NUPTIAL DETERMINANTS OF FERTILITY IN WESTERN KENYA

by

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DECLARATION

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

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ABSTRACT

This research on nuptial determinants of fertility investigates the relationship between selected nuptial variables and total fertility rates in Western Kenya. Its basic objectives are as follows: to investigate the level and direction of correlation between selected nuptial variables and total fertility rate; to demonstrate that socio-economic factors influence fertility not only directly but also indirectly through their impact on nuptial variables; and to identify appropriate policy measures which could be employed to control fertility in the study region. The null hypotheses tested were: (i) nuptial variables are less important than socio-economic variables as predictor variables of current total fertility rate, (ii) nuptial variables are less important than socio-economic variables as predictor variables of lifetime total fertility rate.

The research utilizing both the 1969 and 1979 census data reinforces its analysis with the sample survey data of 1978. The sample survey data was collected by a two-stage stratified random sampling method. Approximately 411 household units were surveyed in Western Province, and another 854 household units were surveyed in Nyanza Province. These household units yielded probability population sample sizes of p = 0.8% and p = 0.4% of the total populations in the two provinces respectively.

The research findings based on a step-wise partial correlation analysis led to the rejection of the first null hypothesis. However, on the strength of β - coefficients, the nuptial variables which emerged as relatively good positive predictor variables of current total fertility rate (Y1) were: the proportion of total adult females aged 15-49 years, (K1); and, the proportion of currently married women aged 15-49 years, (K3). On the other hand, the nuptial variables which emerged as relatively good negative predictor variables of current total fertility rate (Y1) were also: the proportion of women widowed aged 15-49 years, (K4); and the proportion of divorced and separated women aged 15-49 years, (K5). The effect of all these nuptial variables on current total fertility rate (Y1), were found to be statistically significant from zero at 0.05 level of significance.

The research findings for the lifetime total fertility rate (Y2), again led to the acceptance of the second null hypothesis, because both socio-economic and situational variables examined dominated the rank of significant predictor variables. The only few nuptial variables which emerged as good predictor variables of Y2 were: age at first marriage, (K7); the proportion of currently married women aged 15-49 years, (K3); the proportion of widowed women aged 15-49 years, (K4); and the proportion of divorced and separated women aged 15-49 years, (K5). All these coefficients were found to be statistically significant from zero at 0.05 level of significance.

When socio-economic and situational variables were incorporated in the analysis, those found to be good predictor variables of current total fertility rate, (Y1), were: the proportion of females of lower primary education who were aged 15 - 49 years, (X3); the proportion of women of upper primary education who were aged 15 - 49 years, (X4); and, the proportion of females aged 15 - 49 years, (X8), who were using contraceptives. All these coefficients were also statistically significant from zero at 0.05 level of significance.

Further reference to lifetime total fertility rate (Y2), indicates the following socio-economic and situational variables as important negative predictor variables: the proportion of illiterate women aged 15 - 49 years, (X2); the proportion of females of upper primary education who were aged 15 - 49 years; the proportion urbanized (X7); and, infant and childhood mortality rate, (X9). It was noted that the proportion of females using contraceptives, (X8) also exerted negative effect on Y2. It should, however, be emphasized that most of these negative effects on lifetime total fertility rate, (Y2), were not statistically significant from zero at 0.05 level of significance.

The main conclusion is, therefore, that in the context of the present and future levels of socio-economic development of Western Kenya, socio-economic and situational phenomena will continue to be relatively better predictor variables of total fertility rate than nuptial variables. Therefore, it is recommended that further research should investigate the impact of accelerated rural agricultural change on family formation and dissolution with the aim of finding out an acceptable new legal age at first marriage which should be enforced for the entire nation. Furthermore the following anti-natalist policies are suggested: age at first marriage policy; population education policy; employment and income policy for female population to make women self-reliant; health care policy that focuses on reduction of infant mortality rates; land adjudication policy to reduce land fragmentation; and a new approach to the current family planning policy.

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If there are any errors or shortcomings in this thesis, then, the responsibility is mine.

CHAPTER 1

1. THE NATURE AND SCOPE OF THE PROBLEM

1.1 Introduction

According to the National Demographic Survey (1973), and the Kenya Fertility Survey (1978), Kenya had a total fertility rate of about 8.1 births. Such a fertility level is sustaining a high population growth rate now approximating 4.0% per annum (W.H. Mosley, 1980)[1]. Hence, Kenya is classified among those countries with the highest population growth rates in the world because the crude death rate is declining. On the basis of the 1969 population census data, Kenya had a crude death rate of 17/1000 population. Yet, in 1979 the crude death rate had declined to 14/1000 population.

The observed high population growth rate should cause serious concern to a developing country such as Kenya, because problems associated with rapid population growth rate have national economic and social development repercussions. Rapid population growth rate accelerates processes which cause regional disparities in socio-economic developments and related bottlenecks in domestic economic growth. Such national problems often create an atmosphere conducive to political instability. Moreover, there could arise a need for increased international financial assistance especially if rapid population growth rate stifles domestic savings. But, such dependence on international aid has also its own unique problems.

It is partly the above reasons, which reinforce concern among policy-makers to identify appropriate anti-natalist population growth policies and, to formulate relevant policy instruments for enforcing such policies. In this context, research on fertility determinants should be of tremendous importance to Kenya today.

1.2 Statement of the Problem

This study is on the nuptial determinants of fertility in Western Kenya. It focusses on the relationship between selected nuptial variables and fertility. However, it also incorporates other socio-economic and situational variables in the analysis, in order, to identify the strength and direction of association between such variables and nuptial variables. Explicitly stated, such analyses aim at showing the importance of socio-economic and other background (situational) factors as equally important to the role played by nuptial variables in determining fertility.

The traditional approach to the analysis of fertility determinants which emphasises the significance of nuptial determinants of fertility is rooted in the (Malthusian) assumption that, fertility is confined to marriage. For this reason, marital fertility and related nuptial factors which determine it, are often considered as dependent factors to socio-economic variables which are often assumed to influence fertility directly.

The Malthusian analytical framework of fertility determinants does not recognize the possibility that the socio-economic status of an individual could also be determined by changing nuptiality. To illustrate this point, we note that, a divorced woman may be re-married to a person from a different socio-economic status, thus causing her life-style to change completely. The relation between nuptial variables and fertility, therefore, needs a thorough investigation, particularly, in developing countries where the accelerating processes of modernization are generating conflicts between child-bearing activities and extra-familial functions.

1.3 Literature Review and Conceptual Framework

A scrutiny of demographic literature reveals that differential fertility on a spatio-temporal context is a demographic reality. Therefore, social scientists seeking for an acceptable theory on human fertility behaviour have focussed on micro-analytical studies based on family units and macro-analytical models focussing on the community at large within different environmental contexts. From such studies, the following theories on fertility behaviour have been formulated: the natural theory or biological theory; the social structure theory or culture theory; the economic and socio-economic theory; and, the socio-psychological theory.

1.3.1 Natural theory or Biological theory

The concept of 'natural fertility', as embodied in the natural theory of fertility behaviour, was the brain-child of the classical school of environmental determinism. This theory is structured on the premise that human fertility behaviour is primarily determined by inherent biological levels of fecundity (Louis Henry (1961)[2]; United Nations (1974[3])). The biological processes are regarded as paramount determinants of the age pattern of reproductive risk because biological forces influence the age of entry and exit into the reproductive mechanism. (Jane A. Menken, 1975)[4]. Implicit in this hypothesis is the assumption that, deterioration in reproductive capacity increases with age. According to this view, the reproductive potentiality of human population and indeed that of other animals is assumed to be determined solely by natural forces, which partially determine too the nature of environment health and nutrition. These situational factors influence mortality levels.

Furthermore, the natural theory of fertility behaviour encompasses the notion that, there is no conscious or unconscious application of socio-economic and cultural forces which could affect exposure to intercourse, conception, and gestation (United Nations, 1974)[5] These forces are conceptualized as determinants of the degree of reproductive risk regardless of the mother's age. In other words, these exogenous forces are significant intermediary variables, thus rendering the concept of 'natural fertility' as embodied in natural theory of fertility behaviour too idealistic.

The major weakness of this theoretical model is its disregard for the conscious and unconscious application of fertility control measures. Rationality in human reproductive behaviour is a reality in both primitive and developed societies. However, the model, though too idealistic, has relevance to this research, because it implicitly emphasizes the intermediary role of nuptial variables as determinants of fertility.

1.3.2 Economic and Socio-economic theories

The economists' analyses of functional mechanism of intervening variables in fertility behaviour have suggested micro-economic theories and macro-economic models. These theoretical models as elucidated by Robert Ropetto (1972)[6], are structured on the premises of cost-benefit analysis. These models assume rationality in human behaviour towards achieving desired family size (Nerlove, (1974)[7];

T. Schultz, (1973)[8]; R.A. Easterlin, (1969)[9]; G.S. Becker, (1960)[10]). Implicit in these theoretical models is the notion that, maximization of household welfare, or potential earnings of the household members accrue from direct and indirect labour efforts.

Furthermore, the cost-benefit approach subjects the household welfare to financial constraints or costs generated from investments on children welfare. Family size is, therefore, presumed to increase to the point at which marginal benefits of an additional child is equal or approximates zero. The cost-benefit model is, however, less plausible because it implicitly operates under the premises that society is indifferent to the size of the population per se. For this reason, economists are now in favour of macro-analytic models that incorporate the impact of the society at large in determining fertility levels of individuals. The product of such analyses has been socio-economic theories as postulated by N.K. Namboodiri (1972)[11]; David Goldberg (1975)[12], and Hawthorn (1970)[13].

One fundamental problem with economic or socio-economic theories, is the incorporation of variables such as taste, or opportunity costs, which are difficult to index and compare between different societies because of variations in indices of measurements. Moreover, such theoretical models are of marginal interest in this research, because they regard nuptial variables as dependent variables in fertility analysis.

1.3.3 Socio-psychological theory

The social psychological theory of fertility builds upon other theories and departs from such models in significant ways.

The theory posits that fertility is a function of income and the social status of the family, and normative pressures impinging upon, the family. (R.P. Bagozzi, et al, (1978)[14]; and Burr, Wesley R. (1973)[15]). The theory regards tastes, family decision processes, and socio-economic variables as important factors in fertility analysis. It hypothesizes that, the noted factors influence fertility only through their impact on the attitudes of family members and the specific social exchanges that occur within the family.

In addition, the theory conceptualizes attitudes as constituted by three taste components: effect; behaviour; and cognitions. (R.P. Bagozzi, et al, 1978)[16]. Family decision making processes are also posited to consist of the relative power and status of the husband and wife within the family, sex-role relationships, and the amount of shared communication and decision making, particularly, with respect to the use of contraceptives, child-rearing, and the demand for children.(R.P. Bagozzi, et al, 1978)[17].

The major shortcoming of this theory is the problem of measurement. It is rather difficult to index accurately variables such as attitudes and the level of husband-wife communication. Nevertheless, the theory emphasizes individual decision-making in fertility behaviour and, knowledge of or awareness of environmental factors which could influence fertility control. In this context, this theory, unlike the other theories, implicitly assumes that all human behaviour can be reduced to the thoughts and feelings of the individual decision-maker. In other words, the role of nuptial variables as determinants of fertility is not clearly stated.

1.3.4 Social structure or culture theory

The conceptual framework of social structure theory or culture theory of fertility behaviour proposes the concept of 'social fertility'. It is structured on the premise that economic and social forces act indirectly upon biological processes of reproduction through several intermediate variables.

Kingsley Davis and J. Blake's (1956)[18] theoretical model, often regarded as a pioneering work on social structure theory, provides a basic analytical model by which fertility levels and differentials can be predicted. This model identified eleven intermediate variables namely: age of entry into regular sexual union; coital frequency; permanent celibacy; separation and dissolution of marriage; abstinence (voluntary or involuntary); fecundity or infecundity; use or non-use of contraceptive methods; and, foetal mortality.

David Yaukey (1969)[19], attempted to improve on the noted analytical model by incorporating measurable environmental and socio-economic variables in order to standardize the application of social structure theory among different societies. However, it was John Bongaarts (1982)[20], whose modified version became more practicable, because it hypothesizes that there are only seven important intermediate fertility variables which he identified as follows: proportions married among females; contraceptive use and effectiveness, prevalence of induced abortion; duration of postpartum infecundity; spontaneous intrauterine mortality; fecundability (or frequency of intercourse); and prevalence of sterility.

The noted intermediate variables are assumed to determine the degree of risk of exposure throughout the different stages of biological reproduction cycle designated as intercourse, conception, and gestation. The central hypothesis of this theoretical model, therefore, states that the observed intermediate variables are the factors through which and only through which social, economic, and cultural conditions can affect fertility. According to the United Nations Secretariat (1974)[21], all these intermediate forces could be categorized into three distinct classes: nuptial variables which influence fertility levels; unconscious practises of health and cultural factors affecting fertility levels; and, conscious or deliberate measures taken to control fertility levels.

The social structure theory or culture theory as postulated by F. Lorimer (1974)[22], therefore, implicitly accounts for fertility differentials between societal classes. It is unquestionable that the most significant factor in culture theory is marital status or structure which affects the exposure to risk of pregnancy. According to this theory, the intermediate variables which relate to nuptiality are; age at marriage or entry into sexual union; permanent celibacy; amount of reproductive time lost between and after union attributed to marital instability; and, widowhood. (U.N. 1974)[23]. It is these factors, which cause marital customs to become significant determinants of fertility levels, particularly, in societies where birth control is minimal as in Western Kenya.

The observed theoretical model adequately caters for the changing predictive role of each variable as the societal level changes of socio-economic development occur. It also satisfactorily accounts for the supply curve of fertility, but inadequately explains the forces reinforcing fertility demand at the individual level, because of the assumption of collective responsibility in fertility behaviour implicit in the theory. This assumption, minimizes individual decision-making in child-bearing functions which is vital due to the effects of modernization processes. The model also incorporates some culture variables which are difficult to quantify for comparative studies.

1.3.5 General studies on nuptial determinants of fertility

John Hajnal (1947-48)[24] was among the first scholars who pioneered the study of the relationship between nuptiality and fertility. His analysis of changing trends in marriage from 1912-1951 in England and Wales, found a positive correlation between increasing marriage trends with increasing fertility levels during that period. The study was descriptive and based on crude demographic statistics.

K.R. Gabriel (1953)[25], focussing on the fertility of Jews in Palestine attempted too, a correlation study between nuptiality and fertility. This study found high rates of marriage as common among young females below the age of 35 years. The fertility of such women was also found to be relatively high when compared with the fertility of older women. The young women also had a very short mean interval between their date at first marriage and the date at first birth. This suggested a high incidence of pre-marital pregnancy among young females. Like the previous study mentioned, this research also failed to control for the effect of socio-economic forces in differential fertility.

Andrew Collver, et al, (1967)[26] using factor analysis demonstrated the significance of the proportion of females married among the Taiwanese population. He found that the fertility of married women in the age-group 20-29 years accounted for 77% of variance in total fertility. A similar conclusion was reached by the research of Larry Bumpass, et al, (1978)[27]. This study of American society correlating the effect of age at first marriage and marital status at first birth on the pace of subsequent fertility, found somewhat stable marriages after birth to have on average low birth interval compared with other marital statuses. In other words, stable marriages had high fertility levels thus producing the result that such stable marriages had great impact on total fertility structure.

These research findings have important bearings for Kenya in the context of Kenya's present high fertility level of 8.1 births. According to the Kenya Fertility Survey Report, (1980)[28], about 84% of the ever-married women sampled were still married to their first husbands and only 12% had been divorced or separated compared with another 5% who had lost their first husband through death. An attempt is now made to review how different nuptial variables have been shown to influence fertility level.

1.3.6 Age at marriage as a determinant of fertility

The significance of age at marriage in determining fertility level is summarized by the United Nations (1973)[29] which states, "of the variables relating to nuptiality, age at marriage and the proportions of persons in a population who never marry are the two believed to be the most significant in accounting for observed variations in fertility levels". The stated notion has been supported quantitatively by the research of Jane A. Menken (1975)[30]. In this study, the relationship between age at first marriage and fertility has been demonstrated by several biometric models of fertility. Similar mathematical studies showing such relationships are by A.J. Coale and McNeil (1972).[31] The operational hypothesis for these studies positively associates fertility with early age at marriage up to a given age level, then inversely associates fertility with late age at marriage commencing from a specified age level. John Hajnal (1953)[32], in his study of Western European societies, found that a decline in age at marriage increases the number of births when other variables are assumed constant. Such findings were also endorsed by S. Hassan (1973)[33] for Cairo. In this study of females in Cairo, when variables such as child mortality, duration of marriage, religion and, education of mother were controlled, the average number of children ever born was found to be inversely related with age at marriage. The relationship, moreover, was found as extremely strong among non-educated women and moderately strong among women with secondary education.

The foregoing discussion suggests that, the effect of age at marriage could be confounded by the level of education. This proposition was tentatively endorsed by A.J. Harman (1970)[34], who studied fertility of the Phillipine society. This research which was confined to women below 35 years of age found that women in these cohorts who tended to marry late on average had lower completed fertility. Similar findings were made by R.W. Morgan (1974)[35] and

M. Skolnick (1978)[36], who studied the Mormon society of America.

Though early marriage in most studies was found to be positively correlated with high fertility level, a study by A. Romaniuk (1968)[37] in Africa, found early age at marriage could also lead to low fertility due to congenital sterility. Conclusively, in promiscuous societies with high incidence of veneral diseases, early age at first marriage often contributes to low fertility. Lastly, few studies have associated late age at marriage with high fertility (R. Freedman and Goldberg, 1963)[38]. In such studies, the authors failed to control for the other intervening variables of socio-economic and cultural phenomena.

The impact of age at marriage as a determinant of fertility is attributed to its close measure of the level of fecundity schedule which is naturally a function of age. This is because reproduction is possible after the age at menarche and ends with the age of menopause. According to Larry Bumpass (1969), the relationship between fecundity level and age structure is a function of psychological and sociological factors which converge to render the age at marriage important in the differential fertility structure. Furthermore, according to Larry Bumpass (1969)[39], age differences between married couples influence their perception and value of adult roles. In other words, a young woman who is married to an elderly man may not discuss freely matters affecting their reproductive behaviour such as the use of contraception, sex-preferences, etcetera. Furthermore, increased age at marriage operates to reduce fertility more through lessened exposure to intercourse. Marriage at older ages also permits exposure to different influences which have a bearing on willingness to practice contraception. Moreover, McGreevey-Birdsall (1974)[40], suggests that delayed marriage may also imply a motivation to space children and reduces total family size. This finding was also endorsed by the study of J. Stoeckel (1968)[41] for Pakistan.

In Kenya, two significant studies relating age at first marriage with fertility were by D.P.T. Ahawo (1982)[42], and the Kenya Fertility Survey Report (1980). The study by D.P.T. Ahawo (1982) shows the complex relationship between teenage nuptiality and fertility. This research found that the higher the age at first marriage the greater the proportion of pre-marital births or pregnancies involved. It also found that, marriage at age 15 involved only 8.9% of all pre-marital births, while marriage at age 19 involved more than 50% of pre-marital births. This study, though properly executed, somewhat over-narrowed the problem to only adolescent females. Hence, it does not produce an adequate representative picture of the relationship between nuptial factors and fertility for the entire country.

The study by Kenya Fertility Survey (1980)[43], again reveals the close correlation between ages at which women first marry and reproductive performance in Kenya. The study found marriage to be a universal phenomena by age 30, for only 2% of women remained unmarried at this age. Moreover, female age at first marriage was found to be increasing, especially, among females aged 15-24 years. Yet, somehow little change was observed to affect the older cohorts in Kenya. This study also found that, in Western Kenya, the Luos who dominate the districts of Nyanza Province marry younger relative to the Luhya who dominate the districts of Western Province. See

Table 1. Moreover, the Kisii ethnic group of Kisii district also have a relatively higher age at first marriage. Both Luhya and Kisii districts are observed in Chapter 2 to have relatively high fertility levels.

Table 1. Age at Marriage for Western Kenya in 1978

Index of Measurement	Province		Tribes		
	Nyanza	Western	Luo	Luhya	Abagusii
Median age at first marriage	16.6 yrs	17.5 yrs	16.2 yrs	17.7 yrs	17.8 yrs
Singulate mean age at marriage	18.9 yrs	19.1 yrs	18.4 yrs	19.0 yrs	20.2 yrs

Source: Table 4.4 p. 74, Kenya Fertility Survey, 1980.

In conclusion, it should be realized that, effects of age at marriage are closely associated with effects of duration of marriage and marital stability. Studies which examine the relationship between age at marriage and fertility levels should therefore control for such related factors.

1.3.7 Marital stability and instability as determinants of fertility

The concepts of marital stability or instability are difficult to define. This difficulty is endorsed by C. Gibson (1971)[44] whose study of marital instability in England and Wales observed that legalized divorce alone was an inadequate measure of marital instability. The situation is worse in a traditional African setting where divorce must be sanctioned by customary laws which differ from one ethnic community to another.

A study by A.T. Onaka and David Yaukey (1973),[45] in Latin

America, found legalized unions which apparently were more stable had relatively higher fertility levels than consensual unions. Marital dissolutions was also found to be high among less fecund women, as well as in consensual unions when other intervening variables such as education, place of birth and residence, were controlled. In a similar study, M. Nerlove and T. Schultz (1970)[46] for Puerto Rico also identified that increases in fertility as generated by increasing proportions of legal marriages (civil and church marriages), substantially exceeded fertility increases generated by corresponding proportional increases in consensual marriages, when other factors of socio-economic and, cultural dimensions were controlled. Another study by Carvajal and Geithman (1973)[47], also confirmed the existance of a low fertility level in consensual marriages. This particular study, however, failed to control for the effects of situational variables as well as the effects of age.

1.3.8 Polygamy as a determinant of fertility

Marital instability caused by polygamous marriages has been hypothesized by several demographers, and other social scientists as a depressing factor to fertility. /Mitchell (1972),[48] Reuben Hill, et al, (1959).[49]/ These studies hypothesize that polygamy reduces the fertility level because of the structural arrangements which affect frequency of sexual intercourse between wives. /H.V. Muhsam, (1956)[50]; Angela Molnos (1972/73)[51]; and W.H. Mosley, et al, (1981)[52]/.

The Kenya Fertility Survey Report (1980)[53] noted that polygamy is widely practised in Kenya, involving about one-third of currently married women. Polygamy was also noted to be common among younger women under the age of 25 years, especially, among non-educated women. W.H. Mosley, et al, (1981),[54] utilizing the Kenya Fertility Survey data of 1977-1978 found polygamy as leading to low fertility levels because of the low pregnancy progression ratio of such women.

A few studies have rejected these findings. A study by K.A. Busia (1954)[55] and Vernon R. Dorjahn (1962)[56], concluded that no significant difference in fertility appear between monogamous married women and those women married to polygynists. Some studies have confirmed that polygamy is often conditioned by the infertility of the first wife, hence marrying another wife raises the fertility level of the household /R.A. Henin (1979)[57]; W.H. Mosley, et al, (1981)[58]/. The United Nations Economic Commission for Africa summarized the results of such studies in Africa in the following manner; "The debate on the influence of polygamy on fertility was far from settled, because there were no convincing evidence that polygamy *per se* reduced fertility".[59] This sentiment had been expressed much earlier by Frank Lorimer (1954).[60]

1.3.9 Divorce, separation, and widowhood* as determinants of fertility

There is overwhelming evidence that, divorce or separation and widowhood are negatively associated with the fertility level. A study by Alvin T. Onaka, et al, (1973),[61] established this relationship. It was found that, divorce, separation, and widowhood if not followed immediately by re-marriage could have a negative

*The author is aware that from a demographic perspective widowhood is not one of the variables of marital instability.

impact on fertility level. The effect of time lost in reproduction, however, tends to become most effective if females in the fecund age-groups of 20-29 years are involved. Note that, the average age difference between mother and daughter would be greater if a young divorced woman is re-married at a very late age. Such a situation in the final analysis reduces fertility level, particularly, in societies with high divorce-marriage ratios.

The impact of divorce on fertility was adequately analysed by Judith Blake (1955)[62] among Jamaican women. Terence H. Hull, et al, (1977)[63] found marital disruption to be high and time lost in reproductive unions also to be high among low income groups and low social classes. Other studies yielding similar results were by E.G. Jacoby (1958)[64]; and, S.M. Farid (1976)[65]. A study by M. Skolnick (1978)[66], which focussed on the Mormon society in America emphasized satisfactorily the importance of widowhood among females aged 20-29 years as negatively associated with the fertility level. Lastly, Wyon and Gordon (1971),[67] who focussed on the impact of separation of spouses found such actions tended to slow conception rates.

It must be emphasized that, on some occasions childlessness has triggered marital disruption. But, according to T.P. Mohanan (1955)[68] such studies are spurious because in most cases they fail to control for the short duration of both childless marriages and marriages which end in divorce to determine the relative importance of each factor. This argument was endorsed by R. Chester (1971)[69], who found the majority of marital dissolutions occurred during the first year of marriage. As a result, major determinants of divorce do not include childlessness, and the fact that disrupted marriages are less exposed to child-bearing than women who have been continuously married. This leads to the expectation that marital disruptions also lead to increases in childlessness.

The Kenya Fertility Survey Report (1980)[70] summarizes the situation in Kenya as follows. "The proportion of first marriages that were still intact fell steadily from 90% for those married in the last 5 years to 79% for those married between 25 and 29 years ago." The major cause for this decline in the proportion of couples still married was found to be an increase in proportion of first marriages terminated by death of husband. In contrast, the proportion of first marriages which ended in divorce or separation showed no regular increase with the number of years since first marriage.

The observed findings, therefore, suggest that marital dissolutions are concentrated in the early stages of marriage. Despite this realization, the study explicitly concluded that marital dissolution in Kenya is unlikely to exert any restraining influence on the overall levels of marital fertility. This could be due to the high re-marriage rates by divorced persons thus minimizing total time lost for reproduction due to marital dissolution. It is, therefore, evident from the foregoing discussion that, early marriage encourages marital disruption and re-marriage is a common practice among divorced persons in Kenya.

In summary, the foregoing literature review reveals that, few studies in Africa have been devoted solely to the investigation of the relationship between nuptial variables and fertility levels and trends. A scrutiny of a literature review on differential fertility studies, also exposes the over-emphasis given to socio-economic, cultural, and environmental factors as direct determinants of fertility behaviour, because such studies do not investigate most of the nuptial variables in their analyses. However, it is evident from the analysis of available literature that, some socio-economic, cultural, and situational variables work through nuptial variables to influence fertility levels and trends. Lastly, there is evidence that controlling for variables is an important step in the study of fertility. But, the complex relationship between variables which determine fertility complicates the problem of differential fertility analysis.

1.4 The significance and Justification of the study

During this phase of socio-economic and political developments in Kenya, emphasis in fertility research should focus more on factors likely to change substantially the fertility level of a greater proportion of the populace. It is unquestionable that, these influences occur within the societal institution of marriage or forces which are directly related to nuptial conditions.

The significance of nuptial variables in the context of Kenya's current population growth rate of approximately 4.0% per annum is best conceived in this statement. "There appeared to be some evidence from comparision of the Kenya fertility survey with earlier survey results that the total fertility rate had risen by some 18% since 1962. It was noted that the rise in fertility was associated with numerous and stable marriages and corresponding decrease in childlessness". (U.N.E.C.A., 1979)[71]

Explicitly stated, the institution of marriage could partly accelerate fertility increase <u>ceteris paribus</u>. The institution of marriage could also become a significant societal instrument for fertility reduction. This notion is endorsed by J.C. Caldwell (1979)[72], who stated that, it is possible to reduce substantially fertility in the contemporary Third World through delayed marriage rather than by any desire to control ultimate family size.

In societies where child-betrothal is common place, a practice which is still perpetuated by some ethnic groups in Western Kenya, e.g. the Kuria, the customary average minimum age at first marriage may be at variance with the average minimum legal age at first marriage which is 18 years in Kenya (Marriage Bill, 1978)[73]. Therefore, to advocate for a society an average minimum age at first marriage and, to successfully enforce such a law, more research is definitely necessary to examine the relationship between nuptial variables and fertility.

Furthermore, in the subsistence economy which still dominates most rural regions of Kenya, the decision to marry is still mostly a collective responsibility involving parents-in-law and other members of the extended family. Such a situation is reinforced by the circumstances of marriage relating to the payment of bride-price or dowry. Equally significant is the traditional custom which requires newly wedded couples to be settled on their own piece of land in order to become self-supporting. It is, therefore, necessary to examine how the increasing processes of socio-economic developments such as land adjudication and consolidation influence the relationship between nuptial variables and fertility. In addition, the increasing modernization processes in the form of education, rural-to-urban migration, and rural-to-rural migration are challenging the traditional role of children as a source of agricultural labour. In other words, the burden of child-care is increasingly becoming an individual parent responsibility. It is, therefore, necessary to gauge whether socio-economic and cultural changes are influencing nuptial variables such as age at first marriage, dissolution of marriage through divorce, and the level of celibacy.

From a demographic perspective, medical knowledge and planning for maternal health and child-care require adequate information on regional patterns and variations in the average age at first marriage. This is because the risk of pregnancy or conception is associated with age at first marriage. Women marrying when they are relatively too young are exposed to greater maternal risks in reproduction just as is the case with women who marry at relatively older ages.

In conclusion, the designated socio-economic and situational determinants of nuptial variables are bound to alter their hierarchy of significance with changing processes of modernization. Continuous research is, therefore, needed to monitor the magnitude and direction of the relationship between socio-economic variables and nuptial variables on the one hand and, the changing level of nuptial variables and total fertility rates on the other hand. It is only by achieving this goal that relevant population policies can be identified.

1.5 Operational definitions

It is now necessary to clarify the following terms and concepts employed in the text.

Age-specific fertility rate

The number of births during one year to women by 5-year age group, per 1000 women in the same age group.

Children ever-born

The number of live births to a woman regardless of the woman's marital history and regardless of whether the children are still alive or dead, or living with or away from the mother.

Cohort

A group of persons who experience a certain event in a specified period of time. For example, a birth cohort is for a group of persons born within a specified period of time and such people belong to the same age group. Similarily, a marriage cohort is a group of persons married within a defined period often one-calendar year. Cohort fertility, therefore, refers to total births of women of the same age group.

Divorce

A marriage dissolved either by a process of law or by custom.

Ever-married

All persons (women) who are currently in marriage or who have been married or divorced, separated, and widowed.

Fertility

The actual level of live births in a population. The concept of 'natural fertility,' therefore, refers to fertility obtained without conscious or unconscious application of socio-economic and cultural forces which affect exposure to intercourse, conception, and gestation. On the other hand, 'social fertility' refers to fertility obtaining with the conscious or unconscious application of socio-economic and cultural forces affecting exposure to intercourse, conception, and gestation.

Fertility behaviour

The concept refers to norms of reproduction in a society. It is a combination of these norms of reproduction and other forces which constitute fertility determinant variables.

Fecundity

The physiological capacity of a woman to participate in reproduction, i.e. the production of a live child. Infecundity is, therefore, the lack of capacity of a woman to participate in reproduction.

Foetal mortality

Death prior to the complete expulsion or extraction from its mother of the product of conception regardless of the duration of pregnancy. For example, miscarriages, abortions, and still births constitute foetal mortality.

Marital fertility

The actual level of live births in a population of married persons only. Married persons also include those in stable consensual unions.

Marital stability

A marriage state which has never been disrupted, i.e. persons were found to be living together at the time of the survey or census enumeration. Conversely, marital instability refers to a marriage state which has experienced some form of disruption in the past, or resulted in divorce or separation.

Nuptial

Pertaining to marriage. Nuptial variables or factors (conditions), therefore, relating to the events of marital status such as single, married, divorced and separated, widowed, ever-married, and marriage types and patterns such as monogamy, polygyny and polygamy. Nuptial variables also embrace other characteristics such as age at marriage, duration of marriage, and re-marriage.

Nuptiality

The frequency of marriage, i.e. unions and characteristics of persons united in marriage and the dissolution of such unions.

Parity

The average number of children ever born alive per woman.

Postpartum infecundability

The inability to produce immediately after birth, i.e. during the period between birth and the first menstruation period.

Pregnancy progression ratio

The proportion of married women who are actually bearing children; that is, are progressing from one pregnancy to the next.

Separation

An estranged couple living apart.

Spontaneous intra-uterine mortality

Natural termination of a pregnancy e.g. miscarriage or still birth.

1.6 Research objectives

It is implicit in the structure of the above theoretical models that the nature of the relationship between predictor variables between themselves and fertility is bound to change in a spatio-temporal context. For this reason, the objectives of this research are as follow;

(a) to portray a spatial (regional) structure of total fertility rates and nuptial levels;

(b) to show the directional effects of selected predictor variables on total fertility rate in Western Kenya.

(c) to investigate the strength of the relationship between each of the nuptial variables and total fertility rate in Western Kenya;

(d) to demonstrate that, socio-economic factors influence fertility not only directly but also indirectly through their impact on nuptial variables;

(e) to identify appropriate policy measures which could be employed to control fertility in the study region.

For the first objective, total fertility rates as reported during census enumerations will be mapped. However, total fertility rates derived by selected demographic techniques of analysis will also be examined. The regional structure of fertility levels, however, will not show accurate (true) regional fertility differences because such a problem is not within the scope of this research.

The second objective aims at utilizing statistical values (correlation coefficients) derived to rank in order of significance predictor variables of fertility in the context of the Western Kenya situation. Only selected variables relating to nuptiality, socio-economic and, situational phenomena are examined. The third objective aims at assessing the predictive value of selected nuptial variables, while assuming other intervening variables constant, in the context of socio-economic development status of Western Kenya. The fourth objective is to show that the often supported direct correlation between socio-economic variables and total fertility rate is actually a product of the strong correlation between socio-economic variables and nuptial variables. Lastly, the policy objective will discuss how best the identified predictor variables of fertility could be translated into policy actions to help reduce high population growth rate of the region.

1.7 Operational hypotheses

The following null hypotheses will be tested and their rejection will lead to the acceptance of alternative hypotheses.

