food, breast-feeding is also important for its contraceptive effect by increasing ovulatory interval (the period immediately after the birth to the resumption of first ovulation or nearly menstruation). The fertility inhibiting effect of breast-feeding is usually known as the lactation infecundability or lactational amenorrhoea.

The contribution of breast-feeding in reducing fertility is recognized by demographers as one of the main determinants of fertility (Bongaarts, 1978; Bongaarts and Potter, 1983). It is the principal factor influencing the length of birth interval (the time between successive births) for 83 per cent of couples in developing countries (Berg et al., 1979 :2). Breast-feeding is a natural contraception that reduces the risk of becoming pregnant for traditional women for whom modern contraceptive is either not accessible or not acceptable. Hence, it can serve efficiently as family planning programs by lengthening the duration of lactational amenorrhoea.

Therefore, breast-feeding is important in limiting fertility, especially before the onset of fertility transition in less developed countries of rural and uneducated women (Bongaarts,1982:14,1986:1-26).The contraceptive effects of breast-feeding depend on the type and duration of breast-feeding. Women who give their infants only breast milk (full breast-feeding) are much less likely to resume mensuration than those who supplement the diets of their infants with some fluid or semi-solid

food (Partial breast-feeding). The frequent and intensive nipple suckling by the infants, as is the case in full breast-feeding, appear to be the main factor in inhibiting ovulation (UN 1984: 93; Jones, 1988: 307-320).

Several studies have been conducted on the relationship between breast-feeding and the restoration of menses. Physiological and behavioral mechanisms have been identified to have influences on the resumption of menses. An investigation carried out by Jones (1988: 307-320) on selected Javanese women in rural Indonesia indicated that the type of nursing behavior practiced by breast-feeding mothers is an important determinant of the resumption of postpartum ovulation. The physiological mechanism suggests that with suckling of the nipple a hormone called prolactin is produced which inhibit the normal process of ovulation.

Available data indicate that lactational amenorrhoea is affected by the nutritional and health status of a woman. Dutz and Habicht (1976: 211-218) report that health and nutrition can affect a woman's fecundity by influencing the age of menarche, menopause, death, success of each pregnancy, duration of postpartum sterility and her menstrual cycle. Earlier menarche and later menopause among females from better nourished population compared with those from malnourished population are indicated. In a cute and severe malnutrition the menstrual cycle is considered to be delayed. It is also hypothesized that malnutrition decreases the likelihood of successful pregnancy by increasing the chances of early or late abortion, but with no direct evidence.

Evidence from Ethiopia indicates that breast-feeding has been the principal factor for spacing birth interval. It was commonly practiced in both rural and urban areas by lactating mothers at any time and place when a child desired it (Assefa, 1990:230-233). A study done by Abdulahi (1988) in Mettu, Alemaya and Addis Ababa shows that mean length of breast-feeding is shorter for younger women than older women- an indication of a decline in postpartum amenorrhoea with shorter duration of breast-feeding in Ethiopia. Furthermore, the study indicated mean children ever born is negatively related with the length of breast-feeding in the area.

(iv) Sexual Abstinence

Postpartum sexual abstinence is one of the intermediate variables that has direct impact on the level of fertility in most African countries. The goal of postpartum abstinence in Africa is not to reduce the number of pregnancies but rather to ensure the chance of survival of a child. Hence its historical origin is most likely to be related with efforts to reduce mortality of children (Lesthaeghe et al., 1981:3-16). It is believed that, in its traditional context, the principle of a prolonged postpartum taboo was universal in sub-Saharan Africa (Schoenmaeckers et al., 1981:25-42).

Although postpartum sexual abstinence is usually related to lactation it cannot completely be identified with lactation. In many societies abstinence is shorter than the duration of breast-feeding. In few societies, however, it is indicated that the total infecundable period is longer than the length of postpartum

amenorrhoea due to the practice of the postpartum abstinence beyond the time of the first postpartum menses (Bongaarts, 1982:4). Many studies indicate that in West Africa the effect of postpartum sexual abstinence on the postpartum infecundable period is quite substantial (Lesthaeghe et. al., 1981:148-173). However, postpartum sexual abstinence does not have any effect on the duration of amenorrhoeal interval.

(v) Infant-child Mortality

As it is indicated in the literature, there are three ways in which fertility can be affected by the death of an infant or a child. The first is physiological effect, which implies that the death of an infant by interrupting early lactation, allows ovulation to be resumed sooner, and in the absence of contraception, it results in an early pregnancy. The second is replacement effects, which denotes that couples continue to produce more children, replacing those who die young, until the desired number is met. The third is insurance effect, which assumes that couples subtly understand the level of infant /or child mortality in the community without considering their experience but tend to adjust their fertility with this risk in mind (Knodel, 1978:22; Vallin and Lerry, 1978:71).Thus, in a society, where infant and child mortality rates are high, fertility rates are also expected to be high.

According to Knodel (1978), the impact of an infant death can shorten the average time between births by 2 to 13 months consequently allowing more exposure time to the risk of pregnancy. According to views of Heer and Wu (1978), the motivation for high family size in many developing countries cannot be altered

without a reduction in the level of infant and child mortality.

Schultz (1976) attempted to make clear the first two effects aforementioned considering them as the biological and behavioral effects of mortality on fertility. In his study, the biological effects indicate the disruption of breast-feeding by the death of an infant or a child and initiation of biological feedback for fecundity or conception through cessation of lactation hormones. It is also indicated that the biological effect depends on the duration and intensity of breast-feeding by the child before its death and the age of the child but independent of mother's age, parity and sex of the child that dies.

The behavioral effects imply the person's desire to replace the lost child. This in turn, depends on the market price, amount of spouse's earning and non human wealth (Schultz, 1976:240-248). Both biological and behavioral effects are difficult to disentangle from other confounding factors such as nutrition, health, specific diseases which may influence breast-feeding practices and the desire of the couples to produce more children. The insurance effects were also discussed by Schultz (1976: 244) under "Uncertainty and Demand for Births". In that he illuminated that the mechanism by which parents view the prevailing risks of child death may entail them to increase their birth rates, especially in agrarian societies.

(vi) Contraception

The level of contraceptive use is usually highly associated with development and widely spread family planning programs. It is one of the intermediate variables primarily responsible for the reduction of fertility in developed nations.In pre-transitional societies, the practice as well as the knowledge of contraception are insignificant or virtually absent (UN, 1987:129-160). Current contraceptive use in selected African countries among all women aged 15-49 ranges from 3.9 percent in Ethiopia (in 1990) 12.3 percet in Ghana (in 1988), 23.3 percet in Kenya (in 1989), 8.4 percent in Liberia (in 1986), 5.5 percent in Uganda (in 1988/89) and to 32.2 percent in Zembabwe (in 1988) (CSA, 1993: 193).

The gathering of information related to the knowledge and use of contraception is very essential for the expansion of family planning movement in developing countries. Analysis of differentials in contraceptive practice according to age, family size, desire for more children, and socio-economic factors are very important in a society where contraception is employed to limit or lengthen birth intervals (Kasarda, at al., 1986:184-189).

The traditional birth-spacing methods, including breast-feeding and postpartum abstinence, are not often considered as contraception because their objectives are not to regulate the number of children to be born but rather to enhance maternal health and child survival (Caldwell and Caldwell; 1981:76-89).

Contraceptive techniques include traditional methods such as rhythm, coitus interrupts or withdrawal, abstinence and those considered modern methods which are usually used by females which consist of pills, intra-uterine devices (IUD), jellies, creams and foams; the condom used by male; and sterilization applied by both sexes.

Ross et al., (1988:116), suggest three ways by which fertility control can be improved in developing societies: (1) by increasing or intensifying the motivation for fertility controls; (2) by enlarging or improving the delivery systems of fertility control typically the national family planning programmes; and (3) by enlarging or improving the technology of fertility control.

Although induced abortion can be recognized as one of the proximate determinants, adequate data on abortion are seldom available in less developed countries.

(Vii) Infecundity

Usually, two types of infecundity are known in any society. One is often called 'primary infertility', defined as the proportion of women who have never been able to bear a child due to either inability to conceive or inability to carry a full-term pregnancy. The second is called 'secondary infertility' which relates to the inability to have a child subsequent to an earlier birth after a reasonably long period of exposure (Mammo and Morgan, 1986; Vaessen 1984;).

Among several causes of infecundity, Bongaarts (1982:30) identified the following: (1) a number of abnormalities of the reproductive system which prevent conception and bearing of offspring; (2) a high incidence of irregular and ovulatory cycles; (3) a rapid rise in intrauterine mortality undetected embryonic mortality among women in their forties; and (4) a high prevalence of specific diseases, primarily gonorrhoea and genital tuberculosis. While the first three factors are nearly constant in all populations, the impact of the fourth factor varies widely and significantly in some parts of Africa (Bongaarts, 1984:526-528; Frank, 1983:137-144).

In Ethiopia, both primary and secondary infecundities are important fertility determinants. Thus, sharp fertility differentials across provinces are largely the outcome of differences in the level of infecundity by province (Mammo and Morgan 1986:544).

2.2.2 Socio-Economic Fertility Determinants

(i) Education

Existing data show the almost universal existence of fertility differentials by education. It is indicated that education affects fertility indirectly by raising age at marriage and facilitating the use of contraception (Bongaarts, 1978; UN, 1987, 1988, 1990; Kasarda et al., 1986; Holsinger and Kasarda, 1976). The latter two are intermediate variables that bear direct influence on fertility.

For Caldwell (1979) the greatest impact of education is not direct but through the structuring of family relationships and family economies and the direction of the net wealth flow. He identifies five mechanisms through which education can affect fertility: (1) it reduces the child's potential for traditional work inside and outside the homes affecting the utility of children; (2) it increases children's cost, the burden which may refrain the parent's desire to reproduce more children; (3) it creates dependency both within the family and the society; (4) it speeds up cultural changes and gives rise to new culture; and (5) it serves as an instrument for propagating the values of Western middle class.

Holsinger and Kasarda (1976), however, rejecting the idea of indirect effect of education as the sole mechanism on fertility, propose three fundamental ways through which education can affect fertility: (1) directly by affecting the preferences and attitudes of individuals towards smaller family size; (2) indirectly, by influencing the intermediary variables such as age at marriage, female labor force participation, social mobility, husband-wife communication, exposure to contraception, mortality and morbidity of children; and (3) jointly, by interacting with other exogenous variables, such as urbanization and industrialization to affect the intervening variables as well.

The amount of schooling required to reduce fertility is not yet known. There can be no relationship, or even positive up to primary levels (Holsinger et al, 1986:169-172). However, most of the empirical studies in developing countries indicated the relationship between education and fertility is found to be negative.

For example, Costa Rica's high rates of literacy and advances in post-primary education were suggested as the main factors which precipitated the initial fertility decline in 1960 (Stycos, 1982:15-29). It is argued that women's education is more important than men's education in affecting fertility (Cochrane, 1976, UN, 1990:90). In short, the relationship between education and fertility takes various forms and sizes depending on the socio-economic and cultural factors that prevail in a country.

(ii) Wealth

Theories of effects of the wealth on fertility usually revolves around the value of children and its impact on fertility. Simon suggests (1974) that the study of the effects of wealth on fertility is important for two reasons: (1) it provides an insight to the study of fertility trends as wealth of the family changes; and (2) it is also important to assess the impacts of wealth, that is, whether or not increase in wealth tends to decrease fertility.

In general, the theory of the impacts of income on fertility comprises two contrasting ideas: (1) Considering children like any consumer goods, in which case with rising wealth people tend to buy more goods, this theory asserts that couples would tend to have more children as their wealth increases, and (2) contrary to this idea is that increasing wealth has the capacity to induce couples to aspire for social advancement rather than devoting their time and resources for reproduction of more children. However, the relationship between wealth and fertility is more complex in terms of its methodological measurement and conceptual framework

than assumed in this paper. Furthermore, there are priceless factors like psychological satisfaction parents derive from their children (Fawcett 1986). Analysis of the value of children in relation to fertility will be treated in great detail elsewhere and will not be discussed here except to indicate that the concept of value of children is the central theme in economic theory of fertility.

An investigation done by Tuladhar et al., (1982:81-85) in rural Nepal indicated that fertility was generally higher among older women who had larger size of land than those with smaller landholding. Studies done by Moberg (1980:115-127), in Sweden revealed that for matriculated students there was a positive and for the rest of urban population a negative association between wealth and number of children. Stys (1957), using data collected from 20 villages in Southern Poland attempted to investigate the fertility of peasant women. His study showed that the richer the couple the more children they had. This was due to earlier age at first marriage of the wealthier peasants' girls. Farooqui (1984), has observed that the zero order correlation coefficient between rural wealth (measured in terms of crop production) and fertility was negative and statistically significant.

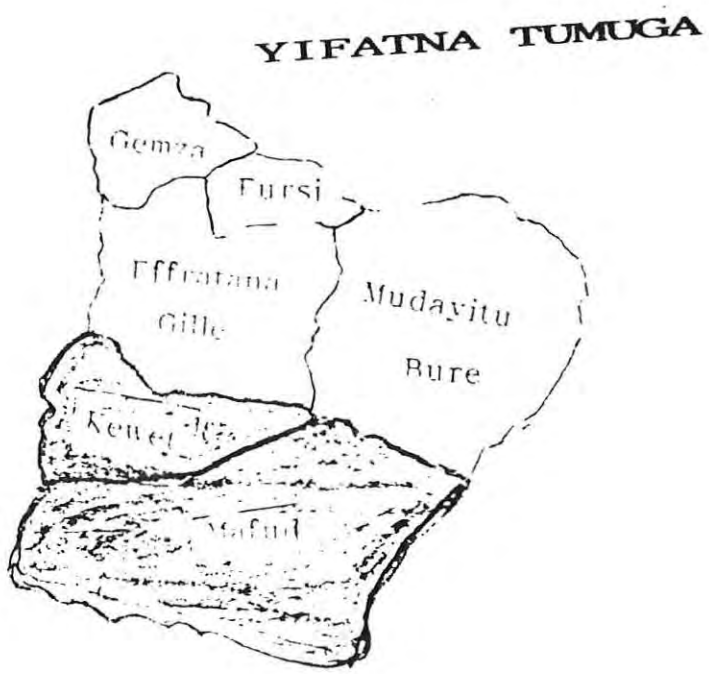
Several empirical studies conducted to examine the relationship between work status of women and their fertility demonstrated that the overall association is a predominantly negative one. The incompatibility between the role of child rearing and pursuance of economic and social enhancement is commonly suggested as the major reasons for small family size in developed countries (Jones,

1982:5-14). But in most of traditional societies since women do not work far from home, childbearing and work status appear to be compatible. According to Caldwell (1976:321-366) the causes for high fertility in rural areas lie primarily in the economic and psychological benefits that come to the old and male members of the Kin and the family by exploiting the labor of children and women.

Cain (1982:159-174), however, challenged the views of Caldwell, arguing that children in rural area are producing less than what is invested on them by parents. Hence, he argues there is no substantial reason why there should be a large number of children to be procreated in rural areas.

Figure 2.1. Map of Ethiopia and Shewa

Fig.2.2 Map of Yifatna Timuga



CHAPTER III: METHODOLOGY

This section describes the selection of the study areas, sampling design and data collection, the hypotheses, the methods of data analysis and evaluation. It also briefly states the limitations of the study.

3.1 The Selection of the Study Areas

Following the subdivision of Ethiopia into 5 autonomous and 25 administrative regions in 1987, Shewa was also subdivided into four administrative regions: North Shewa, South Shewa, East Shewa, and West Shewa with their capital towns at Debereberihan, Zuway, Nazareth and Weliso respectively. Each of the regions has been further subdivided into Awrajas, Weredas (Districts), Peasant Associations Areas (PAAs) and Urban Dwellers Associations Areas (UDAAs) as sub administrative units hierarchically. The Awrajas of North Shewa (before division of the whole Shewa), were Tegulet and Bulga, Menz and Gishe, Merhabete, and Yifat and Tumuga.

The present study focuses on two districts, Mafud and Kewet, located in Yifatna Tumuga Awraja, part of North Shewa administrative region. The two districts, are situated at a distance of some 200 and 230 kms, respectively, from Addis Ababa. The capital towns of both districts, Debre Sina of Mafud and Shewa Robit of Kewet, are located along the main road from Addis Ababa to Dessie and Asseb.

Mafud is bounded in the north by Kewet, in the south by Angolala, in the west by Sela Dingay and in the east by Hararge province. Kewet is bounded in the north by Bure Medayitu, in the north east by Mafud, in the south and the south east by Hararge and in the east by Mafud district.

The area has become a focus of research specially since the 1980s. One of the big projects that devotes its resource to the study of peasants' life and production in relation to natural crisis that has repeatedly occurred in the area (mainly caused by famines and draughts) is the Peasant Production and Development in Ethiopia (PPDE). It is with the supplemental fund from this project that this study was conducted in the area.

Several PPDE sponsored studies have already been done in North Shewa. However, although the studies reflect several disciplines, intensive demographic analysis of the area is lacking. The two districts were selected purposively on the basis of accessibility of the areas for study of rural fertility.

3.2 Sampling Design and Data Collection

The sampling design in this study, involves two stages. First, the two districts are stratified into Peasant Associations Areas (PAAs) which are the least administrative bodies in rural areas. Using the asphalt road from Addis Ababa to Dessie as a reference, Among 40 PAAs of Mafud 16 and among 53 PAAs of Kewet

14 were purposively selected. The attempt was made to represent the two districts by selecting some PAAs that have access to the road and those far away from the road. In addition to this, an attempt was made to balance the representation by selecting PAAs from hot and cool areas as well as from different ethnic and religious groups. Second, all households in the selected PAAs were listed and then all eligible women aged 15-49 were registered to create the sampling frame. Among the eligible women in the selected PAAs 25 percent of them were systematically selected making a total sample of 1067 from Mafud and 996 from Kewet districts for the administration of the final questionnaire (For a copy of the questionnaire, pleases see Appendix). The following items were collected from the respondents:

1. Household Background Questionnaire

For each household member

-name
-relationship to head of household
-sex
-age
-marital status
-activity status
-level of education

2. Individual Questionnaire

(a) Respondent's background

-date of birth
-literacy
-level of educational
-religion
-ethnicity

(b) Marriage history

-date of the start of marriage
-termination of each marriage

(c) Biological factors

-age at menarche
-duration of menstruation
-regularity of menstruation
-length of cycle

(d) Pregnancy and mother-hood history

-live births
-sex
-date of birth
-incidence of infant mortality
-child mortality
-incidence of pregnancy wastage
including open interval
-current pregnancy status
-duration of pregnancy
-breast-feeding in the last closed interval and
-in the open interval
-postpartum amenorrhoea in the last closed interval and
-in the open interval
-postpartum abstinence

(e) Knowledge and use of contraceptive

-knowledge
-ever use of contraceptive methods
-current use of contraceptive method
-attitude towards family planning

3. The Household Questionnaire

-agricultural production
-livestock
-land (cultivable and grazing land)

3.3 Recruitment and Training of Interviewers and the Pilot Survey

Selection and training of female and male enumerators were done before actual data was collected. They were selected on the basis of the result of Ethiopian School leaving Certificate (ESLC) and their knowledge about the selected PAs. After two days of intensive training in each districts, enumerators were taken to a nearby peasant village to fill some questionnaires. Then after, the best 12 enumerators and two supervisors were selected for each district. Soon after, a pilot survey on 30 households in one of rural villages was conducted. The pilot survey was essential to assess the appropriateness of the questionnaires, content, logical flow, clarity and length of the interview.

Consequently, the questionnaires were modified in such a way that some questions were omitted and new ones were added for the final survey. The questionnaires were translated into Amharic, the language most often spoken by the people, to make it easy for the enumerators and respondents. Hence, it was the Amharic version of the questionnaire that has actually administered. The final questionnaires have six sections. The first collected information on members of the households; the second on the respondent's background; the third on marriage history; the fourth on the pregnancy history and motherhood; the fifth on contraceptive use and knowledge; whereas the sixth section collected information on the wealth of household.

3.4 The Hypothesis

Based on literature reviews the study hypothesizes objectives of the study the following:

(1) Respondents from high household socio-economic status and high level of education would be expected to have less duration of postpartum amenorrhoea than respondents from low household socio-economic status and low level of education. Consequently, with less duration of postpartum amenorrhoea, high fertility rates are expected among the latter.

(2) Marriage disruption shows an inverse relationship with fertility when the effects of other predictors and age are taken into account.

(3) Age at first marriage makes the onset of the period of exposure to the risk of childbearing, and an early age at marriage implies a longer duration of exposure and consequently higher cumulative fertility.

(4) Education delays the age at first marriage and reduces the duration of exposure to the risk of childbearing and while facilitating the use of contraception, as such educational level above primary school is inversely related to cumulative fertility.

(5) Cumulative fertility is expected to be higher for women with primary education since they would acquire the necessary knowledge to improve their nutrition and hygiene to prevent any fecundity-impairing diseases, but without corresponding use of contraceptives.

3.5 Methods of Data Analysis

The methods of analysis employed in this study, to some extent determined by the type and nature of data, vary from simple cross tabulation to refined analytical techniques and statistical models.

The application of path analysis and Bongaarts' model were the techniques proposed to be used in this study. However, the results of path analysis were not as good as expected. Hence, after so many trials to fit the data with various techniques of regression, multiple classification analysis known as MCA and the Bongaarts' model are used instead. The MCA is employed to assess the effects of each independent factor on fertility (measured by children ever born) under the context of controlling for other independent predictors (factors) and covariates. The model can be expressed by
the following equation:

$$Y_{ij}...n = Y + a_i + b_j + ... + e_{ij}...n$$

Where, $Y_{ij}...n$ is the score of a woman who falls in the i-th category of predictor A, j-th category of predictor B, etc.