H:0 1(a) The following nuptial variables (age at first marriage, marital status, and marriage type and pattern) are less important than socio-economic variables (education, employment and income, religion, contraceptive use, and land-ownership) as predictor variables of current total fertility rate.

NB:

The alternative hypotheses for the stated null hypotheses are simply the converse of the null hypotheses (i.e. ... are relatively more important ...)

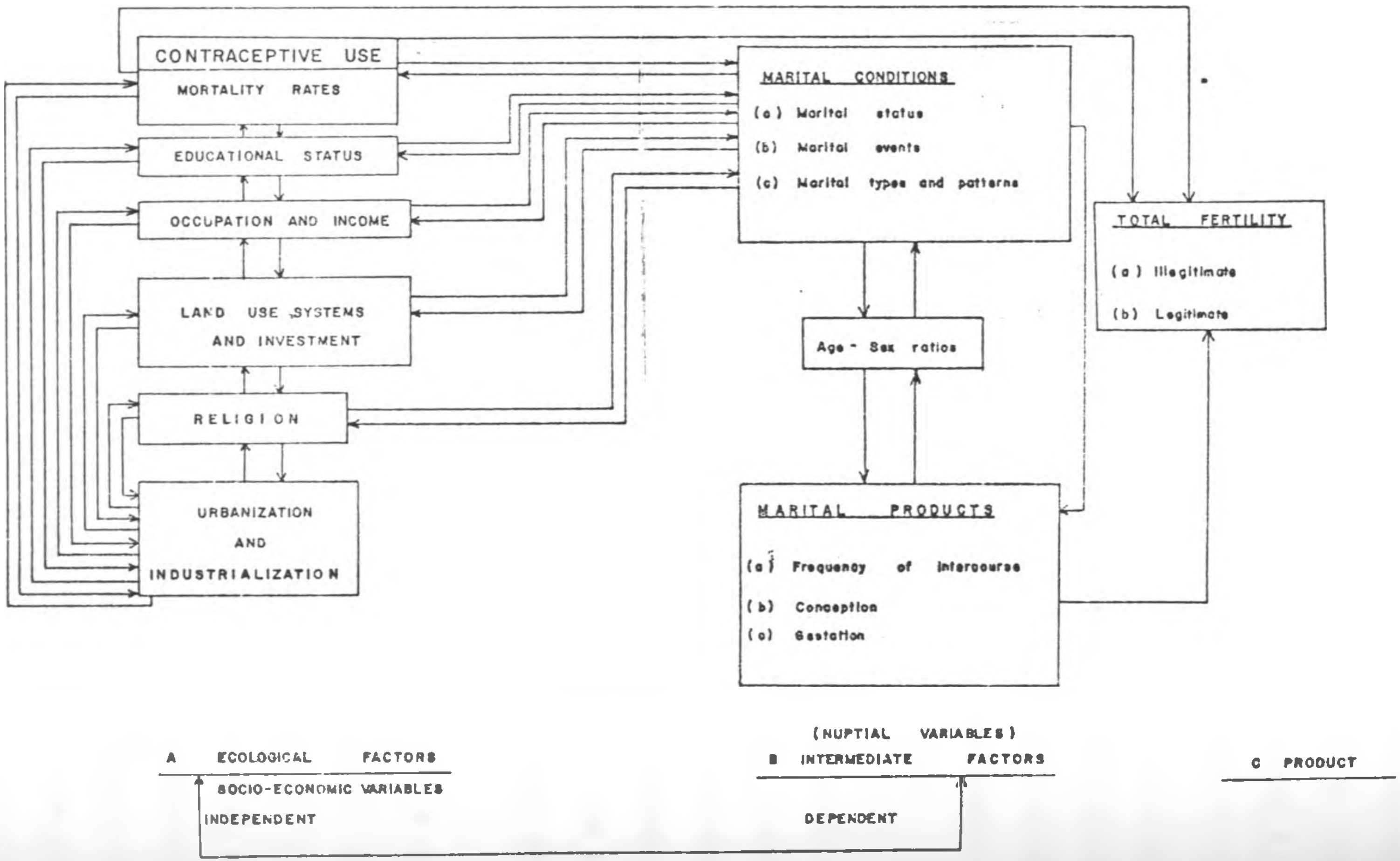
H:0
(b) The noted nuptial variables are less important than the noted socio-economic and situational variables (urban residence), as predictor variables of lifetime total fertility rate.

Though the predictive value of each variable will be obtained through correlation analysis, the collective predictive role (all variables combined) implied in the statement of hypotheses above will be difficult to test. To overcome this problem, variables will be ranked in their order of significance as predictor variables of fertility and their standardized mean parities compared.

1.8 The research model on determinants of fertility

Since each of the designated intermediate fertility variables as embodied in the theoretical models above, are not of equal interest in studies of fertility levels and differentials, this research model has identified only a few of the intermediate fertility variables as depicted by figure 1. The criteria for choosing these variables as predictors of fertility in Western Kenya has been dictated by the availability of such data from the 1969 and 1979 census records. In addition, the possibility of collecting accurate and reliable information on such data through field interviews also influenced the selection process. The other variables were omitted because as J. Bongaarts, (1982)[74], rightly asserted, "it is difficult to incorporate the Davis-Blake (1956)[75] model into quantitative reproductive models," because some of the eleven intermediate fertility variables are difficult to quantify and to get reliable data on them.

Fig. 1 THE RESEARCH MODEL OF FERTILITY DETERMINANTS



KEY

——→ Direction of Interaction

For the above reason, this research model's nuptial variables constitute the following characteristics of women aged between 15 and 49 years.

a) age at first marriage.

b) proportions single.

c) proportions married.

d) proportions divorced and separated.

e) proportions widowed.

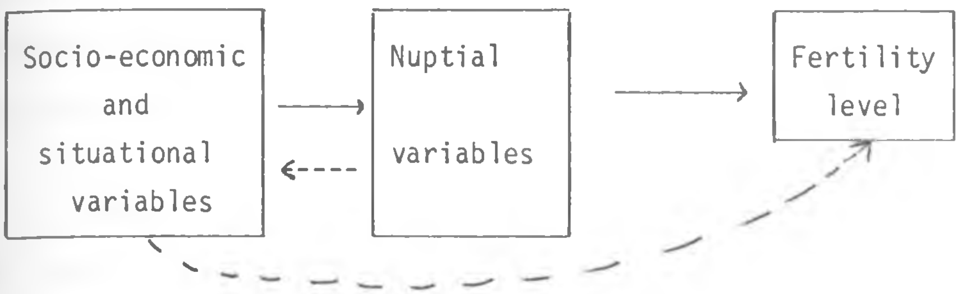
f) proportions in polygamous unions.

g) proportions in civil or customary unions.

On the other hand, the socio-economic variables of this research model are identified as the level of female education, employment and income, religion and farm size. Under situational factors (background variables) the proportion of women aged between 15 and 49 years residing in urban centres and childhood mortality rates are also examined.

Figure 1 suggests how each of the designated variables are related and interact with each other as predictor variables of fertility level. Note that, a theoretical discussion of the direction and magnitude of interaction between variables and their impact on fertility has been briefly summarised in the literature review. More precisely, the theoretical framework of this section merely highlights the main features of the relationship between nuptial variables, socio-economic variables, and fertility as demonstrated below. The model proposes that socio-economic and situational variables function through nuptial variables to influence fertility. However, there could be some socio-economic

Functional relationship model



and situational variables with direct impact on the fertility level as demonstrated by the dotted line of the functional model.

In summary, the theoretical framework of the research model has three important stages of analysis. The first stage correlates selected nuptial variables with fertility levels while holding constant socio-economic and situational variables. The second stage then correlates socio-economic variables and situational variables with nuptial variables. Lastly, socio-economic and cultural phenomena are correlated with the fertility level while holding constant effects of nuptial variables.

Outline of chapters

Chapter 2 introduces the study area by a brief discussion of the location and size of all study units. It then gives a brief description of the regional structure of socio-economic and situational forces which contribute to the region's level of fertility and nuptiality. The analysis, therefore, fulfils the requirements of the first research objective.

Chapter 3 is on research methodology. It examines the practicability of a two-stage sampling design adopted in the research.

Data sources and quality are also examined and statistical methods of analysis employed in the text are also examined. It concludes by a brief statement on research limitations and how the field survey was conducted.

Chapter 4 again partly fulfils the requirements of the first research objective by giving the detailed regional structure of fertility levels. The fertility levels are estimated on the basis of selected indices such as current total fertility rate, lifetime total fertility rate and the Brass p/f ratio method.

Chapter 5 also fulfils the requirements of the first research objective by giving a detailed descriptive analysis of regional structure of nuptial variables with the aim of identifying the nature of regional variations. Similarly, Chapter 6 is devoted to the discussion of socio-economic and situational variables in order to satisfy requirements of the fourth and fifth research objectives.

The central issue of this research is discussed in Chapter 7. Nuptial variables are statistically correlated with total fertility rates. In addition, the chapter theorizes on the nature and direction of interaction between nuptial variables and total fertility rates while holding constant other intervening variables. It finally summarizes the impact of each nuptial variable on total fertility rate by identifying which socio-economic and situational variables are strongly correlated with each nuptial variable to compound its effect on total fertility rate. This analysis, therefore, fulfils the requirement of all other research objectives except the first.

Chapter 8 attempts to examine the independent impact of selected socio-economic and situational variables on the total fertility rate in order to enable a comparative analysis between the impact of such factors and the impact of nuptial variables on the total fertility rate. An attempt is also made to classify situational variables which function together to influence the total fertility rate. This chapter again fulfils the requirements of all research objectives except the first.

Chapter 9 discusses the research findings and conclusions. It gives a recommendation for further research on the subject and concludes by making policy recommendations on fertility control measures as required by the fifth research objective.

The Appendix is in two parts. Part I contains tables which give additional information or illustrations of the subject matter, while Part II contains the research questionnaire.

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CHAPTER 2

2.0 THE STUDY AREA

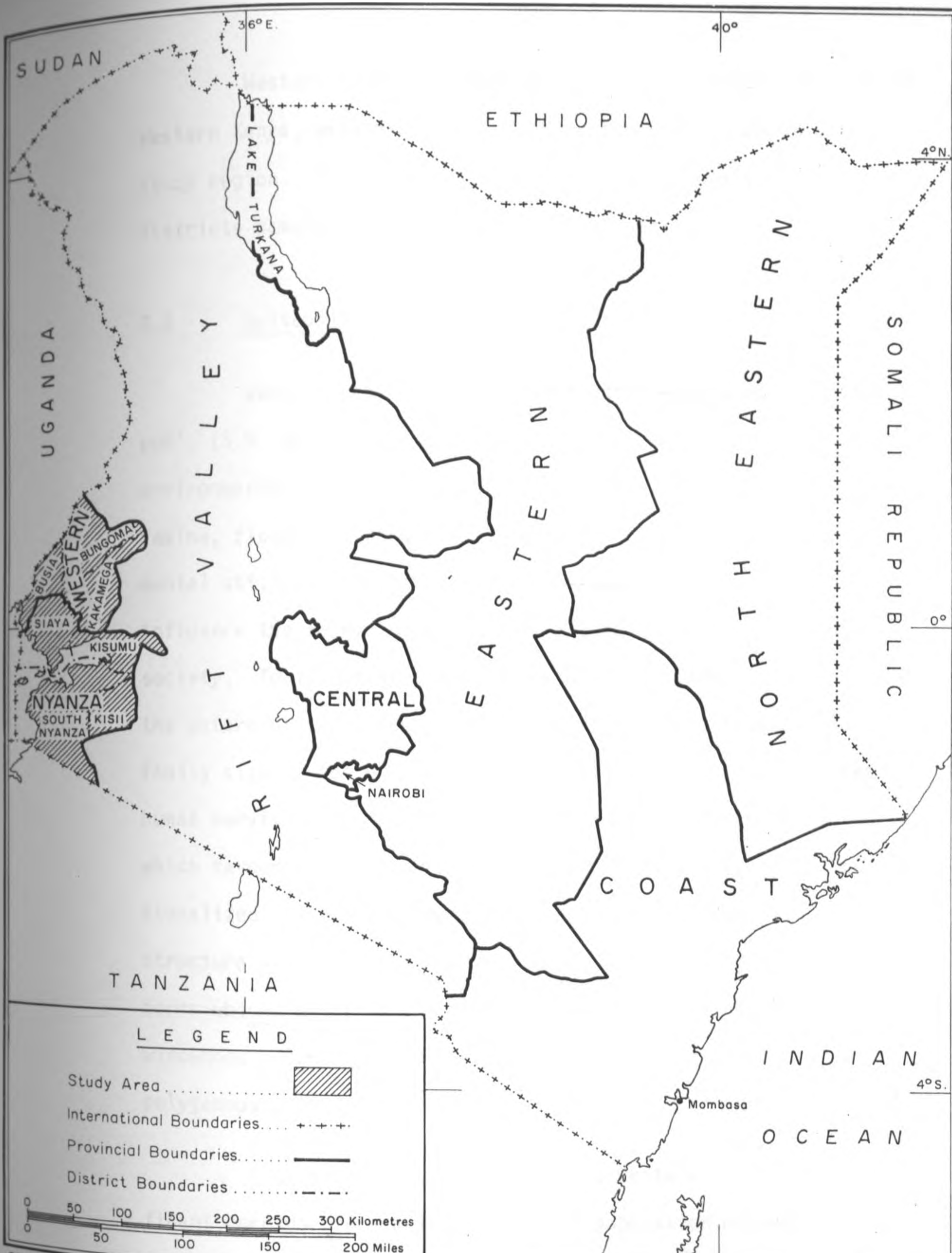
2.1 Introduction

The basic objective of this chapter is to portray regional structure of reported total fertility rates and nuptial levels as required by the first research objective. It is,however, unnecessary to give a systematic synopsis of all ecological background factors to the study area, because such descriptions are irrelevant to the content of this research. However, a synopsis of selected ecological factors which are perceived to influence fertility and nuptial variables directly or indirectly are examined in the section on the suitability of the study region.

2.2 Location and size

The concept of Western Kenya, as applied in this research, refers to Nyanza Province and Western Province which encampass almost the entire Lake Victoria Basin of the Republic of Kenya as portrayed by figure 2. Western Kenya, therefore, is bounded by latitutdes 34^0 East to 36^0 East and longitudes 2^0 North to $2^0.30''$ South of the Equator.

Nyanza Province, which occupies the southern portion of Western Kenya, extends over 12525 sq. kilometres or 60.4% of the entire study region. It is divided into four administrative districts constituting Kisii, Kisumu, Siaya and South Nyanza.



SOURCE: Atlas of Kenya, 1970

FIG. 2. LOCATION OF THE STUDY AREA

Western Province, which occupies the northern enclave of Western Kenya, extends over 8223 sq. kilometres or 39.6% of the study region. It is also divided into three administrative districts namely Busia, Bungoma, and Kakamega.

2.3 Suitability of the region

Western Kenya, is regarded by geographers as a 'melting pot'. (S.H. Ominde, 1963)[1]. Indeed this zone experiences constant environmental instability reflected by cyclic patterns of drought, famine, floods and population movements. The perception of environmental utility or risks by the inhabitants of a region could influence the fabric of the social and economic institutions of a society. To illustrate, environmental perception could reinforce the nature of traditional norms or customs which favour a large family size if the environment is perceived to have high risks for human survival. Under such circumstances, population policies which favour early age at first marriage are likely to be institutionalized. Moreover, changes in population composition and structure attributed to high mortality rates reinforce cultural norms which favour levirate marriages due to the high incidence of widowhood. Consequently, such regions experience high rates of polygamous unions and the associated features of marital instability.

From a historical perspective, Western Kenya was a significant corridor for early patterns of population migration and settlement in Kenya. (B.A. Ogot, et al. 1963)[2]. The constant large scale ethnic wars during this incipient period of early organization of human spatial economies was a significant factor in the creation of several buffer zones in the area by the British administration. Even today, small scale ethnic skirmishes still occur in the region. Consequently, these buffer zones since independence in 1963 have become attractive zones for the landless populations of neighbouring tribes such as Luo, Luhya, and Gusii. In other words, frontier populations have evolved in these areas.

These developments have reinforced tribal assimilations for Western Province, which was originally dominated by the Lake-shore Bantus, has now several pockets of Nilotes. Similarly, Nyanza Province, which was originally dominated by Nilotes, has pockets of Abagusii and Kuria ethnic groups who belong to the Lake-shore Bantu stock. The significance of these frontier populations from a demographic perspective is that, they suppress regional variations in demographic characteristics especially if the level of analysis is limited to the provincial boundary. Moreover, frontier populations have a high propensity for migration thus creating prospects for increased population instability.

In fact, the entire Western Kenya has been regarded by historians and geographers as eliciting high rates of population spatial mobility. (S.H. Ominde, 1963)[3]. Inter-regional migration has been stimulated by frequent flooding of the lower regions around the Lake-shore. Consequently, there has been constant in-migration to the relatively higher grounds within such areas, or out-migration to completely new environments. The expectedly high migration rates within the study-area should influence the marital characteristics of the region. Migration reinforces separation or divorce, particularly rural-urban migration with split families. Migration may also offer an opportunity for re-marriage for it creates new socio-economic environments. This probably accounts for the low proportion of divorced and separated females in the study region as observed later in the text. Moreover, migration is selective of population characteristics. As a result of this, differentials in sex-ratio could influence the marriage market within the study area. Migration also contributes to changing perceptions on the environment. As a result, an individual's perception of ideal family size norms, age at first marriage, etc., could be altered significantly . Lastly, migration could influence positively or negatively an individual's exposure to mortality conditions.

The regional state of agricultural development in Western Kenya is another important factor. Current economic investment projects in the form of large scale sugar cane farming in parts of Kisumu district, Kakamega, Bungoma, and more recently South Nyanza have partly contributed to the nature of population instability in the region. These industrialization processes have caused massive depopulation of large areas annexed by sugar cane companies. Moreover, a substantial proportion of the population in these areas are now sugar-cane out-growers receiving high annual income. Others work as labourers thus receiving regular income in areas where originally they were mere peasants.

Further regional study reveals a tremendous boost in small scale cash-crop farming affecting mostly zones of high agricultural potential such as the Kisii highlands, Bungoma district, and parts of Kakamega district. These three districts definitely have high monetary circulation compared to the predominantly subsistence areas of livestock farming and food cultivation dominating parts of Busia district and the Lake-shore lowlands of Siaya, Kisumu, and South Nyanza districts. In addition, the highland zones of Kisii, Kakamega, and Bungoma, because of favourable ecological conditions, are also zones of acute population pressure and relatively better nutritional standards. In agrarian economies, acute population pressure often reinforces the institutionalization of late age at marriage. This demographic behaviour was confirmed among Luhya and Gusii tribes. (see Chapter 1).

The traditional land tenure system of communal land ownership and shifting cultivation which still dominate parts of Western Kenya could also greatly affect the marital characteristics of the population. Under the traditional system of land inheritance (patrilineal system) and, the perception of land as a source of livelihood, such phenomena are likely to influence early or late age at first marriage depending on the supply of and demand for land.

In traditional economies, territorial expansions encourage polygamous marriage as a means of legitimizing land-ownership. But, with increasing modernization of the agricultural sector in parts of Western Kenya as accelerated by the forces of land consolidation, small scale commercial farming, large scale industrial investments, and greater rural accessibility due to the increasing density of rural feeder roads, a change of individual or societal perceptions of environmental levels of risks and utility is imminent. Consequently, individual's psychological behaviours generated could influence the decision-making process on marital behaviour.

Increased agricultural investments raise individual incomes which could stimulate desire for early or late marriage, investment on more wives, or a desire for a higher standard of living. These situational forces could stimulate prospects for increased marital instability. Moreover, acute population pressure in high potential agricultural zones of Western Kenya has forced the government to encourage massive population resettlement schemes in the Yala swamp area, Lugari Settlement Scheme, Kano Plains, and parts of Suna location in South Nyanza district. These frontier populations constituted mostly by young migrant populations are likely to elicit different marital characteristics from their neighbouring populations.

Lastly, Western Kenya has Kisumu Municipality which is the third largest town in Kenya. According to the 1979 census records, Kisumu Municipality had approximately 150,400 residents. The other important urban centres in the study region are Kakamega Town (31,800); Busia Town (25,000); Kisii Town (30,700); Migori Town (6,135); and, Homa Bay Town with 7,387 residents. These centres are the regional nodes of development. For this reason, they function as centres initiating modernization processes which are then diffused to the rural environments. For example, contraceptive knowledge could easily diffuse from these centres to their rural hinterlands through rural-urban migration process.

The opportunities generated for different sex-roles in these urban centres could also influence individual desire for early or late marriage depending on the intensity of rural-urban interaction process and individual's aspirations. In addition, prospects for greater marital instability arising from rural-urban interactions are likely to increase with the declining distance from urban centres. The totality of urban influence is, however, bound to differ between regions depending on the regional proportions of urbanized populations and the accelerating forces of urbanization.

It is against the background of these observed areal characteristics of Western Kenya that regional structure of total fertility rates and nuptial levels are now examined.

2.4 A brief background of fertility levels

On the basis of fertility data portrayed by Table 2, some significant generalizations can be made. First, Western Kenya is a region of high fertility, because the current total fertility rates computed from the 1969 and 1979 population census data greatly exceeded the average of two births per family, which is a characteristic feature of low fertility of most industrialized societies.

Table 2: Selected indices of fertility levels for Western Kenya in 1969 and 1979.

Province/ district	Current Total fertility rates		Lifetime total fertility rates	
	1969	1979	1969	1979
NYANZA	6.2	6.5	7.4	7.9
Kisii	7.3	7.3	8.8	9.1
Kisumu	5.6	6.5	7.2	7.7
Siaya	6.0	6.3	6.9	7.0
South Nyanza	5.8	6.0	7.8	7.9
WESTERN	7.7	7.4	8.2	8.6
Bungoma	8.2	8.2	8.7	9.1
Busia	6.5	6.7	7.9	7.7
Kakamega	8.1	7.2	8.2	8.8

Source: Computed from the 1969 and 1979 census data.

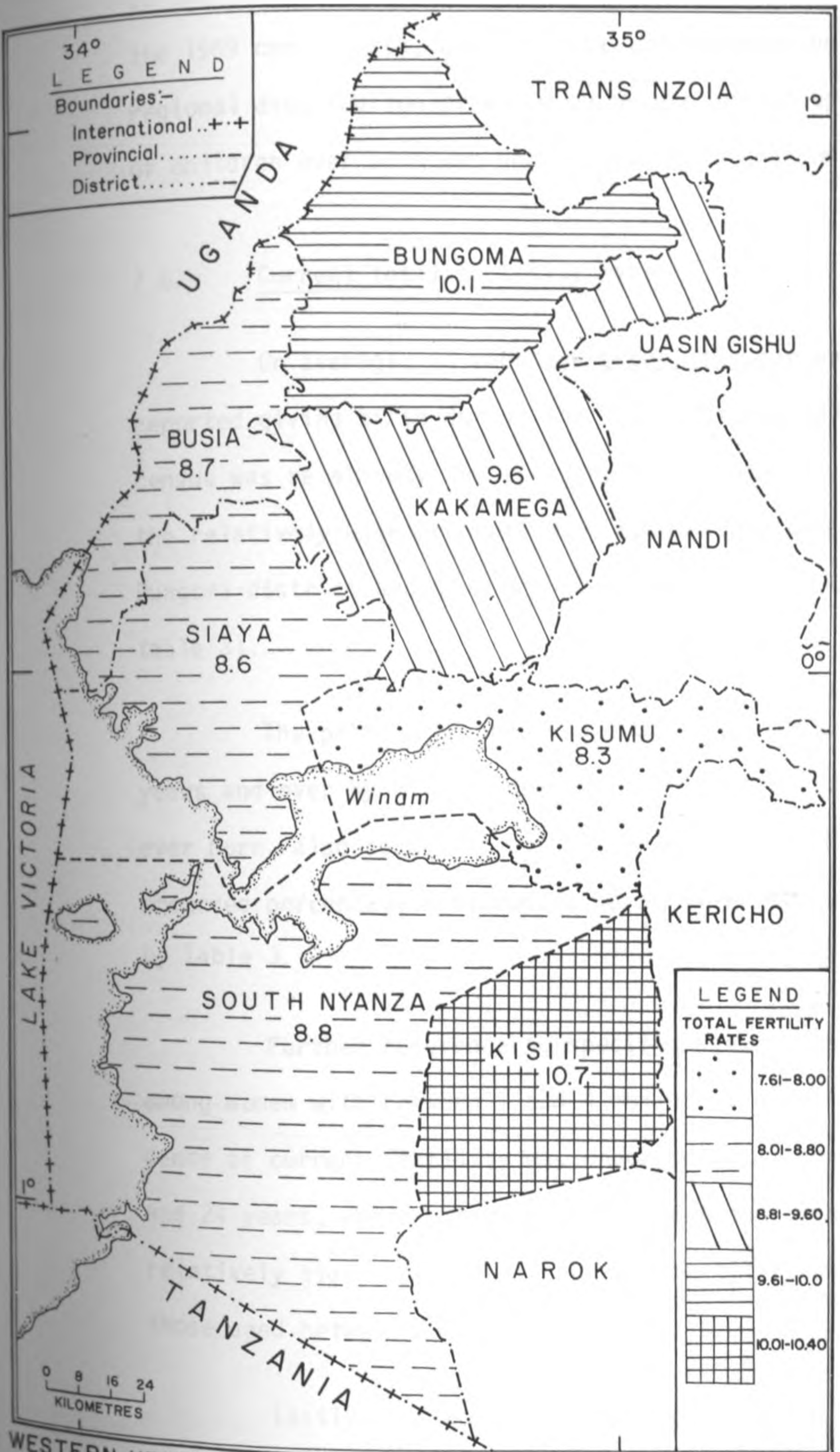
Moreover, at the provincial level of analysis, Western Province had slightly higher total fertility rates than Nyanza Province. The percent of provincial differences for current total fertility rates were 24.2% and 13.9% for the two censuses respectively. But, for lifetime total fertility rates, the computed differences were relatively lower being 10.8% and 8.9% for the two periods respectively. The spatial pattern of total fertility rates for individual districts in 1979 is portrayed by figure 3. Reference to the map suggests a broad belt of extremely high total fertility rates running from north in Bungoma district (10.1) through Kakamega district (9.6), and passing through a corridor of relatively low total fertility rates of 8.3 and 8.8 for Kisumu district and South Nyanza district respectively. The observed broad belt of extremely high total fertility rates continues southwards into Kisii district (10.7).

Further evidence from Table 2 and figure 3 suggest that Kisii district had consistently higher fertility levels than the other districts in Nyanza Province. Yet, in Western Province, Busia district had consistently lower fertility levels than the other districts in the province. Lastly, the ungraduated (smoothed) reported total fertility rates of Table 2, perhaps suggest a rising trend in fertility within all the districts.

2.5 A brief background of cohort fertility

With the exception of generalizations made about the regional pattern of the incidence of childlessness as portrayed by Table 4, the inferences made about cohort fertility are based only

FIG. 3.



WESTERN KENYA TOTAL FERTILITY RATES BY DISTRICTS, 1979 on the 1979 census data. Such inferences could not be verified by the 1969 census data, because detailed information on the 1969 regional distribution of women by 5-year age-groups and the number of children ever born was unavailable from government publications.

2.6. Current total fertility rate

On average, in each age-group, the percentage of women who reported giving birth during the 12 months preceeding the 1979 census was relatively low throughout the entire region. In fact, the relatively high proportion of about 13.3% was reported only in Bungoma district among women who had between 1 and 4 children. (see table 3).

The pattern of percentage distribution of women aged 15 years and over by 5-year age-groups and, the number of children ever born, also tended to be similar throughout the region as the observed percentage differences were relatively small as depicted by Table 3.

Further reference to specific age-groups reveal that, among women with between 1 and 4 children, a relatively high incidence of current fertility was reported by those aged between 20 and 24 years, while among women with between 5 and 6 children, a relatively high incidence of current fertility was reported by those aged between 25 and 29 years.

Lastly, for women with over 7 children, there were some variations between the districts. The districts previously observed as having a relatively low fertility level namely Kisumu,

Table 3: Percent of women aged 15 years and over who reported giving birth during the 12 months before the 1979 census, by 5-year age-group and number of children ever born.

Children ever-born	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Average
1-4 Children	%	%	%	%	%	%	%	%
Kisii	10.9	26.2	14.5	2.8	0.9	0.3	0.2	11.7
Kisumu	15.0	24.5	12.0	3.0	1.2	0.4	0.2	11.4
Siaya	13.1	25.4	12.2	3.1	1.4	0.4	0.3	9.6
South Nyanza	13.7	14.8	10.8	2.6	1.1	0.5	0.3	9.2
Bungoma	12.0	31.7	16.8	3.3	1.0	0.3	0.2	13.3
Busia	13.9	27.9	13.6	3.3	1.1	0.4	0.2	11.6
Kakamega	10.6	27.4	15.3	3.5	1.3	0.5	0.3	11.3
5-6 Children								
Kisii	0.1	3.5	13.1	8.1	2.4	1.0	0.5	3.9
Kisumu	1.3	3.5	11.1	6.2	2.6	0.6	0.4	3.6
Siaya	0.1	3.4	11.2	6.6	2.6	0.7	0.4	3.5
South Nyanza	0.2	2.1	9.8	5.4	2.3	0.8	0.4	2.9
Bungoma	0.1	2.6	14.1	9.8	2.5	0.6	0.2	4.1
Busia	0.1	3.3	11.3	7.7	2.9	0.8	0.5	3.7
Kakamega	0.1	2.8	12.6	8.5	2.7	0.7	3.9	3.7
Over 7 Children								
Kisii	0.0	0.9	6.7	17.3	17.5	10.3	4.1	5.4
Kisumu	0.0	1.0	5.7	13.7	13.2	6.7	2.4	4.7
Siaya	0.0	1.0	5.9	14.0	13.2	6.4	2.3	5.2
South Nyanza	0.0	0.7	6.0	13.6	12.5	7.0	3.2	4.5
Bungoma	0.0	0.6	5.1	19.6	22.6	14.2	4.2	6.5
Busia	0.0	0.7	5.2	14.1	14.1	7.8	2.9	5.0
Kakamega	0.0	0.8	4.8	15.9	17.8	9.9	3.7	5.5

Source: Computed from the 1979 census data.

Siaya, South Nyanza, and Busia experienced a relatively high incidence of current fertility among women aged between 30 and 34 years. On the other hand, the districts previously noted as having a relatively high fertility level namely Kisii, Bungoma, and Kakamega had high incidence of current fertility among women aged between 35 and 39 years.

In summary, the most important age-groups with respect to current fertility were between 20 and 39 years. Furthermore, in all the districts except South Nyanza, the level of current fertility among women with between 1 and 4 children declined substantially between the age-groups of 20-24 years and 25-29 years. Yet, the level of current fertility among women with between 5 and 6 children increased substantially between the same age-groups.

2.6.1 Lifetime total fertility rate

Focussing first on the incidence of childlessness in 1979, on average, the percentage of women aged between 15 and 49 years who were childless was relatively high throughout the entire region (see Table 4). The highest proportion of 27.0% was observed in Kisii district compared with a relatively low proportion of 21.3% noted in South Nyanza district. Conclusively, the noted district variations were rather small. However, the age-groups most affected with a relatively high incidence of childlessness were between 15 and 24 years, while the remaining age-groups had extremely low proportions.

Furthermore, except for Kisii district which portrayed a decreasing trend in the proportion of childless women between 1969 and 1979, the other districts experienced an increasing trend in the proportion of childless women in all age-groups except for minor variations in the initial age-group of 15-19 years.

Table 4: Percent of Women who have never borne a child by age-group for districts in Western Kenya in 1969 and 1979

District	Year	15-19 %	20-24 %	25-29 %	30-34 %	35-39 %	40-44 %	45-49 %	Average %
Kisii	1979	67.7	18.9	4.5	2.2	1.6	1.5	1.5	27.0
	1969	77.3	21.2	6.3	2.4	1.8	1.3	2.8	-
Kisumu	1979	58.2	18.8	10.0	7.2	6.5	6.1	6.2	22.9
	1969	58.0	17.3	6.9	4.1	3.8	4.3	2.7	-
Siaya	1979	61.0	18.8	10.8	8.5	7.5	7.3	8.1	22.4
	1969	67.9	17.5	9.6	5.7	6.7	6.2	5.4	-
South Nyanza	1979	60.5	12.9	10.8	7.2	6.0	5.7	5.6	21.3
	1969	55.3	13.9	6.3	5.1	3.8	2.9	4.0	-
Bungoma	1979	74.0	18.8	5.5	3.5	2.6	3.1	3.3	27.3
	1969	74.4	17.3	4.2	2.8	2.4	3.4	2.8	-
Busia	1979	69.6	17.1	8.2	5.7	5.4	5.1	5.8	24.9
	1969	70.7	15.8	7.0	3.1	4.9	3.1	4.1	-
Kakamega	1979	69.4	20.7	7.4	4.1	3.2	2.9	2.8	26.1
	1969	69.9	17.6	6.3	2.5	3.5	2.5	4.7	-

(Age-group in years spans columns 15-19 to Average.)

Source: 1979 percentages computed from the 1979 census data.
1969 percentages obtained from Census Vol IV, CBS.

Further reference to Appendix 1, reveals that on average district variations in the percentage distribution of women by different parities were rather small to yield distinct spatial differences. However, women with between 1 and 4 children were relatively more numerous in the age-groups of 15-39 years, while women with between 5 and 6 children were concentrated in the age-groups of

25-39 years. Lastly, women with over 7 children as expected were relatively more numerous in the age-groups of 30-49 years. Note that, the open-ended nature of this last class-interval of children ever born somewhat inflates the proportions of women in the last age-groups.

In summary, it is important to consider the entire reproductive life-span in the analysis of lifetime fertility. However, the relatively small number of women aged over 40 years in the region attributed to the relatively low life expectancy in Western Kenya (Republic of Kenya, 1969)[4], reinforced by the relatively low probability of reproduction already noted (see Table 3) suggest that, the most important female cohorts to examine in the study of fertility are between 20 and 39 years. For this reason, before testing the research model of fertility predictor variables, it is necessary to briefly examine the nuptial characteristics of women aged between 15 and 49 years. The rationale for this proposition is to attempt a theoretical correlation between the observed regional characteristics of fertility level with regional characteristics of nuptial variables.