$Y =$ the grand mean of the criterion variable

a_i = the effect of membership in the i-th category of predictor A

b_i = the effect of membership in the j-th category of predictor B, and

$e_{ij}...n$ is an error term.

In MCA model, each independent variable is divided int two or more categories and mean values of the dependent variables and deviations from the grand mean for these categories are estimated, adjusted simultaneously for the effects of all other variables under consideration and their inter correlations.

Hence, in order to get the general picture of the pattern of relationship between fertility and socio-economic factors, the MCA model is utilized for the two rural districts and total sample.

However, before assessing the impact of various factors on fertility, screening techniques including one-way variance analysis and correlation analysis are used in order to evaluate the strength of relationship between fertility (children ever born) and socio-economic variables.

Recognizing that human reproduction can be analyzed according to three phases- intercourse, conception and gestation, Kingsley Davis and Judith Blake identified a list of 11 variables through which socio-economic factors must work in order to affect fertility. These variables (called intermediate variables) are the following:

A. Factors affecting intercourse

1. age of entry into a union
2. permanent celibacy
3. the amount of reproductive period spent out of unions (through divorce, separation and death of husband)
4. voluntary abstinence
5. involuntary abstinence
6. coital frequency

B. Factors affecting exposure to conception

7. fecundity or infecundity from involuntary causes
8. use or non-use of contraception
9. fecundity or infecundity from voluntary causes (sterilization, medical treatment, etc.)

C. Factors affecting gestation or successful parturition

10. foetal mortality through involuntary causes (miscarriage) and
11. foetal mortality through voluntary causes (induced abortion).

The important aspect of this framework is that the 11 factors are present in every society, although in any given society some factors may be more important than others in affecting fertility. Moreover, the impact of each factor may be either to increase or decrease fertility. For example, if in a society the age at first marriage is high, fertility will tend to be lower. Similarly, if permanent celibacy is

low, fertility will tend to be higher. The actual level of fertility will depend on the importance of each factor.

According to Davis and Blake, these variables are the only ones that affect Fertility directly; all other variables must work through one or more of the "intermediate variables". The major shortcoming of this framework is that the data necessary for the adequately quantifying the 11 factors are rarely available. Further, the lists exclude the effect of breastfeeding. John Bongaarts (1978), however, noted that not all intermediate variables are equally important in explaining the level of fertility. Hence, by including the effect of breastfeeding, he condensed the 11 original factors into eight:

A. Exposure factors

1. Proportion married

B. Deliberate marital fertility control factors

2. Contraception

3. Induced abortion

C. Natural marital fertility controls

4. lactational infecundability

5. Frequency of intercourse

6. Sterility

7. Spontaneous intrauterine mortality and

8. Duration of fertile period.

Bongaarts assuming that major parts of fertility variations in a society can be explained by the most important four variables, lists them as follows:

1. proportion married
2. contraception
3. induced abortion and
4. lactation.

Bongaarts (1978:105-132) developed a model to measure the fertility effects of the four most important intermediate variables by applying four indexes. The multiplicative model that expresses the level of total fertility rate (TFR) as a product of these indexes and total fecundity rate (TF) is given as follows:

$$TFR = C_m \times C_c \times C_a \times C_i \times TF$$

Where TFR is the total fertility rate, and TF is the total fecundity rate, or the maximum level of fertility possible in a population without the practice of lactation and postpartum abstinence. The total fecundity (TF) measures the combined effect of all the remaining intermediate variables: fecundability, spontaneous intrauterine mortality and sterility. It is assumed to be constant in all populations at the level of 15.3 births per woman throughout her reproductive life.

The indexes C_m, C_c, C_a and C_i represent proportions married, non-use of contraception, induced abortion and lactational infecundability, respectively. The indexes can only take values between 0 and 1. When there is no fertility inhibiting effect of a given intermediate variable, the corresponding index equals one; if the fertility inhibition is complete, the index equals zero (Bongaarts,

1982:1981-1989). The decreasing values from unity towards zero signify the increasing reduction of fertility by that particular index; hence the lower the value, the greater the effect on fertility. Because the complement of each index is equal to the proportionate reduction of fertility due to that particular index.

One important note is that partial application of the model is possible (Bongaarts, 1978:p.121). Hence, for the purpose of this study only three indices will be utilized assuming that there is no induced abortion in the study area. The method of estimation for each index used in this study is given as follows.

Index of Marriage

$C_m = \Sigma m(a)\, g(a)/\Sigma g(a)$

Where (ma) = average age-specific proportion married, g(a) = age-specific marital fertility rates, a = age

Index of contraception

$C_c = 1-[1.08xUxE]$

Where U = is the proportion of all married women of reproductive age that currently uses contraception, E = is the average use = effectiveness of contraception. The value for developing countries is assumed to be 0.85 (Bongaarts, 1978: p.111). 1.08 is an adjustment factor for non-fecundity.

Index of Postpartum Infecundability

$C_i = 20/18.5 + i$

Where i is the duration in (months) of postpartum infecundability. The value 20 is the length of birth interval in (months) without breast-feeding. Or it consists of:(1) 9 months of gestation, (2) 7.5 months (average) for waiting time to

conception, (3) 1.5 months (average) of minimum postpartum infecundability in the absence of breast-feeding, and (4) 2 months of time added by spontaneous intrauterine mortality. The value 18.5 is the duration of birth interval without postpartum amenorrhoea.

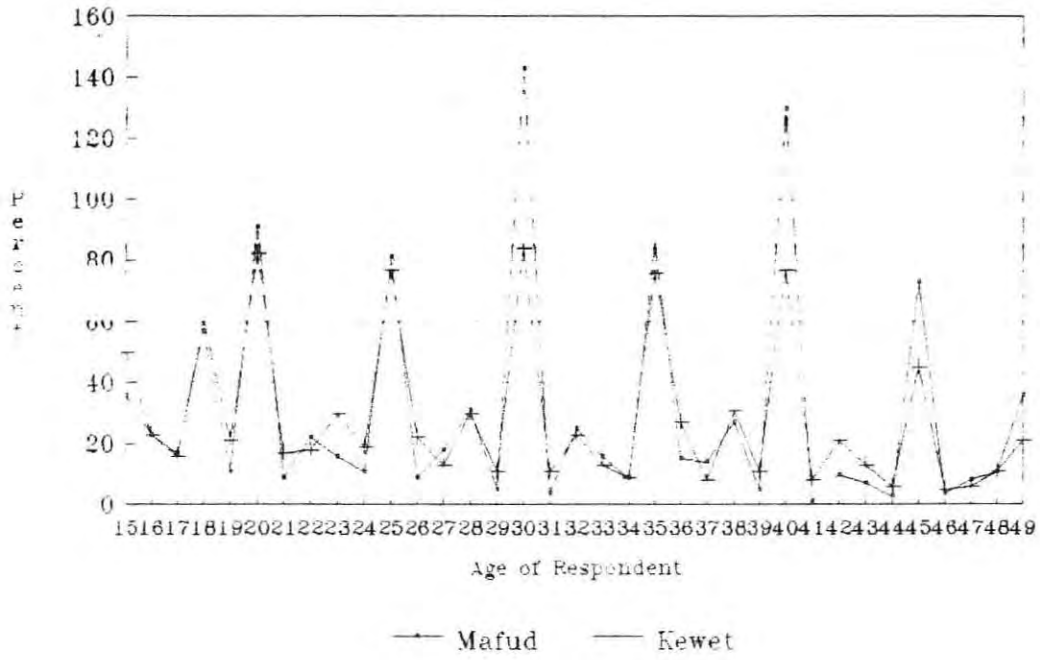
Bongaarts (1982:7-8) found that postpartum amenorrhoea is highly correlated (R Squared= 0.96) with the duration of breast-feeding. Based on this assumption, the following regression equation was developed to give postpartum infecundability or postpartum amenorrhoea.

$$i = 1.75 \, Exp(0.1396B-0.001872B^2)$$

where: i = mean or median duration of postpartum amenorrhoea, in months, and B = mean or median duration of breast-feeding in months.

A number of empirical analyses confirm that fertility variation among populations can be explained by the four factors alone (Bongaarts, 1978, 1982, 1981; Bongaarts and Potter, 1983; Bongaarts et al, 1984; Thapa, 1987; Yang, 1987; Gadalla et al, 1987).

Fig.3.1 Distribution of Respondents by % and Age Mafud, Kewet, Total, 1993



3.6 Evaluation of Data

This section examines the quality of data collected in the survey.It is very important to assess the quality of data before doing detailed analysis of fertility using some statistical methods.

3.6.1 Evaluation of Age Data

Under normal circumstances, in which mortality is neither drastically increasing nor decreasing and mass migration of population is absent, age distribution is expected to follow descending pattern as age advances. However, this is not the case in most of the developing countries where majority of the respondents are illiterates. A very few respondents can report their exact date of birth. In present study, when the respondents cannot remember the exact date at birth, they are simply asked to guess using at least some important events that occurred at local and national levels. Hence, the data for present study, deviates from the general trend as marked heaping at ages ending in 0 and 5 is clearly evident from figure 3.1 in both districts. An examination of the single year age data indicates that in spite of different proportions in each age, the pattern of age reporting in both districts is almost similar.

A marked heaping in digits ending in 0 and 5 and medium age heaping with digits ending in 2 and 8 are observed. On the other hand, dislikes for digits ending in 7, 9, and 1 can also be observed from the figure in both districts as well as for

total sample. The peaks in age heaping that seems to be prominent in both districts are 18, 20, 30, 35, 40 and 45.

The quality of age data can also be assessed using Myers' blended index. The method calculates a blended population which is a weighted sum of the number of the persons reporting ages in each of the ten terminal digits. The underlying assumption of this method is that if there are no systematic errors in the reporting of age, the blended sum of each terminal digit should approximately equal to 10 percent of the total blended population. If the sum at any digit exceeds 10 percent of total blended population, it indicates over selection of ages ending in that digit (digit preference). Conversely, a negative deviation or a sum that is less than 10 percent of the blended indicates under selection of ages ending in that digit (digit avoidance). A summary index of preference for all terminal digits is derived by dividing the absolute total deviations by two. If the data are free from age heaping, the index would indicate a value of zero. Theoretically, the Myres' index vary between zero and 180 where 0 represent no heaping and 180 would result if all ages were reported at a single year. In other words, the lower the value of the index the lesser the degree of digital preference (Myres' 1940). The deviations from 100 percent for digits from 0 to 9 and the summary index are given in Table 3.1 In both districts, the most preferred digits are zero and five. While the next preferred digit is 8 in Kewet, no other digit is preferred in Mafud. The most disliked digits are 1, and 9 in both districts.

Table 3.1 Digit preferences in Age Reporting of Eligible Women, Mafud and Kewet, 1993

Digit Preferred	Total (both districts)	Mafud	Kewet
0	**+25.6**	**+27.7**	**+18.6**
1	-7.7	-9.0	-6.2
2	-3.2	-5.5	-2.4
3	**-5.1**	**-6.1**	**-4.2**
4	-6.9	-7.6	-6.2
5	**+15.3**	**+20.6**	**+14.8**
6	-4.5	-6.3	-2.2
7	-5.9	-5.6	-6.5
8	**-0.4**	**-1.7**	**+0.5**
9	-7.3	-8.5	-6.1
Total	41.0	50.3	33.8

3.6.2 Evaluation of Reported Fertility Data

Data on fertility can be evaluated by examining the average number of children ever born by five-year age groups of women. Under normal circumstances, it is expected that average number of children ever born would increase as age of women increases. However, it is common knowledge that data on retrospective fertility can be affected by omission of children ever born alive to older women due to memory relapse. To examine such deviations from normal pattern the average parities (total children born from the beginning of reproductive life to current age) by age group of women are computed and presented in Table 3.2

Table 3.2 Distribution of Mean Number of Children Ever Born by Five-Year Age Group of Women Aged 15-49 and Rural Districts, Mafud, Kewet and Total Sample, 1993

Age Group	Mafud	Kewet	Total
15-19	0.31	0.25	0.28
20-24	1.45	1.15	1.28
25-29	3.05	2.34	2.68
30-34	4.54	3.35	4.05
35-39	5.65	3.78	4.70
40-44	5.57	5.18	5.39
45-49	5.49	5.26	5.40
Total	3.74	2.76	3.27

Source: Survey Data

It is observable from this table that the average parities show increasing trend from age 15 up to age 39 in Mafud and from age 15 to age 49 in Kewet. The deviation of age group 40-44 from the expectation in Mafud district, may indicate omission of children ever born to older women due to memory lapses. However, when the children ever born in both districts are combined, the data seem to fit more likely the theoretical expectation. In spite of the slight failure to increase in age group 44-49 which may not indicate serious omission of children ever born as such) the mean parity increases steadily across all reproductive ages for total sample.

The consistency of data on children ever born can also be evaluated by looking into the sex ratios of children ever born.

Accordingly , the sex ratios of children ever born to women in the sample for both districts are calculated and presented in Table 3.3.

Table 3.3 Sex ratio of Children Ever Born and Proportion dead, by Age Group of Women, Mafud and Kewet,1993

Age Group	Name of District				Total	
	Mafud		Kewet		Sex Ratio	Proportion Dead
	Sex Ratio	Proportion Dead	Sex Ratio	Proportion Dead		
15-19	142.1	0.087	115.0	0.116	128.2	0.101
20-24	137.0	0.083	141.8	0.178	139.2	0.113
25-29	111.5	0.118	134.6	0.125	121.9	0.126
30-34	97.4	0.139	132.4	0.184	108.2	0.154
35-39	97.4	0.138	129.8	0.133	109.5	0.136
40-44	120.5	0.137	119.2	0.183	119.9	0.156
45-49	89.0	0.185	119.9	0.213	100.0	0.196
Total		0.141	127.1	0.168		0.152

Source: Survey Data

The data in Mafud district displayed the omission of female children in age group of women 15-24, with less magnitude in age group 25-29 and 40-44 and under reporting of male children in age group 45-49.

In Kewet, the sex ratio data indicate under reporting of female children in age group 20-34, with less extent in other age intervals. The sex ratio results in Kewet implicitly indicates the respondents might have forgotten to report female children who were either living elsewhere at the time of the survey or who have died long time ago. The total sex ratio in Kewet is very high to accept. This might be due to selective out migration of females or biased selection of house holds with more female children.

The proportion of dead children are also presented in Table 1.3. The hypothetical expectation is that as the age group of women advances proportion of dead children ever born is increasing. In Mafud district, proportions of dead children in age group 15-19,20-24, 24-29 are almost similar while the proportions in age group 30-34, 35-39,40-44 are also similar but higher proportions. Thus it is tempting to say that the proportion of dead children ever born in Mafud district can linearly increase for broader age groups, 15-29, 30-44 and 45-49.

Nevertheless, the proportion of dead children in Kewet don't show regular patterns which might be a suggestive for omission of dead children. The proportion of dead children with total sample is linearly increased except in age group 35-39.

Another method of testing inconsistencies of fertility data is to compare life time fertility, obtained from children ever born, with that of current fertility derived from births of last year. The idea underlying this assumption is that if current age specific fertility rates are cumulated over reproductive age groups, they would result into a period fertility similar with that of retrospective fertility, when using these procedures, it is important to note that the fertility experiences of women who were dead are assumed to be similar as those who survived and fertility is constant in the recent past. The method is known as P/F ratios, ratios of average parities (P) to the estimated parity equivalent (F).

Theoretically, average parity equivalent should be equal with the lifetime average parity. Any deviation of the P/F ratio value from unity at any age groups

of women indicates either there has been an over or under estimation of fertility because of misunderstanding of the reference period during which births of last year occurred, or because of omission of children ever born who live elsewhere or those who died earlier. If the P/F ratios are under unity, it may be said that births occurred more than twelve months from the survey date are included and hence over estimation of current fertility level. Or it may be said that the retrospective fertility is under reported.The results of P/F ratios by age group of women in the study areas are given in Table 3.4.

Table 3.4 The P/F Ratios by Age Group and Districts

Age Group	Mafud	Kewet	Total
15-19	1.347	1.767	1.520
20-24	0.989	1.557	1.194
25-29	1.052	1.702	1.286
30-34	1.069	1.921	1.342
35-39	1.034	1.879	1.244
40-44	0.901	2.282	1.263

The table reveals that the ratios are about unity for all age groups in Mafud. The result in Mafud neither denotes omission of children ever born or over inclusion of births above one year since the survey time. The ratios in Kewet, however, deviates too much above unity implying most probably under reporting of children born during the 12 months prior to the date of the survey. This result can also occur if current fertility is assumed to decline. Any way, there is no substantial reason to accept this assumption. The data for total sample is almost in accordance with theoretical expectation. The analysis is limited to age group 15-44 because births in the last twelve months from the survey date for women in age group 45-49 was not reported in Kewet.

In conclusion, the examination of single and five-year age distributions as well as Myers' blended index, revealed the existence of inconsistencies in age data in the study areas. The fertility data also showed omissions of children ever born and under reporting of children born in the preceding 12 months of the survey. The ratios of parity to cumulative fertility (P/F) and proportion of dead children by age group of respondents support the existence of omission or under reporting of children ever born, especially in Kewet district. Moreover, the sex ratio of children ever born by age group of women denoted exclusions of female children in Kewet.

Therefore, the reported fertility data is suspect of errors and deficiencies. Before adjusting the data with defects, it would be difficult to establish fertility levels in the study areas. Hence, indirect techniques of fertility estimation are applied on reported fertility data to determine acceptable fertility levels in the study areas. In the chapter that follows, fertility levels will be established.

3.7 Limitations of the Study

There are many factors that bear impacts on the completeness of this study. The sampling techniques and the models adopted for the analysis of the data can have their own effects on the study. Perceptions and personal experiences of the respondents and the enumerators can also influence the quality of the outcome of the study. Thus, bearing this in mind, before doing analysis, the quality of the data is examined and adjusted. In general, all possible efforts will be made to minimize the risks that may bias the study.

CHAPTER IV: LEVELS OF THE FERTILITY IN THE STUDY AREAS

In this chapter, an endeavor is made to estimate the levels of fertility for the study areas, taking into account the levels of reported crude birth rate (CBR), general fertility rate (GFR), total fertility rate (TFR), gross reproduction rate (GRR), and average parity for women aged 45-49 years. As indicated in the ongoing discussion, the fertility data suffers from omission of children ever born and /or under-reporting of births born preceding 12 months of the survey. This suggests that the reported fertility rates might possibly be underestimated, especially in Kewet district, and hence may not be accepted as the true level of fertility in the study areas. Therefore, the reported fertility is adjusted using various demographic indirect techniques of fertility estimation.

4.1 Reported Fertility Level

The level of fertility in the study areas, explained in terms of crude birth rate(CBR), general fertility rate (GFR), total fertility rate (TFR), gross reproduction rate (GRR) and average parity for women aged 45-49 years (i.e., competed fertility) are presented in Table 4.1

Table 4.1 Distribution of Reported Fertility Rates for the Two Districts and Total Sample, 993 .

Index	Name of districts						Total		
	Mafud			Kewt			N	Birth	Rate
	N	Birth	Rate	N	Birth	Rate			
CBR	5122	201	39.2	4019	72	20.0	9141	273	30.0
GFR	1067	201	188.0	996	72	73.3	2063	273	132.0
TFR	1067	201	6.3	996	72	2.3	2063	273	4.4
GRR			3.1			2.6			2.7
AVE. PARITY	132	724	5.5	88	463	5.3	220	1187	5.4

As it can be seen from the table the reported CBRs are 39.2 and 20.0 per 1000 population in Mafud and Kewet, respectively. The CBR in Mafud is almost the double of CBR in Kewet. The corresponding figure for total rural Shewa is 39.0 per 1000 population which is the same with the result in Mafud (CSO: 1984). The result for Kewet is the lowest as compared with rural areas explained above. The most probable reason is under reporting of births of last year.

The general fertility rate was 188.0 and 73.3 per 1000 population in Mafud and Kewet respectively. The rate in Mafud is nearly more than twice in Kewet. The corresponding figure for rural Yifat and Timuga was 170.6, according to the 1984 Population and Housing Census. The total Fertility rate in rural Mafud is about 2.7 times the rate in Kewet. According to the 1990 FFS, the total fertility rate for rural Ethiopia is reported to be 6.9. The difference between TFR of rural Ethiopia and that of Mafud and Kewet is 0.6 and 4.6 respectively. The TFR for rural Shewa is 6.5 which is almost the same with TFR of rural Mafud. The corresponding TFR for rural Yifat and Timuga Awraja is 5.6.The average number of children ever born per woman at the end of their reproductive period (45-49) is 5.5 and 5.3 in Mafud

and Kewet respectively. The Average parity of rural Yifat and Timuga was 5.8 too. Interestingly, the average parities in both districts for age group 45-49 are almost similar with that of rural Yifat and Timuga.

In all the reported fertility measures, the rates in Kewet district are lower than the rates recorded in Mafud. The reason can be either fertility was under reported or genuinely fertility is low in Kewet due to various reasons such as high rates of primary and secondary sterility that can deserve especial research in the area to ascertain this finding. Or the condition could be most likely the combination of the two and several trends favor this idea. Therefore, if the low results of reported births cannot fully accounted by fertility reduction, it calls for indirect techniques of fertility estimation that account for under reported births.

4.2 Estimated Fertility Level

As already discussed, the fertility data are subject to under reporting of children ever born. Consequently, the reported fertility rates are under enumerated, especially in Kewet district. Thus, in the section that follows, an attempt is made to adjust the measures of fertility using indirect estimation techniques. The techniques employed for these purposes are the Brass P/F ratio technique latter modified by Coal and Trussel, and the Gompertz frtility model.

4.2.1 Estimation of Fertility Using the P/F Ratio Method

The P/F ratio method, which was original to Brass, but latter modified by Coal and Trussel (UN, 1983:32), has been used not only for detecting errors in fertility data but also for adjusting the data distorted by omission of children ever born and under reporting of children born 12 months before the survey. The data required are:

(a) the number of children ever born classified by five-year age group of mother;

(b) the number of children born during the year preceding the survey date classified by five-year age group of women;

(c) the total number of women classified by five-year age group (irrespective of marital status)

(d) and total population if the birth rate is to be established.

Essentially, the method assumes that (a) the reported age-specific fertility rates are approximately correct in age structure though not necessarily in over all level, (b) the average parity reported for the younger women is accurate, (c) fertility patterns in the recent past is constant, (d) The fertility performance of women who passed away is similar as those who survived. If the above assumptions hold true, the cumulated current fertility rate or average parity equivalent F(x) should be equal to the life time fertility or average parity P(x). If there is any difference between the two , it can be due to errors in reporting children ever born

and current births. Any error in the overall level is corrected by means of an adjustment factor that is obtained by comparing the average parity (actual cohorts) reported for the younger women with the cumulative fertility (synthetic cohorts).

In this study, the ratios for the crucial age group 20-34 are fairly found consistent for Mafud data and total sample. The adjustment factor has therefore been selected as the average of the three ratios for women in this age range ($P_2 /F_2 + P_3 /F_3 + P_4 /F_4)/3$. In the case of Kewet, however, the ratios for age range 25-39 appeared to be more consistent when compared with ratios in other age ranges. Hence the three ratios ($P_3 /F_3 + P_4 /F_4 + P_5 /F_5)/3$ were applied and this has raised the observed total fertility rate by 81.0 percent. The adjustment procedure has increased the observed total fertility rate in Mafud by 3.7 percent. The procedure might have well adjusted the data towards a better expectation.

The reported and the adjusted fertility rates are presented in Table 4.2

Table 4.2 Distribution of Reported and Adjusted Age Specific Fertility Rates, 1993

Age Group	Name of districts				Total	
	Mafud		Kewt		Reported	Adjusted
	Reported	Adjusted	Reported	Adjusted		
15-19	0.1088	0.1372	0.0643	0.1419	0.0849	0.1309
20-24	0.3087	0.3256	0.1386	0.2490	0.2190	0.2823
25-29	0.2708	0.2795	0.1111	0.1911	0.1886	0.2385
30-34	0.2640	0.2706	0.0571	0.1010	0.1780	0.2229
35-39	0.2177	0.2152	0.0523	0.0940	0.1333	0.1630
40-44	0.0861	0.0738	0.0400	0.0624	0.0652	0.0697
Fertility Indices*						
TFR	6.3	6.5	2.3	4.2	4.4	5.5
GFR	211.8	219.3	79.3	144.5	132.0	187.0
GRR	3.1	3.2	2.6	2.1	2.1	2.7
CBR	39.2	40.0	17.9	32.6	30.0	37.7

* The fertility indices given in Table 4.2 are based on women aged 15-44 while the indices indicated in Table 4.1 are based on women aged 15-49.

Based on the age-specific fertility rates (ASFRs), the adjusted TFR for Mafud is 6.51 while for that of Kewet the rate is 4.20 children per woman. The adjusted corresponding value for rural population of Shewa region is 7.7 (CSA: 1989). The adjusted CBR is 40.0 and 32.6 per 1000 population in Mafud and Kewet respectively. The method has adjusted the CBR in Kewet inflating the reported CBR by 82.1 percent. In Mafud, however, CBR has increased by only two percent.

The result of adjusted gross fertility rate also showed an increment of 16.7 percent in Mafud and 97.1 percent in Kewet. Assuming sex ratio of 104 males per 100 females, the adjusted rates produced gross reproductive rates of 3.2 and 2.10 daughters per woman in Mafud and Kewet respectively. While the rate in Mafud is increased by 0.1, it is decreased by 0.5 in Kewet after adjustment. In sum, all fertility levels estimated by the P/F ratio method denoted that the levels of fertility in the study areas are modest and even less than modest in Kewet.

4.2.2 Estimation of Fertility Using the Relational Gompertz Model

To supplement the fertility estimates done by the Brass P/F ratio method, the relational Gompertz model of fertility estimation is also used in this study. The relational Gompertz model has been developed to adjust and correct fertility distributions obtained from retrospective fertility data on children ever born and current births (Zaba, 1981;Brass 1981). This model, unlike the P/F ratio method, does not require the assumption of constant fertility in the recent past.

The Gompertz relational model for fertility estimation can be expressed as

$$F(x) = T.e^{-e-[a+bYs(x)]}$$

Where $Y_s(x) = -\ln[-\ln F_s(x)]$

Where F(x) = cumulated fertility up to age X, T= total fertility rate and $F_s(x)$ = standard cumulative fertility up to age X with $F_s(50) = T_s$. α and ß are the intercept and slope of the data respectively obtained by ordinary least square methods. The model is transformed into linear expression by taking the double logarizms of the observed parity values. Hence, the transformed value is done as follows:

$$Z(i) = -\ln[-\ln(P(i)/P(i+1)]$$

$$Y = Z(i)-E(I)$$

Where E(i) are standards obtained from Table 5 (Zaba, 1981)

Taking the calculated Y values and the standard X value of the first three from the same table (Table 5) a and b are calculated. Applying the a and b on standard values:

$$Z\hat{}(i) = a+bZ_s(i)$$

Where $Z_s(i)$ are the results of double logarizms of standard mean parities. And the double logarizm of the transformed vaue is given as:

$$P\hat{}(i)=\exp(-\exp(-Z\hat{}(i))$$

The total fertility rate is estimated by dividing reported mean parity, P(i) by P^(i). Mean parity is used to estimate age-specific fertility rate because current fertility is under reported. Then, the estimated total fertility rate is multiplied by P^(i) to obtain cumulative fertility rate, F(x). The cumulative fertility rate is divided by five to get adjusted age-specific fertility rate.

Table 4.3 Gompertz Relational Method of Estimating Fertility

Age Group	Mafud Reported ASFR	Adjusted ASRF	Kewet Reported ASFR	Adjusted ASFR
15-19	0.1088	0.1562	0.0643	0.1252
20-24	0.3087	0.2916	0.1386	0.2255
25-29	0.2708	0.3125	0.1111	0.2236
30-34	0.2640	0.2867	0.0571	0.1885
35-39	0.2177	0.2359	0.0523	0.1407
40-44	0.0861	0.1306	0.0400	0.0686
TFR =	6.3	7.18	2.3	4.91
GFR =	211.8	237.4	79.3	163.0
GRR =	3.1	3.5	1.1	2.4
CBR =	38.7	43.3	17.9	36.8

Table 4.3 presents the indices of fertility derived through the Gompertz model. As it can be seen from the table the estimates of the fertility rates based on this method are comparable with the corresponding rates derived through the P/F ratio method. Indeed, the Gompertz model has slightly increased the fertility rates in both the districts. The Gompertz model gives TFR of 7.18 and 4.91 per woman for Mafud and Kewet respectively. Using the sex ratio at birth of 104 males per 100 females, the GRR obtained are 3.5 and 2.4 daughters per woman in Mafud and Kewet respectively. The GFRs are also calculated to be 237.4 and 163.0 per 1000 women in Mafud and Kewet in that order. The CBRs are also calculated and the results are 43.3 births per 1000 population in Mafud while the results for Kewet is 36.8 births per 1000 population.

To conclude, it may be said that in spite of the observed differences, the fertility rates obtained by the relational Gompertz model could also be considered as reasonable as those derived through the P/F ratio method.

4.3 Plausible Fertility Levels for the Study Areas

The estimated fertility rates obtained using the P/F ratio method and Gompertz relational method together with reported fertility rates are provided in Table 4.4 It is observed from the table that both methods have raised the reported fertility rates. The TFR for Mafud is comparable with TFR for rural areas of Ethiopia estimated from the 1984 demographic sample survey as 7.5 children per a woman (CSA, 1991).

Table 4.4 Reported and Adjusted Fertility Rates, by Fertility Indices and Districts, 1993

Indices	Name districts					
	Mafud			Kewet		
	Reported	Adjusted		Reported	Adjusted	
		P/F Ratio	Gompertz Model		P/F Ratio	Gompertz Model
TFR	6.3	6.5	7.18	2.3	4.2	4.9
GFR	211.8	219.3	237.4	79.3	144.5	163.0
GRR	3.1	3.2	3.5	2.6	2.1	2.4
CBR	38.7	40.0	43.3	17.9	32.6	36.8

Although the fertility estimates obtained by applying the P/F ratio and relational Gompertz methods are not very much different, it is not easy to choose among the results of the two methods. Both methods have their own shortcomings

advantages. The assumptions of the P/F ratio method require correct data and constant fertility in the recent past. In the cases of Gompertz relational model, the assumption of constant fertility in the recent past is not there. But its results can be biassed by errors in reporting data and approximations used to obtain the estimating equations (Zaba, 1988). In view of this, a way out is to use ranges between the lowest and highest estimates of fertility measured by the two methods. Hence, in Mafud the fertility levels range from a CBR of 40.0 to 43.3; a GFR of 219.3 to 237.4; a TFR of 6.5 to 7.18 and a GRR of 3.2 to 3.5. In Kewet, following the same procedure, the ranges are from a CBR of 32.6 to 36.8; a GFR of 145 to 163.3; a TFR of 4.2 to 4.9; and a GRR of 2.1 to 2.4.

CHAPTER V: DESCRIPTIVE INFORMATION

5.1 General Demographic Characteristics

(a) Ethnicity and Religion

Owing to cultural diversities, fertility differentials among various ethnic groups living in similar economic and environmental circumstances have been observed by several researches. In some societies, the norms and values of certain ethnicities are more pronatalist than the norms and values of other ethnicities.

The total number of peoples and ethnicities in the sampled households in the two districts are presented in Table 5.1 The Table shows that almost everybody in rural Mafud are an Amhara (99.0 percent). Amhara is also the largest ethnic group in rural Kewet comprising of 73.1 per cent. Oromos and Argobas, being the second and third largest ethnic groups in Kewet are comparable in size. The two ethnicities, Oromos and Argobas, constitute about 13.8 and 12.6 percents in Kewet districts, respectively. Of the total population (N=9141) in the sampled households, 56.0 and 44.0 percents are listed in Mafud and Kewet respectively.

Table 5.1 Percentage Distribution of Total Population in the Sampled Households by Ethnicity and District, 1993

Ethnicity	Name of District				Total	
	Mafud		Kewet		N	Percent
	N	Percent	N	Percent		
Amharas	5072	99.0	2939	73.1	8011	87.6
Oromos	16	0.3	556	13.8	572	6.3
Argobas	34	0.7	508	12.6	542	5.9
Others	0	0.0	16	0.4	16	0.2
Total	5122	100.0	4019	100.0	9141	100.0

Table 5.2 presents percent distribution of population by religion and district. In Mafud, it is most likely to say that the total population is predominantly followers of Christian religion while in Kewet they constitute about 71.5 percent with the remaining 28.5 percent followers of Islamic religion. Since the total number of Amharas and christians in the two districts are about 87.6 and 86.9 percent, respectively, it is justified to say that christian Amharas dominate in both districts.

Table 5.2 Percent Distribution of Total Population in the Sampled Households by Religion and District

Religion	Name of District				Total	
	Mafud		Kewet		N	Percent
	N	Percent	N	Percent		
Christians	5071	99.0	2875	71.5	7946	86.9
Muslims	51	1.0	1144	28.5	1195	13.1
Total	5122	100.0	4019	100.0	9141	100.0

(b) Education

Education is known to be one of the most important variables for the reduction of fertility in many countries of the world. From Table 5.3 it can be seen that Kewet is a little better off than Mafud by 3.0 per cent in terms of those who can read and write including informal and formal education although this may not be a significant difference. However, it is important to note that the literacy rate is calculated irrespective of age of the population.

Table 5.3 Number and Percent Distribution of the Total Population in the Sampled Households by Literacy Status and District, 1993

Educational Status	Name of District				Total	
	Mafud		Kewet		N	Percent
	N	Percent	N	Percent		
Illiterate	4216	82.3	3188	79.3	7404	81.0
Literate	906	17.7	831	20.7	1737	19.0
Total	5122	100.0	4019	100.0	9141	100.0

(c) Sex Distribution

Usually in most parts of the world, males are more in numbers than females at early ages, producing a sex ratio of 105 per 100 females at birth. In Table 5.4 population distributions by sex and districts are presented.

Table 5.4 Percent Distribution of Total Population in the Sampled Households by Sex Status and District, 1993

Educational Status	Name of District				Total	
	Mafud		Kewet		N	Percent
	N	Percent	N	Percent		
Males	2546	49.7	2086	51.9	4632	50.7
Females	2576	50.3	1933	48.1	4509	49.3
Total	5122	100.0	4019	100.0	9141	100.0

Source:survey data

It is interesting to note from Table 5.4 that in Kewet males are 3.8 percent higher than females, producing a sex ratio of 107.9. In Mafud, on the other hand, females are more in numbers than males and the sex ratio is 98.8 per 100 females. The overall sex ratio for both districts are 102.7.

(d) Household Size

The mean household sizes are calculated to be 5.4 and 4.5 persons in Mafud and Kewet respectively. The median household sizes are found to be 5.0 and 4.0 in Mafud and Kewet respectively. The median household size is higher in Mafud by one person than in Kewet.

5.2 Demographic Characteristics of Sampled Women

This section provides some socio-economic and demographic characteristics of respondents. For the purpose of this study 1067 (51.7 percent) women aged 15-49 from Mafud district and 996 (48.3 percent) from Kewet district were selected. The percents are comparable with the total percent of females in the sampled households (50.3 percent in Mafud and 48.1 in Kewet).Tables 5.5 and 5.6 show number and percent distribution of women aged 15-49 by PAAs in Mafud and Kewet districts, respectively.

Table 5.5 Number and Percent Distribution of Women Aged 15-49 by PAAs Mafud, 1993

Serial number	PAAs	Number	Per cent
1	Armania	62	5.8
2	Asfachew	60	5.6
3	Argag	77	7.2
4	Mengeta	54	5.1
5	Abdilak	65	6.1
6	Eltoki	36	3.4
7	Weinweha	53	5.0
8	Yizaba	90	8.4
9	Agamber	88	8.2
10	Arada	69	6.5
11	Genet	117	11.0
12	Gedelge	58	5.4
13	Tife Amba	101	9.5
14	Wanzaberet	65	6.1
15	Facil Amba	23	2.2
16	Kassie Ager	49	4.6
Total		1067	100.0

Table 5.6 Number and Percent Distribution of Women Aged 15-49 by PAAs Kewet, 1993

Serial Number	PAAs	Number	Per cent
1	Ashegna Guanch	68	6.8
2	Qolomuyana Inbulbul	66	6.6
3	Chare	37	3.7
4	Goze	40	4.0
5	MengistnaGult	52	5.2
6	Wejedna Mesobit	61	6.1
7	Kobo	85	8.5
8	Berbirana Gilgilo	125	12.6
9	Balchi	79	7.9
10	Wessen Kurur	86	8.6
11	Insertu	23	2.3
12	Deberna Jegol	96	9.6
13	Yelen	84	8.4
14	Abay Ater	94	9.4
Total		996	100.0

Source: Survey data

(a) Age Distribution

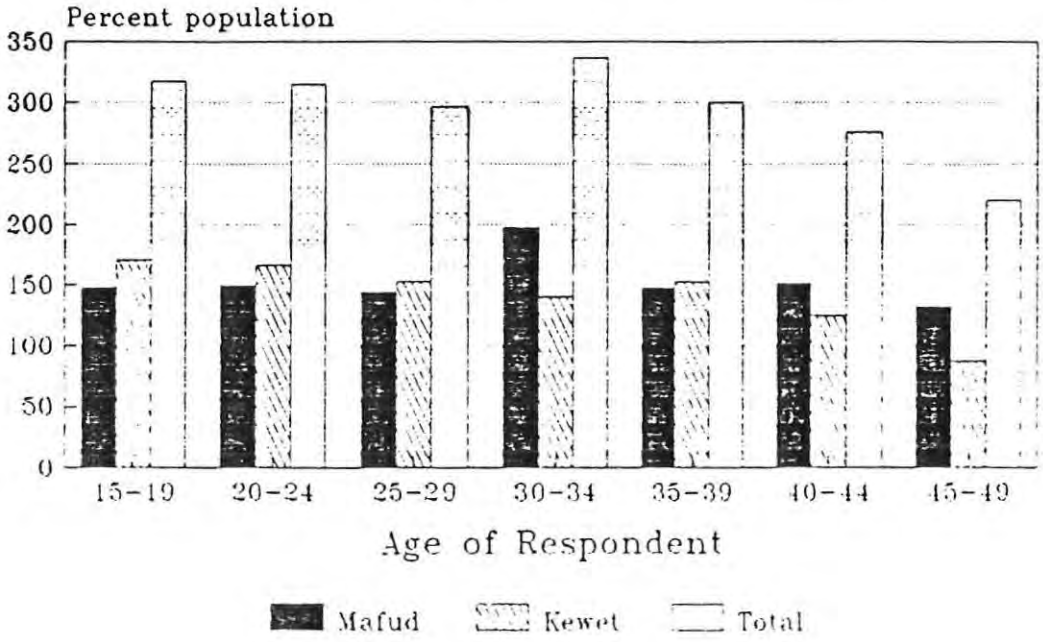
The age distribution of the selected women who were interviewed during the survey (conducted from April to May 1993) are shown in Table 5.7. The Table shows a typical pattern of developing countries where for the most part, the largest proportions are in the lower age groups, and that the proportions decrease as age advances. The distribution in Mafud district is a bit irregular: age group 30-34 somewhat deviates from the norm. When the percent distribution of the two districts are compared by age group, it is observed that there are some differences. The difference, which ranges from 1.6 to 4.4, is significant as observed in one-way variance analysis. This may indicate that the age distributions of the respondents in the two districts are different.

Table 5.7 Distribution of Number and Percent of Women Aged 15-49 by Age Group, Total and District, 1993

	Total		Mafud		Kewet	
Age group	N	percent	N	Percent	N	Percent
15-49	318	15.4	147	13.8	171	17.2
29-24	315	15.3	149	14.0	166	16.7
25-29	297	14.4	144	13.5	153	15.4
30-34	337	16.3	197	18.5	140	14.1
35-39	300	14.5	147	13.8	153	15.4
40-44	276	13.4	151	14.2	125	12.6
45-49	220	10.7	132	12.4	88	8.8
Total	2063	100.0	1067	100.0	996	100.0

Figure 5.1 Presents the age distribution of respondents for the two districts and combined data. It is observable from the figure that the proportions in the lower age groups (15-29) are a bit higher in Kewet while higher proportions are found in upper age groups (30-34, 40-49) in Mafud when the two districts are compared.

Fig.5.1 Percent Distribution of W
Mafud, Kewet, Total, 1993



(b) Ethnic and Religious Composition

As already mentioned, the impacts of ethnic and religious composition on fertility, may arise from cultural factors in which some aspects of certain ethnic and religious groups may be pronatal while others may not.

Table 5.8 presents percent distribution of ethnic and religious compositions of women in reproductive age groups. In general, the ethnic and religious distributions of women aged 15-49 are similar with total population in the sampled households of the two districts discussed earlier. That is, women in reproductive age group in Mafud are predominantly followers of christian religion and of Amhara ethnic group, whereas in Kewet about a third of them are either Oromo or Argoba ethnic group and followers of Islamic religion.

Table 5.8 Number and Percent Distribution of Women Aged 15-49 by Ethnicity and District, 1993

	Mafud		Kewet		Total	
Age group	N	percent	N	Percent	N	Percent
Amhara	1057	99.1	725	72.8	1782	86.13
Oromo	1	0.1	130	13.0	131	6.4
Argoba	9	0.8	135	13.6	144	7.0
Others	0	0.0	6	0.6	6	0.3
Total	1067	100.0	996	100.0	2063	100.0

Source: Survey data

(c) Education

Data on respondents' eduction was collected by the level and grade completed and presented in Table 3.18 The majority of the respondents (73.5 percent in Mafud and 77.9 percent in Kewet) are illiterate. Only 26.5 percent of respondents in Mafud and 22.1 percent in Kewet are literate including those who attended literacy program and formal education of any grade. As indicated in the literature review, it is not clear at what level education affects family size. In general, however, in most societies as

well as in Ethiopia education at all levels would negatively correlate with the number of children ever born. The 1990 National Family and Fertility Survey for Ethiopia indicates that both the reported and standardized mean parity and levels of education are negatively associated (CSA,1993: 150).

Table 5.9 Percent Distribution of Women Aged 15-49 by Level of Educational, Mafud, Kewet and Total, 1993

Educational Status	Name of District				Total	
	Mafud		Kewet		N	Percent
	N	Percent	N	Percent		
Illiterate	782	73.5	776	77.9	1558	75.6
Literacy	174	16.3	165	16.0	339	16.5
Primary	73	6.9	39	3.9	112	5.4
Secondary	31	2.9	12	1.2	43	2.1
Tertiary	4	0.4	4	0.4	8	0.4
Total	1064	100.0	996	100.0	2060	100.0

Source: Survey Data

(d) Socio-Economic Status of the Household

An attempt was made to collect data on socio-economic status of the household. To this end, three variables were used as the indicators of rural socio-economic status. First, the amount of land size that is at the disposal of the household at the time of the survey was asked. The total land size (both used for cultivation and grazing) measured in hectares are given in Table 5.10 which reveals that landless respondents are greater by one percent in Kewet than in Mafud. The percent distribution of respondents by land size in both districts is slightly different.