2.7 A brief background of females marital status

The regional levels of proportions of women aged 15-49 years of different marital statuses are indicated in Table 5. Focussing first on the proportion of single women aged 15-29 years, there is statistical evidence that the proportions of such women were important in all districts. Note that the proportions of single women beyond the age of 29 years exceededed 13% in all districts. Could the observed relatively high proportions of single women in the younger cohorts partly account for the observed situation of high levels of childlessness already noted in all districts?

Furthermore, it is puzzling to observe that districts such as Kisii, Bungoma, and Kakamega which had a relatively high fertility level also had relatively high proportions of single female aged 15-29 years in 1969 and 1979. The proportion of these women as a ratio of all women in the reproductive life-span exceeded 20% according to the two censuses. Yet, the remaining districts which apparently had a relatively low fertility level had between 13% and 20.0% of such women according to both censuses (see Table 5).

In addition, between 1969 and 1979, all districts experienced small a percentage increase in the proportion of single women aged 15-29 years. The observed intercensal changes ranged between 2.8% in Bungoma district and 6.0% in Kisii district as portrayed by Table 5. Factors underlying the observed changes will be examined later.

To what extent could the noted changes account for the observed intercensal increase in current fertility levels of the districts? Furthermore, is there any relationship between the noted intercensal increase in the proportions of single females and the rising trend in regional incidence of childlessness? This demographic phenomenon characterised all districts except Kisii district, which experienced a declining trend in the incidence of childlessness. These are some of the questions which need thorough investigation.

Table 5: Percent of females of different marital statuses in Western Kenya in 1969 and 1979

Province/ district	% of Single Women aged 15-29 years		% of Currently married women aged 15-49 yrs		% of Widowed women aged 15-49 years		% of divorced/ separated Women aged 15-49 years	
PERIOD	1969	1979	1969	1979	1969	1979	1969	1979
NYANZA	17.8	21.6	75.0	71.1	4.8	4.4	2.1	2.0
Kisii	23.4	29.4	69.5	64.4	3.8	3.3	2.4	2.1
Kisumu	16.1	19.3	74.9	72.9	4.9	4.6	2.4	2.2
Siaya	14.6	18.6	77.5	73.7	5.0	5.2	1.8	1.8
S. Nyanza	13.0	17.2	78.1	74.9	5.4	5.0	1.8	2.0
WESTERN	21.6	24.7	73.0	69.5	2.3	2.6	2.9	2.2
Bungoma	21.6	24.4	73.1	70.2	1.9	2.1	2.6	2.5
Busia	15.2	19.5	78.1	74.6	3.0	3.5	2.0	1.8
Kakamega	21.5	26.4	71.6	67.5	2.4	2.6	3.2	2.2

Source: Computed from the 1969 and 1979 census data.

It is realized that, in general, the entire Western Province had a slightly higher proportion of single females compared to Nyanza Province without Kisii district. However, these regional differences were rather small being approximately 7%. At this juncture, it is emphasized that, voluntary or involuntary celibacy whether of partial or permanent nature is an important predictor variable of fertility level.

Further reference to Table 5 indicates that, universal marriage was a characteristic feature of all districts. The proportions of currently married women in 1969 ranged between 78.1%

in South Nyanza district and 69.5% in Kisii district. In 1979, the proportions were apparently low in all districts as they ranged between 74.9% and 64.4% for South Nyanza district and Kisii district respectively. To what extent could the observed proportions of currently married women account for the general high levels of fertility observed in the entire region? It is also puzzling to observe that, the intercensal decline in proportions of currently married women which varied between 5.1% in Kisii district and 2.0% in Kisumu district did not tally with the previously noted intercensal increase in fertility level. Moreover, Kisii district with its apparently high fertility levels in 1969 and 1979 had, relatively, the lowest levels of proportions of currently married women aged 15-49 years. Despite these changes and differences, the entire study-area exhibited small and, therefore, negligible differences.

Proportions of married females by cohorts are also important predictor variables in the analysis of fertility levels. Marriage per se may not be important due to intervening variables of socio-economic and cultural phenomena which are discussed later. However, the age of entry into regular sexual union, and the duration of regular sexual union are the two most important aspects of marriage.

Widowhood is another important predictor variable of fertility because it depresses fertility by reducing frequency of regular sexual relation ceteris paribus. According to the 1969 and 1979 census data, the regional levels of proportions of widowed women aged 15-49 years were rather small as depicted by Table 5

The proportions of such women in 1969 ranged between 1.9% in Bungoma district and 5.4% in South Nyanza district. Moreover, by 1979, all districts in Western Province experienced an increase in the proportion of such women, while in Nyanza Province all districts except Siaya recorded a decline in proportion of widowed women. Nevertheless, all the noted intercensal changes were small and somewhat insignificant as they were less than 0.5%. Further analysis of age-groups reveals that widowhood was relatively more prevalent in cohorts aged between 35 and 49 years, These cohorts, however, have relatively low fecundity levels compared to the younger cohorts. For this reason, it is desirable to consider the entire reproductive life-span. Whether these observations reduced the effectiveness of widowhood as an acceptable predictor variable of fertility within Western Kenya is discussed later.

Lastly, reference to divorce and separation among females aged 15-49 years also elicited a declining trend in all districts. Could this demographic phenomenon also partly account for the observed intercensal increase in fertility level? Note that, proportions of women aged 15-49 years who were either divorced or separated were also small (see Table 5). In 1969, proportions of such women ranged between 1.8% in Siaya district and 3.2% in Kakamega district. Yet, in 1979, the proportions were even less ranging between 1.8% in Siaya district and 2.5% in Bungoma district. Since the observed statistics were rather small, to what extent could the level of marital instability be considered as an acceptable predictor variable of fertility level within Western Kenya?

2.8 Summary

In summary, the following observations are made:

a) the entire Western Kenya was a zone of homogeneous demographic characteristics because the differences between districts were extremely small,

b) there were some regional fertility features which could not be fully explained by regional characteristics of nuptial variables. In other words, socio-economic and cultural phenomena are also important predictor variables of fertility, and this research aims to establish whether these phenomena function directly or through nuptial variables as determinants of fertility level,

c) Lastly, it should be realized that, the list of nuptial variables discussed in this section has been determined by the nature of census data which was rather limited in scope.

References

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CHAPTER 3

3.0 RESEARCH METHODOLOGY

3.1 Introduction

In order to identify the nuptial factors which are significant intermediate fertility variables, and to determine the extent to which socio-economic and situational variables influence fertility through their direct or indirect impact on nuptial variables, it was deemed necessary to select a sampling technique that would enable a representative sample to be drawn from every cross-section of the female population studied. Such a population sample should constitute females from different cohorts, social status, ethnic background, and different geographical units. This was a necessary condition if all factors influencing fertility had to be incorporated in the analysis.

The problem also required reliance on secondary data to facilitate effective comparative analyses and to bridge gaps in sample survey data. It was for these reasons, that both the 1969 and 1979 census data were found useful. In addition, the relationship between intermediate fertility variables is very complex, thus rendering the use of multivariate statistical methods of analysis necessary, in order, to identify the predictive function of each variable and the categorisation of such variables according to the strength of association between them. It is for this reason that the use of a computer was extremely valuable.

3.2 Sampling methodology

A two-stage sampling design was adopted for this research

The first sampling stage,is the areal unit sampling frame which helps in choosing the geographic units in each district for survey. The second stage,is the population sampling frame which helps in selecting which household units should have their household-members interviewed in each of the sampled geographic units.

3.2.1 Area sample frame

The defined study area has 109 administrative locations with 520 sub-locations. (see figure 4). Obviously, a complete coverage of the area would be an enormous financial undertaking. Moreover, the differentials in spatial distribution of the major ethnic groups, reinforced by the spatial differences in indices of development constituted a vital aspect of the magnitude of the problem.

In order to reduce sampling biases and errors in selecting enumeration units (geographic units) for the research, a two-stage stratified random sampling procedure was adopted. The first stage involved selection of the locations for the survey in each district. This was achieved through the following steps. First, the 1969 population census data for total adult females for all the 109 locations in the study area were exponentially projected to the mid-year of 1978, which was the period for field-work. Secondly, the average crude density per square kilometre of the projected adult female populations were then computed for each location.

The computed crude density figures for the locations in each district were then ranked in descending order and arbitrarily

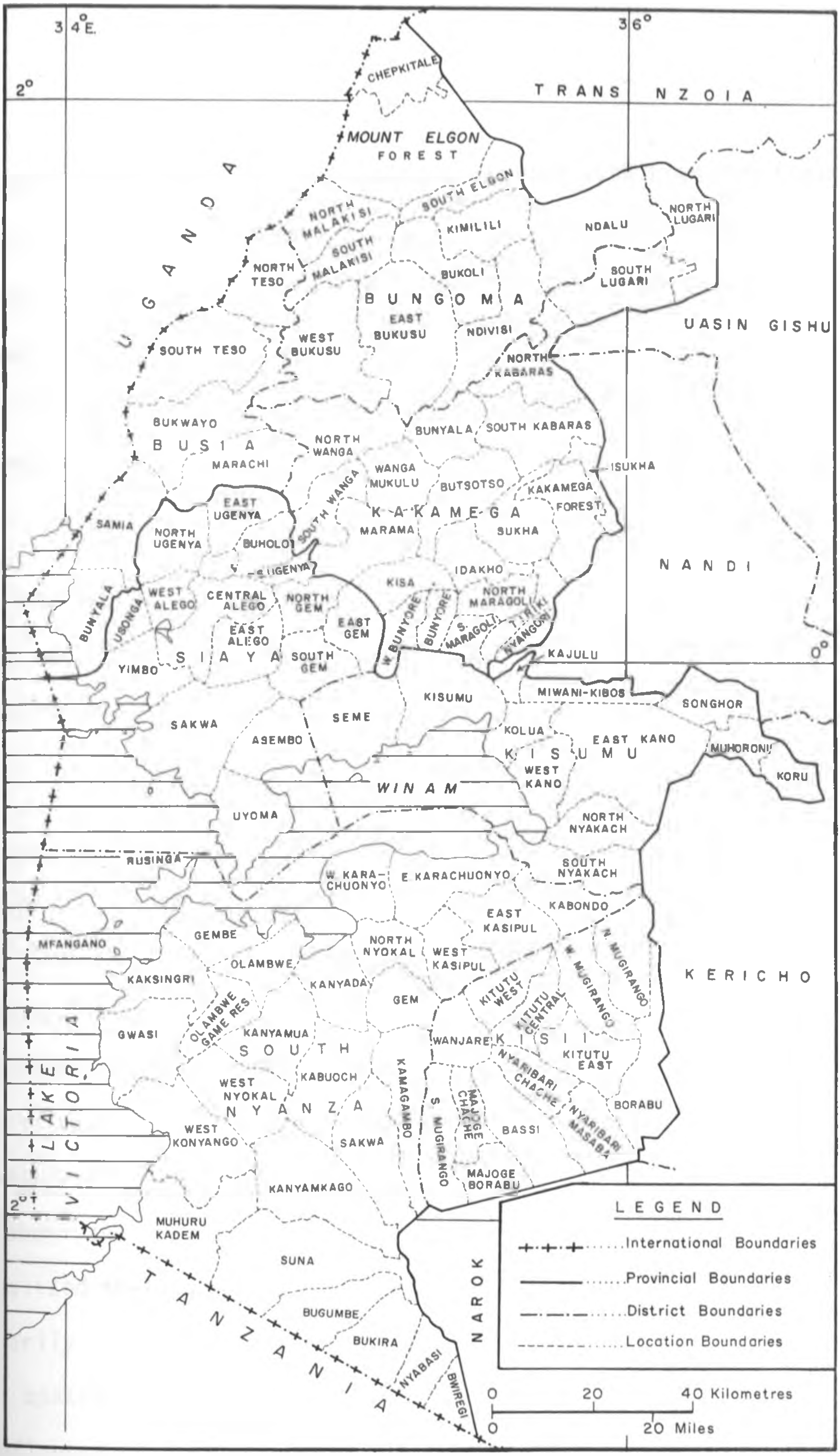


FIG. 4. ADMINISTRATIVE BOUNDARIES

classified into three strata namely locations with high density, locations with moderate density, and locations with low density. For each stratum 25% of the total number of locations were finally randomly selected for the research as portrayed by figure 5. In other words, for every district the three types of locations were represented.

The second and final stage of areal sampling then involved listing all sub-locations (enumeration units) of the locations selected under stage one and, randomly selecting again 25% as the final enumeration units for the research.

The stratified sampling method ensures that various aspects of regional variations are somehow represented. It is best achieved under the criteria of population size and density. Criticism of the population size and density concept in the areal sampling method has been discussed elsewhere and need not be repeated. (Frank Notestein, 1966)[1]. Despite this criticism, the advantages of using population density concept as a suitable sampling tool outweighs its disadvantages. United Nations, (1958);[2] G.F. Afalabiojo, (1968)[3] and T.L. Smith, et al, (1970)[4]. In addition, it should be realized that, uneveness in population distribution may not necessarily influence the volume and direction of population mobility as spatial mobility involves human decision. In this context, its influence on nuptial conditions is marginal.

The alternative procedure of utilizing a simple random sampling method for selecting enumeration units for the research is regarded as unsuitable as concisely stated by E.H.O. Ayiemba,

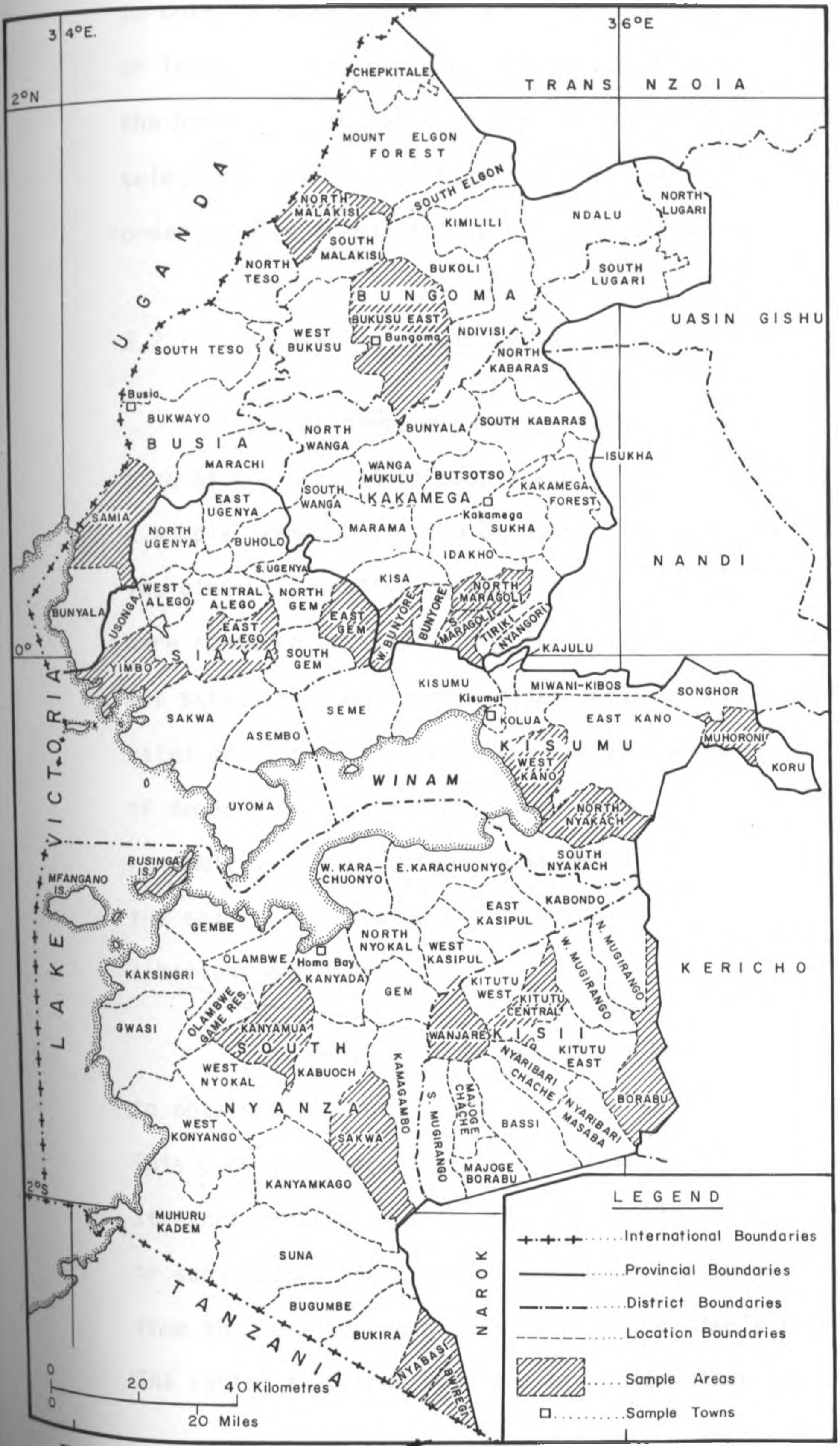


FIG. 5. THE DISTRIBUTION OF SAMPLED AREAS

(1974)[5]. In summary, the spatial distribution of sampled locations as portrayed by figure 5, yields an acceptable distribution. It is only in Busia district where at least 25% of the total number of locations were not surveyed because of the inaccessibility of the North Teso location which fell in the sample. Moreover, some selected urban centres have been incorporated in the analysis in order to give a realistic picture to the average regional statistics.

3.2.2 Population sample frame

The problems of whom to interview and how to determine the size of the population sample was solved indirectly by employing a sample frame consisting of household units in the study region. The other alternative methods, such as the list of tax-payers, were rendered unsatisfactory for most administrative records were not exhaustive and in most cases included individuals who had emigrated or were working elsewhere or were even dead. The other method of demarcating the sub-locations into a network of grid-lines then randomly selecting a few blocks and interviewing all people within the selected blocks proved theoretically sound but practically more laborious and expensive.

The only feasible method for the rural environments was to obtain a list of all householders in every sub-location sampled. This proved rather easy and effective for the hierarchy of administrators ranging from the chief down the scale to the clan leader or sub-headman corresponded pretty well with regional hierarchy from the location down the scale to the clan's regional boundaries. The system therefore requires each clan elder (sub-headman) to know practically all the subjects under his jurisdiction. This is more common with village-owners or single household-heads within their jurisdiction.

The practicability of this approach is reinforced by the customary practice of the Nilotic and Bantu ethnic communities who live in nucleated settlements constituted by extended family relations. In the major urban centres such as Kisumu Municipality, the numbering system of houses made selection of household units much simpler. However, in peri-urban areas the settlement units had to be separated into blocks and the household units selected randomly. The same procedure was applied for areas with a communal water system where numbering of the household units proved ineffective.

Table 6: Household units sample size

District	Number of Household units sampled per district	% of total household units per district
Kisii	261	0.17
Kisumu	201	0.92
Siaya	100	0.80
South Nyanza	292	1.41
Nyanza Province	854	0.41
Bungoma	100	0.53
Busia	158	2.70
Kakamega	153	0.56
Western Province	411	0.79

Source: Computed from the 1978 sample survey data.

In order to determine the number of household units to visit, a probability sample of p = 0.5 was used. With a sampling error of approximately 2.5%, the research needed to cover only 614 household units in both Nyanza and Western Province. This result was derived by the application of the statistical formula derived by D. Ebdon, (1978)[6].

$$n = pq \div \frac{(E)}{z}^2$$

where n = sample size of the household units

p = proportion to be estimated

q = 1 - p

E = allowable error (½ the estimated confidence interval)

z = critical probability in terms of the standard normal deviate.

The estimated household units of 614 for the entire region yielded an average of 89 household units per district. This minimum requirement was, however, exceeded in all the seven districts as depicted by Table 6. According to Table 6, the total selected household units in Nyanza Province were 854. These units had a total population size of approximately 5124 persons which represented a probability population sample size of about, p = 0.41% for the entire Nyanza Province by mid 1978. Similarly, Western Province had about 411 household units covered with approximately 2,877 people who constitutted a probability population sample size of about, p = 0.79% of the total population in the province by the mid-year of 1978. Note that, in both cases, population sample sizes corresponded with percent of total household units covered in each province.

A significant question to raise now, is whether, the number of household units sampled differed significantly between the two provinces and within the provinces. The null hypothesis tested is that, there was no significant difference in mean of sampled household units between Nyanza Province and Western Province. Using variance analysis (F-distribution test), the critical value for x = 0.05 is $F_{.05} = 6.61$, whereas, the computed F value is 2.13 as portrayed by the anova table 7 which summarizes the results of the computation. Since the computed value of F = 2.13 does not exceed $F_{.05} = 6.61$, we accept the null hypothesis and conclude that, there is sufficient evidence to indicate no significant difference in the average number of sampled household units in both provinces.

Anova Table 7

Source	df	ss	ms	F
treatments	1	10,032.43	10,032.43	2.13
Error	5	23,523.00	4,704.60	-
Total	6	33,555.43	-	-

Last, but not least, visiting the required number of household units in each district was randomly done after compiling a list of all household-heads in the selected enumeration units. The list which was supplied by the local administrators made it easier to visit a particular household unit falling in the sample, thus reducing the role of personal bias in choosing whom to interview. It also enabled replacement to be systematic for whenever, an interviewer failed to find all the occupants of a household unit, then the adjacent settlement unit was taken as a substitute. Cases of refusal were minimal and since they were less than one percent, they have been omitted in statistical analysis. The enumeration process covered only adult population, whereas, information on children was furnished by their mothers or step-mothers where applicable.

3.3 SOURCES OF DATA

This thesis utilizes two types of data namely, primary data which have been obtained from field interviews and, secondary data which are documented information from the 1969 and 1979 population censuses, as well as other government publications.

3.3.1 Primary data

(a) The questionnaire

The survey administered two different questionnaires simultaneously. The first questionnaire (part I) elicited basic household data for all household members. This was necessary because not all household members such as children were eligible for interview. Questions under section (A) gathered basic demographic and socio-economic data. The demographic questions covered age, sex, marital status, marriage type and patterns.

The questions under sections B,C,D, and E, were rather detailed questions on marital history. The basic aim was to elicit data on marriage characteristics with greater emphasis on age at first marriage, marriage duration, and reproductive time lost due to marital disruptions.

The questions labelled F, G, H, I, and J, focussed on socio-economic and cultural dimensions. The items covered were land ownership, migration, health, occupation and income respectively. The basic aim again was to associate these acquired characteristics with decision-making processes which influence the decisions to marry or not to marry, age at first marriage and re-marriage, marriage type and patterns, and reproductive time lost due to marital disruption.

The second questionnaire (part II) which was administered only to adult females in the household had questions on fertility levels, knowledge and practice of fertility control. Detailed questions covered pre-marital pregnancy, pre-marital fertility, pregnancy losses, i.e miscarriages and still-births. Lastly, infant and childhood mortality data were also obtained.

Though the questions were simple and clearly stated, the response to some of them were deemed unreliable. The questions mostly affected by poor response were on pre-marital pregnancy, pre-marital fertility, pregnancy losses, frequency of re-marriage, and reproductive time lost due to separation. For this reason, data on these responses were not utilized.

Lastly, the questionnaires had an appendix containing a calender of historical events carefully selected to be relevant to each region as some regions experienced different historical events. The usefulness of a calender of historical events in demographic surveys is debatable. However, in developing societies with high illiteracy ratio, its usefulness in age statement is somewhat acceptable. All the questionnaires were pre-tested to determine their applicability and adjustments were made where necessary.

3.3.2 Secondary data

(a) The 1969 census data

The 1969 census data for the study region constituted the basic data from which research propositions and sampling methodology were designed. Since this research problem was conceived in early 1978, the 1969 census data by then provided the most reliable recorded information for the entire Western Kenya. Even the 1973 National Demographic Baseline Survey data was regarded as unsuitable when compared with the 1969 census data for the following reasons;

(a) The 1969 census data was assumed to be a complete head count thus giving the basic demographic and socio-economic data on the entire population of Western Kenya.

(b) Normally census surveys carry out a 10% sample size of the population in each enumeration unit. Since such surveys are more detailed in structure, it was concluded that such information would be more representative of the environmental situation of Western Kenya compared with the 1973 National Demographic Baseline Survey which selected very few enumeration units in the entire study region.

The 1978 Kenya Fertility Survey data could not be utilized fully because the survey was carried out when data for this research was also being collected in the field. Moreover, some of its data already published are in a format which makes it rather difficult to reconcile with this research data.

(b) The 1979 census data

The provisional data for the 1979 population census was released when the first draft for this thesis was nearing completion. However, it was deemed necessary to incorporate such data in the analysis to reinforce comparative analysis. It must be noted that, it was not possible to have access to raw census data which could have given relevant detailed regional information. Conclusively, the 1979 census data had limitations because the preliminary report was rather less detailed.

(c) Other socio-economic data

The data on land-use, number of schools per location, number of health centres per location and the proportion of women attending family planning clinics were supplied by relevant ministries in each district.

3.4 QUALITY OF DATA

Demographic statistics utilized in this research are drawn from two different sources namely census data and sample survey data. For this reason, it is absolutely necessary to determine the quality and reliability of such data before making comparative analyses and inferences on the level and direction of correlation between nuptial variables and fertility.

3.4.1 Types of errors in fertility analysis

Empirical observations reveal that common errors in fertility reporting are associated with age-misstatements such as digital preference, memory lapses, and chance fluctuations resulting from poor sampling procedure (W. Brass, 1960)[7]. It is, however, noted that random errors in age transfer (age of mothers) are likely to cancel one another as transfer upwards could be matched by transfer downward. The consequence of an upward transfer is often a reduction of parity with increasing ages. Similarly, a downward transfer increases parity and the level of increase is inversely associated with age.

The errors which affect recorded fertility levels are therefore, mostly, reporting errors. The consequence could be a deflation or inflation of actual fertility experienced. The omission of births often increases with advancing age which is attributed to the poor memory of births experienced. In some cases, women merely fail to state their parity by excluding children living elsewhere. In addition, in a few cases, women with zero parity may be erroneously classified with the non-response category.

If the numbers of such women are deducted from the total number of women sampled, then the results of average parity obtained might be misleading as the denominator would be small by the number substracted, thus inflating fertility levels. Increases in average parity could also be attributed to the inclusion of stillbirths and late fetal deaths. (Shryock and Siegel, 1975)[8].

It is now necessary, to examine the nature and magnitude of errors affecting the 1969 and 1979 census data before discussing regional levels of fertility derived from such data. This is necessary to clarify why certain demographic techniques have been utilized to adjust population census data in order to attain plausible regional analysis.

3.4.2 Regional differences in errors of female age-structure

The indices measuring the magnitude of errors affecting census statistics for the study region are depicted by Table 8. Focussing first at the provincial level of analysis, on the basis of Whipple's indices, the 1969 reported age data could be summarized as 'rough' for the two provinces, because the calculated indices fall within the range of 125% and 174.9%. Further reference to Table 8, indicates Nyanza Province had relatively higher Whipple's indices of 146.2% and 143.5% for males and females respectively compared to 126.3% and 128.9% for Western Province for the respective sexes.

According to the 1979 population census data, computed Whipple's indices for the two provinces indicated a slight improvement in age reporting for males in Nyanza Province and for both sexes in Western Province. The reported age data for Nyanza Province therefore could still be classified as 'rough' yielding Whipple's indices of 133.7% and 138.0% for males and females respectively. The computed values for Western Province were relatively much lower thus suggesting a situation of relatively much better age reporting. Its observed Whipple's indices were 116.3% and 118.4% for both sexes respectively. Conclusively, the quality of

Table 8: Measurement of Age-Misstatement

Province/ district	Year of Census	Index of Measurements					
		Whipples Indices		United Nations Indices			
		Male	Female	Sex score	Age (males)	Ratio score (females)	Joint score
NYANZA	1979	133.7	138.0	9.2	8.2	5.7	41.4
	1969	146.2	143.5	7.3	7.2	9.2	38.3
Kisii	1979	141.1	161.1	8.7	10.7	7.9	44.6
	1969	140.9	145.5	8.8	9.6	9.5	45.5
Kisumu	1979	131.6	130.1	9.1	6.1	5.2	38.5
	1969	154.3	148.9	7.3	5.6	8.6	36.1
Siaya	1979	123.8	122.6	11.2	10.0	5.5	49.1
	1969	143.9	143.4	10.6	7.5	9.1	48.4
S. Nyanza	1979	133.3	134.2	11.8	8.3	5.8	49.5
	1969	146.1	138.6	9.3	9.7	12.0	49.6
WESTERN	1979	116.3	118.4	7.1	6.3	4.4	31.9
	1969	126.3	128.9	8.9	7.5	8.7	42.9
Bungoma	1979	111.6	109.9	5.4	6.1	6.4	28.6
	1969	112.3	115.2	6.8	5.5	6.0	31.9
Busia	1979	130.5	142.8	8.8	7.7	7.0	41.2
	1969	139.9	146.4	11.4	7.2	7.5	48.9
Kakamega	1979	118.3	119.6	8.2	7.0	4.4	36.0
	1969	129.1	129.1	9.6	10.1	11.0	49.9

Source: Computed from the 1969 and 1979 census data.

age reporting in the districts of Western Province in 1979 could be classified as 'comparative' (Republic of Kenya, 1969)[9].

Further reference to the individual districts reveals that, in Nyanza Province, Kisii district emerged as having extremely 'rough' reported age data as its Whipple's indices were above 140.9% for both sexes according to the two censuses. Similarly, in Western Province, only Busia district emerged as having extremely rough age data because Whipple's indices for both sexes exceeded 130.5% according to both census data.

The United Nations indices apparently yield a different result. On the basis of the 1969 population census data, the United Nations joint scores were 38.3 and 42.9 for Nyanza Province and Western Province respectively. But, according to the 1979 census data similar measurements were 41.4 and 31.9 for the two provinces respectively. In other words, while combined analysis of age reporting was apparently better in Nyanza Province by 1969, the analysis of the 1979 census data suggested that, in general, age reporting was relatively much better in Western Province. This proposition was endorsed by the analysis of joint scores for the region.

Since differential analysis of errors in fertility considers female age-misstatement as more relevant to the analysis of fertility levels, in this context, female age reporting in Western Province was apparently much better than was the case in Nyanza Province as portrayed by Table 8. To illustrate, according to the 1969 population census data, the computed United Nations.

Ratio Scores for females was 8.7 for Western Province compared to 9.2 for Nyanza Province. Similarly, the same measurements in 1979 were 4.4 and 5.7 for Western Province and Nyanza Province respectively. Reference to individual districts reveal only Kakamega district as having a relatively high Ratio Score of 11.0, while in Nyanza Province, only South Nyanza district had a relatively high Ratio Score of 12.0. All the remaining districts according to the 1969 census data had Ratio Scores which were below 9.5. In fact, computations based on the 1979 census data yielded much lower Ratio Scores for all the districts except Kisii which recorded a high value of 7.9.

The observed situation of relatively better age reporting in the districts of Western Province is confirmed again by reference to the 1969 Whipple's indices for female population of 128.9% and 143.5% for Western Province and Nyanza Province respectively. Even the 1979 Whipple's indices for female population were 118.4% and 138.0% for Western Province and Nyanza Province respectively. The relatively higher scores for Nyanza Province in both measurements is indicative of relatively greater errors in female population age reporting.

The application of these demographic techniques to measure the nature and direction of errors affecting sample survey data, such as the 1978 research survey, is not recommended because of the greater effects of migration on population age-structure of sampled data. Note that, in regions of high migration rates as seen in the study region, census data which presumably involves a complete head-count reduces the effects of migration as in-migration may cancel out out-migration especially at the macro-regional level of analysis such as a province and to a lesser extent a district. In other words, the effects of migration on a sample survey data is likely to become greater because the regional unit of data collection is at a micro-regional level. For example, in this research the regional unit of data collection was a sub-location. The proposition that the noted demographic techniques should not be subjected to sample survey data was endorsed by Shryock and Siegel, (1975).[10] It is, however, assumed that the 1978 research data on female population age-structure had relatively less age-reporting errors because of the steps adopted to reduce sampling bias and misinformation as explained under sampling methodology.

In summary, the above results suggest, on average, that age reporting in all districts of Western Province was relatively much better than age reporting in the districts of Nyanza Province. The extent to which preference for particular digits affected individual districts in 1969 is portrayed by figure 6 and figure 7 for Nyanza Province and Western Province respectively.