Table 5.10 Number and Percent Distribution of Ever Married Women by Size of Land Holding, Mafud, Kewet, and Total, 1993

Land Size by Category	Name of District				Total	
	Mafud		Kewet		N	%
	N	%	N	%		
1 None	66	6.9	86	9.6	152	8.0
2 0.12-0.75	342	36.0	330	36.7	672	36.0
3 0.76-1.25	293	30.9	276	30.7	569	31.0
4 1.26-1.75	139	14.6	104	11.6	243	13.0
5 1.76+	108	11.5	103	11.4	211	11.0
Total	949	100.0	899	100.0	1847	100.0

Livestock raising was the second most important indicator of rural socio-economic status for which data was collected by the survey. Number and percent distribution of the respondents by value of livestock owned for the last twelve months is indicated in Table 5.11 which shows that the distribution of respondents by this socio-economic status is not even, especially in Kewet district where more than a quarter (29 percent) of the respondents are concentrated in the last category. Respondents those who own no livestock are greater by two percent in Mafud than in Kewet.

Table 5.11 Number and Percent Distribution of Ever Married Women Aged 15-49 by Value of Livestock Owned, Mafud, Kewet, and Total, 1993

Value of Livestock Owned by Category	Name of District				Total	
	Mafud		Kewet		N	%
	N	%	N	%		
1 None	111	11.7	80	8.9	191	10.0
2 133.0-1000	91	9.6	44	4.9	135	7.0
3 1001-2000	188	19.8	67	7.4	255	14.0
4 2001-3000	206	21.7	64	7.1	270	15.0
5 3001-4000	153	16.1	111	12.3	264	14.0
6 4001+	200	21.1	534	59.3	734	40.0
Total	949	100.0	900	100.0	1849	100.0

Source: Survey Data

Grain production is another indicator of socio-economic status in rural areas. Number and percent distribution of ever married women by the value of grain production and the two districts is presented in Table 5.12. It is possible to observe from the table that the percent of respondents who have no crop production is the same in both districts.

Table 5.12 Number and Percent Distribution of Ever Married Women by Value of Grain Production and District, 1993

Value of Grain Production by Category	Name of District				Total	
	Mafud		Kewet		N	%
	N	%	N	%		
1 None	82	8.6	75	8.3	157	8.0
2 7.50-500	259	27.3	15	1.7	274	15.0
3 501-1000	243	25.6	54	6.0	297	16.0
4 1001-1500	159	16.8	91	10.1	250	14.0
5 1501+	206	21.7	665	73.9	871	47.0
Total	949	100.0	900	100.0	1849	100.0

Source: Survey Data

The way the value of grain production is categorized in the above table does not appear to fit the data in Kewet district. The distribution is highly skewed towards the last category (36.0 percent). When an attempt is made to adjust the distribution, it would have an effect on the distribution of value in Mafud district. In any case, the number of observation in each category is reliable for discussion.

(e) Marital Status

Information about respondent's current marital status were obtained at the survey under the following categories: single (never married) currently married, widowed, divorced, separated, cohabited and single but gave birth. Since the number of women under the categories of separated and cohabited were found to be small in both districts, those under separated were included in the divorced categories while those in cohabited were considered as currently married. The following two tables (Table 5.13 & 5.14) present percent distribution of women by marital status and districts. It is evident from these tables that 11.1 percent of women are reported as never married, 74.6 percent as currently married, 6.5 percent as widowed and 7.8 as having dissolved their marriages at the time of the survey in Mafud district.The percent distribution in Kewet is 9.6 as single,75.0 as currently married, 8.0 as widowed and 7.3 as divorced. The distribution in Kewet is lower by 1.5 for single, 0.4 for currently married, 0.5 for divorced and greater by 1.5 percent for widowed when compared with that of marital status of Mafud district. The examination of the marital status by current age of women in both districts shows that marriage in the study area is universal. That is, the proportion

of women who are single substantially decreases as age increases. By age 35-39 a substantial proportion of are married in both districts.

Table 5.13 Distribution of Number and Percent Women Aged 15-49 by Age Group and Marital Status, Mafud, 1993

Age Group	Marital status of respondent							
	Married		Single		Divorced		Widowed	
	N	Percent	N	Percent	N	Percent	N	Percent
15-19	57	5.3	80	7.5	11	1.0	4	0.4
20-24	102	9.6	29	2.7	13	1.2	3	0.3
25-29	130	12.2	2	0.2	9	0.8	13	1.2
30-34	158	14.8	3	0.3	23	2.2	5	0.5
35-39	132	12.4	4	0.4	6	0.6	24	2.3
40-44	111	10.4			15	1.4	20	1.9
45-49	106	9.9			6	0.6		
Total	796	74.7	118	11.1	83	7.8	69	6.5

Table 5.14 Distribution of Number and Percent of Women Aged 15-49 by Age Group and Marital Status, Kewet, 1993

Age Group	Marital Status of Respondent							
	Married		Single		Divorced		Widowed	
	N	Percent	N	Percent	N	Percent	N	Percent
15-19	82	8.2	74	7.5	14	1.4	1	0.1
20-24	137	13.8	16	1.6	8	0.8	5	0.5
25-29	124	12.5	4	0.4	13	1.3	12	1.2
30-34	119	12.0	1	0.1	8	0.8	12	1.2
35-39	124	12.0			11	1.1	18	1.8
40-44	98	9.8	1	0.1	7	0.7	19	1.9
45-49	63	6.3			12	1.2	13	1.3
Total	747	75.0	96	9.6	73	7.3	80	8.0

(f) Postpartum Variables

Data on breastfeeding, postpartum abstinence and postpartum amenorrhoea were collected in the survey. Data on breastfeeding for the last three children were collected at three age levels: (1) age at full breastfeeding (or breastfeeding practice

before any supplementary food is given to a child), (2) age at weaning a child (or partial breastfeeding) (3) and current status. Beastfeeding is found to be universal (99.0 percent) in rural areas of both districts.

Mean duration of full breastfeeding for the last child is given in Table 5.15 which roughly suggests that women of older ages appear to give their children supplementary food at latter ages when compared to younger women.

Table 5.15 Distribution of Number of Mothers and Mean Duration of Full Breastfeeding for the Last Child, Both Districts and Total Sample, 1993

Age Group	Name of Districts				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
15-19	17	9.2	26	6.3	43	7.5
29-24	63	9.2	74	6.4	137	7.7
25-29	105	9.4	109	7.2	214	8.3
30-34	137	9.1	108	7.6	245	8.4
35-39	98	9.3	126	7.6	224	8.3
40-44	124	10.9	102	7.6	226	9.4
45-49	103	10.1	67	7.7	170	9.1
Total	647	9.7	612	7.3	1259	8.5

For the last child, age at additional food (other than mothers's milk) on average is about 9.7, 7.3 and 8.5 months in Mafud, Kewet and total sample,respectively. The mean duration of full breastfeeding for the next to last child and the number of women those fed their next to last child are presented in Table 5.16. The highest mean duration of the full breastfeeding for next to last child in Mafud is for age group 15-19. This cannot be a reliable mean as the

number of observation is very small. In both districts the mean full breastfeeding duration increases beginning from age 20-44 which may suggest that older women may breastfeed their children longer, before giving additional food either in the form of liquid, semi-liquid or solid. In the last age group (45-49) there is a problem of memory on the part of the respondents to report correctly the age at which supplementary of food is given. In both districts the mean duration of full breastfeeding is lower for this age group as compared with the preceding two age groups.

Table 5.16 Distribution of Number of Mothers and Mean Duration of Full Beast Feeding For the Next to Last Child, Both Districts and Total Sample, 1993

Age Group	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
15-19	5	12.0	8	7.8	13	9.4
20-24	65	9.6	46	6.8	111	8.4
25-29	107	9.6	91	7.7	198	8.7
30-34	166	9.9	106	7.8	272	9.1
35-39	129	10.1	118	7.8	247	9.0
40-44	125	11.2	97	7.9	222	9.8
45-49	100	9.9	63	7.5	163	9.0
Total	697	10.1	529	7.7	1226	9.1

The mean duration of full breastfeeding for the previous child is not very much different from that observed for the last and next to last children. Still older women seem to breastfeed longer than the younger women. Furthermore, the mean duration for the age group 45-49 seemes to be lower as usual than the preceding one or two age groups in both the districts due to memory relapses by older women. Looking at the tables on full breastfeeding for the last three children, it is

observable that the total mean duration of full breastfeeding for the next to last and previous children is higher than the mean duration for the last child.

Table 5.17 Distribution of Number of Mothers and Mean Duration of Full Breastfeeding for the Previous Child, Both Districts and Total sample, 1993

Age Group	Name of Districts				Total	
	Mafud		kewet		N	Mean
	N	Mean	N	Mean		
15-19	2	12.0	2	6.0	4	9.0
20-24	24	10.0	15	7.5	39	9.0
25-29	73	9.7	51	6.9	124	8.5
30-34	137	10.2	82	8.0	219	9.4
35-39	119	10.3	97	7.7	216	9.2
40-44	106	11.0	82	7.6	188	9.5
45-49	86	10.2	52	7.7	138	9.3
Total	547	10.3	381	7.6	928	9.2

Source: Survey Data

Age at weaning is a complete stoppage of breastfeeding. Age at weaning is remembered by mothers better than age at which they start giving supplementary of food to their child.The mean duration of age at weaning for the last child is given in Table 5.18. The table reveals that mean duration of partial breastfeeding in Mafud district at 32.3 months is higher by 7.9 months than in Kewet. Except for age group 40-44 in Kewet and 15-19 in Mafud, mean duration of breastfeeding is on increasing trend across all age groups. For the total data the mean duration of beastfeeding increases at each successive ages implying that older women breasrfeed longer duration than the younger women.

Table 5.18 Distribution of Number of Mothers and Mean Duration of Partial Breastfeeding for the last Child by Age Group and District, 1993

Age Group	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
15-19	4	30.8	10	19.1	14	22.4
20-24	27	27.4	45	22.1	72	24.1
25-29	45	29.0	97	24.5	142	26.0
30-34	81	29.0	93	23.6	174	26.1
35-39	58	34.2	112	25.2	170	28.3
40-44	95	33.2	89	24.6	184	29.1
45-49	94	35.9	72	25.8	166	31.5
Total	404	32.3	518	24.4	922	27.8

Source: Survey Data

The mean duration of partial breastfeeding for the next to last child is indicated in Table 5.19 for both districts. The duration smoothly increases with the age of the respondent.

Table 5.19 Distribution of Number of Mothers and Mean Duration of Partial Breastfeeding for the Next to Last Child by Age Group and District, 1993

Age Group	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
15-19	5	22.6	8	22.6	13	22.6
20-24	64	24.8	47	21.6	111	23.5
25-29	107	26.9	92	24.3	199	25.7
30-34	166	27.7	103	23.9	269	26.2
35-39	128	30.0	116	25.0	244	27.9
40-44	123	31.0	95	23.6	218	27.9
45-49	98	32.8	66	23.7	164	29.2
Total	691	29.2	527	23.9	1218	26.9

In Mafud, women in age category of 45-49 breastfeed their children eight months more than women in age category 20-24. The mean duration of partial breastfeeding for the total respondent in Mafud is 29.2 months for the next to last child. The corresponding value for the Kewet district is 23.9 months. The mean duration of partial breastfeeding for the next to last child is lower by 3.1 and 0.5 months in Mafud and Kewet, respectively, when compared with the mean duration of partial breastfeeding for the last child. The observed differences can probably be attributed to under reporting of duration of breastfeeding for the next to last child. The mean duration of partial breastfeeding for previous child is also calculated and presented in Table 5.20 which indicates values lower in Kewet than in Mafud district.

Table 5.20 Distribution of Number of Mothers and Mean Duration of Partial Breastfeeding for Previous Child by Age Group and District, 1993

Age Group	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
15 19	2	18.0	2	24.0	4	21.0
20-24	24	24.8	15	18.1	39	22.2
25-29	73	26.1	53	24.2	126	25.3
30-34	136	29.3	80	23.8	216	27.2
35-39	117	30.0	98	24.6	215	27.6
40-44	107	32.3	80	23.3	287	28.4
45-49	85	31.8	56	23.3	141	28.4
Total	544	29.8	384	23.7	928	27.2

Another postpartum variable that has direct effect on fertility is postpartum amenorrhoea. Although data on this variable is collected for the last three children, it is believed that respondents would have memory relapse in reporting duration.

On the other hand, since many respondents didn't resume their menstruation at the time of the survey, reports based on the last child would have small number of observations. Therefore, the postpartum amenorrhoea based on the next to last child is selected for analysis. The mean duration of postpartum amenorrhoea for the next to last child in Mafud, which is presented in Table 5.21 is also increasing across all ages except in age group 45-49. The data clearly indicate that both mean duration of breastfeeding and mean duration of amenorrhoea have positive association in Mafud district.

Table 5.21 Distribution of Number of Mothers and Mean Duration of Postpartum Amenorrhoea for the Pen-Ultimate Child by Age Group Mafud, Kewet, and Total, 1993

Age group	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
15-19	4	14.3	6	21.7	10	18.7
29-24	65	15.2	44	16.8	109	15.8
25-29	105	17.2	76	18.7	181	18.2
30-34	161	18.5	94	17.2	255	18.0
35-39	126	19.7	106	17.5	232	18.7
40-44	123	20.6	80	16.7	203	19.1
45-49	96	19.4	51	15.4	147	18.0
Total	680	18.8	457	17.3	1137	18.2

The relationship between partial breastfeeding and postpartum amenorrhoea for the next to last child in Kewet district is also positive. The pattern is that in age groups where mean duration of breastfeeding is low the mean duration of amenorrhoea is low and in age groups where mean duration of breastfeeding is high the mean duration for amenorrhoea is also high.

Table 5.22 Distribution of Number of Mothers and Mean Duration of Abstinence by Age Group and District, 1993

Age Group	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
15-19	5	7.8	7	2.0	49	4.2
20-24	67	4.1	36	3.7	151	3.5
25-29	107	3.8	65	4.3	206	4.0
30-34	164	4.3	85	3.4	250	3.9
35-39	127	4.6	101	2.8	235	3.3
40-44	123	5.1	75	3.5	206	4.6
45-49	100	5.8	49	3.6	161	5.1
Total	693	4.7	418	3.4	1258	4.0

Source: Survey Data

The mean duration of postpartum abstinence in the two districts, Mafud and Kewet, were 4.7 and 3.4 months respectively for the next to last child. Since the mean duration is much less than the mean duration of postpartum amenorrhoea, it will have no impact on fertility.

CHAPTER VI: FERTILITY DIFFERENTIALS

6.1 Effects of Socio-Economic Variables on Fertility

The main emphasis, in this section, is to examine the relationships that exist between fertility and socio-economic variables. It is very important to note from the outset that there is no common understanding among social scientists as to the causal relationships between fertility and socio-economic factors. The various interpretations and findings regarding the concept of the relationships between fertility and socio-economic domains have been discussed in the literature part of the present study. All of them were contrasting ideas.

The socio-economic information collected in this survey can be grouped into four major areas: (1) data on ethnicities, (2) religions, (3) educations, (4) size of land holding, (5) value of livestock owned, and (6) value of grain production. Each of major areas have been further divided into variables and categories. The main ethnic groups in the area are the Amharas, Argobas and Oromos. Two religions - christian and islam are the dominant. Education consists of none literate, literacy program, primary and secondary. Size of land holding (size of land in hectares - both arable and used for graizing) at the time of the survey. Value of livestock owned and grain productions (average values in 1993 market price) preceding twelve months at the time of the survey. The direct relationships between each of these socio-economic factors and rural fertility is analyzed in the subsequent discussions.

(a) Ethnicity and Religion

The mean parity of the ethnicities in the study area is calculated and presented in Table 6.1. The highest mean parity is reported for Amharas (3.4) followed by Oromos (3.3) and Argobas (2.7) for total sample. Nevertheless, the differences observed in fertility due to variations in ethnicity are not statistically significant as measured by one-way analysis of variance at F ratios of 1.7138 and F probabilities of 0.1622 for the total sample.

Table 6.1 Distribution of Women Aged 15-49 & Mean Children Ever Born by Ethnicity and District, 1993

Age Group	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
Amhara	1057	3.8	725	2.7	1782	3.4
Oromo	1	4.0	130	3.3	131	3.3
Argoba	9	2.4	135	2.7	144	2.7
Others	0	0.0	6	4.5	6	4.5
Total	1067	3.8	996	2.8	2063	3.3

F Ratio	F Prob.
1.7138	0.1622

When fertility is analyzed by religion categories, Moslems seem to have lower average mean parity than Christians by half a child. Because of small number of observations in each districts, in the case of ethnicities and religions, it is inconvenient to consider fertility differences in the two districts based on ethnicities and religions. In any case the difference is less than a child for total samples and the difference is also insignificant as tested by one-way variance analysis at significant level of F ratio = 1.8923 and F probably = 0.1692 for religions.

Table 6.2 Distribution of Women Aged 15-49 & Mean CEB by Religion and District & Religions, 1993

Religion	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
Christians	1058	3.8	703	2.8	1761	3.4
Islams	9	2.7	293	2.9	302	2.9
Total	1067	3.8	996	2.8	2063	3.3

F Ratio 1.8923

F Prob. 0.1692

The reasons for the absence of differences in fertility levels, among the populations compared, based on these socio-cultural variables are not difficult to ascertain. As it can be observed in the descriptive analysis of this study the ethnicity and religious compositions are dominated by higher percent of christian Amharas. Therefore, there is no substantial fertility differences based on the background of ethnicity and religious compositions. However, in Kewet district where the sizes of other ethnicities are a bit high, mean children ever born to Amhara and Argoba are the same (2.7) while the Oromos have the highest mean children ever born (3.3).

(b) Education

Usually, existing literatures on the relationships between education and fertility indicates the almost universal existence of fertility differentials by education. The exact form of the relationship varies and the mediating causal mechanisms are complex and worthy of detail study.

In the present study, number of women and their mean parity by the levels of education they completed for each districts and total sample are presented in Table 6.3. The Table suggests that, education is inversely related with cumulated fertility.

Table 6.3 Distribution of Number & Mean CEB of Women by Level of Education & District, 1993

Level of Education	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
None	782	4.0	776	3.0	1558	3.5
Literacy	174	3.9	165	2.4	339	3.2
Formal	108	1.3	55	0.7	163	1.1
Total	1064	3.7	996	2.8	2060	3.3

However, it will be more meaningful, particularly in the analysis of determinants of rural fertility, if average parity is considered for respondents that have at least one live birth. Therefore, Table 6.4 presents the number of ever married women with at least one live birth and their cumulative fertility by educational status for both districts and total sample.

As it is indicated in Table 6.4 the fertility variation by level of education exists in both districts. In Mafud as well as in Kewet and for total sample also,almost an illiterate woman would have two more children than a woman with formal education when mean children ever borne is considered. However,the mean parity of illiterate women and of those attended the literacy program alone is not significantly different, implying that the effect of education on fertility can be felt

for formal education.

Table 6.4 Distribution of Number & Mean CEB of Women by Level of Education & District,1993

Level of Education	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
None	649	4.9	566	4.1	1215	4.5
Literacy	151	4.5	118	3.4	269	4.0
Formal	55	2.5	20	2.1	75	2.4
Total	855	4.6	704	3.9	1559	4.3
	F Ratio	F Prob.	F Ratio	F Prob.	F Ratio	F Prob.
	18.5961	0.0000	15.5493	0.0001	29.7356	0.0000

The prevalence of fertility variations among ever married women with live birth due to education is significant as explained by one-way analysis of variance of F ratios and F probabilities (Mafud: F ratio =18.5961, F probability=0.0000 ;Kewet:F ratio=15.5493,Probability=0.0001, Total:F ratio=29.7356, F probability=0.0000).

Furthermore, the relationship between education and children ever born is found to be linear and negative with r= -0.1732, p=0.000 in Mafud;r=-0.0904, P=0.011 in Kewet;r=-0.1336 and p= 0.000 for total sample. All the analyses up to now demonstrate that as the level of education increases the mean parity of ever married women with live births decreases.

As already mentioned in the ongoing discussion, to analyze the economic aspects of fertility, data were collected on the size of land holding, livestock raising and grain production that were at the disposal of the members of the households to which the respondent belongs. In the section that follows, the direct effects of economic variables on the mean parity of women are considered.

(c) Land

Among the economic variables that is known to have positive effects on fertility is the size of the lands that are used by the members of the households.

A number of empirical studies conducted in developing countries have highlighted positive relationship between land size owned and fertility. According to the literatures, the positive relationship reflects the effects of income on fertility on one hand and importance of child labor on the other hand. It is important to note that several theoretical and conceptual definitions can be raised when fertility and land holding relationships are examined. How land is leased ? who works on the land ? can land substitute the value of children as source of security during old age ? or they are complementary to each other needs further investigations. These and other questions complicate the measurement of land holding and its relationship with fertility.

In the present study, land size is defined as operational holdings which include area of land used for cultivation and grazing purposes by the members of the household at the time of survey. The size of land holding and its effect on

fertility is indicated in Table 6.5. It is observable from the table that both the size of lands and mean children ever born are positively and linearly correlated with r=0.1831, p=0.000 in Mafud; r=0.1606, p=0.000 in Kewet; r=0.1755, p=0.000 for total sample. In addition to this, the result of one-way variance analysis indicate that there is a highly statistically supported differences of mean children ever borne when related with size of land holding in both districts (F ratio=13.3519, F probability=0.0000 in Mafud; F ratio=6.2063, F probability=0.0021 in Kewet; Total Sample F ratio=20.2946, F probability=0.0000).