3.4.3 Regional levels in errors of Reported fertility

Focussing on errors in fertility response, the observed pattern (shape) of age-specific fertility rates for 1969, 1978, and 1979 have been graduated by a set of multipliers derived by William Brass, (1960).[11] It should be emphasized, that the application of polynomial functions in fertility graduation does not correct the fertility level, but only adjusts the shape of the fertility curve. In other words, the produced age-specific

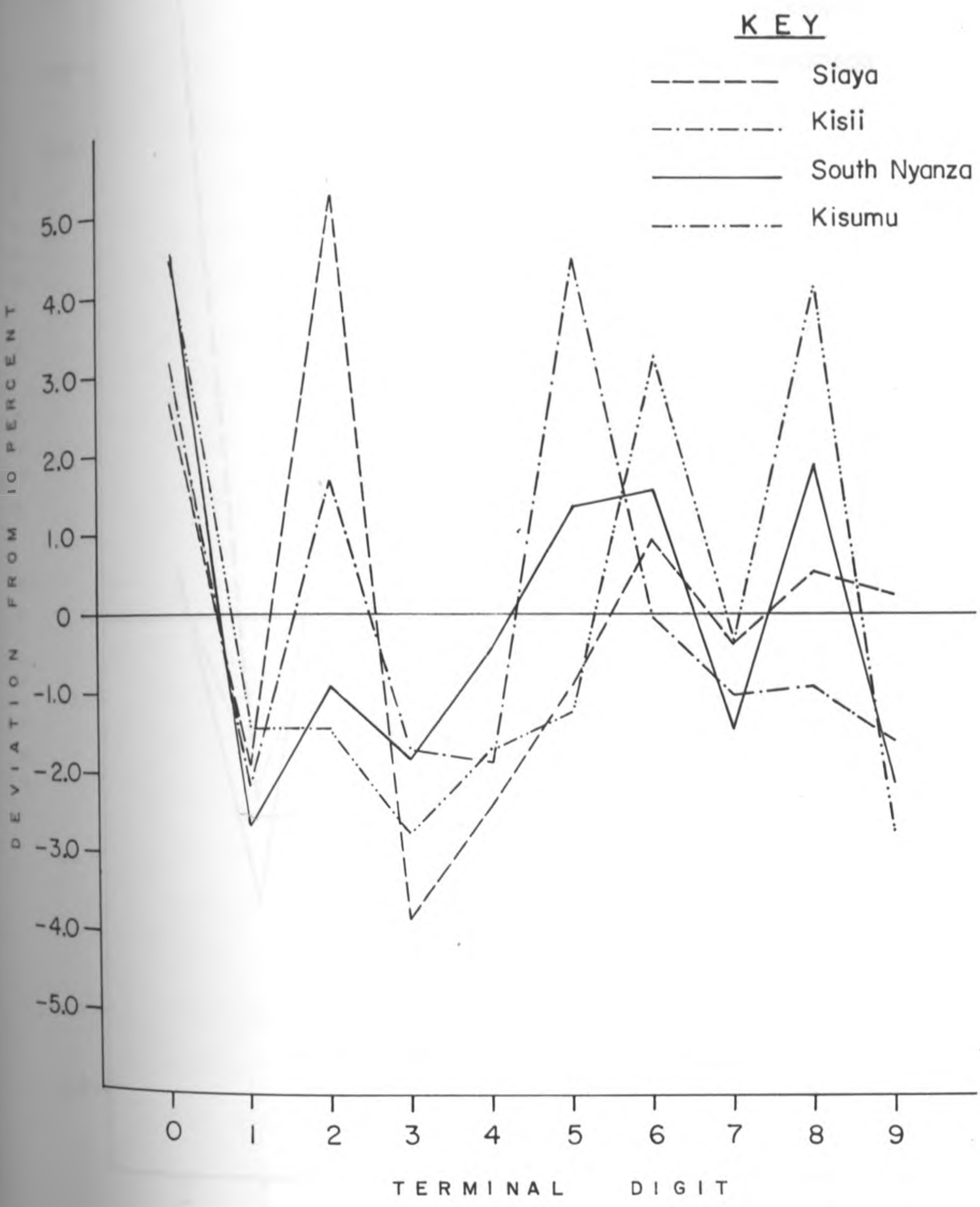


FIG. 6. DIGITAL PREFERENCE FOR NYANZA PROVINCE DISTRICTS (1969).

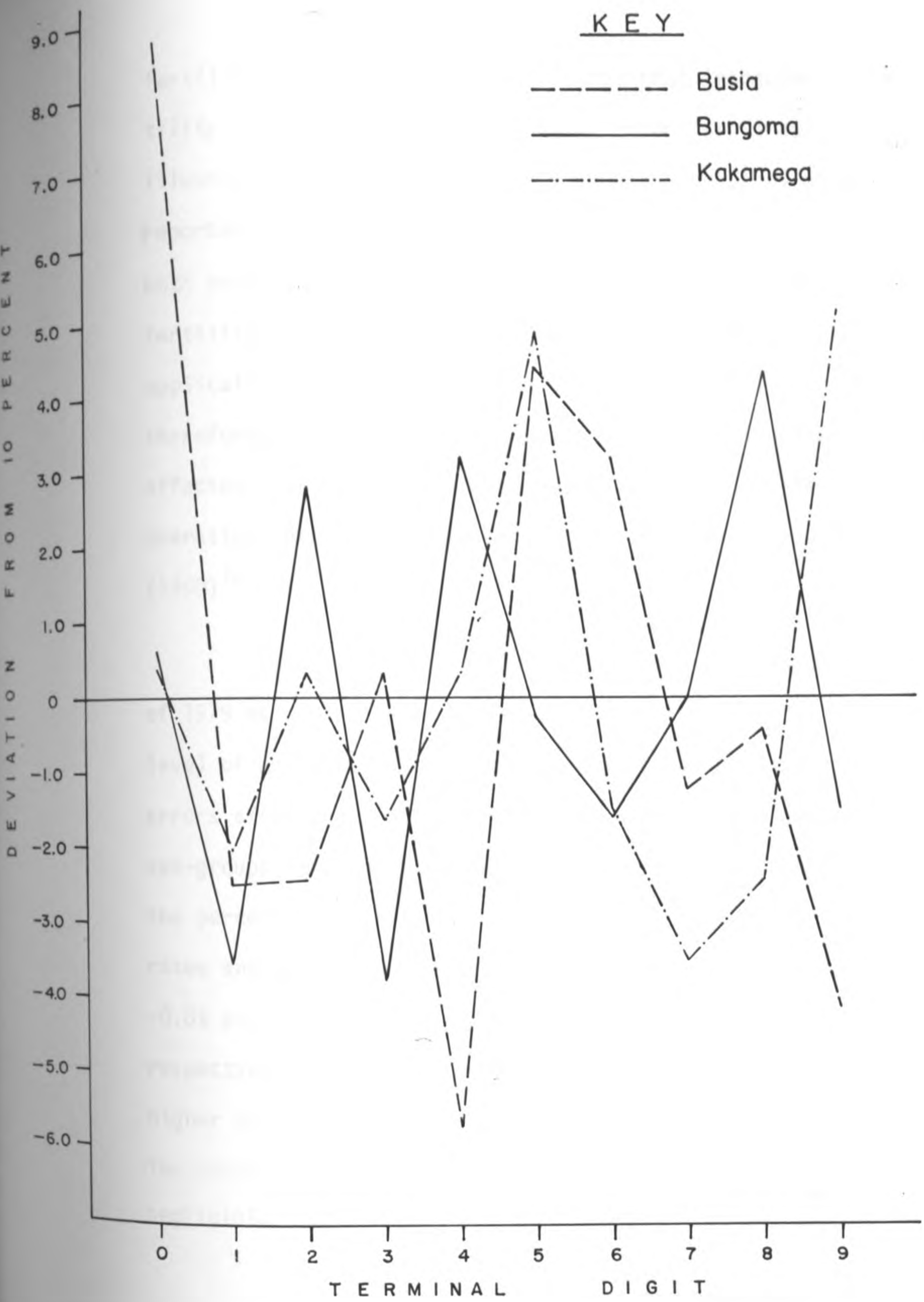


FIG. 7. DIGITAL PREFERENCE FOR WESTERN PROVINCE DISTRICTS (1969

fertility curve by this method assumes that irregularities in fertility shape caused by age reporting errors are graduated. To illustrate, figure 8 and figure 9 show the shape of observed (reported) and expected (smoothed) age-specific fertility curves for both provinces in 1969 and 1978 respectively. The reported total fertility levels for both provinces have not been altered by the application of the method. The usefulness of this procedure is, therefore, that it identifies which age-groups are likely to be affected most by errors in age response. For detailed mathematical operations explaining derivation of multipliers consult W. Brass (1960)[12].

Focussing first on the most recent population census data of 1979 as contained by Table 9, it is evident at the provincial level of analysis that, Western Province had relatively fewer errors affecting fertility reporting especially among the younger age-groups between 15 years and 24 years. In Western Province, the percentage difference between reported age-specific fertility rates and graduated age-specific fertility rates ranged between -0.8% and -1.1% for the age-groups 15-19 years and 20-24 years respectively. The same values for Nyanza Province were relatively higher being -8.2% and 3.1% for the noted age-groups respectively. The observed differences were therefore small and, therefore, negligible.

Further analysis reveals that the age-groups of 25-29 years and 35-39 years suggested features of relatively better fertility reporting especially in Nyanza Province compared with the level of fertility reporting in Western Province. For these

Fig 8 : Observed and expected age-specific fertility rates per woman for Nyanza and Western Provinces in 1969.

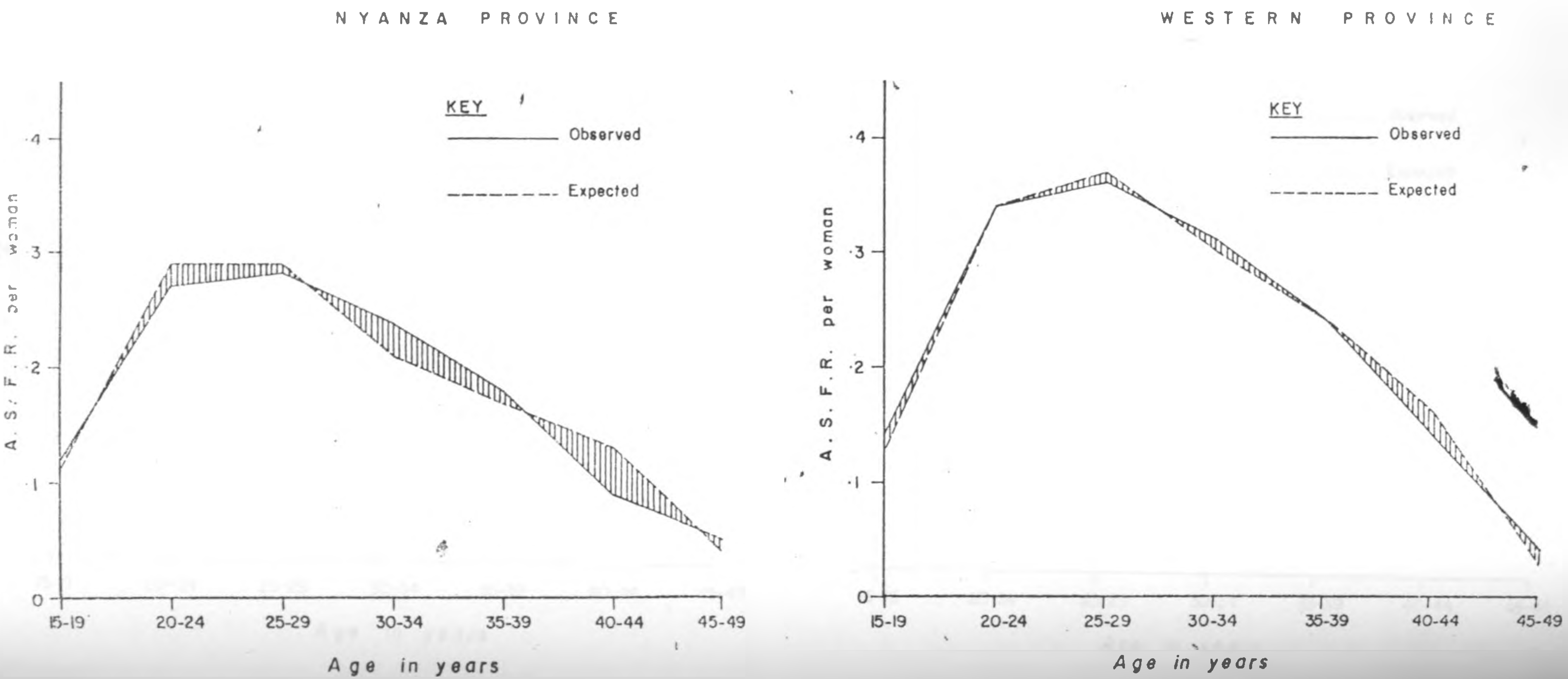
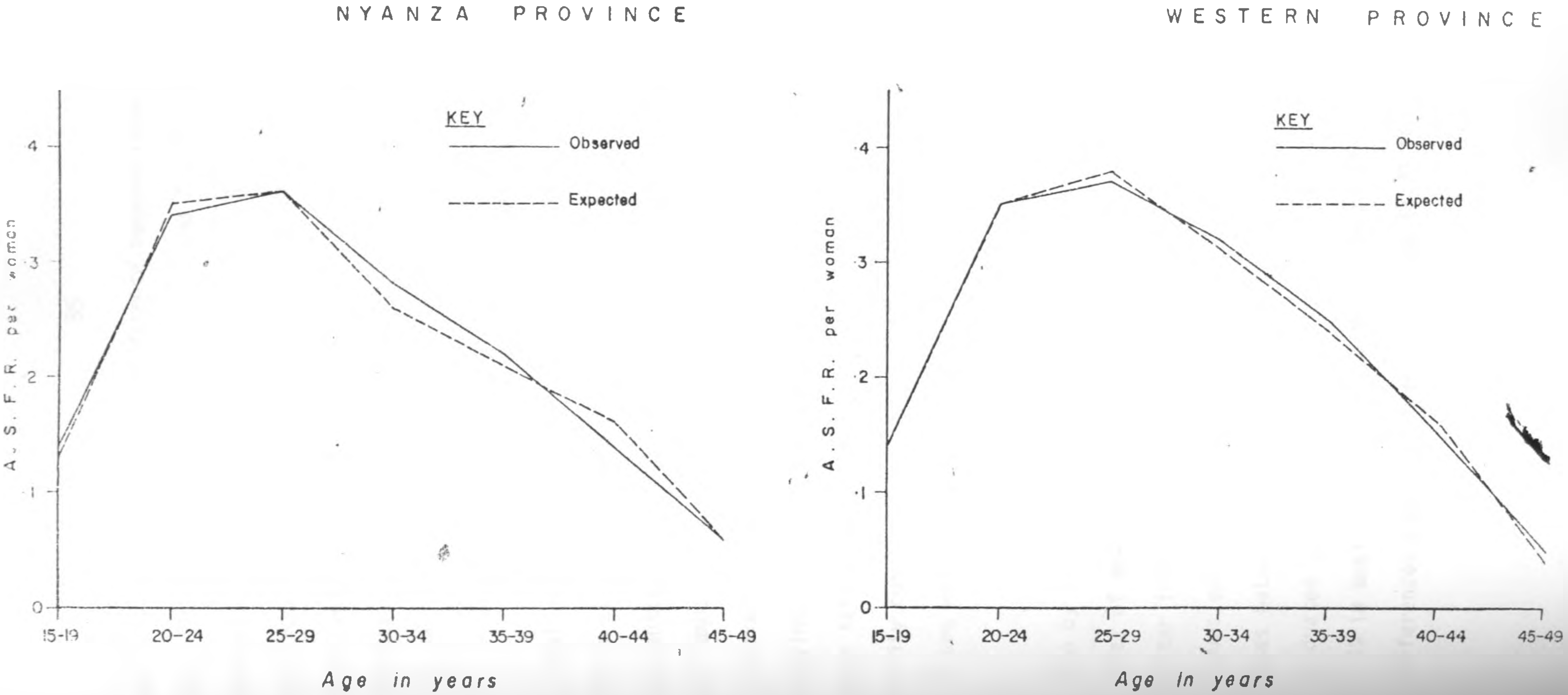


Fig. 9 : Observed and expected age-specific fertility rates per woman for Nyanza and Western Provinces in 1978.



age-groups the percentage difference between reported age-specific fertility curve ranged between -4.9% and 2.2% for Nyanza Province compared with -7.5% and 4.8% for Western Province. However, reference to the older age-groups above 40 years again indicates relatively better fertility reporting in Western Province. Nevertheless, these differences were again small to yield distinct spatial differences.

Further reference to Table 9 indicates that, at the individual district level, according to the 1979 census data, only Busia district in Western Province emerged as having the highest percentage difference between reported age-specific fertility curve and smoothed age-specific fertility curve. The noted percentage differences ranged between -10.9% and 39.1%. Similarly, in Nyanza Province only South Nyanza district elicited features of extremely poor fertility response. Its percentage differences for the fertility curves in question ranged between -23.4% and 29.9%. These values were significantly high.

Now considering the 1978 sample survey data as portrayed also by Table 9 and figure 9, it is evident again at the provincial level of analysis that, Western Province consistently had relatively better fertility reporting than Nyanza Province for all the age-groups except the age-group of 25-29 years. The observed differences between the reported age-specific fertility curve and the graduated age-specific fertility curve ranged between -7.1% and 7.4% in Western Province compared with relatively higher percentage differences ranging between -6.6% and 17.3% for Nyanza Province.

Table 9: Percentage differences between reported and graduated age-specific fertility rates per woman for Western Kenya.

	1979 Census Data						
	Age Groups in Years						
REGION	15-19	20-24	25-29	30-34	35-39	40-44	45-49
NYANZA PROVINCE	-8.2	3.1	2.2	-4.9	-2.2	24.8	-20.5
Kisii district	-4.9	3.4	1.6	-5.1	-5.4	20.5	-17.9
Kisumu "	-4.3	3.8	1.2	-3.7	-7.6	26.2	-21.9
Siaya "	-2.0	0.1	5.4	-3.4	-8.3	24.4	-19.7
S.Nyanza "	-6.2	6.0	1.8	-8.5	-6.1	29.9	-23.4
WESTERN PROV.	-0.8	-1.1	4.8	-3.3	-7.5	18.30	-16.9
Busia district	12.2	21.3	19.6	9.10	4.30	39.1	-10.9
Bungoma "	1.6	-3.2	5.5	-2.4	-5.1	9.3	7.9
Kakamega "	-1.3	-0.7	4.5	-3.3	-8.6	22.1	-17.6
	1978 Sample Survey Data						
NYANZA PROVINCE	-5.2	4.1	1.5	-6.6	-4.2	17.3	-4.7
Kisii district	-12.6	8.3	3.5	-13.2	-6.0	33.8	-22.7
Kisumu "	-10.6	12.3	1.3	-16.9	-2.9	44.8	-29.7
Siaya "	-6.1	4.8	2.3	-5.1	-11.7	49.8	-31.0
S.Nyanza "	-7.5	6.6	5.5	-13.4	-8.0	46.5	-29.3
WESTERN PROVIN.	-1.3	0.3	2.0	-2.3	-3.0	7.4	-7.1
Busia district	1.7	-4.9	-11.6	-6.2	-11.4	27.9	-18.6
Bungoma "	6.8	-7.9	6.8	2.9	-5.9	1.2	6.8
Kakamega "	-6.2	5.5	1.4	-6.9	-3.8	20.5	-3.1
	1969 Census Data						
NYANZA PROVINCE	-9.2	17.6	5.6	12.5	-7.9	41.9	-12.3
Kisii district	-37.6	8.4	3.6	-13.2	-5.6	28.2	-21.5
Kisumu "	-10.6	12.3	1.2	-16.8	-3.0	44.9	-29.6
Siaya "	- 6.2	4.7	2.3	- 5.1	-7.5	16.4	-31.3
S.Nyanza "	- 7.5	6.6	5.3	-13.4	-8.2	46.7	-29.8
WESTERN PROVIN.	- 6.1	1.0	4.0	- 4.3	-5.3	15.5	-14.4
Busia district	1.9	-14.8	11.6	- 6.2	-11.4	28.1	-18.9
Bungoma "	6.9	- 8.1	6.8	2.5	- 5.8	1.0	7.2
Kakamega "	6.7	- 5.2	-1.3	7.4	4.1	-14.9	23.2

Source: Computed from indicated data sources.

Further reference to the individual districts identify Busia in Western Province as emerging again with extremely large percentage differences ranging between -18.6% and 27.9%, while in Nyanza Province, Siaya district had large differences ranging between -13.0% and 49.8%. In fact, all the districts in Nyanza Province, according to the 1978 sample survey data had extremely poor fertility reporting affecting the advance age-groups between 40 and 49 years. This poor response should be considered in the context of high illiteracy among old people which contributed to poor memory of past events. In addition, the relatively low life expectancy of about 50 years for males and 52 years for females in Western Kenya reinforces high mortality experiences in the advanced cohorts (Republic of Kenya, 1969).[13] Consequently, fertility response is likely to be suppressed in such cohorts.

Lastly, information portrayed by Table 9 and figure 8 based on the 1969 census data, confirm again that, at the provincial level of analysis, relatively better fertility reporting occurred in Western Province. The percentage differences between reported age-specific fertility curve and graduated age-specific fertility curve were moderate ranging between -14.4% and 15.5% compared with a range of -12.5% and 41.9% for Nyanza Province. On the basis of individual districts of Western Province, Busia district emerged again with the highest percentage differences of -18.9% and 28.1%, while in Nyanza Province, South Nyanza district again ranked top with percentage differences ranging between -29.8% and 46.7%. The older cohorts again showed extremely poor reporting in all the districts.

It is evident from the analysis of Table 9 and figures 8 that, systematic under-reporting of fertility levels must have affected the cohorts aged 15-19 years, 30-39 years, and 45-49 years in nearly all districts of Western Kenya.

The systematic under-reporting of fertility levels within the age-group of 15-19 years could be attributed to the systematic over-statement of age among females aged 15-19 years. It could also partly reflect suppression of information on illegitimate births. The districts most likely to have been affected by such errors were Kisii and Kisumu in Nyanza Province and Busia district in Western Province (see Table 9).

The systematic under-reporting of fertility among women aged 30-39 years could be accounted for partly by the effects of memory lapses, out-migration, and probably age-misstatement. In Nyanza Province, the districts which could have been affected most by such types of errors were Kisumu, Siaya, and South Nyanza district, while in Western Province, Busia district and Kakamega district were also very affected. These factors could also account for the under-statement of fertility levels among the cohorts aged 45-49 years though effects of mortality were probably more significant.

Though this technique of polynomial functions does not adjust the level of the total fertility rate, it should be realized that, systematically incorporated errors in fertility responses attributed to sampling biases, or faults in reported fertility can hardly be measured accurately by any statistical method. For this reason, the application of this procedure as a crude measure of the extent of regional differences in the magnitude and direction of errors in observed regional fertility schedules is plausible. From the noted differences in the shape of observed and expected fertility schedules of figures 8 and 9, it has been possible to identify the age-groups experiencing upward or downward fertility transfers.

Further analysis of the level of accuracy affecting fertility responses is based on the pattern of W. Brass (1975)[14] Pi/Fi ratios. These ratios,as indicated by Table 10, merely throw light on the magnitude of deviation between current and retrospective fertility. Note that, the difference between Pi and Fi exist by definition and that is why the technique has been devised to be used for estimating total fertility rate from defective current and retrospective data on fertility. But as W. Brass (1975) aptly argues, under situations of accurate reporting of both current and retrospective fertility, the pattern of Pi and Fi ratios should be very close to Unity.[15] In other words, the pattern of Pi and Fi ratios which deviate significantly from unity, therefore, indirectly measure the magnitude of error incorporated in reported current and retrospective fertility data. It is with the above assumptions, that the method is used.

The noted differences in Pi and Fi ratios range between 36.2% and 56.2% for Nyanza Province, compared with a range of 17.5% and 31.7% for Western Province on the basis of the 1979 census data. The same pattern of response is reflected by the 1969 census data. (see Table 10). In fact, the 1969 census data reflected a greater degree of accuracy in fertility reporting because the Pi and Fi ratios were very close to unity. The observed high levels of difference

Table 10: The Pattern of P(i)/F(i) Ratios for Western Kenya

REGION	15-19	20-24	25-29	30-34	35-39	40-44	45-49
	1979 Population Census Data						
NYANZA PROVINCE	1.5675	1.5618	1.4793	1.5092	1.4501	1.4089	1.3621
Kisii district	1.671	1.461	1.390	1.390	1.330	1.286	1.243
Kisumu "	1.041	1.278	1.206	1.255	1.223	1.213	1.183
Siaya "	1.303	1.360	1.238	1.253	1.193	1.151	1.106
S. Nyanza "	1.423	1.455	1.381	1.438	1.384	1.348	1.322
WESTERN PROVINCE	1.317	1.302	1.208	1.237	1.213	1.200	1.175
Busia district	1.232	1.289	1.166	1.245	1.191	1.171	1.147
Bungoma "	1.260	1.232	1.153	1.158	1.145	1.133	1.110
Kakamega "	1.403	1.342	1.247	1.278	1.259	1.247	1.228
	1978 Sample Survey Data						
NYANZA PROVINCE	1.412	1.387	1.334	1.311	1.292	1.287	1.264
Kisii district	1.701	1.652	1.521	1.512	1.462	1.312	1.298
Kisumu "	1.502	1.477	1.439	1.395	1.382	1.299	1.277
Siaya "	1.709	1.663	1.478	1.392	1.368	1.279	1.256
S. Nyanza "	1.502	1.498	1.357	1.333	1.212	1.210	1.202
WESTERN PROVINCE	1.402	1.401	1.399	1.377	1.266	1.229	1.207
Busia district	1.402	1.397	1.374	1.355	1.311	1.300	1.272
Bungoma "	1.326	1.311	1.288	1.246	1.222	1.212	1.204
Kakamega "	1.333	1.329	1.284	1.252	1.243	1.232	1.222
	1969 Population Census Data						
NYANZA PROVINCE	1.519	1.549	1.482	1.436	1.332	1.297	1.256
Kisii district	1.782	1.591	1.507	1.436	1.332	1.286	1.229
Kisumu "	1.382	1.534	1.505	1.493	1.351	1.327	1.285
Siaya "	1.478	1.495	1.362	1.300	1.193	1.157	1.156
S. Nyanza "	1.416	1.547	1.512	1.483	1.422	1.412	1.364
WESTERN PROVINCE	1.186	1.244	1.226	1.188	1.130	1.098	1.051
Busia district	1.475	1.450	1.369	1.359	1.230	1.254	1.210
Bungoma "	1.267	1.231	1.245	1.172	1.142	1.093	1.068
Kakamega "	1.085	1.212	1.192	1.164	1.109	1.065	1.011

Source: Computed from census data.

between current fertility and retrospective fertility in Nyanza Province were confined to the younger age-groups of 15-24 years. These younger age-groups as previously noted suffered from the effects of under-reported fertility.

Further reference to the individual districts on the basis of 1979 data identify Kisii district and South Nyanza district as exhibiting very high levels of difference between current fertility and retrospective fertility. The noted differences ranged between 24.3% and 67.1% for Kisii district while the range for South Nyanza district was between 32.2% and 42.3%. The rest of the districts in the study region had fairly accurate data as the pattern of Pi/Fi ratios were close to unity. Furthermore, according to the 1969 census data, only two districts in the study area namely Bungoma and Kakamega could be categorized as giving fairly accurate fertility data.

On the basis of 1978 sample survey data, a somewhat different picture emerged, for relatively low percentage differences between current fertility and retrospective fertility were observed in Nyanza Province, particularly among the younger age-groups between 15 and 34 years. Among these age-groups the observed difference between Pi and Fi ratios ranged between 31.1% and 41.2%. But, among the older age-groups above 34 years, the fertility response was apparently much better in Western Province because the observed differences between Pi and Fi ratios ranged between 20.7% and 26.6% compared with a range of 26.4% and 29.2% for Nyanza Province. However, these variations at the Provincial level of analysis were small and, therefore, negligible.

Lastly, the 1978 sample survey data once more identified the younger age-groups between 15 and 24 years as experiencing greater response errors in both provinces. This is evidenced by the pattern of Pi/Fi ratios which were above 1.300 among these younger cohorts.

The results are consistent with demographic research findings in Francophone African countries. It was realized through demographic researches in these regions that, the application of Pi/Fi ratios as a measure of errors affecting current fertility and retrospective fertility was extremely crude with census data.[16] The Pi/Fi ratios obtained from censuses sometimes exceed values of 1.500 due to poor response. Note that the organisation and execution of enumeration influence the quality of data collected. For this reason, it has been observed that better organized and better supervised sample surveys often yield Pi/Fi ratios which are more plausible as they approximate unity in most cases while Pi/Fi ratios obtained from censuses, often exceed 1.500 because of poor response partly caused by poor organisation and execution of census enumeration.

3.5 Summary

The following observations are noted:

(a) On the basis of both the 1979 and 1978 data, reported fertility levels tended to elicit a high degree of accuracy.

(b) All the three sets of data namely that of 1979, 1978, and 1969, seem to indicate a relatively better fertility response in the districts of Western Province compared with the situation in the districts of Nyanza Province. However, the differences were rather small.

(c) The age-groups which were probably affected more by poor fertility response, throughout the study region, were 15-19 years and 40-49 years.

In conclusion, it should be emphasized that the primary objective of this research is to relate observed (reported) fertility with the observed regional levels of nuptial variables. However, attempts will be made through different fertility adjustment techniques to reduce such errors substantially. The same procedure will be applied to nuptial variables where possible.

3.6 DATA ANALYSIS

3.6.1 Fertility Analysis

Various indices of fertility measurement are employed in this research. The total fertility rate as derived by the formula below is extensively used;

$$T.F.R = n \sum_{x=15}^{49} nF_x = n \sum_{x=15}^{49} \left(\frac{nBx}{nWx} \right)$$

The data are grouped into age intervals of n=5-years, and f = age-specific fertility rate as reported by females (W) aged between 15 and 49 years. In other words, f = total births per woman (B). This index is used because it measures fertility changes and is independent of the age and sex distribution. It is also a good measure of fertility trends. However, its main limitation is that it is an imperfect measure of a real situation because it covers the fertility behaviour of women of all child-bearing ages in a particular year. Sometimes parents might decide to postpone some births through family planning, but eventually have the same number of children they would have otherwise had, and this process might show up as a decline of the total fertility rate (G.M.K. Kpedekpo, 1982)[17].

The Brass P/F ratio method is also used. It uses data on numbers of children born and date of last live birth and information on the age distribution of the population. From these two sources, independent estimates of the total fertility rate can be obtained by methods involving comparison of cummulated current fertility rates with average parity and by comparison of the cumulative age distribution with stable population models. Brass, (1968)[18] using cumulative current fertility rates with average parity, developed a technique which has been extensively used to estimate the age-specific fertility rates and total fertility rates from data of number of children ever born and retrospective data on number of children born during 12 months prior to the survey or census. The method is based on the simple relationship between age-specific birth rates and current parity. The number of children ever born to a woman of a given age should be equal to the sum of her age-specific fertility at all previous ages.

The basic assumptions on which the method rests are (i) fertility patterns have been constant overtime, (ii) the level of fertility is accurately reflected in the number of children ever born as reported by younger women or those under 30 years. Note that at the older ages data on the children ever born are distorted by omission of births, (iii) the age pattern of fertility is accurately reflected by the data on number of children born in the past year or other interval (Brass, W 1968)[19].

The method consists essentially in the use of Brass multipliers for correcting reported age-specific fertility rates, i.e. the comparison of cumulated current rates with reported retrospective levels. These multipliers relate the recorded parity for age group a, F(a) to the cumulated age-specific fertility rate to the bottom of the age group Ø(a), plus K(a) the multiplier, times the age specific fertility rate for age group a, f(a).

$$F(a) = \emptyset(a) + K(a)\ f(a).$$

The value K(a), however, depends on the shape and position of the the age specific fertility schedule. It is, therefore, clear that by employing the set of Brass's multipliers, it is possible to compare the reported current fertility with the reported parity and correct the level of the former accordingly by using an appropriate correction factor which is either the ratio of f1/f2 or $\overline{m}$, the mean age of child-bearing. Although this method is extensively used in analysing fertility data in Africa, it is very sensitive to age-misstatements which are common in Africa. It is also only appropriate in situations where the assumptions hold (Brass, W. 1975)[20].

3.6.2 Mortality Analysis

Sullivan's method,for the estimation of infant and childhood mortality is also used. It is based essentially on the same concepts as the Brass method, but uses regression coefficients for obtaining the multipliers. Sullivan determined the value of adjustment factors by constructing the adjustment required for each of a number of empirical fertility schedules by single years of age and used regression analysis to determine the relationship between the needed adjustment factor and the parity ratios. However, the scarcity of fertility schedules incorporating an early start of fertility forced him to use fictitious fertility schedules incorporating a start one year earlier than that recorded in empirical schedules of fertility (Sullivan J.M. 1972)[21]. Basically, Brass's model is of the form stated below:

$q(a)$ = (multiplier) (Di) and Sullivan's model is of the form:

$$q(a) = (A + B \quad P2/P3)\ Di.$$

The coefficients are developed by examining the relationship between nqo and the proportion of children dead among ever born to women in each five year age group. The regression equations are calculated according to the equation

$$nqo \;/\; (1 - Si/Pi) = A + B\ P2/P3\cdot$$

where Si is the number of children surviving to women in the i^{th}

5-year age groups and Pi is the number of children ever born to women in the i^{th} 5-year group. It is important to realize that, in estimating regression equations for the relevant mortality pattern of a population the Coale Demeny Model Life Tables must be used. This method is, therefore, suitable for use except in situations where data on children that have died is grossly unreliable, or in cases where mothers experience extremely high mortality rates, because in such a situation children whose mothers have a high risk of dying tend also to have high risk of dying too. (Brass, W. 1975)[22].

3.6.3 Other Indices

A measure of the degree of accessibility to medical institutions in the study region is based on an index of accessibility formula derived as:

$$Ia = \Delta p \times \Delta r.$$

where Ia = index of accessibility.

Δp = the number of places with health institutions multiplied by k and divided by the area of the entire region in km^2. Note that k = 1000.

Δr = the length of all roads in the entire region multiplied by k and divided by the area of the entire region in km^2.(E.E. Arriaga, 1967)[23].

3.6.4 Statistical Analysis

Some measures of central tendency, namely proportions and percentages, have been used in most chapters because of their simplicity and suitability in data analysis and comparison of different types of data analysed. Furthermore, standardization technique based on the formula below has also been applied to marital status data and fertility data (see Shryock and Siegel, 1974).[24]

$$\% \text{ standardized} = \frac{\sum_{a=1}^{n} ra.\ Pa}{\sum_{a=1}^{n} Pa} \times \frac{100}{1}$$

where, Pa = standard population; ra = population of the region in question; and a = the region in question.

Standardization reduces the effects of hidden differences in population composition. In other words, standardization is effective only if age distribution is actually different in configuration. However, variations in age composition due to age misstatement often cause standardization to yield biased results. For this reason, it is essential to graduate mathematically the reported age structure.

Partial correlation analysis will be applied to the data to determine direction and magnitude of relationship between fertility and nuptial variables; nuptial variables and socio-economic variables; and, between various socio-economic and situational variables. The partial correlation, usually, assumes linear relationship between any two variables analysed, and that, such variables are normally distributed. Correlation analysis, therefore, helps in identifying the effect of one variable while holding the latter variable constant. Note that the first order partial correlation coefficients, those holding constant only one other independent variable can be derived by the formula given by R.J. Johnston (1978)[25] as follow:

$$r01.2 = \frac{r01 - (r02)(r12)}{\sqrt{1 - r02^2}\ \sqrt{1 - r12^2}}$$

where xo is the dependent variable and x1 the independent variable, holding constant the effects of other specified independent variable x2. The list of other independent variables held constant can be extended (i.e. x_2, x_3, x_4 - - - xn). The interpretation of the results usually involves the use of the product, moment zero-order correlation coefficients. According to H.M. Blalock, Jr. (1979), it is not necessary to go much beyond the second or third order partial because the additional controls produce very few insights.[26] It should, however, be realized that though correlation analysis indicate which variables are highly related, its limitation is that no causality can be inferred and this limits its application for policy conclusions. For this reason, a multiple regression model is needed to establish causality. The partial correlation results will be analysed in chapters 7 and 8.

3.6.5 Econometric Analysis

A multiple regression model will be specified and estimated. In matrix notation, we propose to specify the following linear regression model.

$$Y = XB + \epsilon$$

where Y = $1 \times n$ vector of total fertility

X = $n \times n$ matrix of nuptial variables

B = $1 \times n$ vector of regression coefficients.

Step-wise regression analysis estimation technique will be used by the help of a computer using the SPSS statistical package. The results of this analysis are also discussed in chapter 7 and 8. The advantage of step-wise regression analysis is that it eliminates our a priori selection of what variables to include and exclude from the regression model. The regression results appear in chapters 7 and 8, and, embrace the following types of regression: nuptial variables on total fertility rates; socio-economic and situational variables on nuptial variables; and socio-economic and situational variables on total fertility rates.

3.7 The Limitations of the research

The concept of nuptiality, which refers to the frequency of marriage, or computed probabilities of marriage rates, divorce rates, and widowhood rates as contained in nuptiality tables, could not be incorporated in the research analysis for several reasons. First, the 1978 sample survey data yielded relatively small response on marriages contracted 12 months before the survey. Second, Western Kenya was observed to experience a high incidence of migration which could have affected such information especially from female age groups.

Moreover, the 1969 and 1979 census data as published, did not give information on first marriages contracted 12 months before the census date. The registration of marriage, divorce, and widowhood by the Registrar General was also regarded as unsuitable for computation of nuptial rates. Such data were found to be very crude due to poor coverage of small sub-regional units such as locations. For this reason, the research uses nuptial variables, namely the number of females aged between 15 and 49 years in different marital statuses and of different marriage types and patterns. Accurate and reliable data based on censuses and sample surveys were obtainable for the noted nuptial variables.

With respect to fertility analysis, the broad aspects of fertility concepts constituting natural fertility, desired fertility and optimal fertility were not incorporated in the analysis in favour of the concept of reported fertility. (R.A. Easterlin, 1976).[27] Reported fertility or the recorded number of children ever born alive has more relevance for it influences immediately the allocation of family resources. Family size goals are also formulated and implemented in terms of surviving children and not births. (R.A. Easterlin, 1978).[28] This notion implies that desired or expected fertility levels are largely a function of surviving children.

Furthermore, the desired family size at the societal level may be incongruent with desired family level of individual couples. In other words, through family planning practices or through natural inhibitions such as sub-fertility an individual family may end up with fewer births than the society expects. Conversely, socio-economic conditions such as wealth could encourage a family to have more children than is socially desirable for the society. Consequently, the theoretical nature of the concepts of desired or expected fertility levels render it difficult to employ them in cross-cultural studies.

With regards to employment and income data, it was deemed necessary to use a general concept of employment to incorporate female employment in both the formal and informal sector, because of the small proportion of females in different employment categories in most rural areas. Females working for paid labour whether in plantation farms or for other individual farms were classified as employed within that period. This classification included females with well established small scale commercial farms from which they derived regular income. But, females working on their subsistence farms were regarded as unemployed though it was realized that the surplus produced from such activities could provide an income. Income was another problematic variable to estimate especially among women in self-employment. However, whatever they stated as their income was the difference between gross annual sales and gross annual costs incurred during production.

The other limitation relates to the unit of analysis. The study does not consider reported fertility levels of individual couples or household units, but rather aggregated reported fertility levels, nuptial levels, socio-economic levels, etc. at the district level thus giving the analysis a geographic dimension. Note that, regional fertility levels are regarded as having more immediate policy implications for regional development. The district in Kenya constitutes the lowest level for integrated regional development planning. For this reason, environmental data (situational variables) in most cases are available only at the district level.

Lastly, another aspect of limitation relates to the nature of relevant data needed for the research model of fertility determinants. These variables are many and have been aptly discussed by R. Freedman, (1962)[29]. Since some of these variables of cultural and socio-psychological conditions are difficult to measure for purposes of quantification, the selected range of variables programmed in the analysis was somewhat limited though accurate and reliable data could be obtained about them.

3.8 Training and interview

It was a requirement that adult males be interviewed by male interviewers, while adult females were approached by female interviewers. Each district, therefore, had a pair of field assistants, who were school certificate holders and also properly trained social workers (field educators). These were seconded to me by the then Ministry of Social Services now the Ministry of

Culture and Social Services.

Each district had also a senior social worker, who in most cases was a professional, to supervise and co-ordinate the survey and attend to the problems of field enumerators during my absence. These enumerators knew very well the populations within their jurisdictions and earned respect from them due to the nature of their work.

I personally conducted the training of these enumerators and all aspects of the questionnaire structure and interpretations were examined to avoid possibility of mis-interpretation. After training, mock interviews were carried out to help enumerators identify possible problems and to collectively prescribe solutions for such problems.

3.9 Conclusion

It is evident from the foregoing analysis that the demographic statistics of the sample survey data had relatively less response error when compared with census data of 1969 and 1979. This was partly due to the effectiveness of the sampling methodology adopted and the strict training and supervision of enumerators. Furthermore, the demographic techniques of analysis already discussed could further help in reducing response errors affecting fertility and age structure.

However, errors affecting socio-economic data and situational variables were difficult to determine and correct. Nevertheless, it is hoped that, such errors were limited only to response errors and were negligible due to the large population of respondents as in the case with census enumerations.

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CHAPTER 4

4.0 REGIONAL STRUCTURE OF TOTAL FERTILITY RATES

4.1 Introduction

In Chapter III, an attempt was made to discuss the various data sources. Data quality and reliability for the purposes of statistical inferences were also examined. It was, however, found that relatively greater response errors affected reported fertility in the districts of Nyanza Province when compared with the districts of Western Province. But the noted differences were small as indicated by table 9; a conclusion consistently endorsed by the data of 1969, 1978, and 1979. Moreover, demographic techniques employed to reduce further response errors in the data were discussed.

The purpose of this chapter is, therefore, to re-examine the first part of the research objective which requires the portraying of the regional structure of fertility. This is now achieved in view of the estimated fertility levels which are assumed to contain relatively less response error. It must be emphasized that, this analysis does not attempt in principle to depict true (exact) regional fertility levels, because such an analysis could well provide enough material for another thesis and would require more sophisticated demographic techniques of analysis. Explicitly stated, the objectives of this research could be satisfactorily realized with crude estimates of total fertility rates.

This chapter is broadly divided into two sections. Section one examines fertility gradients of the study areas. Note that the tempo of fertility, apart from helping one to identify the most important age-groups in reproduction for policy action, may also partly reflect regional pattern of reproduction behaviour which can be best conceived in the context of the marital characteristics of a population. The second section of this chapter then utilizes selected fertility indices, namely current total fertility rates, lifetime total fertility rates and, total fertility rates estimated by P_3^2/P_2 ratios, and the Brass Pi/Fi ratio method.

4.2 Regional structure of fertility gradients

According to figure 10, the pattern of fertility take-off was rather similar at the provincial level of analysis. But a diagramatic comparision of fertility curves as portrayed by figure 10 could be misleading due to the effects of scale. For this reason, a more plausible analysis which measures crudely the steepness and decline of the fertility curve is the mean value theorem which is used to obtain $f^1(x)$ or the first derivative at specified ages using the formula below;

$$f^1(x) = \frac{f(x+h) - f(x-h)}{2h}$$

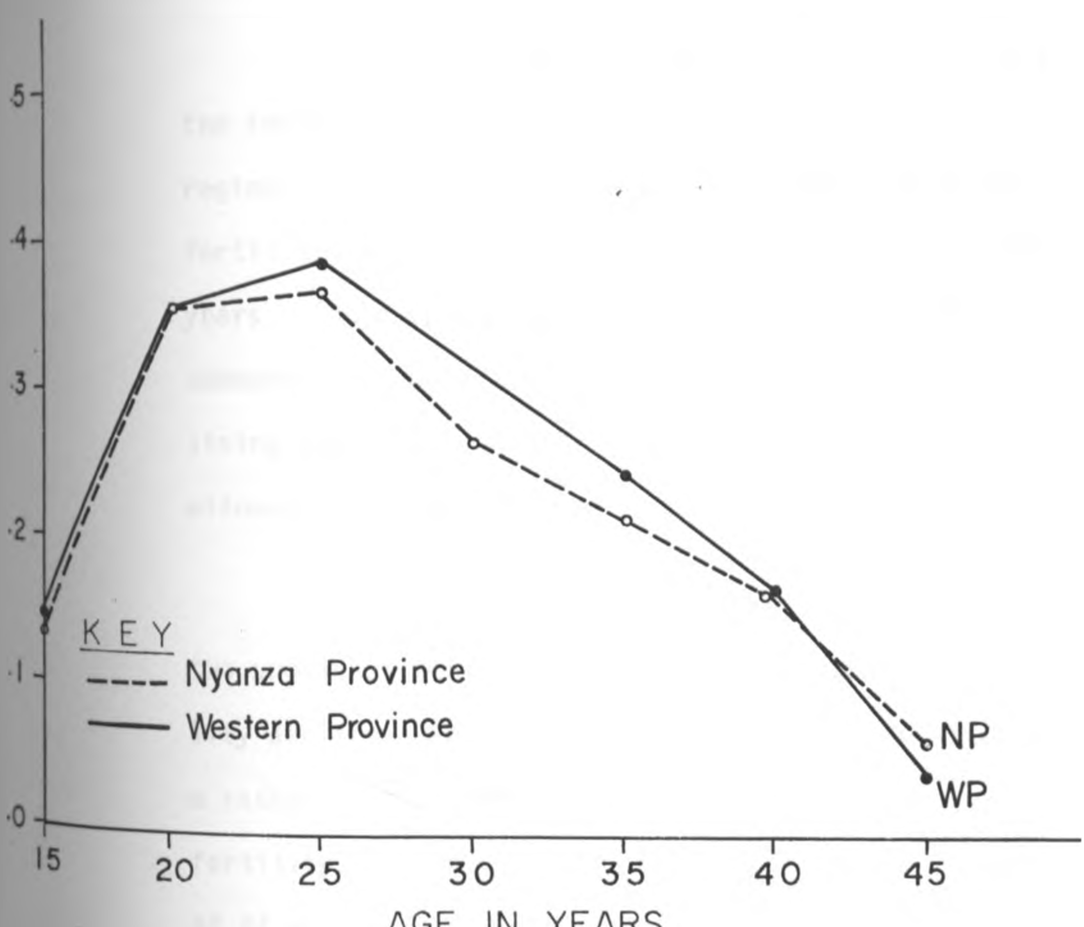
where h is the interval. (G.M.K. Kpedekpo, et al. 1976)[1]. The results of this calculation are contained in Table 11. On the basis of 1978 sample survey data, fertility take-off from age 15 to 22 years was very similar for both provinces as the gradients at age x = 22 years were 1.48 and 1.51 for Nyanza Province and

FIG 10

Graduated age-specific fertility rates per woman for NYANZA and WESTERN PROVINCES in 1978

Slope of the age curve of fertility

Province	22	27	32	37	42
Nyanza	+ 1·48	-0·61	-0·99	-0·64	-0·99
Western	+ 1 51	-0·28	-0·88	-0·90	-0·20



Western Province respectively. Could this phenomenon suggest that, in both provinces, the mean age at first marriage and the proportions marrying between the age of 15 and 24 years were nearly the same? Furthermore, there was evidence, though insignificant that the gradient of fertility take-off for Nyanza Province was relatively less steep than that of Western Province. This observation was better endorsed by the fertility gradients of the 1979 population census data. (see Table 11).

Further reference to Table 11 suggests that a decline in the tempo of fertility began at the age of 27 years in the study region. Explicit in this analysis is the notion that, maximum fertility level was attained by the age groups between 25 and 29 years. Could this observed declining trend in fertility which commenced at about the age of 27 years be accounted for by a declining trend in fecundity, proportions divorced and separated, widowed, or contraceptors?

Furthermore, there is evidence from Table 11 that, the two provinces differed somewhat with respect to the rate of fertility decline. For example, in 1978 Nyanza Province experienced a rather more gradual rate of fertility decline because it had fertility gradients ranging between -0.61 and -0.99 for the ages of 27 and 42 years respectively. On the other hand, Western Province experienced a rather high rate of fertility decline which ranged between gradients of -0.28 and -1.20 for the ages of 27 and 42 years respectively. A similar tempo of fertility decline emerged from the 1979 census data.

Table 11: The Slope of The Age Curve of Fertility

Region/District	Year	$f^1(x)$ Gradients at Different Ages				
		22	27	32	37	42
NYANZA PROVINCE:	1979	1.31	-0.40	-0.97	-1.22	-1.10
	1978	1.48	-0.61	-0.99	-0.64	-0.99
Kisii district	1979	1.64	-0.18	-0.94	-1.17	-1.14
	1978	1.60	-0.05	-0.54	-0.86	-1.08
Kisumu "	1979	1.10	-0.50	-0.96	-1.23	-1.12
	1978	1.07	-0.35	-1.05	-1.20	-0.81
Siaya "	1979	1.29	-0.49	-0.98	-1.30	-1.14
	1978	1.43	-0.21	-0.90	-1.45	-1.20
S. Nyanza "	1979	1.08	-0.46	-0.92	-1.13	-1.02
	1978	0.99	-0.35	-0.77	-1.25	-1.01
WESTERN PROVINCE:	1979	1.51	-0.25	-0.78	-1.18	-1.25
	1978	1.51	-0.28	-0.88	-0.90	-1.20
Busia district	1979	1.31	-0.51	-1.00	-1.22	-1.09
	1978	1.28	-0.48	-0.61	-1.19	-1.21
Bungoma "	1979	1.48	-0.14	-0.62	-1.08	-1.33
	1978	1.40	-0.11	-0.41	-1.05	-1.53
Kakamega "	1979	1.57	-0.23	-0.78	-1.21	-1.25
	1978	1.39	-0.12	-0.82	-1.13	-1.15

Source: Computed from the 1978 Sample Survey data and 1979 Population Census data.

Now,focussing attention on the individual districts as portrayed by Table 11, it is observed that, Bungoma district had an age-specific fertility schedule with a relatively gradual rate of decline confined to the age-group of 27 and 37 years, after which fertility gradients began to decline steeply. Similarly, fertility decline was somewhat gradual between the ages of 27 and 32 years only in Kisii and Kakamega districts, after which the decline became very steep indeed. It was also observed that the fertility decline in the remaining districts tended to be gradual from the age of 27 up to the end of the reproductive period.

The observed degree of similarity in the tempo of fertility endorses the proposition that, reproduction behaviour in the entire Western Kenya region is somewhat similar. Explicitly stated, both provinces could constitute one regional unit of homogeneity with respect to nuptial variables such as age at entry into reproduction, proportions of female population in different marital statuses, marital instability, etcetera.

In addition, the gradual rate of fertility decline which characterises most districts in Nyanza Province relative to the situation in Western Province (note, the difference is more insignificant) suggests older women in Nyanza Province have a greater probability of experiencing relatively more live births assuming other factors affecting fertility level are constant. Lastly, the rapid rate of fertility decline observed in Kakamega district and to some extent Kisii district must be accounted for not only in the context of fecundity decline and the increasing rate of female mortality rate with advancing age, but also bearing in mind nuptial factors such as divorce rate and other practices such as contraception.

4.3 Regional Total Fertility Levels

According to the Kenya Fertility Survey (GK/CBS, 1980)[2], the average total fertility level for Kenya was 8.1 births. This value was used as a yard-stick for identifying districts which had a total fertility level above the national average. According to Table 12, three districts were identified as having extremely high total fertility levels above the national average. Kisii district had average births of 9.0 and 8.7 for 1979 and 1978 respectively. Bungoma district also had 9.1 and 9.6 births and Kakamega district 8.8 and 9.0 births for the two years respectively. Though the remaining districts had total fertility rates below the national average, their total births were equally high, approximating the national average. It must be realized that, at the provincial level of analysis, differences in total fertility rates were small (see table 12). For example, Nyanza Province had total births of 7.9 and 7.6 compared with 8.6 and 9.1 for Western province during 1979 and 1978 respectively.

A similar experience of high fertility levels emerged when adjusted total fertility rates by Brass P/F ratio method were examined. Though K.V. Ramachandran, et al., (1979)[3] who analysed fertility and mortality levels in some English-speaking African countries concluded that the Brass P/F ratio method tends to give slightly higher fertility levels, its use is still plausible

Table 12: Total Fertility Rates for Western Kenya

REGION	Year	Current Total Fertility Rate	Lifetime Total Fertility Rate	P_3^2/P_2 Estimate of total F. Rate	Brass P_2/F_2 Estimate of Total F. Rate	Brass P_3/F_3 Estimate of Total F Rate
NYANZA PROVINCE	1979	5.8	7.9	7.9	9.1	8.3
	1978	7.6	7.6	8.2	10.0	9.3
	1969	6.2	7.7	8.0	9.5	9.1
Kisii District	1979	7.3	9.0	9.3	10.6	10.2
	1978	8.8	8.7	9.3	12.2	11.2
	1969	7.3	8.8	9.1	11.6	11.0
Kisumu "	1979	6.5	7.7	7.1	8.3	7.8
	1978	6.9	7.4	8.0	9.3	8.6
	1969	5.6	7.2	7.8	8.6	8.4
Siaya "	1979	6.3	7.0	7.0	7.8	7.7
	1978	7.3	7.8	7.4	8.9	8.3
	1969	6.0	6.9	7.2	8.9	8.2
S. Nyanza "	1979	6.0	7.9	7.4	8.8	8.3
	1978	7.1	7.5	8.0	9.5	8.9
	1969	5.8	7.8	7.8	8.9	8.7
WESTERN PROVINCE	1979	7.4	8.6	7.8	9.6	8.9
	1978	8.1	9.1	8.4	9.1	9.1
	1969	7.9	8.2	8.7	9.8	9.6
Bungoma District	1979	8.2	9.1	8.1	10.1	9.5
	1978	8.5	9.6	8.7	9.6	9.6
	1969	8.2	8.7	9.2	10.0	10.2
Busia "	1979	6.7	7.7	7.0	8.7	7.8
	1978	6.6	8.7	7.6	8.5	8.4
	1969	6.5	7.9	7.9	9.5	8.9
Kakamega "	1979	7.2	8.8	7.9	9.6	8.9
	1978	8.4	9.0	8.4	9.2	9.1
	1969	8.1	8.2	8.7	9.8	9.7

Source: Computed from Census data of 1979 and 1969 and Sample Survey data of 1978.

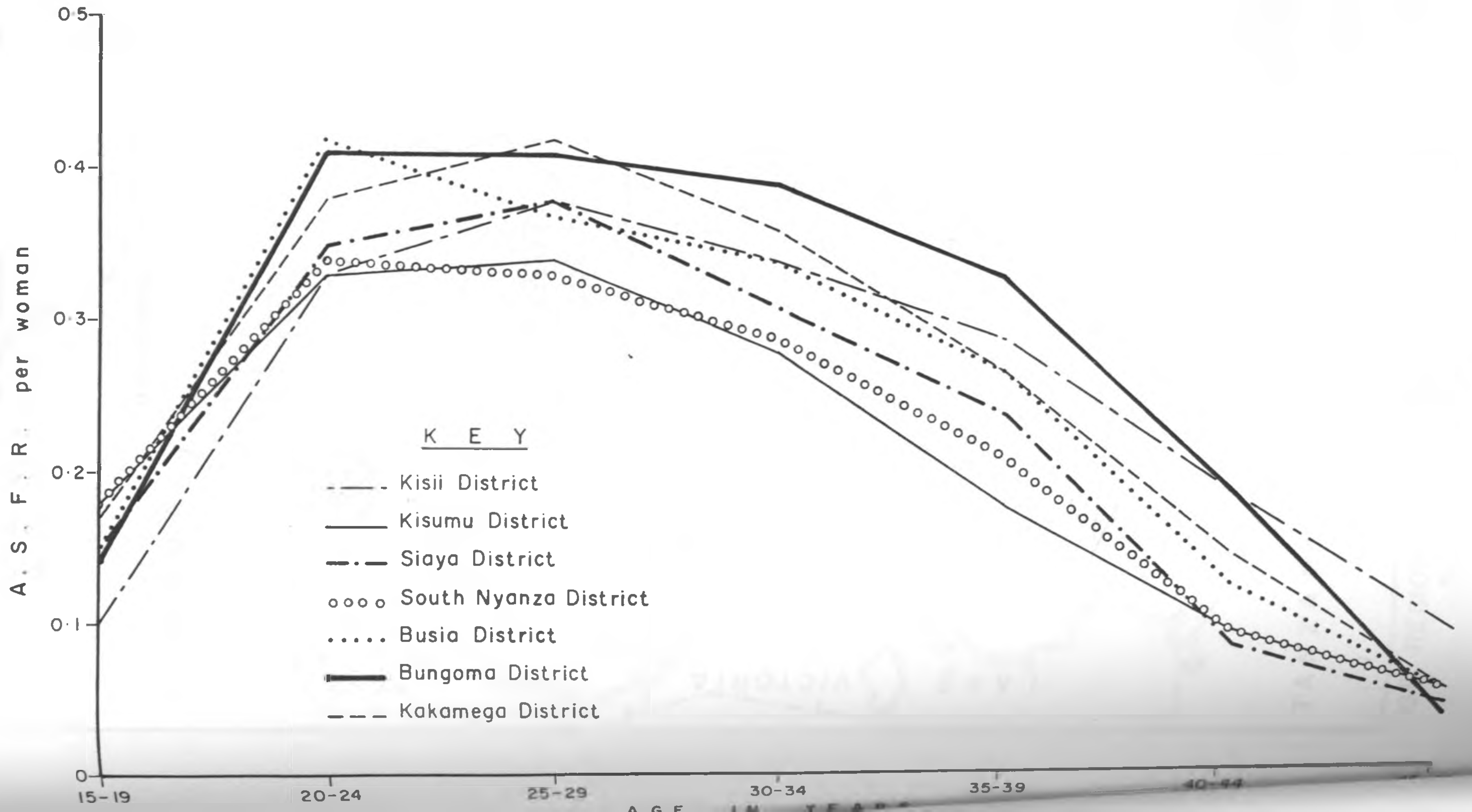
especially in situations of better collected data. (J.G.C. Blacker, 1979)[4]. Conclusively, adjusted total fertility rates on the basis of P3/F3 ratio method yielded plausible results because such values were somewhat consistent with the pattern of lifetime total fertility rates unadjusted.

4.4 Regional Structure of Fertility Patterns

Though the structure of fertility patterns is implicit in the analysis of the pattern of Pi/Fi ratios as discussed in Chapter III, and subsequent discussion on fertility gradients of Table 11, it is absolutely necessary to re-examine statistically age-specific fertility distributions in order to correlate such fertility structure with the pattern of age-distribution of nuptial variables which will be discussed in the next chapter.

At the provincial level of analysis, the observed levels and trends of age-specific fertility rates suggest that the entire study region belong to the broad-peak fertility pattern. This notion is supported by the observed small differences in the percentage distribution of total fertility rates of the age-groups 20 - 24 years and 25 - 29 years (see appendix 2). According to the 1978 Sample Survey data, in Nyanza Province, the age-groups of 20 - 24 years and 25 - 29 years accounted for 23.2% and 23.4% of the current total fertility rates respectively. For Western Province, the noted age-groups accounted for 21.8% and 23.5% of the current total fertility rates respectively. Even at the individual district level, the noted levels and trend of age-specific fertility rates could be classified as broad-peak (see figure 11 and 12).

FIG. 11 GRADUATED AGE-SPECIFIC FERTILITY RATES PER WOMAN FOR EACH DISTRICT IN 1978.



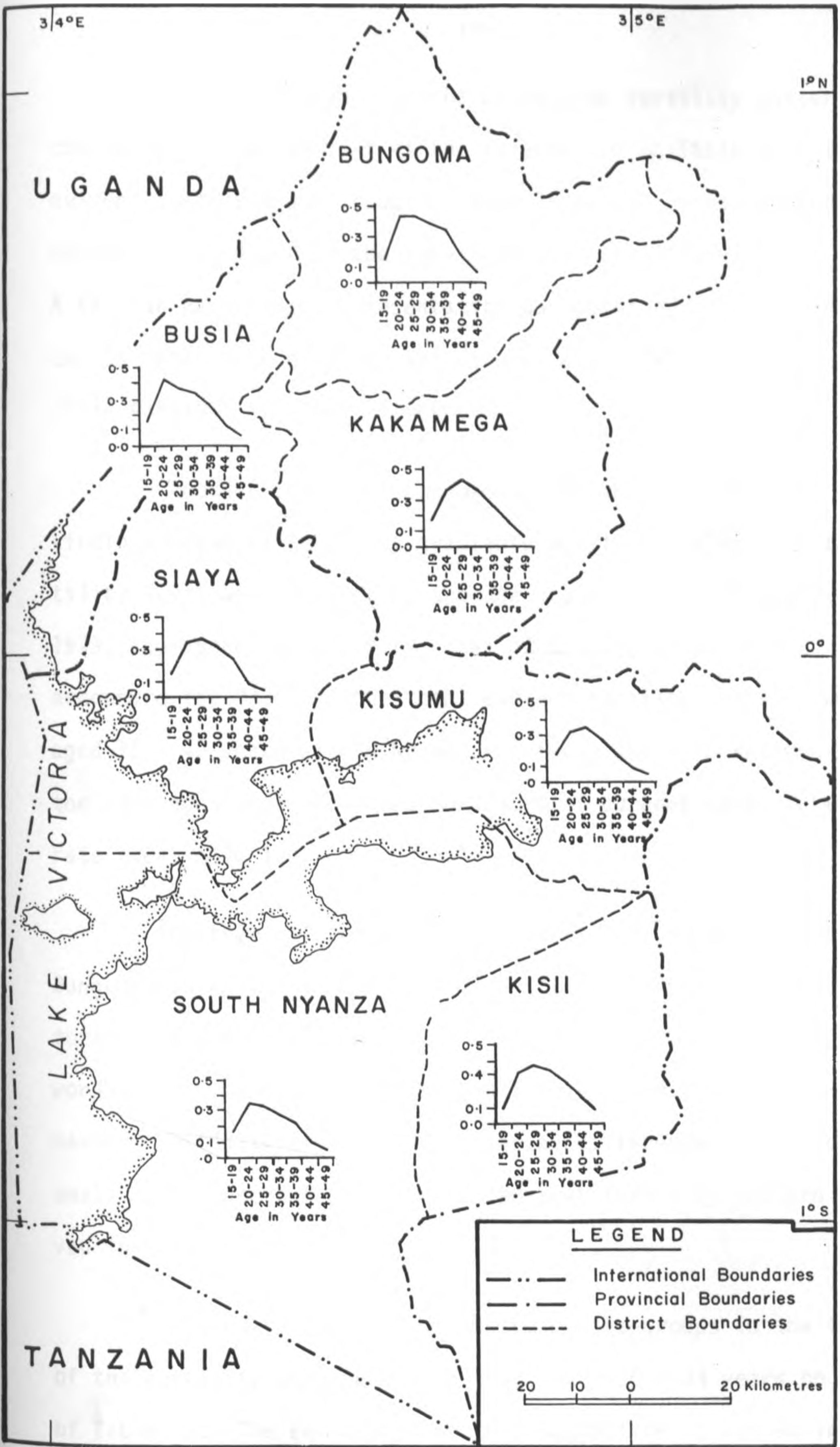


FIG.12 REGIONAL PATTERN OF AGE-SPECIFIC FERTILITY SCHEDULE PER WOMAN IN 1978

The significance of the broad-peak fertility pattern is considered in the context of the information on Table 13. It is evident that, the age-groups between 15 and 29 years accounted for between 47% and 57% of the total current fertility rates in 1969. A similar percentage representation was observed with the 1979 census data. The district values were again fairly similar to yield distinct spatial differences.

Another important phenomenon, which reinforces the earlier findings given by fertility gradients was that the maximum fertility level was achieved by the age-group of 25 - 29 years. In 1979, age-specific fertility rates of the age-group 25 - 29 years accounted for 23.6% of the total current fertility rate of women aged 15 - 49 years within Nyanza Province, while in Western Province, the same age-group accounted for 23.2% of current total fertility rate (see Table 13).

Further reference to each district isolated Kisii district, Bungoma district, and Kakamega district as having maximum current total fertility levels among females aged 25 - 29 years. In other words, the remaining districts had females aged 20 - 24 years with maximum fertility levels. The observed differences were, however, small thus contributing to the broad-peak fertility pattern observed in most districts.

In addition, the most important age-groups in the totality of the fertility structure were those aged 20 - 34 years on the basis of Table 13. The rationale for this suggestion is rooted in the realization that in 1979 and 1969, reference to each district showed

Table 13: Accumulated Percent of Age-Specific Fertility Rates for Western Kenya

REGION	Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
NYANZA PROVINCE	1979	10.5	33.6	57.2	76.3	90.2	97.1	100.0
	1969	9.5	31.1	53.7	73.3	88.0	95.6	100.0
Kisii District	1979	7.8	29.5	53.7	73.6	88.4	96.6	100.0
	1969	5.9	25.1	47.0	66.7	83.2	94.3	100.0
Kisumu "	1979	12.3	35.8	59.1	77.6	91.3	97.5	100.0
	1969	12.2	34.6	57.5	76.4	88.8	95.7	100.0
Siaya "	1979	10.7	34.8	58.4	77.6	91.4	97.6	100.0
	1969	9.7	32.0	56.2	76.2	91.4	97.0	100.0
S. Nyanza "	1979	11.9	34.9	57.6	76.0	89.5	96.6	100.0
	1969	11.8	34.4	56.2	75.5	89.4	96.1	100.0
WESTERN PROVINCE	1979	8.1	30.5	53.7	73.6	89.0	97.1	100.0
	1969	8.7	30.3	52.9	72.7	88.2	96.9	100.0
Bungoma Dist.	1979	7.5	29.1	51.4	71.6	87.7	97.1	100.0
	1969	7.5	28.9	50.4	70.7	88.1	97.9	100.0
Kakamega "	1979	7.7	30.0	53.4	73.4	89.0	96.9	100.0
	1969	9.2	30.2	53.3	73.1	88.0	96.5	100.0
Busia "	1979	10.5	34.5	58.1	78.0	91.6	98.3	100.0
	1969	8.7	32.9	54.4	73.8	89.2	96.7	100.0

Column heading spanning the age columns: Age Groups In Years

Source: Computed from the 1969 and 1979 census data.

that age-specific fertility rates of the age-groups between 20 and 34 years accounted for between 60% and 65% of the total fertility rates in each district. Does this observation suggests that the nuptial determinants of fertility also attain their maximum positive influence on fertility among the age-groups between 20 and 34 years? Explicitly stated, the first-half of the reproductive life-span is the most important with regards to fertility structure. It is these age-groups that should be influenced with anti-natalist policies.

4.5 Summary

The foregoing analysis identified Western Kenya as a whole as a zone of high total fertility rate, in which districts such as Kisii, Kakamega, and Bungoma have total births per woman exceeding the national average birth of 8.1.

The pattern of fertility take-off was very similar in most districts and yielded a broad-peak fertility pattern. Maximum fertility level per woman was attained in the age-group of 25 - 29 years in only three districts. The tempo of fertility was found also to rise rapidly up to age 26 years before commencing to decline at the age of 27 years to reach zero level at menopause. The rate of fertility decline tended to be gradual in most districts except Kisii and Kakamega in which the tempo of fertility decline was very steep. It was also observed that, the age-group of 20 - 34 years probably constituted the most important female cohorts as these age-groups accounted for about 3/5 of the total fertility rates.

These phenomena suggest that the whole of Western Kenya is a region of probably homogeneous reproductive behaviour in which similarities in determinants of fertility levels should also be expected. In other words, the elements I have noted in the regional structure of total fertility rates suggest apparent homogeneity in the structure of nuptial variables and socio-economic factors.

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CHAPTER 5

5.0 REGIONAL STRUCTURE OF NUPTIAL VARIABLES

5.1 Introduction

In Chapter IV, it was proposed that, the whole of Western Kenya is probably a zone of homogeneous reproductive behaviour at the macro-regional unit. It was further implied that such phenomena (reproductive behaviour)could only be reinforced by regional similarity in the structure of nuptial variables, socio-economic variables, and situational phenomena.

The main objectives of this chapter are therefore twofold. First, an examination is made of the regional levels and trends of nuptial variables with the aim of justifying the nature and extent of regional similarities in the structure of nuptial variables. This examination will satisfy the requirements of the second part of the research objective which requires describing the regional structure of nuptial variables. Second, the extent to which cohort structure of nuptial variables corresponds with cohort structure of fertility levels as discussed in Chapter IV is also examined. Such an analysis, therefore, satisfies the requirements of the third research objective which aims at investigating the strength of the relationship between each nuptial variable and total fertility rate.

5.2 Regional levels of proportions single

On the basis of the 1969 and 1979 population census data, the proportions of single females over the age of 29 years were found to be rather small in every district because proportions of such women never exceeded 3.0% . For this reason, a meaningful study of regional levels of single females should be restricted to the age-group between 15 and 29 years only. The significance, of these cohorts is implicit in the districts pattern of single females aged 15-49 years as portrayed by Figure 13. Though most districts by 1969 had a similar pattern of proportions single, South Nyanza district somehow tended to have relatively low level of such women especially in the age-groups between 15 and 24 years. To what extent, then could the implied phenomena of universal marriage in the whole of Western Kenya be attributed to a relatively low stage of socio-economic development in the region?