Table:6.5 Distribution of Women With at Least One Birth & Mean Children Ever Born by Land Size & District

Land Size	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
None	55	3.3	43	3.0	98	3.2
0.12-0.75	296	4.3	247	3.7	543	4.0
0.76-1.25	274	4.8	233	4.1	507	4.5
1.26-1.75	128	5.2	87	4.1	215	4.8
1.76+	103	5.5	97	4.4	197	4.9
Total	856	4.7	704	3.9	1560	4.3
	F Ratio	F Prob.	F Ratio	F Prob.	F Ratio	F Prob.
	9.0640	0.0000	3.7757	0.0048	12.2691	0.0000

(d) Livestock

One of the important assets in rural areas is livestock raising. In this study, in order to assert existence of fertility differentials among those who have any kind of known livestock and those have not, one way analysis of variance was used.The result of analysis showed that there is a significant fertility differences with value of livestock at F ratio of 10.1227 and F probability of 0.0000 for Mafud;F

ratio = 2.1299, F probability = 0.0609 for Kewet;and for total sample F ratio = 3.7958, F probability = 0.0020. Therefore, the relationship between children ever born and value of livestock is positive and linear (r = 0.2179, p = 0.000 in Mafud; r = 0.1264, p = 0.001 in Kewet; r = 0.0814, P = 0.001 for total sample). However, the mean parity as related to values of livestock slightly violates the trend of linearity in Kewet district and for total sample. Otherwise, Table 6.6 indicates that fertility variations exist with different subcategories of values of livestock.

Table 6.6 Distribution of Number and Percent of Ever Married Women Aged 15-49 by Value of Livestock and District,1993

Value of Livestock by Category	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
1 None	92	3.7	54	3.7	146	3.7
2 133.0-1000	77	3.7	30	4.1	107	3.8
3 1001-2000	173	4.4	45	3.4	218	4.2
4 2001-3000	186	4.6	47	4.4	233	4.6
5 3001-4000	141	5.0	84	3.4	225	4.4
6 4001+	188	5.6	444	4.0	632	4.5
Total	857	4.7	704	3.9	1561	4.3
	F Ratio	F Prob.	F Ratio	F Prob.	F Ratio	F Prob.
	10.1227	0.0000	2.1229	0.0609	3.7958	0.0020

(e) Grain

Another source of rural wealth is grain production. Data on value of grain, also, indicates the existence of fertility differences as displayed in Table 6.7. The difference is strongly significant in Mafud district while it is less significant in Kewet and for total sample at F ratio of 4.5315 and F probability of 0.0013 in Mafud and at F ratio of 1.1870 and F probability of 0.3152 in Kewet. The

significance level for total sample is F ratio of 3.3362 and F probability of 0.0099. Furthermore, the strength of associations measured by Pearson correlation coefficient indicates that fertility and value of grain have significant relationship in Mafud ($r=0.1493$, $p=0.000$) while the relationship in Kewet is less significant ($r=0.0513$, $p=0.096$). Because of the influence of the result in Kewet, the association of the mean parity and value of grain for total sample is also statistically insignificant ($r=-0.151$, $p=0.283$). This is so because the value of grain is not stable over time. The significant positive relationship between size of land and value of livestock, on the one hand, and level of fertility, on the other hand, may indicate the importance of child labor in tiling the land and looking after animals.

Table 6.7 Number and Percent Distribution of Ever Married Women by Value of Grain and district, 1993

Value of Grain by Category	Name of District				Total	
	Mafud		Kewet		N	%
	N	Mean	N	%		
1 None	69	3.7	39	3.5	108	3.6
2 7.50-500	228	4.4	15	4.6	243	4.4
3 501-1000	219	4.7	38	4.1	257	4.6
4 1001-1500	150	4.8	70	3.6	220	4.4
5 1501+	191	5.1	542	4.0	733	4.3
Total	857	4.7	704	3.9	1561	4.3

Source: Survey Data

The objectives of the preceding discussions were to find out whether or not fertility differentials existed among the populations based on these socio-economic variables and subsequently to apply multiple classification analysis (MCA) for those

found to be significant. Therefore, one-way variance analyses have been conducted for each categorized variables. As the result, fertility differentials measured in average children ever born were found to be statistically insignificant for ethnicity and religion. Hence, there is no important differences in average parity by ethnicity and religion.

The remaining variables, such as education, land size, value of livestock and grain have been, however, found to be accountable for fertility variations in the study areas when tested by F probability of oneway analyses of variance and Pearson correlation coefficients. In the preceding discussions, the extent of the direct effects of these variables on the average number of children ever born were examined without controlling for the interaction between the independent variables and covariate age. Hence, the main focus of the subsequent discussion is to reveal the independent effects of each socio-economic variables considered in explaining variations in fertility levels as measured by mean parity of ever married women with at least one live birth. The independent explanatory capacity of each socio-economic variables can be assessed by using multiple classification (MCA) in which interactions among independent variables and covariate age can be controlled. Multiple classification analysis is a useful way of displaying the effects of each independent factors on the dependent variable by controlling the interaction effects. It is an important model, specially when the interaction effects are insignificant. The extent of two way interactions among the independent variables towards altering the dependent variable for the total sample are given in Table 6.8

Table 6.8 Variance Analysis of Two-Way Interactions,Total Sample, 1993

Source of Interaction	F Ratio	Sign.of F
2-Way Interactions	0.835	0.810
Education Land Size	0.475	0.827
Education Livestock Income	0.337	0.971
Education Grain Income	0.418	0.867
Land Size Livestock Income	**0.984**	**0.470**
Land Size Grain Income	1.081	0.375
Livestock Income Grain Income	**1.249**	**0.229**

The above table suggests that the joint effects of the independent variables on the dependent variables (children ever born) for the total sample are statistically insignificant.

Moreover, it is important to look into significance of the observed variation in the mean children ever born due to the independent socio-economic factors in each district before applying the multiple classification analysis to determine their independent effects. Therefore, the analysis of variance for the study of the significance of each variable for Mafud is presented in Table 6.9.

Table 6.9 Multivariate Variate Analysis of F ratios and Significance of F, Mafud, 1993

Source of variation	F	Significance of F
Main Effects	6.535	0.000
Education	15.629	0.000
Land Size	2.709	0.029
Value of Livestock	5.614	0.000
Value of Grain	0.336	0.854

Source: Survey Data

Except the effect of value of grain, when analyzed with other independent variables, the explanatory ability of other factors are statistically significant. Therefore, it is possible to apply multiple classification analysis with the present data.

Table 6.10 presents the multiple classification analysis of children ever born of ever married rural women by selected socio-economic variables for Mafud district. Both the unadjusted and adjusted deviations from grand mean (4.652 mean children ever born per woman), manifest negative relationship between mean number of children ever born and educational levels. When Beta coefficients, which reflect the impact of the adjusted independent factor, of education for the two districts are compared, education seems to have higher influence on mean children ever born in Kewet than in Mafud (see Table 6.10 and 6.12).

Interestingly, introducing covariate age and controlling for other independent variables showed that in both districts the literacy program launched in the country since 1979 has affected fertility positively. Although insignificant, the mean children ever born of women those attended the literacy program is higher than those with no education and those attended formal education. The reason for this might be the lower duration of breastfeeding that has been observed in the analysis of breasfeeding by education. In both districts the mean duration of breastfeeding for women attended the literacy program is found to be lower than for women with

no education and formal education. Furthermore, introduction of age as a covariate reduced the Beta coefficients to a marginal level which tacitly reveal that the seeming raised Beta coefficients are not attributable to the effects of education but rather to the age of respondents.

Table 6.10 Multiple Classification Analysis of Mean Children Ever Born by Socio-Economic Variables Mafud,1993

Variable + Categories	N	Unadjusted Dev'n Eta	Adjusted for Independents Dev'n Beta	Adjusted for Independents + Covariates Dev'n Beta
Education				
1 None	649	0.23	0.18	0.03
2 Literacy	151	-0.20	-0.10	0.09
3 Formal	54	-2.15	-1.93	-0.66
		0.21	0.19	0.06
Land Size				
1 None	55	-1.36	-0.10	-0.21
2 0.12-0.75	296	-0.40	-0.28	-0.23
3 0.76-1.25	273	0.14	0.14	0.21
4 1.26-1.75	127	0.56	0.45	0.39
5 1.76+	103	0.80	0.46	0.25
		0.20	0.15	0.14
Value of Livestock				
1 None	91	-0.92	-0.44	-0.23
2 133-1000	77	-0.99	-1.06	-0.66
3 1001-2000	173	-0.29	-0.25	0.05
4 2001-3000	186	-0.07	-0.12	-0.19
5 3001-4000	140	0.33	0.34	0.23
6 4001+	187	0.95	0.74	0.35
		0.23	0.19	0.11
Value of Grain				
1 None	68	-0.96	0.41	0.29
2 7.50-500	228	-0.26	0.06	-0.18
3 501-1000	218	0.06	0.02	0.05
4 1001-1500	150	0.14	-0.13	-0.06
5 1501+	190	0.47	-0.14	0.10
		0.14	0.05	0.05
Multiple R^2			0.105	0.339
Multiple R			0.324	0.582
Grand Mean			4.652	4.652

When fertility is analyzed in relation to land size and value of livestock using MCA model, both the unadjusted and adjusted deviations from grand mean reflect that with the increment of land size, and value of livestock mean children ever born increases in Mafud district. When current age of respondent is controlled as a covariate the relation between these economic variables and fertility is unchanged except that the mean children ever born in fifth category seems to be slightly lower than the preceding values which might be due to data error. Another important point to note is that the fertility of women with no livestock is slightly higher than the fertility of women with the lowest value of livestock in all the cases of analysis. But when the fertility of women with no livestock and those possess any number of livestock is compared, it is observed that women with none livestock have the lowest mean parity in Mafud district. The relationship between fertility and value of grain reflects positive association in Mafud district but after adjustment for independent factors the trend is changed to negative association. When the independent factors are further adjusted with covariate age, the relationship between fertility and value of grain is blurred.

In general, the explained proportion of variation in fertility by the independent variables in Mafud is 10.5 percent (Multiple R^2 =0.105). Controlling covariate age of respondent increased the explained proportion to 33.9 percent (Multiple R^2 =0.582).

Table 6.11 Multiple Variate Analysis of F ratios and Significance of F, Kewet, 1993

Source of variation	F	Significance of F
Main Effects	3.529	0.00
Education	10.459	0.00
Land Size	4.171	0.00
Value of Livestock	1.586	0.16
Value of Grain	1.344	0.25

In Kewet, also the relationship between fertility and land size is positive and linear except in the forth category which slightly deviates from the trend most probably due to error in data reporting. Even the slight violation is disappeared when independent factors are adjusted with covariate age. Both the gross effect (Eta Coefficient) and the net effect (Beta coefficient with covariate age) of land size on fertility is the same, indicating insignificant effect of age. values of livestock and grain, in Kewet, do not predict regular patterns of mean children ever born both before and after adjustment for other independent factors. Nevertheless, their independent contribution towards fertility variation in the district is not unimportant as explained in Eta and Beta coefficients. The total explained fertility differentials by all socio-economic factors (controlling for independent factors) in Kewet district is 7.1 percent (Multiple R Squared=0.071). But adjusting independent factors with covariate age raised the proportion explained to 38.8 percent (Multiple R Squared =0.388).

Table 6.12 Multiple Classification Analysis of Mean Children Ever Born by Socio-Economic Variables,Kewet 1993

Variable + Category	N	Unadjusted Dev'n Eta	Adjusted for Independents Dev'n Beta	Adjusted for Independents + Covariates Dev'n Beta
Education				
1 None	566	0.17	0.17	-0.04
2 Literacy	118	-0.51	-0.53	0.27
3 Formal	20	-0.85	-1.73	-0.35
		0.17	0.17	0.06
Land Size				
1 None	43	-0.88	-1.58	-0.82
2 0.12-0.75	247	-0.25	-0.23	-0.29
3 0.76-1.25	233	0.18	0.26	0.20
4 1.26-1.75	87	0.15	0.15	0.21
5 1.76+	94	0.48	0.56	0.46
		0.15	0.21	0.15
Value of Livestock				
1 None	54	-0.24	-0.15	0.33
2 133-1000	30	0.20	0.34	0.39
3 1001-2000	45	-0.53	-0.26	-0.03
4 2001-3000	47	0.52	0.57	0.35
5 3001-4000	84	-0.51	-0.45	-0.16
6 4001+	444	0.11	0.05	-0.07
		0.12	0.10	0.07
Value of Grain				
1 None	39	-0.44	0.96	-0.16
2 7.50-500	15	0.70	1.07	0.31
3 501-1000	38	0.17	0.31	0.31
4 1001-1500	70	-0.35	-0.26	-0.33
5 1500+	542	0.05	-0.09	0.02
		0.08	0.13	0.06
Multiple R^2			0.071	0.388
Multiple R			0.261	0.623
Grand Mean			3.905	3.905

The analysis of variance for the total sample indicates that the effects of all the considered independent variables on fertility variations are significant. The result of the analysis which show the F ratios and significance of F are illustrated

in Table 6.13 as follows.

Table 6.13 Significance of Multivariate Analysis of Children Ever Born by Selected Socio-Economic Variables, Total Sample, 1993

Source of Variation	F Ratio	Significance of F
Main Effects	8.273	0.000
Education	**23.390**	**0.000**
Land Size	10.171	0.000
Livestock Income	**2.282**	**0.044**
Grain Income	5.879	0.000

Source: Survey Data

All the socio-economic variables considered in the model have significant effect on fertility when analyzed for total sample although the effect of income from livestock is less significant.

Table 6.14 presents the multiple classification analysis of mean children ever born by socio-economic variables for total sample. The analysis of the results for the total sample indicates a better consistency relationship between fertility and socio-economic variables than the analysis of data for each districts. The most important predicatory variables in explaining variation in mean children ever born before adjustment for independent variables are education, land size, value of livestock and grain, respectively. After adjustment for independent variables, the order changes with land size becoming the single most important variable followed by education, value of grain and livestock, respectively, for the total sample.

Table 6.14 Multiple Classification Analysis of Children Ever Born by Socio-Economic Variables,Total Sample, 1993

Varaible + Categories	N	Unadjusted for Independents Dev'n Eta	Adjusted for Independents Dev'n Beta	Adjusted for Independents + Covariate Dev'n Beta
Districts				
1 Mafud	854	0.34	0.41	0.38
2 kewet	**704**	**-0.41**	**-0.50**	**-0.46**
		0.14	0.17	0.16
Education				
1 None	**1215**	**0.19**	**0.19**	**0.00**
2 Literacy	269	-0.33	-0.33	0.16
3 formal	74	-1.94	-1.86	-0.57
		0.18	0.18	0.05
Land Size				
1 None	98	-1.14	-1.20	-1.02
2 0.12-0.75	543	-0.33	-0.25	-0.27
3 0.76-1.25	506	0.15	0.15	0.19
4 1.26-1.75	214	0.43	0.33	0.32
5 1.76+	197	0.63	0.54	0.41
		0.17	0.16	0.14
Value of Livestock				
1 None	145	-0.60	-0.32	0.00
2 133-1000	107	-0.53	-0.69	-0.35
3 1001-2000	218	-0.16	-0.28	0.04
4 2001-3000	233	0.24	-0.02	-0.10
5 3001-4000	224	0.07	0.02	0.08
6 4001+	631	0.17	0.29	0.06
		0.11	0.11	0.04
Value of Grain				
1 None	107	-0.71	0.60	0.13
2 7.50-500	243	0.09	0.10	-0.19
3 501-1000	256	0.31	0.12	0.10
4 1001-1500	220	0.09	-0.11	-0.12
5 1500+	732	-0.06	-0.13	0.05
		0.09	0.08	0.04
Multiple R^2			0.092	0.361
Multiple R			0.303	0.600
Grand Mean			4.315	4.315

The proportion of the variations in the dependent variables (children ever born) explained by the model is 9.2 percent for the total sample. When the covariate age is controlled, however, the proportion explained increased to 36.1 percent implying that the current age of the respondents are highly significant in determining variation in rural fertility.

In conclusion, it is understood that when the direct effects of the socio-economic variables discussed above on mean children ever born to rural women are analyzed, their net effects are marginal. Much of explained variations are by virtue of differences in age of respondents.

Nonetheless, these socio-economic variables don't have direct effects on fertility. Rather, they are known to affect fertility indirectly by influencing the proximate variables. The proximate variables, however, are the ones those determine fertility directly. In the ensuing discussion, using cross tabulations and Bongaarts' model, the influences of selected proximate variables on fertility are pursued.

6.2 Effects of Proximate Variables on Fertility

(a) Age at First Marriage

Age at first marriage is one of the most important proximate determinants of fertility. It indicates the beginning of a woman's exposure to the risk of childbearing. However, due to cultural differences in the patterns of family formation the date of an initial union may not always mark the beginning of exposure to the risk of childbearing. In some societies, cohabitation, extramarital union, consensual visiting, etc. may precede formal marriage which can confuse with the exact date of age at first marriage.

In spite of some cultural differences in the actual date of age at first marriage and conceptual definitions, it has become an interesting variable in the study of the demographic characteristics of populations. Demographic investigations have shown that differences in age at first marriage can account for substantial variation in fertility among population groups.

Table 6.15 presents the number and percent distribution of women by current age and age at initial union in Mafud where 22 percent of the respondents entered first union at age bellow 15. The effects of age at first marriage on fertility becomes significant if girls enter their first union after they reach puberty. One of the most important variables that can designate puberty is age at menarche. The mean age at menarche was 15.4 for Mafud district while mean age at first marriage was found to be 16.5 years (see Table 6.17 for the relationship between age at first

marriage and age at first menarche). That is the first marriage took place 1.1 years after first menstruation. Moreover,the table reveals that 71 of ever married women aged 15-49 entered their first union at age below 18 years old. The table also shows that peak age at marriage for ever married women was between 15 and 17 years which constitutes 49 percent of the ever married women.

Table 6.15 Number & Percent Distribution of Women by Current age of Woman & Age at First Marriage, Mafud, 1993

Age Group	Age at First Marriage										Total	
	< 15		15-17		18-20		21-23		24+		N	%
	N	%	N	%	N	%	N	%	N	%		
15-19	16	2	42	5	7	1					65	7
20-24	26	3	56	6	34	4	1	0	1	0	118	13
25-29	31	3	62	7	32	3	11	1	5	1	141	15
30-34	48	5	92	10	31	3	11	1	7	1	189	21
35-39	35	4	56	6	30	3	6	1	10	1	137	15
40-44	21	2	79	9	33	4	6	1	6	1	145	16
45-49	27	3	67	7	11	1	4	0	15	2	124	13
Total	204	22	454	49	178	19	19	4	44	5	919	100

Source: Survey Data

In kewet, 25 percent of women entered their first union at age below 15 years whereas 25.3 percent saw their menstruation for the first time before reaching 15 years of age. The mean age at menarche for Kewet was 14.9 while mean age at first marriage was observed to be 16.2. In Kewet, girls stay on average about 1.3 years after first menstruation before marriage. Although age at menarche is lower by 0.5 years in Kewet than in Mafud, girls in Kewet wait 0.2 years more than in Mafud before their first marriage took place.

The pattern of distribution of ever married women by current age and first age at marriage is similar in Kewet with that of Mafud. In Kewet, 72 percent of the respondent married at age below 18 years old and the peak age at marriage is also 15-17 years (that is 47 percent of the total ever married women).

Table 6.16 Number & Percent Distribution of Women by Current age of Woman & Age at First Marriage, Kewet, 1993

Age Group	Age at First Marriage										total	
	< 15		15-17		18-20		21-23		24+		N	%
	N	%	N	%	N	%	N	%	N	%		
15-19	26		49	7	10	1					85	12
20-24	28	4	58	8	41	6			1	0	128	18
25-29	36	5	56	8	28	4	2	0	3	0	125	17
30-34	28	4	54	7	27	4	2	0	1	0	112	15
35-39	18	2	61	8	26	4	7	1	5	1	117	16
40-44	26	4	37	5	28	4	4	1	2	0	97	13
45-49	18	2	26	4	16	2	1	0	3	0	64	9
Total	180	25	341	47	176	24	16	2	15	2	728	100

Source:Survey Data

Table 6.17 Distribution of Number, Percent and Mean Age at Menarche of Women Aged 15-49 by Age at First Marriage, Mafud, Kewet, Total, 1993

Age at First Marriage	Name of District						Total		
	Mafud			Kewet					
	N	%	Mean	N	%	Mean	N	%	Mean
< 15	198	22.3	13.9	161	25.3	13.7	359	23.5	13.8
15	259	29.2	15.0	129	20.3	14.9	388	25.4	14.9
16	109	12.3	15.5	99	15.5	15.0	208	13.6	15.2
17+	322	36.2	16.6	248	38.9	15.7	570	37.4	16.2
Total	888	100.0	15.4	637	100.0	14.9	1525	100.0	15.2

The average age at menarche in the present study for the total sample is 15.2 years and the cumulative range within which 62.5 percent experienced menarche is 16 years. Therefore, analyzing the average age at first marriage and

age at menarche for both the districts, one can expect the significant effect of age at first marriage on children ever born. This concept is supported by the one-way variance analysis at F ratio of 5.1323 and F probability of 0.0004 in Mafud. The result of the analysis clearly shows that mean children ever borne is different based on the age at initial union.

However, variation in mean children ever borne due to age at first marriage does not seem to be strongly significant in Kewet when compared with that of Mafud. In Kewet, the oneway variance analysis that was used to test the significance of variability in mean children ever born by age at first marriage was only supported by F ratio of 5. and F probability of 0.066

The distribution of mean children ever born by age at first marriage and districts as well as for the total sample is presented in the Table 6.18. The mean children ever born revealed in the table is calculated for valid respondents only. Respondents with zero parity are excluded. The problem of analyzing mean children ever born by first age at marriage is that substantial number of ever married respondents in both districts don't remember their age at first marriage. For instance, the none responses are 19.1 and 3.2 percents in Kewet and Mafud districts respectively out of ever married women (900 in Kewet and 949 in Mafud).