According to Table 14, Nyanza Province on average realized a small intercensal increase of 4.8% in the proportion of single females aged 15 - 29 years. The province also recorded the greatest level of intra-district variations in proportions of single females aged 15 - 29 years. To illustrate, the highest proportions of 23.4% and 29.4% were realized in Kisii district during 1969 and 1979 respectively. Conversely, the lowest proportions of 13.0% and 17.2% were realized in South Nyanza during the two periods respectively. But, the remaining districts in Nyanza Province recorded relatively low proportions of such women and also yielded very small intercensal growth rates. Note that Kisii district which exhibited the highest total fertility rate in the whole Province, also had the highest level of proportion

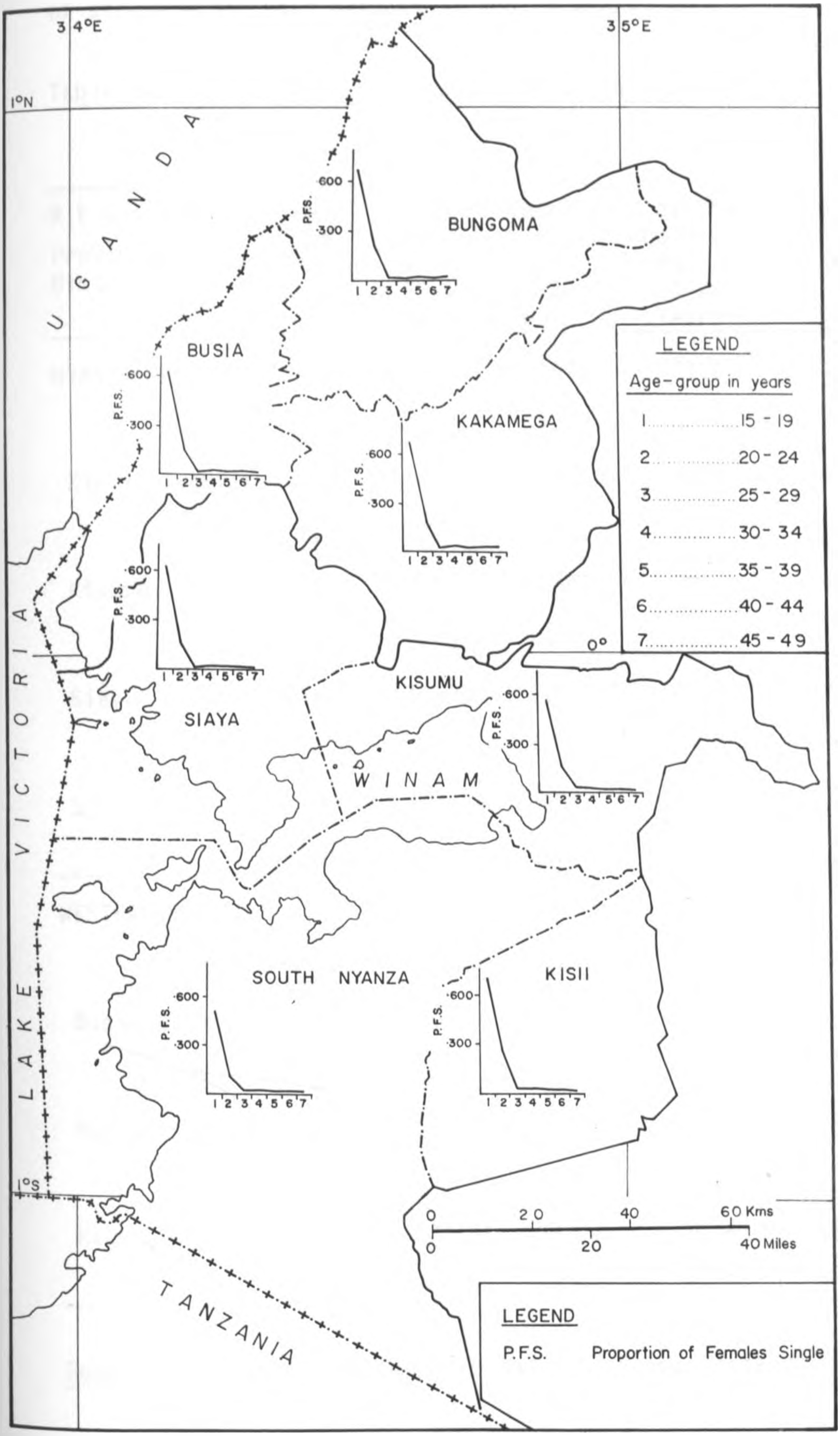

FIG. 13 PROPORTION OF FEMALES SINGLE BY COHORTS FOR WESTERN KENYA IN 1969.

of single women aged between 15 and 29 years.

Table 14: Proportions of Females Single in Western Kenya

REGION Province/ District	Year of Census	Total Females aged 15-49 Years	Females Single aged 15-29 Years	% of Single Females aged 15-29 Years	% of Intercensal Change
NYANZA PROVINCE	1979	609383	131573	21.6	4.8
	1969	462443	77771	16.8	
Kisii District	1979	187071	55055	29.4	6.0
	1969	128943	30212	23.4	
Kisumu "	1979	111618	21500	19.3	3.2
	1969	89351	14360	16.1	
Siaya "	1979	115906	21503	18.6	4.0
	1969	91834	13383	14.6	
S. Nyanza "	1979	194774	33515	17.2	4.2
	1969	152315	19816	13.0	
WESTERN PROVINCE	1979	401547	98984	24.7	4.2
	1969	274464	56251	20.5	
Busia District	1979	71944	13992	19.5	4.3
	1969	45029	6835	15.2	
Bungoma "	1979	106476	25984	24.4	2.8
	1969	69038	14925	21.6	
Kakamega "	1979	223141	59008	26.4	4.9
	1969	160397	34491	21.5	

Source: Computed from the 1969 and 1979 Census data.

In Western Province, a rather low intercensal change of 4.2% was also observed among single females aged between 15 and 29 years. Furthermore, unlike the situation in Nyanza Province, intra-district proportions of such women were highly comparable as the highest proportions of 21.5% and 26.4% for 1969 and 1979 respectively were observed in Kakamega district compared to relatively low proportions of 15.2% and 19.5% for Busia district during these two periods. The observed differences between the two districts were nearly half the observed differences noted in Nyanza Province. Note that Kakamega district which recorded relatively high total fertility rates also had relatively high proportions of single females aged 15-29 years, while Busia district, which had the lowest level of total fertility rates in the entire Western Province also had the lowest level of proportions of single females.

5.3 Regional levels of Proportions Currently Married

The 1969 and 1979 population census data confirm that universal marriage is a demographic reality in the entire study region. Nevertheless, there was an apparent declining trend in the proportion of females aged 15-49 years who were currently married between 1969 and 1979.

In Nyanza Province, currently married females aged 15-49 years constituted 75.0% and 71.1% of all women in the reproductive life-span during 1969 and 1979 respectively. The noted intercensal change was negative by -3.9%.

In Western Province, currently married females of similar

Table 15: Percent of Currently Married Women in Western Kenya

REGION Province/ district	Year of Census	Women aged 15-49 Years only	Women aged 15-49 Years currently married	Percent of currently married
NYANZA PROVINCE	1979	609,383	433,232	71.1
	1969	462,443	346,644	75.0
Kisii District	1979	187,071	120,516	64.4
	1969	128,943	89,575	69.5
Kisumu "	1979	111,618	150,663	72.9
	1969	89,351	66,934	74.9
Siaya "	1979	115,906	85,434	73.7
	1969	91,834	71,188	77.5
S. Nyanza	1979	194,774	145,893	74.9
	1969	152,315	118,947	78.1
WESTERN PROVINCE	1979	401,547	279,052	69.5
	1969	274,464	200,465	73.0
Bungoma District	1979	106,476	74,703	70.2
	1969	69,038	50,432	73.1
Busia "	1979	71,944	53,686	74.6
	1969	45,029	35,167	78.1
Kakamega "	1979	223,141	150,663	67.5
	1969	160,397	114,866	71.6

Source: Computed from the 1969 and 1979 Census data.

age-groups also constituted high proportions of 73.0% and 69.5% of all women aged 15-49 years according to both census data. The observed intercensal change again was negative being -3.5%.

The individual districts as portrayed by Table 15 showed small differences in the proportions of currently married women aged 15-49 years. In Nyanza Province, South Nyanza district recorded the highest proportions of currently married women. The proportions were 78.1% for 1969 and 74.9% for 1979. Yet, Kisii district which had the highest total fertility rate in the whole Province had the lowest level of currently married women. The observed proportions of such women were 69.5% and 64.4% for 1969 and 1979 respectively.

The structure in Western Province was less dramatic. Busia district, which had relatively the lowest total fertility rate in Western Province, apparently had the highest level of women aged 15-49 years who were currently married. The observed proportions were 78.1% and 74.6% for 1969 and 1979 respectively. Conversely, Kakamega district which had one of the highest total fertility rates also had the lowest level of proportions of currently married women of 71.6% and 67.5% for the two periods respectively. In both provinces, intra-district differentials in proportions of currently married women of reproductive life-span were rather small as portrayed by table 15. To illustrate, the variations between Kakamega district and Busia district were 6.5% and 7.1% for the two censuses respectively.

It is plausible on the basis of regional patterns of

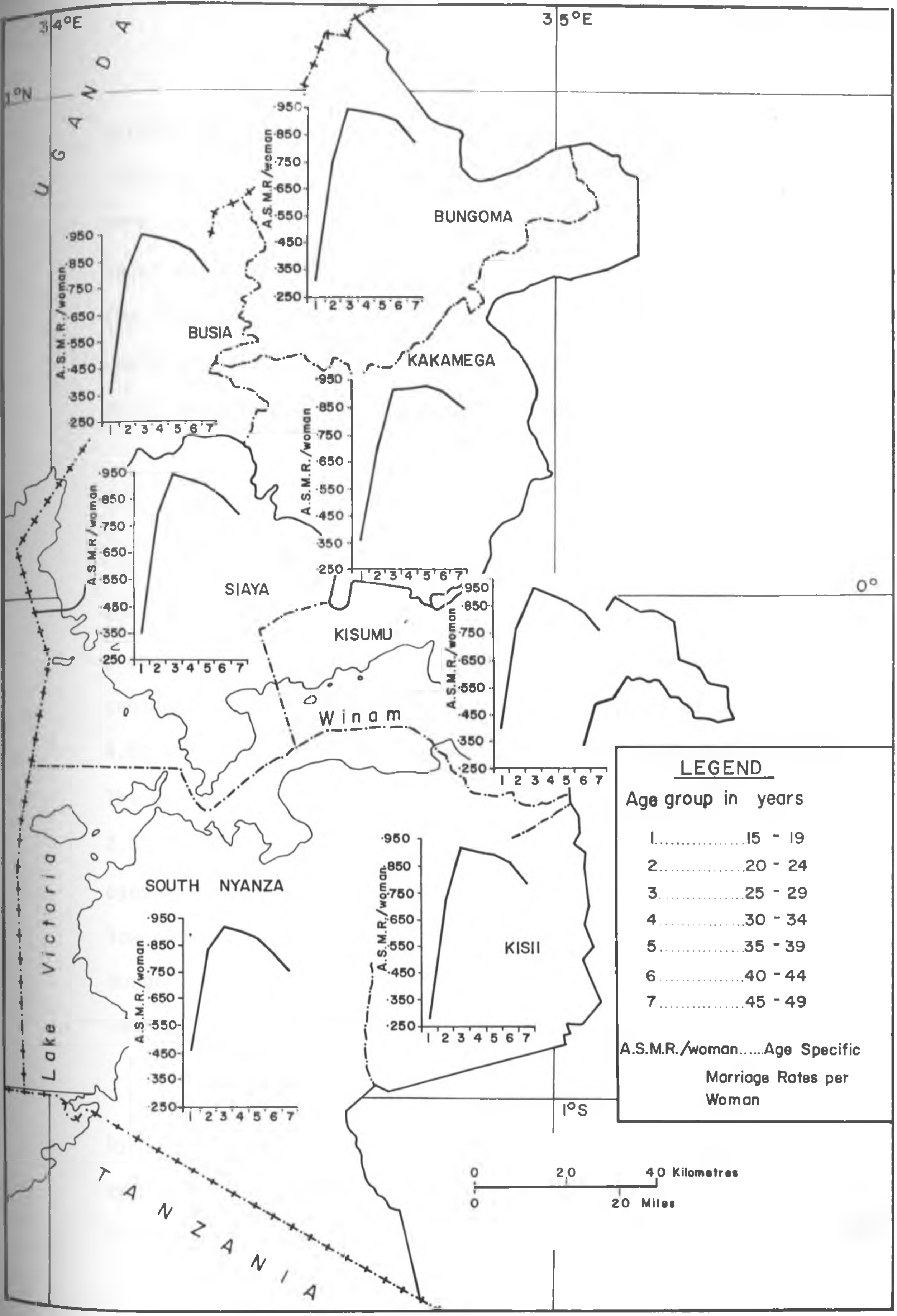

FIG.14 PROPORTIONS OF MARRIED FEMALES BY AGE-GROUPS FOR WESTERN KENYA IN 1969

percentages of currently married females aged 15-49 years as portrayed by figure 14 to accept the proposition that by 1969 there were small differences between districts in such percentages of women. Nevertheless, by 1979 the noted similarity in the tempo of marriage had started to differ significantly. This could be a reflection of changing impact of socio-economic and cultural forces on the institution of marriage.

5.4 Regional levels of Proportions Widowed

According to Table 16, the proportion of widowed females aged 15-49 years in Nyanza Province was nearly twice that of the proportion of such women in Western Province. The computed percentages of widowed women between 15 and 49 years of age were 4.8% and 4.4% for Nyanza Province in 1969 and 1979 respectively. The percentages of such women in Western Province were 2.3% and 2.6% for the two periods respectively. Conclusively, the percentages of widowed females in both provinces were relatively very low ranging between 5.4% for South Nyanza district and 1.9% for Bungoma district in 1969. (see table 16). Even the differences between the two provinces were very small indeed.

The districts pattern of proportions of widowed females by different cohorts are portrayed by figure 15. The entire study region apparently depicts two important features. First, the districts which had exhibited relatively very high total fertility rates namely Kisii, Bungoma, and Kakamega were also the districts experiencing extremely low levels of widowhood. To illustrate,

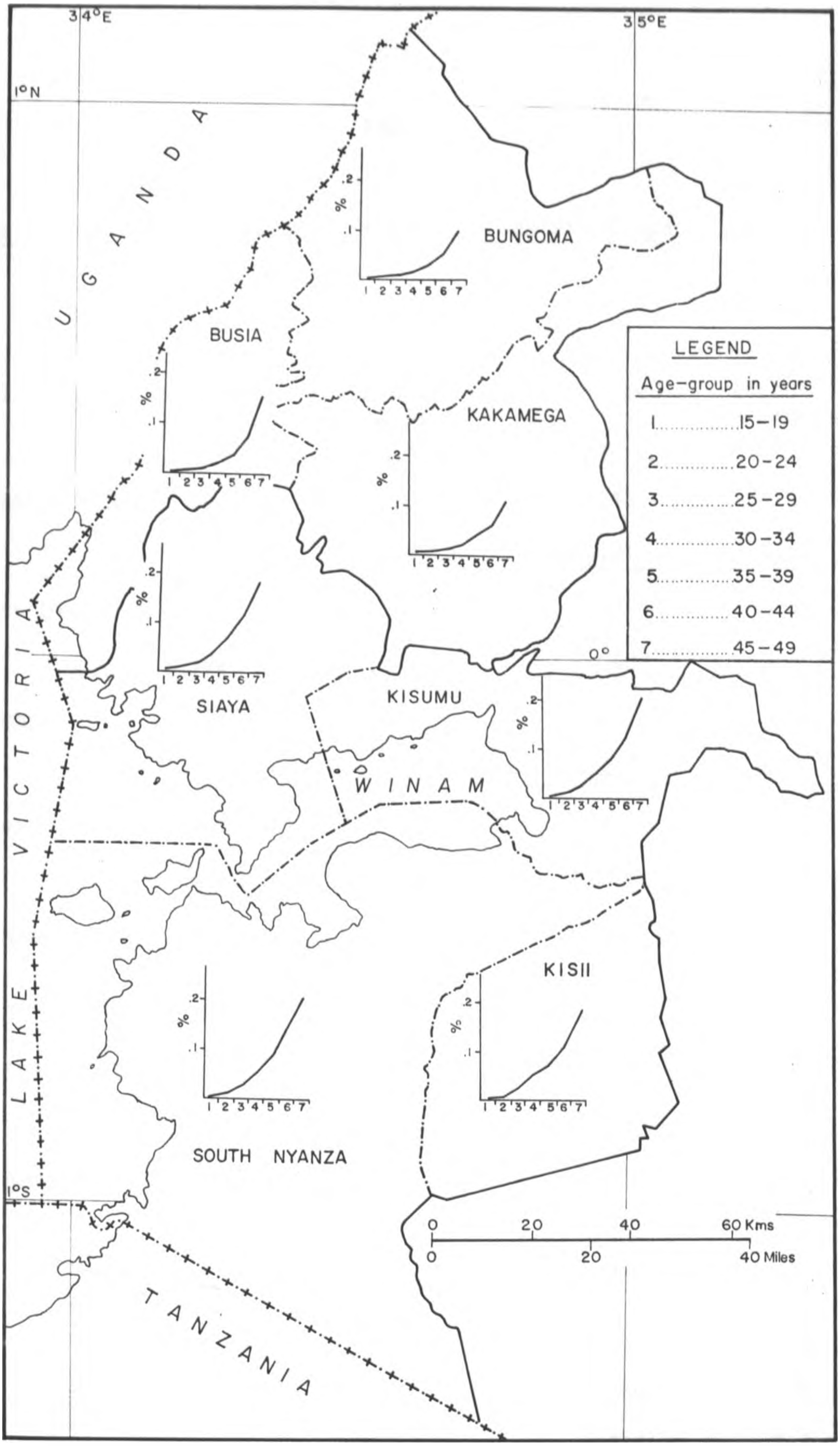

FIG.15 PROPORTIONS OF WIDOWED FEMALES BY AGE-GROUPS FOR WESTERN IN 1969

Table 16: Percent of Widowed Females in Western Kenya

REGION	Year of Census	Total Women aged 15-49 Years	Women aged 15-49 Years Widowed	Percent of widowed Women
NYANZA PROVINCE	1979	609,383	27,042	4.4
	1969	462,443	22,181	4.8
Kisii District	1979	187,071	6,095	3.3
	1969	128,943	4,946	3.8
Kisumu "	1979	111,618	5,147	4.6
	1969	89,351	4,411	4.9
Siaya "	1979	115,906	5,986	5.2
	1969	91,834	4,562	5.0
S. Nyanza	1979	194,774	9,814	5.0
	1969	152,315	8,262	5.4
WESTERN PROVINCE	1979	401,547	10,557	2.6
	1969	274,464	6,420	2.3
Bungoma District	1979	106,476	2,238	2.1
	1969	69,038	1,282	1.9
Busia "	1979	71,944	2,483	3.5
	1969	45,029	1,364	3.0
Kakamega "	1979	223,141	5,836	2.6
	1969	160,397	3,774	2.4

Source: Computed from the 1969 and 1979 Census data.

Kisii district had percentages of widowed females of reproductive life-span of 3.8% and 3.3% for the two censuses respectively. Bungoma district also had low percentages of 1.9% and 2.1% for the two periods respectively, while Kakamega district recorded equally low percentages of 2.4% and 2.6% for 1969 and 1979 respectively. Secondly, all the remaining districts which had recorded relatively low total fertility rates apparently had relatively high proportions of widowed females as depicted by Table 16.

Further reference to Table 16, suggests that all the districts in Western Province experienced positive intercensal changes in the proportion of widowed females. But in Nyanza Province, only Siaya district experienced such positive intercensal change. This trend in widowhood does not tally with the earlier observed intercensal increase in fertility levels throughout Western Kenya. Note that, the World Bank Report of 1980, had identified the entire Nyanza Province as a region of extremely high mortality rates, especially Siaya district.[1]

In summary, intra-district variations in widowed females were extremely small to yield distinct spatial differences.

5.5 Regional levels of Divorced and Separated Women

It was apparent that regional homogeneity was greater with respect to the proportions of women aged 15-49 years who were either divorced or separated.

According to Table 17, Nyanza Province during 1969 and

Table 17: Percent of Divorced and Separated Women in W. Kenya

REGION	Year of Census	Total Women aged 15-49 years	Women aged 15-49 years divorced	% of Total women divorced/ separated
NYANZA PROVINCE	1979	609,383	12,132	2.0
	1969	462,443	9,548	2.1
Kisii District	1979	187,071	3,825	2.1
	1969	128,943	3,122	2.4
Kisumu "	1979	111,618	2,409	2.2
	1969	89,351	2,111	2.4
Siaya "	1979	115,906	2,057	1.8
	1969	91,834	1,648	1.8
South Nyanza	1979	194,774	3,838	2.0
	1969	152,315	2,667	1.8
WESTERN PROVINCE	1979	401,547	8,844	2.2
	1969	274,464	7,819	2.9
Bungoma District	1979	106,476	2,677	2.5
	1969	69,038	1,823	2.6
Busia "	1979	71,944	1,263	1.8
	1969	45,029	885	2.0
Kakamega "	1979	223,141	4,904	2.2
	1969	160,397	5,111	3.2

Source: Computed from the 1969 and 1979 Census data.

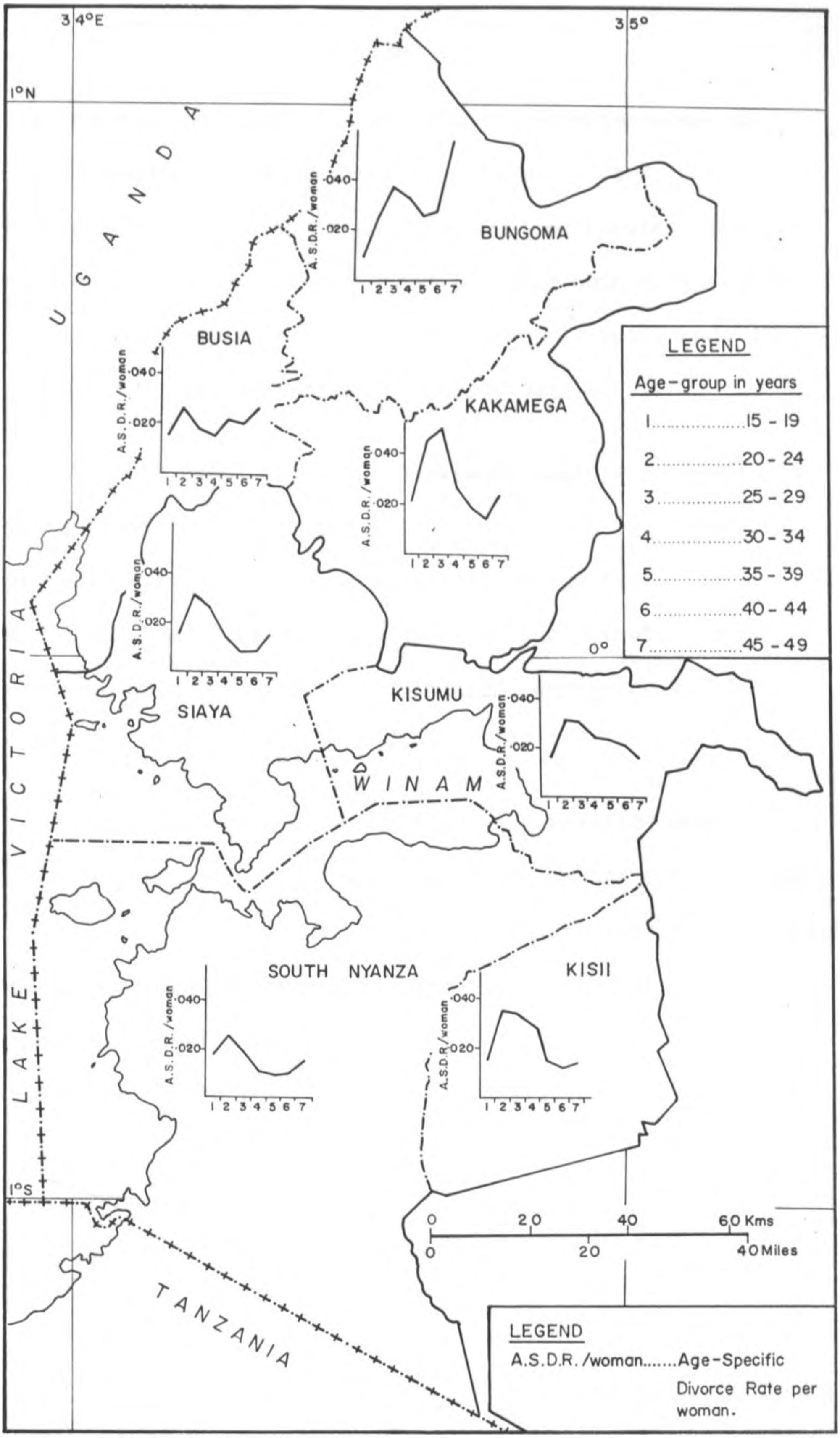

FIG. 16 PROPORTIONS OF DIVORCED FEMALES BY AGE-GROUPS FOR WESTERN KENYA IN 1969

1979 recorded percentages of divorced and separated women who were aged between 19 and 49 years as 2.1% and 2.0% for the two periods respectively. Similarly, for Western Province the percentages of such women were 2.9% and 2.2% for both censuses respectively. The noted variations were extremely small and, therefore, negligible in the context of census data.

Further examination of individual districts revealed a declining trend in the percentages of such women in all districts except South Nyanza which experienced an insignificant intercensal increase of 0.2%. It was apparent again that, intra-district and between district variations were very small to yield distinct spatial differences (see table 17).

The age-structure of divorced and separated women is summarized by figure 16. It is clear that, in the entire study area only Bungoma district had the most inconsistent pattern which tended to increase in level after the age of 35 years. Could this phenomenon reflect the impact of population spatial mobility in the region? Note that the district has a long border with Uganda.

5.6 Regional levels of Marriage Patterns

Since both the 1969 and 1979 published population census data had no information on marriage patterns and types, reference is now made to the 1978 Sample Survey data. Therefore, reference to Appendix 3, shows that provincial differences in proportions of polygamous unions were very small as indicated by table 18.

Table 18: Provincial levels of Marriage Patterns in 1978

Marriage Pattern/ Type	NYANZA PROVINCE		WESTERN PROVINCE	
	Females aged 15-49 years sampled	% of total females	Females aged 15-49 years sampled	% of total females
Total females	697	100.0	367	100.0
Females in monogamous unions	488	70.0	259	70.6
Customary marriage	553	79.3	291	79.3
Civil registration	58	8.3	24	6.5
Consensual union	86	12.4	52	14.2

Source: Computed from the 1978 Sample Survey data.

The standardized percentages of women aged 15-49 years in polygamous unions were 30.5% and 29.9% for Nyanza Province and Western Province respectively. The observed difference of 0.6% was too small to be subjected to any statistical significance test. Therefore, both provinces constituted a homogeneous region with respect to polygamy.

Additional information portrayed by Table 18 reveals of minor regional differences in proportions of women in different marriage patterns. It was observed that, customary marriage was a near universal phenomena in most districts. It accounted for 79.3% of marriage patterns in both provinces. But, when proportions of women in civil marriage and consensual marriage were compared and subjected to a statistical analysis, some significant regional variations emerged. The observed differences in both marriage patterns at the provincial level of analysis were 1.7% and 1.8%

for civil marriages and consensual unions respectively. The null hypothesis to test is that, there were no significant variations between Nyanza Province and Western Province in either pattern of marriage. The application of the Z - statistic test, however, yielded results which rejected the null hypothesis at 95% level of confidence. Conclusively, on the basis of research data, districts in Nyanza Province and districts in Western Province differed significantly with respect to women aged between 15 and 49 years in either consensual unions or civil marriage. (see Table 18).

In summary, it must be emphasized that the observed small differences in percentages of women in polygamous unions probably reflected similar societal perceptions on polygamous matrimony. In both provinces, the cultural phenomenon of polygamy constituted an important index of societal status among male populations. Only wealthy persons could afford the expenses of polygamy.

5.7 Summary

The evidence accruing from the foregoing analysis supports the proposition stated earlier of regional homogeneity in the structure of most nuptial variables except in the structure of marriage patterns which were found to be significantly different. But, the proportions of women of reproductive life-span found in consensual unions and civil unions were rather too small to be expected to exert a significant influence on fertility levels and trends. The percentages of such women according to the 1978 Sample Survey data were 8.3% and 6.5% for civil marriages in Nyanza Province and Western Province respectively. And the percentages of females in consensual unions were moderately significant being 12.4% and 14.2% for Nyanza Province and Western Province respectively.

The entire study area also elicited features of universal marriage in all districts and the tempo of marriage was also found to be rather similar in most districts, though, it is known that the region has three dominant ethnic groups namely the Luo, Luhya and Abagusii. Could the noted regional structure in nuptial variables suggest that the entire study region is experiencing more or less similar levels of socio-economic and cultural development? This question will be examined in the next chapter.

Lastly, the analysis exposed some levels and trends in nuptial variables which were contrary to some noted trends in fertility levels. These irregularities in the correlation between nuptiality and fertility should therefore be explained in the context of regional structure of socio-economic and situational variables.

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CHAPTER 6

6.0 REGIONAL STRUCTURE OF SOCIO-ECONOMIC VARIABLES

6.1 Introduction

In chapter 5, an attempt was made to examine the extent to which districts in Western Kenya had a similar structure of nuptial variables. It was evident that some degree of regional homogeneity existed in the distribution of most nuptial variables. It was also observed that irregularities in the association between nuptial levels and trends could probably be accounted for by the regional structure of socio-economic and situational phenomena.

The objective of this chapter is, therefore, to examine whether districts in Western Kenya manifested similar structures of socio-economic and situational forces prior to the 1979 population census. The extent to which forces of modernization might have influenced nuptial variables will also be examined. The analysis, therefore, should satisfy the requirements of the fourth research objective which aims at demonstrating that socio-economic and situational factors influence fertility not only directly but also indirectly through their impact on nuptial variables.

6.2 Educational attainment of females

A comparative analysis of the 1969 and 1979 census data on the proportions of women who were illiterate reveals a remarkable intercensal decline. If the number of illiterate females in each age-group was expressed as a ratio to all females aged between 15 and 49 years, then the tremendous decline in female illiteracy affected mostly the younger cohorts aged 15 - 29 years, while the older cohorts experienced insignificant changes.

In Nyanza Province, all districts except Siaya district had the least proportion of illiterate women aged between 15 and 19 years. The proportion of illiterate women also tended to increase gradually to reach a maximum level among females aged between 25 and 29 years, before the level of illiteracy commenced to decline gradually with advancing ages. In Western Province, all districts except Busia district did not follow the pattern observed in Nyanza Province. (See Appendix 4).

With respect to the proportions of females aged between 15 and 49 years with lower primary level of education as indicated by Appendix 5, the following observations are made. First, the proportions of females aged 15-49 years with standard I to IV level of education were extremely low throughout the study region. Secondly, all the districts showed a consistently declining trend in the proportion of such women with advancing ages.

It is plausible to argue that, the decline in the proportions of such women with advancing age-groups was because older women belonged to a different period of socio-economic development and might have been exposed to limited educational opportunities. Moreover, with advanced age-groups the effects of high mortality rates were more pronounced thus suppressing the number of women.

Further examination of individual districts reveal that, in 1979, all districts in Nyanza Province had relatively more women with lower primary level of education than was the case in 1969. Yet, in Western Province, a different development had affected female education by 1979. It was observed that, all districts, except Busia district, had the proportions of females with lower primary education among the age-groups between 15 and 29 years being relatively lower than that of 1969. But, the experience among older women above 30 years was different. Among older women, the proportion with lower primary educational attainment was relatively much higher in 1979 than was the case in 1969. Nevertheless, the noted differences within and between districts of Western Kenya were very small indeed (see table 19).

It was with respect to the percentages of females aged between 15 and 49 years with upper primary level of education that tremendous regional advances were made between 1969 and 1979. This could be attributed to the Presidential decree of free Primary education in 1965. Even though, the proportion of such women again tended to decline with advanced age-groups. (See Appendix 6). Lastly, the proportions of females aged between 15 and 49 years with secondary and university education as portrayed by Table 19, were extremely low and generally of no significance especially among age-groups above 30 years which had zero respondents.

The foregoing analysis suggesting the significance of education in rural areas as a predictor variable of nuptial levels and trends should be restricted to the younger female age-groups between 15 and 24 years. These were the cohorts exposed to the marriage market; schooling opportunities; and, also were the cohorts in which fecundity levels were extremely high. For these reasons, this research emphasises education among such women as portrayed by Table 19.

According to Table 19, the percentages of all women aged 15 and 24 years who had formal education by 1979 were 73.7% and 72.9% for Nyanza Province and Western Province respectively. It was apparent that all districts of the two provinces had rather small differences in female education among the younger cohorts.

However, a different result was obtained from the 1969 census data. The percentages of all females aged between 15 and 24 years with formal education were 38.9% for Nyanza Province compared with 57.9% for Western Province. The observed difference of 19% was definitely significant. Conclusively, the entire study area constituted a homogeneous zone with respect to the education of young females especially by 1979.

6.3 Occupational and Income Characteristics of Females

The analysis of the regional structure of female unemployment or employment yields statistics which support the proposition that the entire study area constituted a homogeneous zone with respect to female occupational characteristics. This proposition was valid if the employment statistics were aggregated at the provincial level.

Table 19: Provincial level of Education among females in 1969 and 1979 for Western Kenya.

Region/level of education	Year of Census	Number aged 15-19 years	% of total	Number aged 20-24 years	% of total
NYANZA PROVINCE					
Total female Population	1979	165209	100.0	120888	100.0
	1969	108104	100.0	84229	100.0
Total female illiterate (with no formal education)	1979	27950	16.9	43263	35.8
	1969	59245	54.8	58276	69.2
Total females with Primary education	1979	105915	64.1	56639	46.9
	1969	45619	42.2	23491	27.9
Total females with Secondary education	1979	30109	18.2	18081	15.0
	1969	3240	3.0	2462	2.9
Total females educated	1979	136024	82.3	74720	61.8
	1969	48859	45.2	25953	30.8
WESTERN PROVINCE					
Total female Population	1979	112270	100.0	81301	100.0
	1969	69404	100.0	50495	100.0
Total females illiterate (with no formal education)	1979	20814	18.5	30271	37.2
	1969	26603	38.3	23937	47.4
Total females with Primary education	1979	69075	61.5	34073	41.9
	1969	40400	58.2	24264	48.1
Total females with Secondary education	1979	21782	19.4	16144	19.9
	1969	2401	3.5	2294	4.5
Total females educated	1979	90857	80.9	50217	61.8
	1969	42801	61.7	26558	52.6

Source: Computed from the 1969 and 1979 Census data.

Reference to Table 20,suggests the proportions of unemployed females in both Nyanza Province and Western Province did not differ significantly. However, the 1978 Sample Survey data indicate that the level of female unemployment was extremely high among young females aged between 15 and 24 years. To illustrate, the percentages of unemployed females were 80.5%for the age-groups between 15 and 19 years, and 57.7% for the age-groups between 20 and 24 years in Nyanza Province. For Western Province the respective age-groups had 83.5% and 54.5% of unemployed females. The noted differences were again very small indeed.

A scrutiny of individual districts identified Kisii district in Nyanza Province as having relatively the lowest level of female unemployment in the whole of Nyanza Province. The observed low levels of female unemployment in the district was noted to be consistent among all age-groups. Similarly, in Western Province, Bungoma district consistently had low levels of female unemployment. Conclusively, the remaining districts in the study region exhibited features of relatively high levels of female unemployment. It was realized the level of female unemployment was extremely high among the age-groups which also constituted the bulk of single females. It was these same age-groups which also constituted the bulk of the school age population.

The analysis of the percentages of females aged between 15 and 49 years who were in self-employment and wage-employment as indicated by Table 20, again reveals of very small differences at the provincial level of analysis. Nevertheless, it is

Table 20: Regional Differences in % Employed by Female Age-Groups for Western Kenya in 1978

	Age-group of Women in Years						
No Employment	15-19	20-24	25-29	30-34	35-39	40-44	45-49
NYANZA PROVINCE	80.5	57.7	49.1	46.2	45.3	41.7	46.6
Kisii District	70.4	25.0	28.1	19.0	22.2	30.8	30.0
Kisumu "	91.9	75.0	65.5	66.7	76.2	52.6	76.5
Siaya "	80.0	79.2	76.2	78.9	64.7	50.0	53.3
S. Nyanza "	79.5	51.4	26.7	20.0	18.2	33.3	26.7
WESTERN PROVINCE	83.5	54.5	37.1	49.2	41.1	42.1	46.7
Busia District	84.6	59.1	57.9	70.6	62.5	61.5	50.0
Bungoma "	72.0	45.4	16.7	33.3	25.0	41.7	40.0
Kakamega "	93.8	59.1	36.8	43.8	35.7	23.1	50.0
Self-Employment							
NYANZA PROVINCE	14.4	21.9	29.9	35.0	50.5	40.3	41.5
Kisii District	24.1	29.5	28.1	47.6	44.4	46.1	60.0
Kisumu "	5.4	12.5	13.8	16.7	9.5	15.8	5.9
Siaya "	10.0	8.3	14.3	15.8	29.4	43.7	40.0
S. Nyanza "	17.9	37.1	63.3	60.0	68.2	55.6	60.0
WESTERN PROVINCE	11.5	27.3	42.8	29.3	32.1	44.4	38.9
Busia District	11.5	36.4	36.8	17.6	18.8	30.8	33.3
Bungoma "	20.0	27.3	38.9	26.7	41.7	33.3	50.0
Kakamega "	3.1	18.2	52.6	43.7	35.7	69.2	33.3
Wage Employment							
NYANZA PROVINCE	5.2	20.5	21.0	18.8	16.8	18.0	11.9
Kisii District	5.5	45.5	43.8	33.3	33.3	23.1	10.0
Kisumu "	2.7	12.5	20.7	16.7	14.3	31.6	17.6
Siaya "	10.0	12.5	9.5	5.3	5.9	6.3	6.7
S. Nyanza "	2.6	11.4	10.0	20.0	13.6	11.1	13.3
WESTERN PROVINCE	5.0	18.2	20.1	21.4	26.9	13.5	14.5
Busia District	3.9	4.5	5.3	11.8	18.7	7.7	16.7
Bungoma "	8.0	27.3	44.4	40.0	33.3	25.0	10.0
Kakamega "	3.1	22.7	10.5	12.5	28.6	7.7	16.7

Source: Survey data 1978

interesting to note emerging significant differences in female self-employment especially among the age-groups between 25 and 29 years. The level of females in self-employment was apparently higher in Nyanza Province. This could be attributed to the relatively high level of female urbanization in the province caused by urban residence in Kisumu Municipality, and the relatively better developed agricultural sector in Kisii district and parts of Kisumu district and South Nyanza.

Agricultural developments in the cited regions stimulated the growth of rural service centres which offer urban services. On the other hand, Western Province has had little impact of urbanization because its development has been restricted mostly to the agricultural sector. Lastly, it was observed that the younger age-groups which contained the bulk of single females also tended to have the least proportions of females in self-employment and wage-employment. For this reason, lack of economic security among these young women exposed them to the risk of premarital pregnancy as they were likely to utilize their sex to solicit economic aid if they couldn't venture into early marriage.

The observed regional structure of female occupational characteristics was duplicated by the regional structure of females in different income brackets as depicted by Appendix 7. It was observed again that, the two regions had greater similarity in the distribution of different income brackets among females though the majority apparently received no monthly income and a moderate proportion of females received less than Ksh.500/- per month.

It must be stressed that, information on income could have been grossly understated because the majority of rural women found it difficult to differentiate accurately costs of production from profits received after the sale of products. Some women whose relatives work in urban centres also received irregular supplementary income though few admitted this.

6.4 Regional distribution of Religious sects

On the basis of 1978 sample survey data as depicted by Table 21, the entire study area could be regarded as a homogeneous unit with respect to the distribution of religious denominations.

However, protestant denominations were the most dominant as the number of females aged between 15 and 49 years who belonged to different protestant denominations was nearly twice the number of female Catholics in both provinces. It was only in Kisii district that the proportion of female Catholics tended to exceed the number of females of other religious sects. These differences were, nevertheless, small indeed to yield distinct spatial differences.

It was observed that, in the entire study region, the proportion of Muslims was negligible. They were, therefore, excluded from the analysis. Equally low were the proportions of females belonging to the 'African religion' or traditional African beliefs who are often classified by Western scholars as non-christians.

The observed regional structure of different denominations suggests religion may not be a significant social variable in the African context with respect to the Western Kenya region.

Table 21: % of Regional Variations in Religion by Female Age-groups for Western Kenya in 1978

		Age	Group		in	Years		
PROTESTANTS	Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
NYANZA PROVINCE	1978	68.8	61.3	64.3	66.5	67.3	60.5	68.8
Kisii District		30.0	16.0	44.0	52.0	33.0	17.0	33.0
Kisumu "		76.0	66.0	62.0	58.0	71.0	59.0	76.0
Siaya "		87.0	83.0	81.0	84.0	88.0	88.0	73.0
S.Nyanza "		82.0	80.0	70.0	72.0	77.0	78.0	93.0
WESTERN PROVINCE		67.7	72.3	64.0	74.3	61.3	66.0	80.7
Busia District		38.0	41.0	63.0	88.0	31.0	38.0	75.0
Bungoma "		72.0	86.0	55.0	47.0	67.0	75.0	90.0
Kakamega "		93.0	90.0	74.0	88.0	86.0	85.0	77.0
CATHOLICS								
NYANZA PROVINCE		28.8	38.0	31.0	29.0	32.8	33.0	28.0
Kisii District		70.0	84.0	56.0	48.0	67.0	66.0	67.0
Kisumu "		22.0	31.0	24.0	29.0	29.0	32.0	18.0
Siaya "		10.0	17.0	14.0	11.0	12.0	12.0	20.0
S. Nyanza "		13.0	20.0	30.0	28.0	23.0	22.0	7.0
WESTERN PROVINCE		31.0	23.0	29.3	21.7	28.7	26.0	14.7
Busia District		58.0	45.0	32.0	6.0	50.0	46.0	17.0
Bungoma "		28.0	14.0	39.0	53.0	25.0	25.0	10.0
Kakamega "		7.0	10.0	17.0	6.0	11.0	7.0	17.0
AFRICAN RELIGION								
NYANZA PROVINCE		2.8	0.8	4.8	4.5	0.0	6.8	3.3
Kisii District		0.0	0.0	0.0	0.0	0.0	17.0	0.0
Kisumu "		3.0	3.0	14.0	13.0	0.0	10.0	6.0
Siaya "		3.0	0.0	5.0	5.0	0.0	0.0	7.0
S. Nyanza "		5.0	0.0	0.0	0.0	0.0	0.0	0.0
WESTERN PROVINCE		1.0	4.7	7.0	4.0	12.7	7.7	5.3
Busia District		4.0	14.0	5.0	6.0	19.0	15.0	8.0
Bungoma "		0.0	0.0	6.0	0.0	8.0	0.0	0.0
Kakamega "		0.0	0.0	10.0	6.0	11.0	8.0	8.0

Source: Computed from 1978 Survey data.

6.5 Regional levels of Urbanization

According to the 1969 and 1979 census data, the level of female urbanization was slightly higher in Nyanza Province compared to Western Province. But, the difference was again small and not necessary to test statistically. To illustrate, in 1969 approximately 1.03% of females aged between 15 and 49 years were urbanized in the whole of Nyanza Province compared to only 0.21% of urbanized females in Western Province. The difference of 0.82% was therefore small (Urbanization refers to residence in towns with over 2000 residents).

The observed level of female urbanization in Nyanza Province was attributed mostly to the impact of Kisumu Municipality which is the third major urban centre in Kenya and the focus of industrial development for the whole of Western Kenya. The analysis of female urbanization in 1979 at the district level, therefore, identified only Kisumu district which had 8.4% of its total population urbanized as worth considering. The remaining districts had extremely low proportions of urbanized population.

In this respect, the study area could be considered again as an homogeneous unit with respect to the level of female urbanization.

6.6 Regional structure of selected environmental (situational) variables

Another proxy measure of a region's stage of socio-economic development is probably infant and childhood mortality rate. An indirect measure of regional levels of infant and childhood mortality rates utilized in this analysis was the proportion of children reported dead by age-group of mothers. Table 22 summarizes this information.

All the districts in the study area realized substantial decline in the proportions of children dead between 1969 and 1979. In fact, the greatest statistical change was observed among mothers aged between 15 and 19 years. The remaining mothers especially the extremely old who were aged 40-49 years recorded very small changes in the proportions of their dead children.

It was also observed according to Table 22, that, on average, Nyanza Province still had the highest percentage level of children dead. The differences observed between districts in Nyanza Province and districts in Western Province were greatest among the active female age-groups between 15 and 34 years. To illustrate, the percentages of children dead by 1979 in Western Province were below those of Nyanza Province by -12.0% and -16.9% for the age-groups 15-19 years and 30-34 years respectively (see figure 17).

A study by M. Kibet (1979)[1], confirms that Nyanza Province experiences high child mortality rates compared to Western Province. In his analysis of children reported dead by illiterate women, he found child mortality rates of 246 per 1000 in South Nyanza; 240/1000 in Kisumu; 237/1000 in Siaya; and, 129/1000 in Kisii. In Western Province, with an exception of Busia district which had 215 children dying per 1000, the other districts had relatively low child

Table 22: Proportion of children dying by age-group of Mother in 1969 and 1979

REGION	Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
		Age-group of Mother in Years						
NYANZA PROVINCE	1979	.1509	.1723	.2029	.2381	.2592	.2957	.3353
	1969	.1852	.2101	.2461	.2806	.3162	.3600	.4042
Kisii District	1979	.0770	.0984	.1216	.1494	.1648	.3451	.2517
	1969	.0883	.1265	.1672	.1861	.2040	.2414	.2912
Kisumu "	1979	.1809	.1918	.2302	.2645	.2908	.3327	.3749
	1969	.2077	.2337	.2660	.2970	.3401	.3763	.4171
Siaya "	1979	.1720	.2071	.2376	.2798	.3090	.3396	.3801
	1969	.1903	.2536	.2750	.3225	.3550	.4054	.4381
S.Nyanza "	1979	.1946	.2162	.2483	.2818	.3006	.3364	.3731
	1969	.2306	.2435	.2864	.3303	.3677	.4147	.4547
WESTERN PROVIN.	1979	.1328	.1475	.1722	.1978	.2214	.2540	.2937
	1969	.1279	.1674	.2040	.2231	.2557	.3043	.3506
Bungoma Dist.	1979	.1146	.1357	.1568	.1738	.1933	.2261	.2613
	1969	.1362	.1456	.1667	.1969	.2327	.2660	.3169
Busia "	1979	.1680	.1934	.2234	.2688	.2960	.3385	.3795
	1969	.1835	.2256	.2679	.2957	.3219	.3918	.4428
Kakamega "	1979	.1285	.1382	.1636	.1857	.2117	.2386	.2803
	1969	.1139	.1612	.2000	.2120	.2460	.2963	.3370
% of Provincial differences	1979	-12.0	-14.4	-15.1	-16.9	-14.6	-14.1	-12.4
	1969	-30.9	-20.3	-17.1	-20.5	-19.1	-15.5	-13.3

Source: Computed from the 1969 and 1979 Census data.

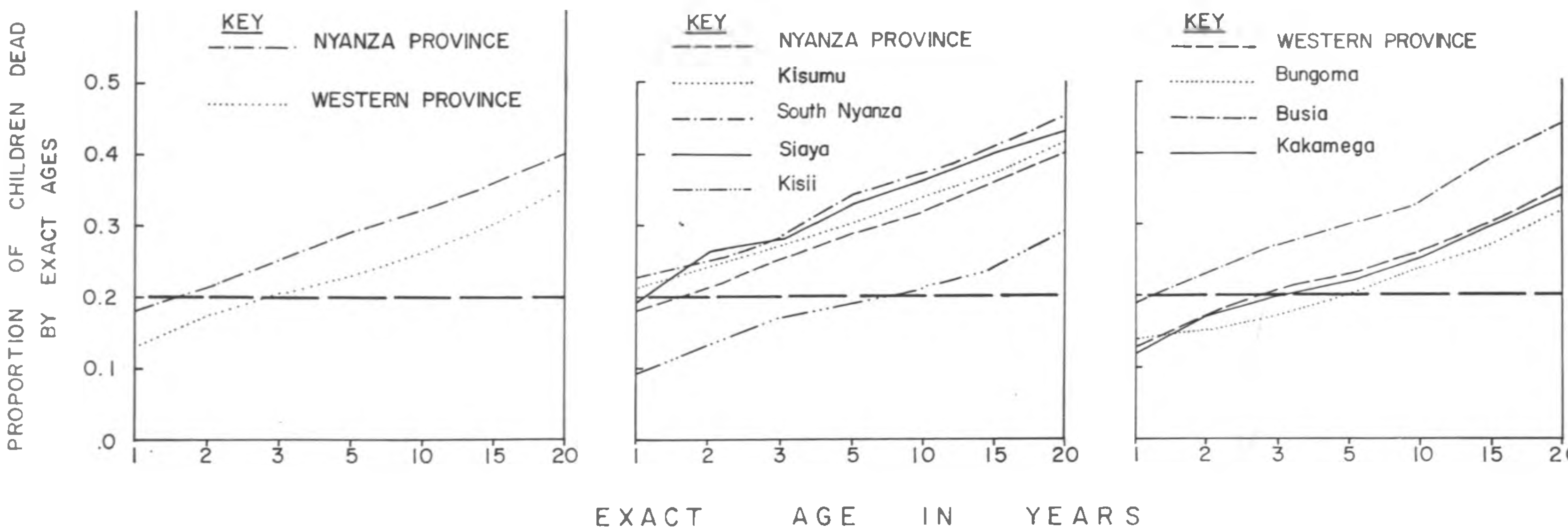

FIG. 17 (a). REGIONAL DIFFERENTIALS IN PROPORTION OF CHILDREN DYING AT EXACT AGE IN 1969 mortality rates of 162 per 1000 in Bungoma, and 161/1000 in Kakamega district. This finding was unexpected because Nyanza Province had numerical advantage over Western Province in the provision of health facilities and services. According to the Western Kenya Physical Development Plan, Nyanza Province had a population size of 19,200 per health Unit compared to a larger population size of 27,249 per health Unit in Western Province (Republic of Kenya, 1970)[2].

It is the proposition in this thesis that the high mortality conditions which prevailed in Nyanza Province relative to the situation in Western Province was due to several geographical factors. First, the uneven distribution of hospitals as noted in Figure 18 reflects the importance of a transport network in providing accessibility to medical services.

In 1969, Nyanza Province had more health institutions than Western Province. It had 25 hospitals, 29 health centres and about 56 dispensaries which compared unfavourably with 15 hospitals, 24 health centres and 10 dispensaries in Western Province. The distribution of these health units, however, was much more even in Western Province compared to the situation in Nyanza Province (see figure 18).

Furthermore, the use of these health institutions was partially inhibited by other obstacles such as medical fees, competition by traditional doctors and, poor accessibility. A measure of the degree of accessibility to these medical institutions was based on an index of accessibility formula stated as

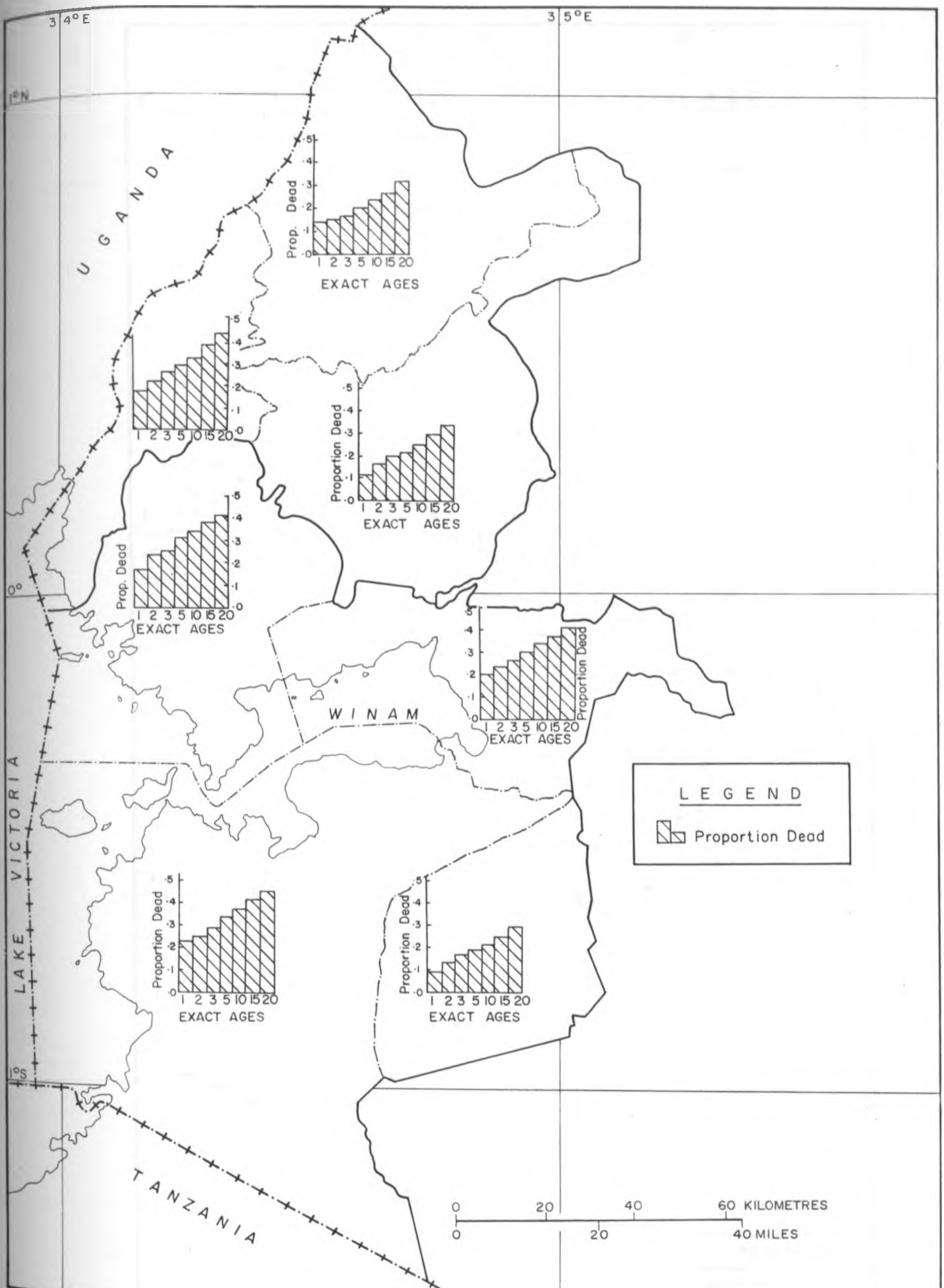

FIG. 17 (b). REGIONAL DIFFERENCES IN PROPORTION OF CHILDREN DEAD BY EXACT AGE FOR WESTERN KENYA IN 1969.

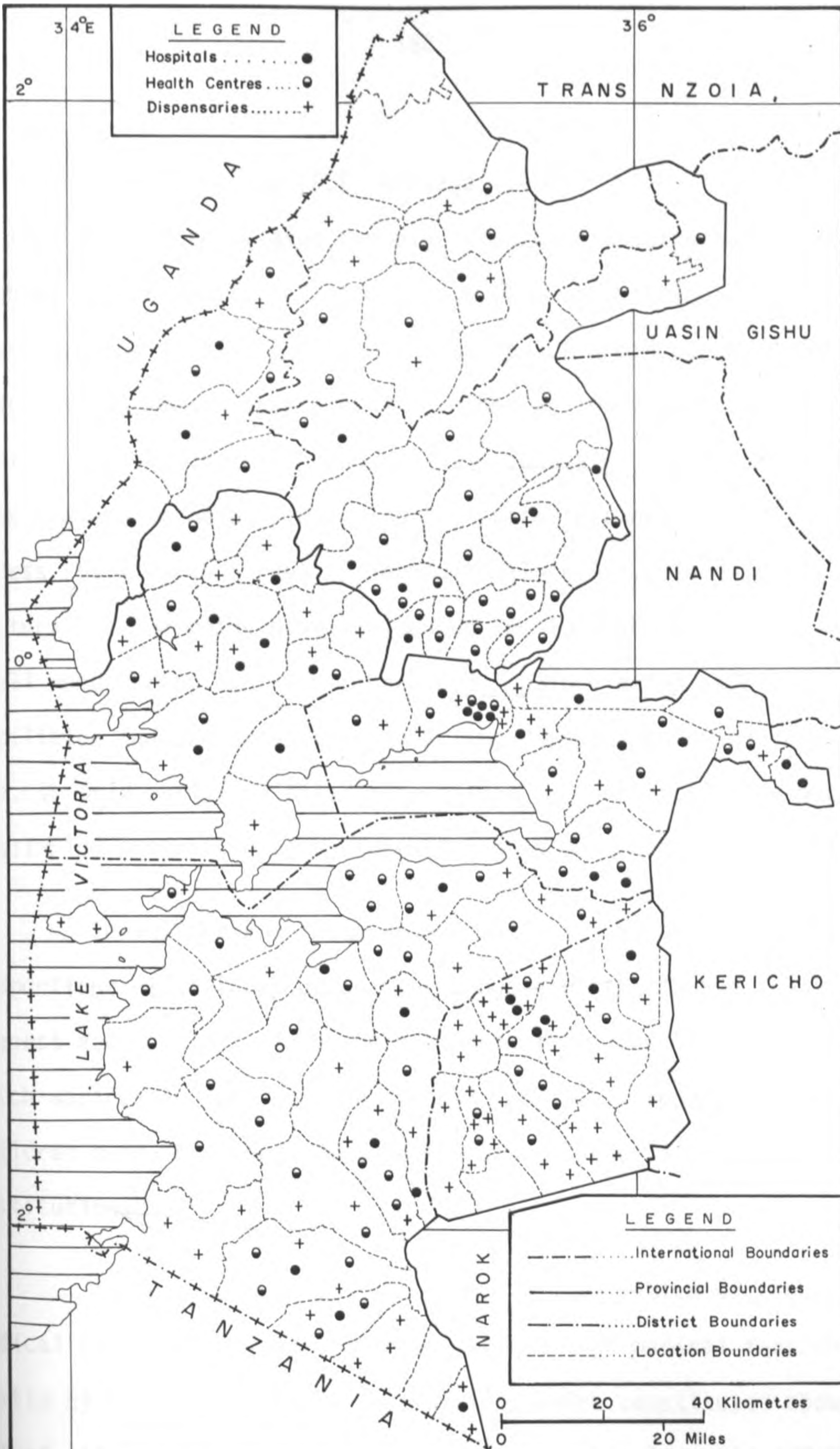

FIG. 18. DISTRIBUTION OF HEALTH INSTITUTIONS IN NYANZA AND WESTERN PROVINCES BY 1978

follow:

$$Ia = \Delta_p \times \Delta_r . \text{(E.E. Arriaga, 1967)}^3$$

On the basis of the stated formula, Kisumu district attained the highest accessibility index of 15.9. This was attributed to the concentration of Kisumu's high proportion of urban population which had a greater accessibility to health institutions in such centres. Kisii district also had high accessibility index of 12.9 This could also be attributed to its better network of rural access roads which serve its agricultural sector. These agricultural feeder roads have influenced the location and growth of small road market centres. These nodal points often have medical facilities and are accessible to a large proportion of the rural populace. It could partly be this geographical factor which contributed to Kisii's low proportion of children dying as depicted by figure 18.

In Western Province Kakamega district, with relatively low proportions of children dead after Bungoma district, had the highest accessibility index to health institutions. Busia district, which apparently recorded the highest levels of proportions of children dead, had the lowest degree of accessibility to health institutions.

It must be realized that maximum utilization of these medical facilities by 1969 was hampered by high medical fees charged mostly by Missionary Health Institutions which constituted about 60% of all medical institutions in Western Kenya (Republic of Kenya, 1970)[4]. It is postulated that, despite the noted economic barrier, more people in Western Province could still utilize the medical facilities. This was reinforced by the fact that, most of her people had some small scale land-use activities which enabled them to earn a higher standard of living compared to the situation in most districts of Nyanza Province.

In addition, it should be realized that, greater concentration of health centres as was the case in Western Province, offered an additional advantage. Health centres have a relatively smaller catchment area and are vital in the provision of health services because they can be visited more regularly. Such rural centres are also known to offer family planning services to the women folk.

The other geographical phenomena to consider are regional variations in the level of nutrition. The relatively better agricultural conditions of Western Province due to its altitude, reliable rainfall, and good soils of the Kikuyu-stargrass ecological zone assure better conditions for food-crop harvesting. Its high altitude and undulating plateaux, give good drainage to most areas and are free of extensive and malarial swamps. These are common in the hot-wet Lake-shore savanna ecological zone, which dominates a greater part of Nyanza Province, except Kisii district which has ecological conditions similar to those of Kakamega and Bungoma districts in Western Province.

The malarial and tsetse-fly menace of Nyanza Province could partly account for the high infant and childhood mortality rates observed. This has important demographic consequences, particularly, in creating widowhood rates which were observed to reinforce the incidence of polygamy in the study area. Furthermore, these conditions also influence regional variations in the intensity of migration which was also observed to cause marital instability.

6.7 Regional variations in Land Ownership

Another economic factor which might influence the observed regional structure of nuptial variables was land ownership. According to the Nyanza Physical Development Plan Report of 1970, Western Province had many more small scale commercial farms compared to Nyanza Province. For example, in Western Province, Kakamega district had 373 farms and Bungoma district had 290 farms. In Nyanza Province only Kisii district had 158 small scale farms. The other districts had not yet developed these farms. (Republic of Kenya, 1970)[5]

The stated regional development phenomena definitely influenced the regional structure of female employment or unemployment. The Agricultural Finance Corporation was established in 1965 to finance rural farmer's agricultural programmes which were geared to improve standards of living in rural areas. A peasant's security was therefore his land title deed. Consequently, regional differentials in possession of land title deed as depicted by Appendix 8, tended also to influence regional structure of female income and consequent standards of living.

It is rather surprising to observe that, in 1969, the three districts which had relatively high proportions of single females namely Kisii, Bungoma, and Kakamega, had initiated and completed land adjudication programmes. These three districts which were also environmentally within the Kikuyu-stargrass ecological zones which receive over 1350 mm of rainfall annually, could therefore offer greater prospects for different types of occupation within their agricultural sector. In other words, increased commercialization of the agricultural sector in these districts could partly account for increased marital instability already noted to be relatively high in the three districts. Studies in other parts of Africa have confirmed this notion. J.G. Bhatia, (1978)[6] found in Ghana that regions dominated by subsistence standards of living experienced greater marital stability.

6.8 Summary

The foregoing discussion suggests that, once more, the whole of Western Kenya constituted a homogeneous zone with respect to socio-economic development. However, three districts tended to be relatively better developed in the agricultural sector. The three districts, namely Kisii, Bungoma, and Kakamega, also had relatively low levels of infant and childhood mortality rates. It was with respect to this single variable that districts tended to differ more significantly. Moderate district variations also affected proportions of females in self-employment.

It must be emphasized that, with the exception of primary education, the proportion of females aged between 15 and 49 years with the socio-economic characteristics discussed tended to be rather too low to have meaningful impact on nuptiality and fertility.

In conclusion, only two variables need greater attention, namely primary education and the child mortality rate. Lastly, the younger age-groups between 15 and 24 years were exposed to the most insecure economic condition and consequently exposed to greater reproductive risks.

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4. Republic of Kenya, 1970: Ibid.

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CHAPTER 7

7.0 ANALYSIS OF EMPIRICAL RESULTS ON NUPTIAL VARIABLES

INTRODUCTION

7.1 An attempt was made, in the previous chapter, to discuss the regional structure of the socio-economic and situational variables and to examine the extent to which such factors might influence the regional structure of nuptial variables. it was observed that the districts did not vary much in the structure of most phenomena; except in the proportions of females in self-employment, primary education, and in the regional structure of childhood mortality rates.

However, in this chapter, the main objectives are (i) to identify statistically the relationship between nuptial levels and fertility levels, while holding constant the intervening influence of the socio-economic and situational variables. This will be achieved through partial correlation analysis; and (ii) to test the null hypotheses of the research project as stated in chapter 1. This will also be achieved through Step-wise regression analysis.

The first objective of this chapter, should help in showing the direction and magnitude of relationship between fertility and nuptial variables on the one hand, and nuptial variables and socio-economic variables on the other hand. The aim is to satisfy the requirements of the research objectives stated in chapter 1 as follows;

(a) to show directional effects of selected predictor variables on total fertility rates.

(b) to investigate the strength of the relationship between each of the nuptial variables and total fertility rate.

The test of the null hypotheses should also satisfy the requirement of the research objective which states that the noted nuptial variables are relatively less important than the noted socio-economic and situational variables as predictor variables of current total fertility rate, but are also less important than the noted socio-economic and situational variables as predictor variables of lifetime total fertility rate.

In this chapter, total fertility rates become the dependent variables while the nuptial variables of the research model as portrayed by figure 1 are regarded as the independent variables.

7.2 Fertility level of single females

It was rather striking for Western Province, which had relatively high proportions of single females aged between 15 and 29 years; who constituted 20.5% and 24.7% of all women aged between 15 and 49 years in 1969 and 1979 respectively, to have a relatively higher total fertility rate, (see appendix 2) than Nyanza Province. Note that, Nyanza Province had relatively low proportions of single females aged between 15 and 29 years; who constituted 16.8% and 21.6% of all women aged between 15 and 49 years in 1969 and 1979 respectively.

It is plausible to accept the proposition that, on average, pre-marital fertility (illegitimate fertility) was not different at the provincial level of analysis. Even differences between districts were rather too small. These suggestions are supported by evidence from Table 23. But closer examination of

Table 23: Average Parity per Single Women in Western Kenya in 1979

Province/ district	Age-groups in years							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	All
NYANZA	0.1	0.6	1.5	2.5	3.6	3.3	3.8	0.3
Kisii	0.1	0.6	1.5	2.5	3.4	3.0	4.6	0.3
Kisumu	0.1	0.7	1.5	2.5	3.2	2.8	4.1	0.4
Siaya	0.1	0.7	1.5	2.6	3.6	3.3	3.3	0.3
S. Nyanza	0.1	0.6	1.4	2.6	3.9	3.6	3.6	0.3
WESTERN	0.1	0.7	1.6	3.0	3.6	3.9	4.4	0.3
Bungoma	0.1	0.6	1.9	3.4	4.8	4.7	5.7	0.3
Busia	0.1	0.7	1.6	3.4	3.5	3.8	3.8	0.3
Kakamega	0.1	0.7	1.5	2.7	3.3	3.9	4.1	0.4

Source: Computed from the 1979 Census data.

women aged between 45 and 49 years in every district showed that pre-marital fertility rates in Kisii district (4.6), Bungoma district (5.7) and Kakamega district (4.1) were relatively high when compared with pre-marital fertility rates of the remaining districts except Kisumu (4.1).

It is plausible to propose that, the already noted regional similarity in the pattern of fertility take-off between the age-groups of 15 and 22 years, as well as, the broad-peak pattern of age-specific fertility curves for both provinces, could partly be accounted for by the small district differences in pre-marital fertility rates among young women aged between 15 and 24 years as depicted by Table 23. To what extent, then, are the proportions of single females in a community a good predictor of fertility levels and trend? This is examined by discussing partial correlation coefficients and stepwise regression results.