Table 6.18 Distribution of Number of Mothers and Mean Children Ever Born by Age at First Marriage and Districts, 1993

Age at First Marriage	Name of Districts				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
< 15	197	5.1	140	4.3	337	4.8
15	241	5.1	113	3.7	354	4.7
16	103	4.4	91	3.4	194	3.9
17+	292	4.0	222	3.7	514	3.9
Total	833	4.7	566	3.8	1399	4.3

Since age at first marriage is important in the study of fertility, as discussed, it is essential to examine some of the socio-economic and demographic factors that influence its trend and level for total sample.

Cultural factors can influence age at first union. In many tribal African societies the puberty ceremony practiced soon after the appearance of first menstruation has an important role in the exposure of women to intercourse. It is also important to note that practices such as infant betrothal or engagement of marriage and prepubertal marriage may be practiced in rural areas. It is common practice, especially in areas where marriage arrangement is controlled by parents.

Age at first marriage was analyzed against background variables using multiple classification analysis model. The result of the analysis is presented in Table 3.49 However, in the present study, cultural differences reflected in types of ethnicities and religious composition do not appear to have strong impact on age at marriage. It is evident from the table that age at first marriage varies a little by

ethnicities and religions for total sample. Age at first marriage appears to be lower for Argoba girls by about 1.3 to 1.7 than the Amhara and Oromo girls respectively. However, because of big differences in the sample sizes between ethnicities that conclusion may not be at ease. Furthermore, only small proportion of the respondents, especially, among Oromos and Argobas reported their age at first marriage. The muslims reported the lowest age at first marriage. Christians marry delaying 1.1 years after muslims. The differences in age at first marriage both by ethnicity and religion are statistically insignificant in multivarite analysis for total sample (F ratio=2.084, F prob.=0.100 for ethnicity; F ratio=1.166, F prob.=0.280 for religion). Ethnicity is reduced to more insignificant level when covariate age at menarche is performed (F ratio =0.193, F prob=0.901).

Many studies in the developing countries, have reported that a close relationship exists between educational status and age at first marriage of females (Bhatia, 1984). As education increases the age at first marriage is also expected to increase. This is true in the present study in the case of formal education for total sample before adjustment is made for independent factors and covariate age is controlled although the level of significance is very marginal in the multivariate analysis. When independent variables on the other hand, are controlled without and with covariate age, age at marriage is earlier for women with informal education than with none and formally educated women. In any case, variation in age at first marriage by educational status is marginal as explained by Beta coefficients.

The variation in mean age at first marriage by marital status is not significant although age at first marriage for divorcee is earlier than for widowed and currently married women when tested in multivariate analysis for total sample controlling for independent factors and covariate age at menarche (F ratio =1.508, F prob=0.222 Total). It is most likely that age at marriage is earlier for women whose marriage frequently disrupts than a woman with stable marriage in both districts.

Frequency of marriage and age at first marriage is inversely related. The relationship is very strong for total sample. It is important to note that the respondents that are considered as married once constitute all women with stable marriage, cohabited and those married once but currently divorced. The inverse relationship between frequency of marriage and age at first union may imply that early age at first marriage can be the cause for the disruption of the first marriage.

The multiple classification analysis of age at first marriage by size of land shows that age at fisrt marriage decreases as land size increases. For the landless respondents age at first marriage is also greater than those who possess land except for the first category.

The multiple classification analysis of mean age at first marriage by value of livestock owned suggests that respondents with no livestock tends to marry at latter ages than respondents with livestock. However, age at first marriage is higher for those who have no livestock when compared with those who are in the second

third and forth categories and possess livestock. The mean age at first marriage appears to be influenced by value of livestock since age at first marriage is somewhat high for values in third, fourth and fifth categories. The reason for delay in age at first marriage among upper categories might be attributed to the importance of girls in looking after animals as herders.

Respondents who earn no grain production tend to marry at latter ages while those who earn the highest value from grain production marry at the earliest age. The respondents without any grain production are likely to marry at latter ages. This may imply that girls from wealthier families may have desirable situation for marriages than girls from poorer families. Age at first marriage for the intermediate values is also intermediate between the lowest and highest ages.

In the foregoing discussions, an attempt has been made to find out the determinants of age at first marriage in the context of controlling for each explanatory factors. A close examination of the effects of the independent variables on age at first marriage indicate that the separate effects of ethnicity, religion, education, marital status, land size and value of grain production are insignificant. But variables like age at menarche, times of marriage, and value of livestock have significantly explained substantial variations in age at marriage. The level of significance would highly increase when the effects of each independent variables are controlled with covariate age at menarche implying that the effect of age at menarche is the single most important variable to explain differences in age at first union for total sample (F prob = 0.000).

Table 6.19 Multiple Classification Analysis of Age at First Marriage by Background Variables, Total Sample, 1993)

Variable + Category	N	Unadjusted Dev'n Eta	Adjusted for Independents Dev'n Beta	Adjusted for Independents + Covariates Dev'n Beta
Districts				
1 Mafud	884	0.17	0.32	0.15
2 Kewet	636	-0.24	-0.91	-0.21
		0.07	0.12	0.06
Ethnicity				
1 Amhara	1224	0.08	0.03	0.02
2 Oromo	19	0.24	0.91	-0.15
3 Argoba	72	-1.54	-0.62	-0.36
4 Others	5	-2.64	-2.19	-0.89
		0.12	0.07	0.03
Religion				
1 Christians	1412	0.09	0.05	0.06
2 Islams	108	-1.17	-0.71	-0.73
		0.10	0.06	0.06
Education				
1 None	1132	-0.01	0.03	0.02
2 Literacy	294	-0.06	-0.15	-0.15
3 Formal	94	0.30	0.06	0.20
		0.03	0.02	0.04
Marital Status				
1 Married	1271	0.02	0.04	0.04
2 Widowed	118	0.05	-0.01	-0.01
3 Divorced	131	-0.27	-0.37	-0.41
		0.03	0.04	0.04
Frequency of Marr-				
iage	347	-0.69	-0.79	-0.70
1 More than Once	1173	0.20	0.23	0.21
2 Married Once		0.12	0.14	0.12
Land Size				
1 None	108	0.08	0.15	0.42
2 0.12-0.75	573	0.19	0.33	0.15
3 0.76-1.25	465	-0.03	-0.08	-0.07
4 1.26-1.75	200	-0.25	-0.40	-0.03
5 1.76+	174	-0.30	-0.49	-0.17
		0.06	0.10	0. 06
Value of Livestock				
1 None	142	0.01	0.12	-0.12
2 133.0-1000	108	-0.09	-0.25	-0.22
3 1001-2000	223	-0.07	-0.27	-0.36
4 2001-3000	237	-0.17	-0.30	-0.26
5 3001-4000	240	0.11	0.09	0.05
6 4001+	570	0.05	0.21	0.30
		0.03	0.07	0.08
Value of Grain				
1 None	112	0.32	0.33	0.36
2 7.50-500	255	0.19	-0.18	-0.03
3 501-1000	273	0.00	-0.07	-0.04
4 1001-1500	231	-0.17	-0.21	-0.13
5 1501-+	649	-0.07	0.12	0.01
		0.05	0.05	0.04
Multiple R^2			0.047	0.210
Multiple R			0.214	0.459
Grand Mean			16.287	16.287

Table 6.19 illustrates the effects of independent factors on initial age at conjugation for total sample. It is observable from the table that age at initial union in the two districts are significantly different after adjustment for independent variables. However, when adjustment is done with covariate the level of significance is reduced. In general, the proportion explained by the model for total sample with covariate age at menarche is 21.0 percent (Multiple R = .210).

(b) Breastfeeding

Breastfeeding is one of the intermediate variables that is important for the health of infants as well as for the suppression of ovulation. It affects fertility by prolonging the period of postpartum amenorrhoea. In other words the temporary ending of ovulation, accompanied by ending of menstruation , after every birth can be prolonged as the result of breastfeeding. Postpartum amenorrhoea lasts on average two months for non breastfeeding and increases to roughly 60 to 75 percent of the average duration of breastfeeding in populations practicing breastfeeding (Page 1981:6)

Table 6.20 Distribution of Women aged 15-49 and Mean Children ever Born by Mean Duration of Postpartum Amenorrhoea, 1993

Mean Duration of Postpartum Amenorrhoea	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
< 13	304	5.3	199	4.7	495	5.0
13-24	277	5.3	232	4.1	509	4.7
25+	99	5.2	34	4.2	133	4.9
Total	680	5.3	457	4.3	1137	4.9

The relationship between amenorrhoea and breastfeeding is found to be highly significant for total sample (r=0.3515,sig.0.001). As expected with low duration of postpartum amenorrhoea children ever born tend to be high. This is so because shorter duration of amenorrhoea is related with better fecundability situation of respondent. Therefore, breastfeeding is important in determining duration of postpartum amenorrhoea.

The multiple classification analysis of breastfeeding by socio-economic variables is fundamental in order to assess the determinants of amenorrhoea indirectly. The output of the analysis for total sample is presented in Table 6.21. It is evident from the table that mean duration of breastfeeding decreases by level of education, both before and after adjustment for independent factors. In spite of reduced magnitude, the relationship between level of education and breastfeeding is in the same direction when independent variables are adjusted with covariate age. The net effect is reduced from 0.11 to 0.07 in which the difference can be attributed to age effect. The mean duration of breastfeeding like education has inverse relationship with the size of land. When mean duration of breastfeeding and income from livestock raising are analyzed, they are positively related up to forth categories and then tend to be reversed before and after adjustment for independent variables. The difference between net effect from independent factors and covariate age is null implying that the effect of age is insignificant when analyzing breastfeeding by income from livestock raising. With grain income, mean duration of breastfeeding decreases. But those who have no income from grain production seem to have lower duration when compared with the lowest category of income. This could be happened because those who have no income from grain

production might have better income from other sources. Otherwise,if mean duration of breastfeeding is be compared among the categories of income from grain production, a strong negative relationship is observed.

The total variation explained by all independent variables and covariate age is highly significant at F ratio=4.011 and F prob.=0.000 implying that age of women have strong predicatory capacity than other independent variables. The level of significance of the covariate is F ratio=43.458 and F prob.=0.000 in the multivariate analysis. In general, all the considered variables and covariate age explained about 13.2 percent variation in mean duration of breastfeeding for total sample. The outcome of the analysis of breastfeeding by background variables is in accordance with the hypothesis of the study. That is respondents from higher household income and higher level of education are expected to have less duration of breastfeeding, consequently, with less duration of breastfeeding high fertility rates are expected. The difference between the two districts in mean duration of breastfeeding is significant as tested by multivariate analysis (F ratio=37.015 and F prob.=0.000). The mean duration of breastfeeding in Kewet is lower by 5.257 months than in Mafud district. This is so because the net effects of the socio-economic factors on the mean duration of breastfeeding are more sounding in Kewet than in Mafud. However, the low duration of breastfeeding in Kewet is balanced by high prevalence of contraceptive usage as it can be seen in this chapter.

Table 6.21 Multiple Classification Analysis of Breastfeeding by Socio-Economic Variables, Total, 1993

Variables + Categories	N	Unadjusted Mean Eta	Adjusted for Independents Mean Beta	Adjusted for Independent + Covariate Mean Beta
District				
1 Mafud	689	29.16	28.68	28.69
2 Kewet	527	23.90	24.52	24.51
		0.28	0.22	0.22
Education				
1 None	975	27.21	27.35	27.20
2 Literacy	202	25.82	25.35	25.82
3 Formal	39	23.95	22.95	24.26
		0.08	0.11	0.07
Land Size				
1 None	55	28.05	29.07	28.95
2 0.12-0.75	424	27.60	27.26	27.21
3 0.76-1.25	399	27.11	27.22	27.33
4 1.26-1.75	178	26.56	26.50	26.53
5 1.76+	160	24.36	24.70	24.56
		0.11	0.10	0.11
Value of Livestock				
1 None	92	27.47	25.84	26.14
2 133.0-1000	8	28.36	26.77	27.01
3 1001-2000	54	28.49	27.20	27.44
4 2001-3000	37	29.30	28.27	28.19
5 3001-4000	76	27.90	27.76	27.79
6 4001+	14	24.78	26.17	26.02
		0.20	0.09	0.09
Value of Grain				
1 None	66	27.48	26.34	26.09
2 7.50-500	184	31.17	29.07	28.77
3 501-1000	206	28.41	26.69	26.74
4 1001-1500	169	27.25	26.45	26.42
5 1501+	591	24.83	26.44	26.56
		0.24	0.10	0.09
Multiple R^2			0.115	0.132
Multiple R			0.339	0.364
Grand Mean			26.877	26.877

Source: Survey Data

(c) Stable Marriage

Of total respondents (2063) of women aged 15-49 89.6 percent (1848) are ever married women and 214 (or 10.4 percent) are singles. Out of the total ever married women about 1416 respondents (or 76.6 percent) reported that they have stable marriage at the time of survey. 431 respondents (23.3 percent of ever married women) dissolved their first marriage and 2 respondents (0.1 percent out

of ever married women) cohabited at the time of the survey. The mean parity of ever married women with stable marriage and those whose first marriage is dissolved is not different as tested by oneway variance analysis for total sample as well as the for the two districts. This is so because the frequency of remarriage in rural area is very high.

An attempt was made to look into the fertility of women with stable marriage by duration of their marriage. The duration of marriage was obtained by subtracting age at first marriage from current age. However, only 1236 (or 87.3 percent) of currently married women know their age at first marriage. The mean number of children ever born for women with stable marriage by duration of marriage is indicated in Table 6.22. Fertility is increasing steadily across the length of marriage durations in both districts and total sample.

Table 6.22 Distribution of Number of Women and Mean Children Ever Born by Duration of Marriage and Districts, 1993

Durations of Marriage	Name of Districts				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
0-4	113	1.5	128	1.4	241	1.4
5-9	96	2.5	95	2.2	191	2.4
10-14	95	4.4	116	3.1	211	3.7
15-19	109	5.5	102	4.0	211	4.9
20-24	91	6.1	90	5.2	181	5.6
25-29	64	6.7	55	6.2	119	6.5
30+	47	7.5	35	6.2	82	6.9
Total	615	4.7	621	3.8	1236	4.3

(d) Child Mortality

As it is indicated in the literature chapter of the thesis, the effects of child mortality on fertility can be summarized into three: (1) the physiological or biological effect which is resulted by the interruption of early lactation due to the death of a child as the result of which early conception can occur and consequently shortening of birth intervals, (2) the replacement effect which is effected by the reaction of the respondent to replace the lost child by giving as much births as possible until the desired number is met, and (3) the insurance effect which is happened by the perception of a woman about child mortality as high in the society at large and the tendency to have a large number of births to ensure against future child loss. Due to these effects the relationship between child mortality and fertility is positive which, however, can also be caused by socio-economic variables that can affect both factors in the same direction. Thus, the complex nature of relationship between child mortality and fertility as well as the presence of other correlated factors make the study of the effects of child mortality on fertility difficult.

In the present study, the relationship between child mortality[1] and fertility is indicated in Table 6.23 where the figures seem to reveal that the mean parity increases as the number of child mortality increases in both districts and total sample.In Mafud, among 530 respondents, who didn't encounter child loss, the mean parity is 3.7 children per woman whereas among the 247 respondents with one child death the mean parity is 5.7. Respondents who have experienced two or more child deaths have mean parity of eight children per woman. That is in the

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[1] In this study, child mortality is considered to include the death of respondent's son or daughter of any age at the time the survey

same district, respondents who have experienced mortality of two or more children tend to produce 2.3 and 4.3 more children than respondents with one and no child mortality experience, respectively.

Table 6.23 Distribution of Women Aged 15-49 and Mean Parity by Child Mortality and District, 1993

Child Mortality	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
0	530	3.7	492	3.3	1022	3.5
1	247	5.7	134	4.8	381	5.4
2+	80	8.0	78	6.3	158	7.1
Total	857	4.7	704	3.9	1561	4.3

Similarly in Kewet, women who have not faced child mortality have the lowest mean parity as compared with respondents who have experienced child mortality. Respondents with one child mortality have 1.5 more mean parity than respondents with no child mortality. However, respondents with two or more child mortality appeared to have procreated three more children as compared with respondents who haven't faced child mortality. The effects of child mortality on mean parity in both districts are highly significant as tested by one-way variance analysis (in Mafud, F ratio = 147.7154, F significance = 0.000; in Kewet, F ratio = 83.5078, F significance = 0.000; Total, F ratio = 229.9717, F significance = 0.000).

The percent of women with child mortality are 38.2 (327) and 30.1 (212) in Mafud and Kewet respectively. According to this study, child mortality seems to be

the highest in Mafud than in Kewet. Consequently, as one possible explanation, women in Mafud may tend to have more children either in order to replace the lost ones or to ensure that they may have the necessary number of children amidst the risk of deaths. Moreover, the physiological effect in which resumption of ovulation can occur when breastfeeding is interrupted by death of a child may prepare favorable situation for early conception in the absence of contraception.

Similar studies conducted by Abdulahi (1988) in Addis Ababa, rural Mettu and Alemaya showed that women who had experienced child mortality of two or more had a mean parity of about three more children in Addis Ababa, Mettu and over four more children in Alemaya compared to those who experienced no child mortality. The results for the two rural districts, Mettu and Alemaya are highly comparable with the results for, Kewet and Mafud, respectively.

Studies conducted in other places also showed similar trend on the relationship between child mortality and fertility. Studies done by Balakrishnan (1978) in rural and semi-urban areas of four developing countries showed that women who had experienced more deaths of children tended to have more additional births, than those with less or non child mortality.

Table 6.24 Distribution of Women Aged 15-49 and Mean Parity by Spontaneous Intrauterine Mortality and District, 1993

Spontaneous Intrauterine Mortality	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
0	702	4.4	588	3.8	1290	4.1
1	93	5.1	82	4.5	175	4.8
2+	62	6.5	34	4.1	96	5.6
Total	857	4.7	704	3.9	1561	4.3

Spontaneous intrauterine mortality has also positive effect on fertility in both districts. The level of spontaneous intrauterine is higher in Mafud than in Kewet district. However, the difference between the two districts in intrauterine mortality is not statistically significant at 0.05 significance level. Further, an attempt has been made to find out if some socio-economic and demographic factors have influence on the child mortality.

Table 6.25 Distribution of Number of Women Aged 15-49 and mean Infant-Child Deaths by Socio-Economic and Demographic Factors and District 1993

Factors	Mafud		Kewet		Total	
	N	Mean	N	Mean	N	mean
Education						
None	630	0.50	431	0.41	1061	0.46
Informal	150	0.45	115	0.37	265	0.42
Formal	52	0.25	20	0.30	72	0.26
Land Size						
None	51	0.53	38	0.37	89	0.46
Own land	781	0.47	528	0.40	1309	0.44
Livestock						
None	81	0.56	41	0.46	122	0.52
Own	751	0.47	525	0.39	1276	0.43
Grain						
None	64	0.55	33	0.55	97	0.55
Own	768	0.47	533	0.38	1301	0.44
Age at Marriage						
<15	193	0.49	140	0.46	333	0.48
15	242	0.56	113	0.36	355	0.50
16	103	0.44	91	0.25	194	0.35
17+	294	0.41	222	0.43	516	0.42
Total	832	0.48	566	0.39	1398	0.44

As it can be seen from table 6.25, early age at first marriage and low socio-economic status have negative relationship with child mortality. On the hand as the level of education of respondents increases child mortality decreases. If land size, value of livestock and grain can be taken as proxies for rural income, child mortality seems to be higher among respondents who don't earn income from these sources. The impact of this situation may influence the parents to increase their

fertility either to replace the lost offsprings or to insure that parents can not be without children at the end of their life.

(d) Infecundity

Infecundity is one of the proximate determinants that has been given less attention by Bongaarts assuming that variation in infecundity across populations is not significant. In the present, study the extent of women who are childless in both districts and total sample is demonstrated in Table 6.26. The table displays that sterility seems to be more prevalent in Kewet than in Mafud districts. Among currently married women about 28.0 percent are childless in Kewet while the figure for Mafud is 13.2 percent.

Table 6.26 Distribution of Number of Childless Women by Duration of Marriage and Districts, 1993

Durations of Marriage	Name of Districts		Total
	Mafud	Kewet	N
	N	N	
0-4	37	62	99
5-9	7	23	30
10-14	4	16	20
15-19	3	18	21
20-24	5	10	15
25+	16	12	28
None Response	9	32	41
Total	81	174	254

Secondary infertility among continuously married women also seems to be more pronounced in Kewet than in Mafud. Table 6.27 demonstrates the distribution of children ever born by duration of marriage excluding zero mean parity. In

Kewet women with duration of up to three years on average have less than one child while in Mafud they have 1.5. When the marriage duration increases up to five years, mean children ever born is 1.2 for Kewet and 2.3 for Mafud, a difference of one child is maintained. Therefore, from this table it is possible to conclude that secondary sterility might prevail in Kewet possibly due to unknown reasons which would be interesting for further in-depth research.

Table 6.27 Distribution of Number of Women and Mean Children Ever Born by Duration of Marriage and District (Excluding Zero Parity), 1993

Durations of Marriage	Name of District				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
< one year	19	0.1	26	0.4	45	0.3
one year	18	0.5	24	0.6	42	0.6
two years	28	1.2	22	0.6	50	1.0
three years	21	1.5	30	0.6	51	1.0
four years	27	1.7	26	1.1	53	1.4
five years	25	2.3	32	1.2	57	1.7
6+	477	5.1	461	3.8	938	4.4
Total	615	4.3	621	3.0	1236	3.7

(e) Children Desired

Fertility in both districts and for total sample is very low for those who have a desire for additional children which indicates the prevalence of unmet need. The differences in children ever born between those who want and do not want more children are highly significant as indicated in Table 6.28

Table 6.28 Distribution of Ever Pregnant Women and Children Ever Born by Desire of Children and Districts, 1993

Desire of Children	Name of Districts				Total	
	Mafud		Kewet		N	Mean
	N	Mean	N	Mean		
Want More	454	3.8	419	3.1	873	3.4
Want No More Total	398	5.7	285	5.1	683	5.4
	852	4.7	704	3.9	1556	4.3

Those who want more children are lagging behind those who do not by two children in both districts. The difference in mean children ever born between those who want children and those who have no desire is 1.9 in Mafud and 2.0 children on average in Kewet. If the desire of those women who want no more children can be taken as the a total children a woman wants at the end of her reproductive period, it may implicitly be concluded that respondents in Mafud and Kewet can be satisfied at a maximum of 5.7 and 5.1 children, respectively.

In relation to actual desire for more children further question was posed to the respondents if they can tell by sex of a child. About 236 women responded that it was the will of God. Probing with further questions, the mean number of male and female children that are desired by Mafud respondents were 2.3 and 2.2 respectively. The corresponding mean number for Kewet was 3.5 males and 2.6 females.

(f) Application of Bongaarts' Model

Bongaarts' Estimation of the Indices

Estimation of C_m from Proportions Currently Married

Age-specific proportions of currently married women among reproductive age group is utilized to take into account the effects of age on fertility. Thus, the index C_m is measured as the weighted age-specific proportions currently married women, with the weights given by the age-specific marital fertility rates.

Table 6.29 Distribution of Age-Specific Fertility Rate, Proportion Married and marital Fertility Rate by Age Group, Mafud, 1993

Age Group	Age-specific Fertility rate	Age-specific Proportion Married	Age-specific Fertility Rate
i	f(a)	m(a)	g(a)=f(a)/m(a)
15-19	0.109	0.381	(0.338)
20-24	0.309	0.685	0.451
25-29	0.271	0.903	0.300
30-34	0.264	0.797	0.331
35-39	0.218	0.898	0.243
40-44	0.086	0.735	0.117
Total	1.256		1.449

TFR = 6.28 TM = 7.245

C_m = TFR/TM
= 6.28/7.245 = 0.87

The age-specific marital fertility rate, g(a), is obtained by dividing the age-specific fertility rate, f(a), by the age-specific proportion married, m(a). Because of problems, such as premarital conceptions and lack of representativeness of the entire age group of 15-19, a correction has been made by equating as g(15-19) =0.75 x g(20-24) (Potter,1938:82).

Estimation of C_c from Contraceptive prevalence and Use Effectiveness

The index of contraception varies inversely with prevalence and use effectiveness of contraception practiced by couples in the reproductive age groups. If contraceptive practice is entirely absent or completely inefficient, C_c will be equals to one. With increasing prevalence and effectiveness, C_c declines below 1.0. The following equation is used to estimate C_c:

C_c =1-[1.08 x u x e]

where u = proportion currently using contraception among married women of reproductive age (male methods are included) and e = average use-effectiveness of contraception which is defined as the proportionate reduction in the monthly probability of conception among the actually practicing contraception. Bongaarts (1978) has estimated the value of e for developing countries to be 0.85. Otherwise the data is not easily available for analysis. According to Bongaarts, at low levels of contraceptive use, the fertility estimates are rather insensitive to errors in e. The coefficient 1.08 is a sterility correction factor. It is an adjustment for the fact that the couples don't use contraception while they are sterile. Fitting the present data from Mafud district with equation the following result is obtained:

$C_c = 1-[1.08 \times 0.02 \times 0.85]$

$= 0.98$

Estimation of the Index C_i from the duration of Postpartum Infecundability (Lactational Infecundability)

Although the primary importance of breastfeeding is provision of nutrition to infants, it has also an important effect on fertility by prolonging the duration of anovulation after each birth. The duration of this interval depends on the intensity and duration of breastfeeding. It has been demonstrated that women who give their infants only breast milk (full breastfeeding) are much less likely to resume menstruation than those who supplement (partial breastfeeding) the diets of their infants with fluids by bottle or with solid food Hence, breastfeeding is the primary determinant of amenorrhoea. Without breastfeeding, the average amenorrhoea is estimated to be 1.5 to 2 months. The index of lactational infecundity, C_i, can be

estimated with the following equation:

$$C_i = 20/18.5 + i$$

where i is the duration (in months) of the postpartum non-susceptible period, defined for each woman as whichever is longer-amenorrhoea or abstinence. In the present study amenorrhoea is longer than abstinence. The index is estimated by assuming that the average birth interval is made up of (a) nine months of gestation, (b) about 7.5 months of waiting time, (c) two months of any miscarriages (9+7.5+2=18.5), and (c) 1.5 months of amenorrhoea without breastfeeding. Therefore, the numerator of the equation represents the average birth interval without lactation or abstinence and the denominator constitutes average birth interval including the effect of lactation and postpartum abstinence. Application of the present data of Mafud with the equation gives the following result:

$$C_i = 20/18.5 + i$$

$$= 20/18.5 + 18.8$$

$$= 0.54$$

Assuming the index of induced abortion, C_a, is 1.0 in the sense that there is no induced abortion that affect fertility in the study areas, TFR can be calculated by applying the multiplicative model of Bongaarts as follows:

$$TFR = C_m \times C_c \times C_i \times C_a \times TF$$
$$= 0.87 \times 0.98 \times 0.54 \times 1.0 \times 15.3$$
$$= 7.0$$

The proportion explained by the considered proximate variables can be obtained by summing the effects of each indices. The separate effect of each index or proportionate reduction in fertility due to that particular index is determined by subtracting the value of the index from 1.0. Thus the proportion of variation explained by the three intermediate variables equals = 0.13+0.02+0.46 = 0.61.

Estimates of Fertility Rates:

TF = Total Fecundity Rate
TF = 15.3
TN = Total Natural Marital Fertility Rate
TN = C_i x TF = 0.54 x 15.3 = 8.3
TM = Total Marital Fertility Rate
Tm = C_c x c_a x TN = 0.98 x 1.0 x 8.3 = 8.1
TFR = C_m x TM = 0.87 x 8.1 = 7.0

Following the same procedure, data from Kewet district is also applied to the Bongaarts' model.

Table 6.30 Distribution of Age-Specific Fertility Rate, Proportion Married and Marital Fertility Rate, Kewet 1993

Age Group i	Age-Specific Fertility Rate f(a)	Age-Specific Proportion Married m(a)	Age-Specific Marital Fertility Rate g(a) = f(a)/m(a)
15-19	0.0643	0.4795	(0.1269)
20-24	0.1386	0.8193	0.1692
25-29	0.1111	0.8105	0.1371
30-34	0.0571	0.8500	0.06772
35-39	0.0523	0.8105	0.0645
40-44	0.0400	0.7840	0.0510
Total	0.4637		0.6159

TFR = 2.3170 TM = 3.079

C_m = TFR/TM
= 2.317/3.079
= 0.75
C_c = 1-[1.08 x 0.07 x 0.85]
= 0.94
C_i = 20/18.5+17.3
= 0.56
TFR = 0.75 x 0.94 x 0.56 x 15.3
= 6.0

Proportion Explained = 0.25+0.06+0.44 = 0.75

Estimates of Fertility Rates

TF = 15.3
TN = C_i x TF = 0.56 x 15.3 = 8.6
TM = C_c x C_a x TN = 0.94 x 1.0 x 8.6 = 8.0
TFR = C_m x TM = 0.75 x 8.0 = 6.0

Table 6.31 Estimates of Bongaarts' Intermediate Fertility Variable Indices and Fertility Levels: Mafud and Kewet, 1993.

A Estimates of indices	Mafud	Kewet
C_m proportion married	0.87	0.75
C_i postpartum infecundity	0.54	0.56
C_c index of contraception	0.98	0.94
C_a index of abortion	1.0	1.0
B Estimates of fertility rate		
TF = Total fecundity rate	15.3	15.3
TN = Total natural fertility rate	8.3	8.6
TM = Total marital fertility rate	8.1	8.0
TFR = Total fertility rate	7.0	6.0

Total Natural Marital Fertility Rate:

In Mafud the long duration of lactational postpartum non-susceptibility produces a less reduction in the natural fertility level (yielding a TN equal to 8.3) but in Kewet, the total natural fertility rate is greater by 0.3 because the lactational postpartum non-susceptible period is shorter than in Mafud by 1.5

Total Marital Fertility Rate:

The modest (0.2) difference between TN and TM in Mafud reflects the low level of contraceptive use. In Kewet, however, TM is less than the TN by 0.5 due to relatively high prevalence of contraception.

Total Fertility Rate:

The variations in the total fertility rate combine the effects of all the intermediate fertility rate. The highest fertility is observed in Mafud where the contraceptive practice and proportion married are relatively low when compared with that of Kewet. It seems that the short duration of lactational postpartum infecundability in Kewet district is compensated by contraceptive prevalence.

The value of TN, TM, and TFR are estimates derived from the model. The estimates can be compared with the following observed rates. In Mafud, TM = 7.2 and TFR = 6.3; in Kewet, TM = 3.1 and TFR = 2.3. The observed rates and the estimated fertility rates have compatible results in Mafud. In Kewet, however, the observed and estimated results are not comparable. It is discovered that fertility of last year in Kewet has been under-reported. However, the Bongaarts' model is not very much sensitive to such kind of errors. Consequently, fertility estimates by this model are acceptable with minimum precaution.

Index of proportion married, C_m

The highest C_m is found in Mafud where marriage is universal at early age. The proportion married, C_m , among the Kewet respondent is less than in Mafud despite early marriage because of universality of marriage at latter age than in Mafud. No respondent is at celibacy by age group 35-39 and 40-44 in Mafud and Kewet respectively.

Index of contraception, C_c

With 1.9 percent of current contraceptive users among married women in Mafud the C_c index is 0.98 while in Kewet where contraceptive use among currently married women is relatively more spread with 7.4 percent current users, the index equals 0.94

Index of postpartum non-susceptibility, C_i

This index is low in Mafud where the lactational postpartum infecundability period is the highest (18.8 months) and where this period is short (17.3 months) the index is high.

Table 6.32 Distribution of Number and Percent of Women Those Who Ever Heard and Ever Used By Methods of Contraception and District, 1993

Method	Mafud				Kewet			
	Ever Heard	Per cent	Ever Used	Per cent	Ever Heard	Per cent	Ever Used	Per cent
Pill	341	35.9	30	3.2	56	39.6	66	7.3
Loup	069	7.3	2	0.2	12	1.3	2	2.2
Inj.	117	12.3	3	0.3	99	11.0	3	0.3
Foam	023	2.4	0	0.0	7	0.8	0	0.0
Condom	119	12.5	2	0.2	174	19.3	0	0.0
Female Stril.	60	6.3	0	0.0	55	6.1	0	0.0
Male Steril.	22	2.3	0	0.0	11	1.2	0	0.0
Abstinence	336	35.4	257	27.1	239	26.6	113	12.6
Withdrawal	20	2.1	7	0.7	24	2.7	2	2.2
Prescription	19	2.0	7	0.7	113	12.6	10	1.1
None Response			1	0.1				

The mean duration of actual postpartum abstinence in the study areas is less than the lactational postpartum infecundability. Thus, postpartum abstinence in the usual sense may not have effects on fertility. In spite of irregular practice, it can have effect on frequency of intercourse and thus affect fertility. But the practice of sexual abstinence requires detail and separate study in its own. The third method of contraception ever known among the respondents in both districts are condoms and is reported by 12.5 percent of respondents in Mafud and 19.3 percent in Kewet. The least known method in Mafud is withdrawal, and it is prescription of paper in Kewet. The ever users of the methods are presented in the Table 3.62 Whenever users of any method are analyzed by method, pill stands the first to be used by 3.2 percent of ever married women in Mafud. The corresponding figure for Kewet is 7.3 percent, and increases by 4.1 percent in Kewet than in Mafud. Periodic abstinence is the second most ever used method in both districts, but with higher percent in Mafud than in Kewet. Other methods were not tried in sufficient number by rural women as such.

Respondents were asked if they know where to get the methods, in case they want to use. Among ever married women, including current users of contraception, 24.1 percent know the place from where to get the specific method in Kewet while the figure in Mafud is 11.0 percent. Excluding the current users of contraception, respondents were asked whether or not they have a desire to use any method of family planning in the future. 9.6 percent in Kewet and 10.1 percent in Mafud responded with positive reply. 83.8 percent in Kewet and 84.4 percent in Mafud don't have a wish to use any method in the future. The remaining 6.5 percent in Kewet and 5.5 percent in Mafud couldn't decide.

Among respondents who are not currently using contraception but who want to use contraceptive method some times in the future indicated that the most desired contraceptive method is pills in both districts: 66.3 percent in Kewet and 73.1 percent in Mafud. In Kewet the second most desired method is sexual abstinence as reported by 18.8 percent of non-users. In Mafud, however, the second most desired method is injection which is reported by 16.0 percent. The number of respondents who expressed their future usage with other methods are insignificant.

CHAPTER VII SUMMARY AND CONCLUSION

The main objective of the present study has been to examine the effects of selected proximate determinants and socio-economic variables on fertility rates in two purposively selected rural districts in North Shewa. In an attempt to achieve this objective 25 percent of the women aged 15-49 in the selected PAs were interviewed. Accordingly, a sample of 1067 and 996 eligible women in the reproductive age group were determined in Mafud and Kewet respectively for a total sample size of 2063. The summary of the findings, their policy implications as well as recommendations for future studies are presented in the following sections.

7.1 Summary of the Findings

The quality of the data collected in the survey was assessed using different methods of evaluation before the application of detailed analysis of fertility. Age of the respondents and their reported fertility were the major data evaluated. Hence, the evaluation of age data indicated a marked heaping in both districts at ages ending in 0 and 5. The evaluation of reported fertility data also showed that children ever born to older women were slightly omitted due to memory lapses in Mafud district while children born 12 months preceding the survey date were under reported in Kewet district.

The reported crude birth rates in the study areas were 39.2, 20.0 and 30.0 per 1000 population in Mafud, Kewet and total sample,respectively. The 1984 corresponding figure for all rural Shewa (according to the 1984 Population and

Housing census) was 36.4. The general fertility rate was 188.4, 73.3 and 132.3 in Mafud, Kewet and total sample, respectively. The 1984 corresponding figure for rural Shewa was 194.0. The reported total fertility rates in Mafud, Kewet and total sample were 6.3, 2.3 and 4.4 children per woman respectively. The total fertility rate for total Shewa was 6.5. The average parity for age group 45-49 was also found to be 5.5, 5.3 and 5.4 in Mafud, Kewet and total sample, respectively which was comparable to average parity of 5.4 for age group 45-49 in rural Shewa. All the aforementioned fertility rates imply that in spite of under reporting, fertility is high in Mafud while it is low in Kewet. The major factors that contributed to the low level of fretility in Kewet were (i) high percent of childlessness (among currently married women 28.0 and 13.2 percent were childless in Kewet and Mafud, respectively), (ii) high percent of contraceptive use (7.0 and 2.0 percent of currently married women were currently using contraception in Kewet and Mafud, respectivly) and (iii) low rate of child mortality (in Kewet, respondents who have experienced two or more child mortalities have appeared to produce three more children as compared with respondents that haven't faced child mortality. But in Mafud respondents who have encountered two or more child mortalities have tended to procreate 4.3 more children as compared with respondents that haven't faced child mortality.)

As already discussed, the fertility data were subject to under reporting of children, especially in Kewet district. Consequently, the reported fertility was adjusted using the Brass type P/F ratio method and the relational Gompertz model. The results of the two indirect techniques provided a comparable and plausible fertility estimates. However, the fertility estimates from P/F ratio method

appeared to be less than the estimates by Gompertz relational method. The fertility rates of the study areas were appraised between the two values, taking the result from the P/F ratio method as the lowest and results from Gompertz as the highest ranges. Therefore, the TFR of 6.5 to 7.2 and 4.2 to 4.9, GFR of 219.3 to 239.4 and 144.5 to 163.0, GRR of 3.2 to 3.5 and 2.1 to 2.4, CBR of 40.0 to 43.3 and 32.0 to 36.8 were estimated as plausible results for Mafud and Kewet districts.

Out of the total people of 9141 listed in the sampled households 56.0 and 44.0 percent were accounted in Mafud and Kewet, respectively. The total population in rural Mafud is predominantly Christian Amhara (99.0 percent), Amhara was also the largest ethnic group in rural Kewet comprising of 73.1 percent. The second and third largest ethnic groups (muslims in religion) were Oromo and Argoba who constituted 13.8 and 12.6 percent of rural population of Kewet, respectively. Among the population in the sampled households 17.7 percent in Mafud and 20.7 percent in Kewet were literate.

The age distribution of the selected women indicated that 87.6 percent in Mafud and 91.2 percent in Kewet were in age groups 15-44. The ethnic and religious compositions of the respondents were almost similar with total population in the sampled households.

The Majority of the respondents in Mafud (73.5 percent) and Kewet (77.9 percent) were illiterate. Among the respondents, 4.0 percent in Mafud and 5.0 percent in Kewet belonged to households without land. In both districts, only about 6.0 percent of the respondent belonged to a household that possesses 1.76 or more

hectares of land. Respondents with no livestock were 6.0 percent in Mafud and 4.0 in Kewet. When considering livestock income 11.0 percent in Mafud and 29.0 percent in Kewet belonged in the last category of income. Similarly, when considering income from grain production 11.0 and 36.0 percent of respondents belonged in the last category in Mafud and Kewet, respectively. This may indicate that income distribution from livestock and grain production in Kewet district are skewed to the upper categories.

In Mafud, 11.1 percent of respondents were reported as never married, 74.6 as currently married, 6.5 as widowed and 7.8 as divorced at the time of the survey. In Kewet, the percent distributions were lower by 1.5 for single, 0.4 for currently married, 0.5 for divorced and greater by 1.5 for widowed when compared with Mafud district. Marriage was nearly universal in both districts as no woman was without first marriage after age 40.

The postpartum variables like breastfeeding, amenorrhoea and abstinence are among the proximate variables that have direct effects on fertility. In Mafud the average durations of full breastfeeding for the last, next to last, and previous child was 9.7,10.1 and 10.3 months, respectively. The figures in Kewet district for the last, next to last and previous child were 7.3, 7.7 and 7.6 months, respectively. In Mafud, the mean durations of partial breastfeeding for the last, next to last and previous child were 32.3, 29.2 and 29.8 months, respectively. The corresponding figures in Kewet were 24.4, 23.9 and 23.7 months. In all the cases, the mean duration of breastfeeding (both full and partial) in Mafud is greater than in Kewet.

The mean durations of amenorrhoea for the next to last child were 18.8 and 17.3 months in Mafud and Kewet, respectively. The average postpartum abstinence for the next to last child were calculated to be 4.7 and 3.4 months in Mafud and Kewet, respectively.

The direct effects of selected socio-economic factors on fertility in rural areas of the two districts were also examined. Fertility variations due to ethnicity and religion were statistically insignificant as tested by oneway variance analysis for total sample. Education was inversely related with cumulated fertility in both districts. An illiterate woman would have two more children than a woman with formal education. Fertility variations among ever married women with live birth due to education is 100 percent significant in oneway variance analysis in both districts. The effect of education on fertility is further examined under conditions where other independent factors and covariate age were statistically controlled. The results showed that, in both districts, when other independent factors are controlled with covariate age, the mean children ever born from women who have attended the literacy program was higher than those who had no education and had formal education. In Mafud, this may be explained by the early age at marriage for those women who attended the literacy program, and in Kewet by the low duration of breastfeeding and early age at marriage when compared with respondents who had no education and had formal education.

It was also observed that land holdings and mean children ever born were positively and linearly associated in the study areas. In addition to this, in both districts, oneway variance analysis revealed that there was a statistically significant

fertility variation as related to the size of land. The predicatory capacity of land holding in the context of multivariate analysis (in which interaction of other independent variables are controlled) is significant at 0.029 and 0.000 levels Mafud and Kewet,respectively. The effect of land on mean children ever born does not show much variation before and after adjustment for independent factors in both districts. This may suggest that other variables may not have significant interaction with land to alter the number of children ever born.

The persistently positive relationship between the size of land holding and children ever born could be attributed to the negative relationship between the size of land and duration of breastfeeding and age at first marriage in both districts. This study, found that as the size of landholding increases mean duration of breastfeeding and mean age at marriage decrease. Consequently, with short duration of breastfeeding and early age at marriage, cumulative fertility would increase. The effects of livestock and grain values on children ever born were positive and linear in Mafud but the trends for Kewet fluctuated and was less significant.

In general, the total explained proportion of variation in fertility by all socio-economic factors was 10.5 (R^2 0.015) and 7.1 (R^2 =0.0710) percent in Mafud and Kewet, respectively. Controlling for the independent factors with covariate age of respondent increased the explained proportion to 34.0 (R^2 =0.339) and 39.0 (R^2 =0.388) percent in Mafud and Kewet, respectively. It is understood that the direct net effects of considered socio-economic variables on mean children ever born were not substantial in both districts. Much of the explained variations are by virtue

of differences in age of respondents.

Nonetheless, socio-economic variables are known to affect fertility indirectly by influencing the proximate variables although, the proximate variables are the direct determinants of fertility. Hence, the effects of the proximate variables on fertility were examined.

Age at first marriage is one of the proximate variables that denotes the duration of a woman's exposure to the risk of childbearing. With lower age at marriage higher number of children ever born was observed in both districts. In Kewet, variations in the mean children ever born in relation age at first marriage does not seem to be significant when compared with that of Mafud.

An attempt was made to investigate the influence of selected socio-economic and demographic determinants of age at marriage for total sample. The socio-economic and demographic variables that have been considered to affect age at first marriage were: ethnicity, religion, education, marital status, times of marriage, land size, livestock grain income and age at menarche as a covariate.

The multiple classification analysis of age at first marriage against these variables showed that the independent effects of ethnicity, religion, education, marital status, land size and income from grain production were not significant. But, variables like times of marriage, land size, income from livestock and covariate age at menarche significantly explained substantial variations in age at first union.

As a whole 5.0 percent of variation in age at marriage was ascribed to the socio-economic and demographic variables considered. The explained variation augmented to 23.0 percent with the introduction of age at menarche as a covariate, indicating that age at menarche played important role in determining age at marriage in the study areas.

Breastfeeding is another intermediate variable that is important not only for the maintenance of health of a child but also for the suppression of ovulation. It affects fertility by prolonging the period of postpartum amenorrhoea.

A multiple classification analysis of breastfeeding by background variables which included education, land, value of livestock, grain and covariate age was conducted. The analysis revealed that in general, the mean duration of breastfeeding decreases as the categories of the socio-economic variables increases. Adjusting for independent variables with covariate age, the contribution of all socio-economic variables in providing different mean durations of breastfeeding for total sample was 13.2 percent. The difference between the two districts in mean duration of breastfeeding was statistically significant; the mean duration of breastfeeding in Kewet was lower by 5.257 months when compared to Mafud. However, the low duration of breasfeeding in Kewet was balanced by the higher prevalence rate of contraceptive use in Kewet district than in Mafud.

The mean parity of women with stable marriages and whose first marriage was dissolved was not significantly different . However, although insignificant, the mean parity of women whose first marriage was disrupted was found to be higher

than mean parity of women with stable marriage. The reason might be women with broken marriages may attempt to stabilize their marriage by producing as much children as possible. The same result was obtained by Abdulahi (1988) from data collected in rural Mettu and Alemaya.

Among currently married women 28.0 percent was childless in Kewet while the corresponding figure in Mafud was 13.2 percent. In both districts, respondents who have a desire for additional children have lower mean children ever born than respondents who want no more children. Given the low mean number of children ever born in Kewet it is not surprising that, women desired more children in Kewet compared to those in Mafud.

The application of Bongaarts' model to the fertility data indicated that fertility variation exists in both districts. In Mafud 61.0 of the fertility variations were accounted by three variables (proportion married, contraception and postpartum lactational infecundability) whereas in Kewet it was 75.0 percent. The two variables, proportion married and postpartum infecundability, alone were accountable for 59.0 and 69.0 percent fertility variations in Mafud and Kewet, respectively.

7.2 Policy Implications

From what has been discussed so far, it is possible to identify the factors that result in high and low fertility rates in the study areas. The factors that are responsible for high fertility rates are: land holding, literacy program, income from

livestock, marital disruption, infant-child mortality and spontaneous **intrauterine mortality**. On the other hand, the factors that are responsible for low fertility rates are: **formal education, contraceptive use, prolonged breastfeeding and age at first marriage** denote negative correlation with fertility. These are the areas to be further encouraged for the reduction of fertility.

The high rates of **infant-child mortality** as well as **foetal** loss observed in the study areas need serious attention not only from the point of view of reducing fertility but also from humanitarian aspects. The reduction of infant-child mortality and spontaneous intrauterine mortality would at least have two advantages. First, if parents can be assured that their offsprings can be grown to adulthood, the indurance effect of fertility can be reduced. In addition to this, if the level of infant-child mortality and foetal loss are reduced, replacement effect of fertility can also be mitigated. Consequently, with reducing these effects low fertility rates might be achieved. The second point is that reducing the human trauma which results from infant-child mortality as well as from foetal loss will have tremendous positive effect on the moral, psychological and health aspect of mothers. Therefore, a policy that gives priority to maternal child health (MCH) program is required.

Land holding and **distributions** affect fertility positively by lowering age at marriage and the mean duration of breastfeeding. Hence care must be taken not to take family size as criterion when land distribution is made in the rural areas since high fertility can be viewed as incentives by rural people to get some plot of land.

Education can positively affect fertility by reducing the traditional birth spacing practices such as breastfeeding and periodic abstinence. Therefore, with the expansion of education, contraceptive practice, breastfeeding and abstinence should be encouraged.

The study also indicated that **raising age at marriage** to 17 years will have substantial effect in fertility reduction. This suggestion is based on the findings of the study that the completed fertility of women married at age 17 or above was smaller by 1.1 and 0.6 mean children ever born in Mafud and Kewet, respectively when compared to those married below 15 years of age. The recommendation here is that age at first marriage be raised to 18 years.

Being without marriage after a certain age creates serious stigmas on individuals, specially on females, in rural areas. This situation must be altered and considered as normal by the society. Teachings that can bring attitudinal change on the part of society must be one of the programs in population policy.

It is believed that a population policy that strives to reduce fertility by concentrating its efforts simultaneously on increasing educational status of women, improving health conditions and strengthening family program can do a lot.

7.3 The Need for Further Research on Fertility

To-date, there are few systematic national studies on the levels, differentials and correlates of **primary and secondary subfecundity** in Ethiopia. Therefore, it is

recommended that research has to be done on the causes of infecundity and its fertility implications.

Marital disruption was found to be high in the study areas. 23.3 percent of the ever married women for total sample was disrupted their first marriage. Hence, it must be studied in detail to investigate its possible causes and consequences on fertility.

The rate of **spontaneous intrauterine mortality** observed in the study areas requires detail investigation of its etiology and differentials.

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APPENDIX QUESTIONNAIRE

HOUSEHOLD BACKGROUND QUESTIONNAIRE

IDENTIFICATION

Province:_____ District:_____ Sub-district:_____ Name of Peasant Association:_____ Number of Peasant Association:_____ _ Household Number:_____ Name of Respondent:_____

Interviewer Visits: 1 2 3 4

Date:

Result*

*Result Codes: 1 Completed satisfactorily
2 Incomplete
3 Desired respondent not available
4 Deferred
5 Address not a dwelling
6 Unable to locate dwelling
7 Other (specify----------)

SECTION 1 INFORMATION ON MEMBERS OF THE HOUSEHOLD

	Names	Relationship	Sex	age	Education			Marital status	Eligibility
	1.1	1.2	1.3	1.4	1.5			1.6	1.7
Line No.	Please give me the names of the persons who usually live in your household	What is the relationship of this person to the head of household ?	What is the sex of this person ? MALE 1 FEMALE 2	How old is he/she ? (AGE IN COMPLETED YEARS)	Has he/she attended school ? YES 1 NO 2 (IF NO SKIP TO 1.6)	Level of school attended ? PRIMARY 1 JUNIOR 2 SENIOR 3 COLLEGE 4	What is the highest grade attended at that level ?	Is he/she now... ? SINGLE 1 MARRIED 2 WIDOWED 3 DIVORCED 4 SEPARATED 5	WRITE LINE NO. OF WOMEN AGED 15-49 FOR INDIVIDUAL INTERVIEW
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									

SECTION 2 RESPONDENT'S BACKGROUND

We would like to know something about your background, date of birth, education and so on.

2.8 What is your date of birth ?

MONTH_____ DON'T KNOW 98

YEAR 19_____ DON'T KNOW 98

2.9 How old are you ?

YEARS_____ DON'T KNOW 98

2.10 What is your religion ?

CHRISTIAN 1

MOSLEM 2

OTHER (SPECIFY_____)

2.11 Can you read, say, a newspaper or magazine ?

YES 1

NO 2 (SKIP TO 3.17)

2.12 Can you write, say, a letter ?

YES 1

NO 2 (SKIP TO 3.17)

2.13 Have you ever attended school ?

YES 1

NO 2 (SKIP TO 3.17)

2.14 What was the highest level of school you attended ?

PRIMARY 1

JUNIOR 2

SENIOR 3

COLLEGE 4

2.15 What was the highest grade you completed at that level ?

GRADE_____

2.16 And how old were you at that grade ?

YEARS____DON'T KNOW 98

SECTION 3 MARRIAGE HISTORY AND ECONOMIC ACTIVITY

Now I would like to ask you some questions about your married life.

3.17 Are you now...

MARRIED 1

WIDOWED 2

DIVORCED 3

SEPARATED 4 ?

3.18 What was your age at first marriage ?

YEARS _____ DON'T KNOW 98

3.19 If you are currently married, in what month and year did your present marriage begin ?

MONTH _____ DON'T KNOW 98

YEAR 19 _____ DON'T KNOW 98

CURRENTLY NOT MARRIED 96 (SKIP TO 3.21)

3.20 How old were you at that time ?
YEARS _____ DON'T KNOW 98
3.21 Does your husband live with you now ?
YES 1 (SKIP TO 3.26)
NO 2
3.22 What is the reason for his absence ?
WORKING SOMEWHERE ELSE IN ETHIOPIA 1
FAMILY DISPUTE, SEPARATED 2 (SKIP TO 3.24)
OTHER (SPECIFY _____)
(SKIP TO 3.24)
3.23 In what month and year did he start working in that place ?
MONTH _____ DON'T KNOW 98 YEAR 19 ____ DON'T KNOW 98
3.24 In what month and year did that (family dispute, separation, other reason) take place ?
MONTH _____ DON'T KNOW 98 YEAR 19 _____ DON'T KNOW 98
3.25 How long was it since (family dispute, separation,other reason) took place ?
MONTHS_____ DON'T KNOW 98
3.26 What was the age of your husband at his first marriage ?
YEARS_____ DON'T KNOW 98
3.27 Who looks after your children in your absence at home ?
SPECIFY _____
HAVE NO CHILDREN 96

3.28 Have you married more than once ?
YES 1
NO 2 (SKIP TO 3.35)
3.29 How many times have you been married altogether ?
NUMBER OF TIMES_____

INTERVIEWER: FOR EACH PAST MARRIAGE ASK THE FOLLOWING (IF CURRENTLY MARRIED, EXCLUDE IT)

	3.30	3.31	3.32	3.33	3.34
Marriage order	In what month and year did your (first, second...) marriage begin ?	How did the marriage end ?	(IF SEPARATION) In what month and year did you stop living together	(IF DIVORCED) In what month and year did you stop living together ?	(IF DEATH) In what month and year did your husband died ?
1	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98	DEATH 1 DIVORCED 2 SEPARATED 3	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98
2	MONTH------ DON'T KNOW 98 YEAR------ - Don't KNOW 98	DEATH 1 DIVORCED 2 SEPARATED 3	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98
3	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98	DEATH 1 DIVORCED 2 SEPARATED 3	MONTH------ DON'T KNOW 98 YEAR------ — DON'T KNOW 98	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98
4	MONTH------ DON'T KNOW 98 YEAR------- DON'T KNOW 98	DEATH 1 DIVORCED 2 SEPARATED 3	MONTH------ DON'T KNOW 98 YEAR---------- DON'T KNOW 98	MONTH------ DON'T KNOW 98 YEAR-------- DON'T KNOW 98	MONTH------ DON'T KNOW 98 YEAR------ DON'T KNOW 98

Now I would like to ask you some questions about the menstrual period.

3.35 How old were you when you had your first menstrual period ?
YEARS OLD _____
HAS NOT YET BEGIN 97 (SKIP TO 4.42)
DON'T KNOW 98

3.36 Did your first menstrual period start before or after the begin of your (first) married life ?
BEFORE 1 AFTER 2

3.37 How many years before you started your (first) married life did your first period come ?
YEARS _____ DON'T KNOW 98

3.38 How many years after you started your (first) married life did your first period come ?
YEARS_____ DON'T KNOW 98

3.39 Do your periods usually come at regular intervals ?
YES 1 NO 2 NO LONGER MENSTRUATING 3.

3.40 What is average number of days between your periods ?
DAYS _____ DON'T KNOW 98

3.41 For how many days do your periods usually lasts ?
DAYS _____ DON'T KNOW 98

SECTION 4 PREGNANCY AND MOTHER-HOOD HISTORY

Now I would like to ask you about your own children.

4.42 Have you ever been pregnant even if that pregnancy lasted only a few weeks or months ?
YES 1 NO 2 (SKIP TO 4.60)

4.43 Have you ever given birth to any children ?
YES 1 NO 2 (SKIP TO 4.60)

4.44 Do you have any sons you have given birth to who are now living with you ?
YES 1 NO 2 (SKIP TO 4.46)

4.45 How many live with you ?
NUMBER _____

4.46 Do you have any sons you have given birth to who don't live with you ?
YES 1 NO 2 (SKIP TO 4.48)

4.47 How many don't live with you ?
NUMBER _____

4.48 Do you have any daughters you have given birth to who are now living with you ?
YES 1 NO 2 (SKIP TO 4.50)

4.49 How many live with you ?
NUMBER_____

4.50 Do you have any daughters you have given birth to who don't live with you ?
YES 1 NO 2 (SKIP TO 4.52)

4.51 How many don't live with you ?
NUMBER _____

4.52 Have you ever given birth to any son who later died, even if, the child lived for only a short time ?
YES 1 NO 2 (SKIP TO 4.54)

4.53 How many of your sons have died ?
NUMBER _____

4.54 Have you ever given birth to any daughter who later died, even if the child lived for only a short time?
YES 1 NO 2 (SKIP TO 4.57)

4.55 How many of your daughters have died ?
NUMBER _____

4.56 INTERVIEWER: SUN NUMBERS TO 4.45, 4.47, 4.49, 4.51, 4.53 AND 4.55 AND ENTER TOTAL HERE: SUM _____
NOW ASK:

Now I would like to ask you about your lost pregnancies.

	4.71	4.72	4.73
Order of pregnancy	In what month and year did your pregnancy end ?	How many months did that pregnancy last ?	Did you or a doctor or someone else do anything to end that pregnancy early ?
1	MONTH_____ DON'T KNOW 98 YEAR _____ DON'T KNOW 98	MONTHS_____ DON'T KNOW 98	YES 1 NO 2
2	MONTH _____ DON'T KNOW 98 YEAR_____ DON'T KNOW 98	MONTHS_____ DON'T KNOW 98	YES 1 NO 2
3	MONTH_____ DON'T KNOW 98 YEAR_____ DON'T KNOW 98	MONTHS_____ DON'T KNOW 98	YES 1 NO 2
4	MONTH_____ DON'T KNOW 98 YEAR_____ DON'T KNOW 98	MONTHS_____ DON'T KNOW 98	YES 1 NO 2
5	MONTH_____ DON'T KNOW 98 YEAR_____ DON'T KNOW 98	MONTHS_____ DON'T KNOW 98	YES 1 NO 2
6	MONTH_____ DON'T KNOW 98 YEAR_____ DON'T KNOW 98	MONTH_____ DON'T KNOW 98	YES 1 NO 2
7	MONTH_____ DON'T KNOW 98 YEAR_____ DON'T KNOW 98	MONTHS_____ DON'T KNOW 98	YES 1 NO 2
8	MONTH_____ DON'T KNOW 98 YEAR_____ DON'T KNOW 98	MONTHS_____ DON'T KNOW 98	YES 1 NO 2

Now I would like to ask you about your each last, next-to-last and previous live births.

	4.74	4.75	4.76	4.77	4.78	4.79	4.80	4.81	4.82	4.83
Birth order	What was the name of this child ?	In what month and year was (NAME) born ?	Was that a male or female ?	Did you breastfeed ? (NAME)	How old was (NAME)when you first started giving him/her any kind of food besides breast-milk ?	How old was (NAME) when you stopped breast-feeding (NAME) altogether ?	Is he/she still alive ?	(If DEAD) How long did the child live ? If less than a year ask months, If less than a month ask days.	How long was it after the birth of (Name) before your period back ?	For how long after the birth did you go without sexual relations ? Write '0' if less than one month
Last Live Birth	NAME-----	MONTH---- DON'T KNOW 98 YEAR------- DON'T KNOW 98	MALE 1 FEMALE 2	YES 1 NO 2 (SKIP TO 100)	MONTHS----- NOT YET STARTED TO GIVE HIM/HER ANY KIND OF FOOD 97 DON'T KNOW 98	MONTHS----- NOT YET STOPPED BREAST-FEEDING 97 DON'T KNOW 98	YES 1 (SKIP TO 102) NO 2	Year------ Moth------- Days------ Don't Know 98	Months---- Still hasn't resumed 97 don't know 98	Month------ Still hasn't resumed 97 don't Know 98
Next To Last Live Birth	NAME-----	MONTH---- DON'T KNOW 98 YEAR------ -DON'T KNOW 98	MALE 1 FEMALE 2	YES 1 NO 2 (SKIP TO 100)	MONTHS----- -DON'T KNOW 98	MONTHS------ DON'T KNOW 98	YES 1 (SKIP TO PREVIOUS BIRTH) NO 2	Year------ Month---- Day ----	Months---- Don't know 98	Month------ Don't Know 98
Previous Live Birth	NAME-----	MONTH---- DON'T KNOW 98 YEAR------- DON'T KNOW 98	MALE 1 FEMALE 2	YES 1 NO 2 (SKIP TO 100)	MONTHS----- DON'T KNOW 98	MONTHS----- DON'T KNOW 98	YES 1 (SKIP TO PREVIOUS BIRTH) NO 2	Year---- Month--- Day----	Month---- Don't Know 98	Month---- Don't Know 98

SECTION 5 CONTRACEPTIVE KNOWLEDGE AND USE

Nowadays some married couples make conscious decisions against getting pregnant too often or having more children than they can support. This is alled family planning.

5.84 Generally speaking, do you approve of this ?
YES 1 NO 2 DON'T KNOW 98

5.85 Have you heard of any method that men/women use to prevent pregnancy ?
YES 1 NO 2 (SKIP TO 5.113)

5.86 What methods have you heard of ?
SPECIFY_____
INTERVIEWER:ASK THE METHODS WHICH THE WOMAN DIDN'T MENTION

5.87 Haven't you ever heard of the following methods ? And haven't you ever used any of these methods ?

	EVER HEARD	EVER USED
PILLS	YES 1 NO 2	YES 1 NO 2
IUD	YES 1 NO 2	YES 1 NO 2
INJECTION	YES 1 NO 2	YES 1 NO 2
DIAPHRAGM	YES 1 NO 2	YES 1 NO 2
CONDOM	YES 1 NO 2	YES 1 NO 2
DOUCHE	YES 1 NO 2	YES 1 NO 2
SUPPOSITORY JELLY, FOAM	YES 1 NO 2	YES 1 NO 2
RHYTHM	YES 1 NO 2	YES 1 NO 2
ABSTINENCE	YES 1 NO 2	YES 1 NO 2
WITHDRAWAL	YES 1 NO 2	YES 1 NO 2
FEMALE STERILIZATION	YES 1 NO 2	YES 1 NO 2
MALE STERILIZATION	YES 1 NO 2	YES 1 NO 2

5.88 From where or whom have you heard these methods ?
SPECIFY_____

5.89 Do you know where to get these methods, if you want to use them ?
YES 1 NO 2

5.90 Are you or your husband currently using a method to keep you from getting pregnant ?
YES 1 NO 2 (SKIP TO 5.92)

5.91 What method are you or your husband currently using ?
SPECIFY_____

5.92 If you (or your husband) are not currently using any contraceptive method, do you thing you (or your husband) may use a family planning method at some time in the future so that you will not become pregnant? YES 1 NO 2
UNDECIDED 3

5.93 Would you mind telling me why you (or your husband) do not want to use a family planning method ?
WANT TO HAVE AS MANY CHILDREN AS POSSIBLE 1
IT IS UP TO GOD. NOT FOR ME TO CHOOSE 2
FAMILY PLANNING IS TOO EXPENSIVE 3

FAMILY PLANNING CAUSES HEALTH PROBLEMS 4
HUSBAND IS AGAINST 5
OTHER (SPECIFY_____)

5.94 What are the advantages of having many children ?
SPECIFY _____
_____
_____
_____

5.95 What are the disadvantages of having many children ?
SPECIFY _____
_____

SECTION 6 HOUSEHOLD INCOME

6.96 Do you or any member of your household own any farm land ?
YES 1 NO 2 (SKIP TO 6.127)

6.97 How many land altogether ?
HECTARES_____

Now I would like to ask you about any of the animals you have raised.

6.98	6.99	
Which of the following animals did you raise in the past 12 months ?	How many of these do you have now ? (Include monetary estimate)	
	NUMBER	BIRR
Oxen ☐	_____	_____
Cows ☐	_____	_____
Calf ☐	_____	_____
Goats ☐	_____	_____
Sheep ☐	_____	_____
Horses ☐	_____	_____
Mules ☐	_____	_____
Camels ☐	_____	_____
Donkeys ☐	_____	_____
Other, specify_____ _____ _____	_____ _____ _____	_____ _____ _____ _____

No I would like to ask you about any of the crops you have grown.

6.100	6.101	
which of the following crops did you grow in the past 12 months ?	How many quintals did you grow in the past 12 months ? (Include monetary estimate)	
	Quintals	Birr
Wheat ☐		
Barley ☐		
Teff ☐		
Sorghum ☐		
Maize ☐		
Horse beans ☐		
Chick peas ☐		
Haricot beans ☐		
Field beans ☐		
Lentils ☐		
Vetch ☐		
Soya beans ☐		
Other, specify_____ _____		

INTERVIEWER: SAY TO THE RESPONDENT, " THANK YOU FOR TAKING THE TIME TO ANSWER THESE QUESTIONS."

DECLARATION

I, the undersigned, declare that this thesis is my work and that all sources of material used for the thesis have been dully acknowledged.

Name: Tilaye Negewo

Signature: 

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Date of Submission: June, 1994