7.3 Partial Correlation between proportions single and total fertility rate.

The proportions of single females in a society could be a positive or negative predictor of the fertility rate depending on the societal moral stance as reinforced by the societal institutional fabric. On the basis of 1969 census data, proportions of single females aged between 15 and 49 years in the entire study region were found to have a relatively weak but positive correlation with the current total fertility rate. The observed zero-order partial correlation coefficient was $r_{11}^{*} = 0.1349$. However, the relationship between proportions of single females and lifetime total fertility rate was slightly higher because the computed zero-order partial correlation coefficient was $r_{21} = 0.4475$ as depicted by Table 24. Note that the pattern of result for the 1979 census

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* As stated in chapter 3, computation procedure for r_{11} holds effects of other independent variables constant.

data and 1978 sample survey data gave almost similar results.

Table 24: Zero-order partial Correlation Coefficients for Nuptial Variables and Total Fertility Rates for 1969

Variable description		
K1. total single females aged 15-49 years.	.1349	.4475
K2. total ever-married women aged 15-49 years	.3938	-.3983
K3. total currently married women aged 15-49 years	.5075	-.0628
K4. total widowed women aged 15-49 years	-.8003	-.1213
K5. total divorced/separated women aged 15-49 years	.7976	-.0715
K6. dummy variable (number childless).	.7502	-.7742
K7. median age at first marriage.	.2644	-.4036

Key: Y1 = Current total fertility rate.

Y2 = lifetime total fertility rate.

The observed relationship between proportions of single females and total fertility rates could have been influenced by the indirect impact of socio-economic and situational characteristics of such women. To identify which socio-economic characteristics were dominant among the number of single women, the proportions of single women were correlated with proportions of single women who were illiterate, educated, residents of urban centres, and those using contraceptive methods, etc. (see Table 25).

Using these socio-economic variables as the independent variables and nuptial variables as the dependent variables, the

the combined regional data for 1969 produced interesting results. To illustrate, the proportion of single women was strongly correlated with the proportion of single women with upper primary education. The two variables yielded a zero-order partial correlation coefficient of $r14 = 0.9334$ for the whole of Western Kenya. Equally important was the correlation with proportions of single women with secondary education which yielded $r15 = 0.8068$, proportions of single women with lower primary education with $r13 = 0.7866$, proportion of single females residing in urban centres with $r17 = 0.7099$, and proportions of such women using contraceptives yielded $r18 = -0.7457$. (see Table 25).

According to the 1979 census data, stronger and positive relationships were observed with most of the cited variables. To illustrate, the proportions of single females when correlated with proportions of single females with upper primary education yielded zero-order partial correlation coefficient of $r14 = 0.9407$, correlation with proportions of single women with secondary education yielded $r15 = 0.9049$, proportion with lower primary education yielded $r13 = 0.8758$, and proportion residing in urban centres yielded $r17 = 0.4331$; and those using contraceptives also yielded $r18 = 0.5942$. These changes in relationship suggest that, the base population of single females was increasing at a rate which did not correspond perfectly with the increasing rate of single women residing in urban centres or using modern contraceptive methods.

On the basis of 1978 sample survey pooled data (i.e.

Table 25: Zero-order Partial Correlation Coefficients for Socio-economic and Nuptial Variables

Variable description	Year	k1	k3	k4	k5	k7
X1. total adult females aged 15-49 years	1969	.8207	-.0964	-.9304	.3159	-.4316
	1979	.8486	.5614	-.4834	.6030	-.5599
X2. total illiterate females aged 15-49 years.	1969	.3875	.4382	-.8638	.6977	-.0133
	1979	-.3395	.6493	.4961	.3996	-.4883
X3. total females of lower primary education aged 15-49 years	1969	.7866	-.1217	-.9216	.2778	-.4034
	1979	.8758	.4947	-.5485	.5538	-.4931
X4. total females of upper primary education aged 15-49 years	1969	.9334	-.3643	-.8062	-.0095	-.6363
	1979	.9407	.3520	-.6057	.4590	-.4239
X5. total females of secondary education aged 15-49 years	1969	.8068	-.2730	-.8253	.1225	-.4865
	1979	.9049	.3647	-.6094	.4885	-.3855
X6. dummy variable (number childless)	1969	-.1579	.2311	-.3716	.5466	.3899
	1979	.9995	.0567	-.4554	.1441	-.4450
X7. total female residents of urban centres aged 15-49 years	1969	.7099	-.0765	-.9354	.3545	-.2997
	1979	.4331	.1556	-.7616	.3627	.1104
X8. total females using contraceptives aged 15-49 years	1969	-.7457	.8565	.0726	.7532	.8037
	1979	.5942	.7001	-.3327	.6806	-.4795
X9. number of children dying by age-group of mothers	1969	-.1306	.7106	-.6294	.9029	.4880
	1979	-.7002	-.1178	.9045	-.3671	-.1172

Key:
k1 = single females
k3 = currently married females
k4 = widowed females
k5 = divorced and separated females
k7 = median age at first marriage.

combined data for Nyanza Province and Western Province) the proportions of single women aged between 15 and 49 years were also found to correlate highly with proportions of such women who were Protestants and Catholics. The observed zero-order partial correlation coefficients obtained were r12 = 0.8788 and r13 = 0.7605 for proportion of Protestants and Catholics respectively. Other significant associations were found with the numbers of single females in household units with land title deed which yielded r15 = 0.9474 for the entire region. The proportion of single females who were unemployed (no income bracket) also yielded strong positive association with r16 = 0.9783. All these factors which had strong and positive correlations with proportions of single women were likely to exert an indirect influence on the fertility rate through their impact on the noted nuptial variables. (see Table 26).

Since correlation results merely indicate the direction and magnitude of relationship between variables, such results cannot be useful for policy action or for testing hypotheses because no causality can be inferred. It is therefore, for this fundamental reason that stepwise regression results are now examined.

7.4 Step-wise Regression Analysis between Total fertility Rate and Proportions of Single females (K1)

According to the 1969 census data for Nyanza Province, as indicated by Appendix 10, the observed predictive role of proportions of single females aged between 15 and 49 years (K1) is indicated by β - coefficient of 0.3920. Even for Western Province,

Table 26: Zero-order Partial Correlation Coefficients for Socio-economic and Nuptial Variables (1978)

Variable description	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12
X1. total adult females sampled (15-49 years)	.8385	.2153	-.4635	.8029	-.9103	.1441	-.8059	.6811	.1863	.2589	-.5103	.5765
X2. total female Protestants (15-49 years)	.8788	.1254	-.5577	.7447	-.9011	.0589	-.8535	.6152	.0926	.1852	-.5784	.4959
X3. total female Catholics (15-49 years)	.7605	.3188	-.3339	.8611	.9101	.2426	-.7248	.7463	.2998	.3250	-.4133	.6589
X4. total females of African Religion (15-49 years)	-.3522	.4776	.5597	.0250	.3525	.4771	.3728	.2270	.4509	.5754	.5132	.3383
X5. females in households with land title deeds	.9474	-.0710	-.6201	.6063	-.8512	-.1499	-.6834	.4492	-.0978	-.0240	-.7267	.3163
X6. total females unemployed (15-49 years)	.9783	-.1525	-.7329	.5711	-.8617	-.2215	-.7484	.3780	-.1804	-.0959	-.7855	.2426
X7. total females in self-employment (15-49 years)	-.4450	.9293	.7324	.4908	.0225	.9354	-.0127	.6808	.9200	.9329	.7728	.7986
X8. total females in wage employment	-.2750	.9799	.6201	.7126	-.2660	.9668	-.3244	.8928	.9808	.9236	.6559	.9354
X9. total females earning no income (p.m.)	.9571	-.0670	-.6698	.6329	-.8831	-.1377	-.7563	.4503	-.0957	-.0124	-.7300	.3247
X10. total females earning less than Ks 499/- p.m.	-.4520	.9303	.6877	.6008	-.1632	.9469	-.2074	.7163	.9422	.8463	.7558	.8139
X11. total females earning Ks 500-999/- p.m.	-.2870	.7126	.5376	.3352	.0908	.6881	-.0073	.6170	.7023	.7274	.5578	.6315
X12. total females earning over Ks 1000/- p.m.	-.6157	.5257	.6895	-.1412	.5847	.5482	.3660	.1898	.5010	.6201	.7334	.2801

Source: Computed from the 1978 Sample Survey data.

K1 - Single females

K4 = marriage duration less than 10 years

K5 - marriage duration over 10 years

K7 = number by civil marriage

K8 = number by consensual marriage

K9 = number in monogamous unions

the effect of proportions of single females on current total fertility rate was found to be positive though somewhat weak as β - coefficient observed was 0.050 as indicated by Appendix 11.

For the object of formulating appropriate policy measures on determinants of fertility level, it is desirable to determine whether the variable K1 in the model is statistically significant as a predictor variable of current total fertility rate. Using a null hypothesis (H_o), that the effect of proportions of single females (K1) on current total fertility rate (Y1) is equal to zero; and an alternative hypothesis (H_a), that the effect of variable K1 on variable Y1 is not equal to zero; the application of a two-tailed t-test with n = 7 and df = (n-k) = 1 yielded the expected results. The observed t-cr at $\alpha = 0.05$ and $\alpha = 0.01$ were 12.706 and 63.66 respectively. Since the t-cal for Nyanza Province was 4.73 and, t-cal for Western Province was 8.109, we accept the null hypothesis and conclude that the effect of proportions of single females (K1) on current total fertility rate (Y1) is statistically not significant from zero at the 0.05 level of significance.

Further reference to the effect of proportions of single females (K1) on lifetime total fertility rate (Y2) also yielded the expected results. According to Appendix 11, the variable K1 showed a negative predictive role on variable Y2 as the computed β - coefficient was -1.511. This result indicates that an increase in the number of single females depressed lifetime total fertility rate. In order to test the significance of the noted negative effect, a null hypothesis (H_0) used was that, the effect of variable K1 on variable Y2 was equal to zero; and the alternative hypothesis (H_a), was that the effect of variable K1 on Y2 was not equal to zero. The application of t-test with all its specifications as shown by Appendix 11, again show that t-cal of 31.50 is greater than t-cr of 12.706 at $\alpha = 0.05$. The null hypothesis is, therefore, rejected and we conclude that the effect of variable K1 on variable Y2 is statistically significant from zero at the 0.05 level of significance.

The interpretation of these results, however, require caution. The noted weak though positive effect of proportions of single females (K1) on current total fertility rate (Y2) should be conceived in the context of societal institutions which regulate sexual relations. It is plausible to argue that as the number of single females increases in a society with high moral restraint, as is typical of most traditional societies, the incidence of premarital sex is restricted by societal institutional mechanisms such as sex taboos, social reward for virginity, and other factors encouraging postponement of marriage such as education and employment. As a consequence, under such situations, the increasing number of single females do not increase correspondingly current total fertility rate though the effect is still positive. It is probably because of this, that such a relationship may be statistically insignificant.

However, as the society modernize, disintegration of societal norms of reproduction due to changing socio-economic and cultural processes could cause fertility to rise initialy especially due to pre-marital fertility. This proposition is valid only in a promiscuous society which has also low incidence of veneral diseases and other fertility control practices. In other words, with increased modernization processes such as education, employment and income, contraceptive use, urbanization, and diffusion of veneral diseases, the impact of proportions of single females (K1) begin to exert a negative effect on lifetime total fertility rate (Y2), which later becomes statistically significant.

It should, however, be realized that the predictive role of K1 on Y1 and Y2 could be complicated by the indirect influence of socio-economic and situational characteristics of single women. To identify which socio-economic and situational variables had greater effect on proportions of single females (K1), stepwise regression model was used again, and the results summarized in Appendix 12. On the basis of the 1969 census data, as expected, the total number of adult females (X1) and the total number of females with upper primary education (X4) were found to have positive effect on variable K1. Furthermore, the effect of mortality rate (X9) and the proportion of females illiterate (X2) were also found to exert negative effect on variable K1.

It is rather interesting to note that, 10 years later, more socio-economic variables had negative effect on the proportions of single females in Western Kenya. The variables exerting negative effect were proportions of females of lower primary education (X3); proportions of females of secondary education (X5);

proportions of female residents of urban centres (X7); proportions of females using modern contraceptive methods (X8); and, infant and childhood mortality rate (X9). However, a t-test of significance with specifications as indicated by Appendix 12, found only the following variables exerting negative effect as important: proportions of females of secondary education (X5), and, infant and childhood mortality rate (X9). These two variables exerted negative effects which were statistically significant at 0.05 level of significance. Note also that all the other variables with positive effect on K1, were found to exert effects which were statistically insignificant at 0.05 level of significance.

The sample survey data further found these other socio-economic variables to exert negative effect on the variable K1 namely; proportions of female Protestants (X2); proportions of females in wage employment (X8); and proportions of females earning some monthly income (X10), and (X11). A t-test of significance, however, found all these negative effects, except for variable X11, to be statistically significant at 0.05 level of significance (see Appendix 12).

In summary,there is evidence that the negative effect of proportions of single females (K1) on lifetime total fertility rate (Y2) is partly a function of the negative effect which socio-economic variables and situational variables exert on the number of single females in a society. The effect of such variables definitely become greater with increased stage of socio-economic development. Note that the given regression results should be considered with caution due to the small sample size and degrees of freedom.

7.5 Fertility Levels of currently married females

According to Table 27, the total fertility rate of currently married women in Nyanza Province and Western Province began to differ among women aged between 35 and 39 years. Among these women, the mean parity per woman in Western Province exceeded that of Nyanza Province by 5.6%; but the difference increased attaining its maximum level among women aged between 45 and 49 years whose differences amounted to 10.3%.

Further reference to table 27 indicates greater regional similarity in the total fertility rate among the younger females except in Kisii district, Bungoma district and Kakamega district where slight increases were noted among the younger females aged between 25 and 29 years. It was shown in chapter III, that these younger cohorts tended to suffer most from under-reporting of births in some districts.

7.6 Partial Correlation between proportions of currently married females (K3) and Total Fertility Rates.

The proportion of currently married women or ever-married women should be a positive predictor of fertility rate *ceteris paribus*. According to the pooled data of 1969 census, the proportions of currently married women aged between 15 and 49 years (K3), in the whole of Western Kenya, were found to have a relatively strong and

Table 27: Average Parity of Currently Married Women in Western Kenya in 1979

Province/ district	Age-groups in years							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	All
NYANZA	1.0	2.4	4.2	6.0	7.1	7.7	7.8	4.7
Kisii	1.1	2.6	4.6	6.7	8.0	8.5	8.9	4.8
Kisumu	1.0	2.3	3.9	5.6	6.6	7.3	7.4	4.3
Siaya	1.0	2.3	3.9	5.5	6.5	6.9	6.9	4.7
South Nyanza	1.0	2.4	4.1	5.9	7.0	7.6	7.8	4.5
WESTERN	0.9	2.3	4.1	6.0	7.5	8.3	8.6	4.9
Bungoma	0.9	2.3	4.1	6.1	7.7	8.8	9.2	4.8
Busia	0.9	2.3	3.9	5.9	6.9	7.5	7.6	4.6
Kakamega	0.9	2.3	4.1	6.1	7.5	8.4	8.7	5.1

Source: Computed from the 1979 census data.

positive correlation with the current total fertility rate. The observed zero-order partial correlation coefficient was r13 = 0.5075. But, the relationship between proportions of currently married women (K3) and lifetime total fertility rate (Y2) was negative because the computed zero-order partial correlation coefficient of r23 = -0.0628 as depicted by Table 24. Note that this negative relationship was very weak and probably close to reality.

The observed strong and positive correlation result of r13 should be considered in the context of marriage as an institution of progeny in a traditional society. Moreover, the result should be interpreted in the context of high pregnancy wastage, infant and childhood mortality rate, especially, in Nyanza Province. These forces substantially reduced the number of live births per woman in Western Kenya. In addition, the current total fertility rate (Y1) pertains to only realized total live births within a relatively short marriage duration of one calender year. In such situations the number of realized births per woman was bound to be relatively small. It was also noted in chapter III that, under-reporting of live births affected some districts.

The analysis of lifetime total fertility rate, or completed total fertility size yielded a different result. The proportion of women aged between 45 and 49 years, who were still currently married, when correlated with the proportion of children ever borne by women who were aged between 45 and 49 years, yielded a weak negative zero-order partial correlation coefficient of r23 = -0.0628. The validity of this finding in the context of the Western Kenya region should be considered in relation to the effects of high mortality rates in the region which reduced the number of currently married women with advancing age-groups. Moreover, with older age-groups the level of infecundability also increased to lower the number of realized live births, the noted relationship may also be complicated by effects of male migration which reduces frequency of sexual contact between married couples. Note also that with increased duration of marriage other intervening forces of family size limitation may be accepted, i.e. family planning practices. It is important to stress that the above findings were again supported by the 1979 census data.

The noted declining importance of proportions of currently married women aged between 15 and 49 years (K3), with increasing duration of marriage, indicates that other socio-economic characteristics of these women influence directly or indirectly completed fertility size. This was confirmed by the 1969 and 1979 census data as indicated by Table 25. It was striking to observe that the majority of these women, approximately 73.4%, and 50.4% for the 1969 and 1979 periods respectively, admitted using some methods of contraception such as breast-feeding, coitus interruptus, and modern methods of contraception. In fact, a partial correlation between variable K3 and the proportions of women using contraceptive methods (X8) yielded a zero-order partial correlation coefficient of r38 = 0.8565 and 0.7001 for the two census data respectively.

According to the 1978 sample survey data, the proportion of married women aged between 45 and 49 years was found to have high and positive relationship with the proportion of such women in self-employment (X7). The observed zero-order partial correlation coefficient for r27 = 0.9293. The majority of these women earned some income annually. The proportion of these old women was also found to be moderately and positively correlated with the proportion of such women with African religious beliefs (X4). The observed zero-order partial correlation coefficient was r24 = 0.4776 (see Table 26). These were the most important socio-economic characteristics of elderly women which could have confused the role of the proportions of old women currently married as a good predictor of the total fertility rate.

7.7 Step-wise Regression Analysis between Total fertility Rate and Proportions of Currently married Women.

According to the 1969 census data for Nyanza Province, as indicated by Appendix 10, the observed predictive role of proportions of currently married women aged between 15 and 49 years (K3) on current total fertility rate (Y1) is indicated by β - coefficient of 0.788. Note that for Western Province, the effect of variable K3 on variable Y1 was also 0.453 (see Appendix 10 and Appendix 11).

The significance of variable K3 on the model was tested using the null hypothesis (Ho), that the effect of variable K3 on variable Y1 is equal to zero, against the alternative hypothesis (H_a), that the effect of variable K3 on variable Y1 is not equal to zero. The application of a two-tailed t-test with n = 7 and df = (n - k) = 1, yielded conflicting results. The observed t_{-cr} at α = 0.05 and α = 0.01 were 12.706 and 63.66, respectively. Since the t_{-cal} for Nyanza Province was 7.89, we accept the null hypothesis and conclude that, in the case of Nyanza Province, the effect of proportions of currently married women (K3) on current total fertility rate (Y1) was statistically not significant from zero at the 0.05 level of significance. But for Western Province where t_{-cal} was 32.81, we reject the null hypothesis and conclude that the effect of proportions of currently married women (K3) on current total fertility rate (Y1) was statistically significant from zero at the 0.05 level of significance.

Further reference to the effect of proportions of currently married women (K3) on lifetime total fertility rate (Y2) also yielded conflicting results. According to the results of Appendix 10, the variable K3 yielded a negative predictive role on variable Y2 only in Nyanza Province. The computed β - coefficient was -54.379. This indicates that an increase in the proportions of currently married women (K3) depressed lifetime total fertility rate (Y2). However, this negative effect was found to be statistically insignificant at 0.05 level of significance. (see Appendix 10). Note that the level of adult mortality rate is relatively high in Nyanza Province as discussed in chapter 6. Hence, the incidence of maternal deaths is likely to be relatively high. Moreover, more deaths of husbands attributed to high mortality rate could also increase the level of widowhood, proportions single, and polygamy. All these forces definitely depress fertility level with increased duration of marriage.

However, in Western Province, the variable K3 had positive effect on variable Y2 as the computed β - coefficient was 8.33. A t-test found this positive effect to be statistically significant at 0.05 level of significance (see Appendix 11). This finding should be conceived in the context of three important factors. First, it is a cultural practice amongst Luhyia ethnic groups that a divorced woman can leave her children with the divorced man. This makes it relatively easy for such a woman to remarry. For this reason, the frequency of re-marriage is relatively high in Western Province. Secondly, the level of pre-marital pregnancy was observed in chapter 5 to be relatively high in

Western Province. This, therefore, stimulates early marriage. And lastly, the level of mortality is relatively low in Western Province compared to that of Nyanza Province. All these factors are likely to reinforce the contribution of the number of females married towards total fertility rate in any specified duration.

In order to determine which socio-economic and situational variables could function directly or indirectly through variable K3 to influence total fertility rate, a step-wise regression model was employed. In this analysis, K3 was the dependent variable and some selected socio-economic and situational variables as specified in chapter 1, became the independent variables. Therefore, on the basis of the 1969 census data, the following variables had positive effect on variable K3 as indicated by their β - coefficients; the proportions of females of upper primary education (X4); the proportions of females urbanized (X7); and the proportions of females using contraceptive methods (X8). The results for the 1979 census data were also as follows; the proportions of females urbanized (X7); and, the proportions of females using contraceptive methods (X8).

Further reference to the 1978 sample survey data also indicated positive effect between the proportions of ever-married women (K2) and the following socio-economic variables: the proportions of females in self-employment (X7); the proportions of females in wage employment (X8); and the proportions of females earning over Kshs 1000/- monthly (X12). A t-test for statistical significance on the basis of specifications stated by Appendix 13, found only all variables of the 1978 sample survey, which were, exerting positive effect, on variable K3, to be statistically significant at 0.05 level of significance.

In addition, the socio-economic and situational variables which yielded negative effect on variable K3 in 1969 were not identified. However, for the 1979 census data the variables exerting negative effect on variable K3 were observed as infant and childhood mortality rate (X9); the proportions of females with secondary education (X5); and the proportions of females with upper primary education (X4). Similarly, for the 1978 sample survey data the only variable yielding negative predictive effect on variable K2 was the proportion of females earning between Kshs 500/- and Kshs 999/- monthly (X11). All these observed negative effects were found to be statistically significant at 0.05 level of significance (see Appendix 13).

In summary, a high positive association between the proportions currently married and the fertility rate of a society is often stated in demographic analysis. This is a reasonable assumption in a society with universal marriage and minimal birth limitation practices. This notion has been endorsed only with regard to current total fertility rate, because with increased duration of marriage the intervening variables of socio-economic and situational phenomena increase their influence on the number actually married.

The institution of marriage is assumed to increase prospects for higher coital frequency to enable realization of its primary role as an institution of progeny. In this context, the "marriage atmosphere" generates forces which influence successful gestation and parnutrition. However, caution is needed before making generalizations about marital fertility rates, because marriage *per se* may not necessarily bring about realization of progeny. Problems of infertility, sub-fecundity; breast-feeding taboos, and differential sex mortality rates could reduce effectiveness of marital unions as determinants of fertility rates. In addition, social aspirations and expectations of couples could reinforce the desire to limit progeny. It is also known that delay in marriage can introduce a biological limitation in desired family size, because late marriage reduces the length of reproductive lifespan.

Despite these limitations in marriage, the significance of marriage as a fertility determinant is often conceived in the context of age at marriage and marital stability. This realization necessitated an investigation of the predictive role of age at marriage in fertility levels and trends.

7.8 Age at First Marriage and Fertility Rate

According to the 1978 sample survey data, which collected information on children ever born by age at first marriage of women folk, it was observed from pooled data of the study region that average parity began to decline as age at first marriage increased. See Table 28. Therefore, age at first marriage and, implicitly, duration of marriage ceteris paribus, strongly influenced the total number of children ever born per woman. This was shown by the declining trend in average total births with increasing age at first marriage. Similarly, the increasing trend in average total number of births per woman as the current age of a woman increases.

From the given data, it could be generalized on the basis of the previous discussion in Chapter 4 which examines the slope of fertility gradients, that, if other intervening variables were constant, then women marrying between the age of 15 and 24 years in Western Kenya, were likely to end up with a minimal difference in the number of desired children (family size); if not, the same number of children. Conversely, differences in family sizes, assuming other factors constant, occurred mostly among women marrying before the age of 15 years and those marrying after the age of 25 years.

7.9 Partial Correlation between Age at Marriage and Total fertility Rate.

Reference to Table 24 suggests again that the relationship between age at first marriage (K7) and current total fertility rate (Y1) was positive. The computed zero-order partial correlation

Table 28: Number of Children Ever-born by All Women Ever-married by Current Age and Age at First Marriage in 1978

Current Age		Under 15 Years	15-17 years	18-19 years	20-24 years	25-29 years	Over 30 years
		Age at First Marriage					
15-19	TC	4	32	4			
	NW	2	49	10			
	AP	2.0	0.7	0.4			
20-24	TC	27	129	150	20		
	NW	12	57	97	14		
	AP	2.3	2.3	1.6	1.4		
25-29	TC	22	125	139	32	4	
	NW	5	42	50	17	3	
	AP	4.4	3.0	2.8	1.9	1.3	
30-34	TC	21	216	157	71	14	
	NW	4	46	36	17	5	
	AP	5.3	4.7	4.4	4.2	2.8	
35-39	TC	6	161	205	61	26	5
	NW	1	31	40	12	6	2
	AP	6.0	5.2	5.1	5.1	4.3	2.5
40-44	TC		115	101	30	6	
	NW	-	20	18	6	2	-
	AP		5.8	5.6	5.0	3.0	
45-49	TC	12	135	115	23	1	-
	NW	2	23	23	5	1	
	AP	6	5.9	5.0	4.6	1.0	
50 +	TC	25	160	203	37	12	-
	NW	4	27	36	7	3	
	AP	6.3	5.9	5.6	5.3	4.0	
All ages	TC	117	1073	1074	274	63	5
	NW	30	295	310	78	20	2
	AP	3.9	3.6	3.5	3.5	3.2	2.5

Source: Computed from the 1978 Sample Survey data.
Key: TC = total children, NW = Number of women, AP = Average parity.

coefficient of r17 = 0.2644. Yet, the relationship between age at marriage (K7) and lifetime total fertility rate (Y2) yielded zero-order partial correlation coefficient of r27 = -0.4036. The results of the 1979 census data also gave a similar pattern of relationship.

Further reference to Table 25 suggests which socio-economic variables are likely to function through median age at marriage as a determinant of total fertility rate. It is, however, noted that the median age at marriage did not differ much among women of different socio-economic characteristics. Nevertheless, on the basis of 1969 census data, it was found that majority of women who were using modern contraceptive methods had already attained a large family size. This, therefore, caused spurious statistical correlation of r78 = 0.8037. It was also observed that majority of older women reported a higher proportion of children dead. Since majority of these old women had a relatively higher median age at first marriage, it was found that age at first marriage by different age-groups of mothers showed a strong positive correlation with proportions of children dead by age-group of mothers (X9). The noted relationship yielded zero-order partial correlation coefficient of r79 = 0.4880.

On the basis of the 1979 census data, median age at first marriage (K7) tended to be slightly higher among urban women although the relationship was very weak as the computed zero-order partial correlation coefficient of r77 = 0.1104. Further reference to the

1978 sample survey data identified the median age at first marriage (K3) as being relatively high among women of African Religious beliefs (X4). The observed zero-order partial correlation coefficient of r34 = 0.5597; self-employed women (X7) yielded r37 = 0.7324; and women in wage employment (X8) yielded r38 = 0.6201. The other socio-economic variables such as educational attainment, religion,and land-ownership had a negative relationship with median age at first marriage. (see Table 26).

7.10 Step-wise Regression Analysis between Median Age at First Marriage and Total fertility Rate.

Evidence from Appendix 10 indicates that, the median age at first marriage (K7) had extremely large positive effect on current total fertility rate (Y1). The observed β - coefficient was 4732.36. The significance of variable (K7) on variable Y1 was tested using the null hypothesis (H_0), that the effect of median age at first marriage on current total fertility rate was equal to zero, against the alternative hypothesis (H_a), that the effect of median age at first marriage on current total fertility rate was not equal to zero. The application of a two-tailed t-test with $n = 7$ and $df = (n - k) = 1$, yielded the expected result. The observed t_{-cr} at $\alpha = 0.05$ and $\alpha = 0.01$ were 12.706 and 63.66 respectively (see Appendix 10). Since the t_{-cal} was observed to be 1.77 which is less than t_{-cr} of 12.706, we accept the null hypothesis and conclude that the effect of median age at first marriage (K7) on current total fertility rate (Y1) was statistically insignificant from zero at the 0.05 level of significance.

Further reference to the effect of median age at first marriage (K7) on lifetime total fertility rate (Y2) also yielded the expected results. Reference to Appendix 10 indicates that the effect of variable K7 on variable Y2 was again very large and positive. The observed β - coefficient was 118291.93. Does this imply that raising the median age at first marriage triggered a substantial rise in lifetime total fertility rate? A t-test of the significance of the effect of variable K7 on variable Y2 was carried out under specifications stated in Appendix 10. The observed t-cr at α = 0.05 and α = 0.01 were again 12.706 and 63.66, respectively. The values of α = 0.05, however, were greater than the t-cal of 7.528 (see Appendix 10). We, therefore, accept the null hypothesis and conclude that the effect of median age at first marriage (K7) on lifetime total fertility rate (Y2) was statistically insignificant from zero at α = 0.05 level of significance. Are these two results consistent with reality?

Focussing on the first result which found the effect of median age at first marriage on current total fertility rate to be positive though statistically insignificant, it should be realized that in any one calender year the act of marriage hardly produce birth unless pre-marital pregnancy is involved. In other words, age at first marriage plays a minor role in determination of current total fertility rate. Note that even after marriage, family planning practices could still be used to delay early reproduction. In traditional cultural setting of Western Kenya, where polygamy is common, such practices if reinforced with conditions of high mortality rate could seriously limit effectiveness of age at marriage towards current total fertility rate. The situation can be complicated by effects of labour migration which is common in the area as discussed in chapter 6.

Further reference to the effect of median age at marriage (K7) on lifetime total fertility rate (Y2) is rather puzzling. Under normal circumstances raising the age at first marriage should depress lifetime total fertility rate (Y2) as this reduces the average reproductive lifespan. This proposition has actually been confirmed by empirical data as indicated by Table 28. The other effects of late age at marriage have been aptly discussed in the section of literature review and conceptual framework of chapter 1. In a nutshell, late age at first marriage should depress total fertility rate _ceteris paribus_.

However, the results of Appendix 10 suggest a contrary effect of age at first marriage on lifetime total fertility rate. The observed statistically insignificant though positive effect of variable K7 on variable Y2 suggests that raising the age at marriage raises too lifetime total fertility rate if other factors are assumed constant. Since the data used in the analysis belonged to the 1969 census data, the accuracy of such data could be doubted. Nevertheless, if we assume that the census coverage was fairly reasonable then the findings of Appendix 10 are still justifiable.

It was noted in the section of literature review that several demographic studies have found out that early marriage has greater risks of maternal deaths. Moreover, such marriage also experience high levels of foetal deaths. Other studies have also observed that early marriage causes early conditions of sub-fecundity due to exposure to veneral diseases and genital defects associated with early reproduction. In addition, early marriage, especially, in polygamous societies increases prospects for divorce as young women are not physically mature and psychologically mature to face problems of matrimony. All these factors are likely to cause early marriage to depress lifetime total fertility. According to the Kenya Fertility Survey (1980), the median age at first marriage was found to be 16.6 years for Nyanza Province and 17.5 years for Western Province as indicated by Table 1 in Chapter 1. The peak of adolescence probably occurs during this time and such cohorts normally have serious psychological problems. Note that,the observed median age at first marriage is still below the stipulated legal age at first marriage of 18 years for males according to the Marriage Bill of 1978. Surely, raising the age at first marriage is, therefore, likely to raise fertility level as mature women will have greater physical and psychological maturity to face problems of matrimony, particularly, in a society with high incidence of polygyny. Note that such arise in age at first marriage is effective only between the cohorts aged 15 and 24 as already observed. In addition, the effectiveness of such a rise in age at marriage will depend on the absence of fertility regulation practices, as well as, sub-fecundity.

Furthermore, it should be realized that the effect of age at marriage on total fertility rate can be complicated by socio-economic and situational factors. A stepwise regression analysis was used to determine which factors have greater effect on age at marriage. The results from Appendix 14 show that proportions of females illiterate (X2); and the proportions of females unemployed (X6) had negative effect on median age at first marriage. In other words, as the number of women with such characteristics increased, the median age at first marriage decreased. All these effects were statistically significant at $\alpha = 0.05$ level of significance. Note that like in other previous cases, such results should be considered in the context of the small sample size and limited degrees of freedom.

In summary, it should be realized that the slope of the fertility curve is not completely a function of age at first marriage because other forces such as marital disruption, and use of contraception could also play a significant role in determining the slope of fertility curve. Nevertheless, it is a biological fact that deterioration in reproductive capacity increases with advancing age. Consequently, early marriage is associated with high fertility levels as opposed to late marriage which is associated with low fertility levels, ceteris paribus. Age at marriage also influences reproductive norms and, is closely associated with duration of marriage. Lastly, it is a significant variable in perception of the environment which could influence family size norms as well as spacing of children.

7.11 Fertility of Widowed Women

It is interesting to observe from Table 29 that mean births per widowed women aged between 15 and 45 years exceeded mean births per currently married women as depicted by Table 27. This was only true among the younger age-groups between 15 and 35 years in the entire study region. Yet for the older women between 35 and 49 years, mean births per currently married women exceeded mean births per widowed woman.

The three districts namely Kisii, Bungoma, and Kakamega on average had relatively higher mean parity among widowed women aged between 15 and 49 years. In fact, the mean parity of widowed women in the named districts exceeded significantly the mean parity of widowed women in the other districts among the age-groups between 30 and 49 years. But the younger widowed women in the districts identified as having relatively lower fertility rates, had their mean parity exceeding the mean parity of younger widowed women in the three designated districts. The reason for this could

Table 29: Average Parity of Widowed Women in 1979

PROVINCE/ district	Age Group in Years							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	All
NYANZA	1.2	3.0	4.6	6.2	7.0	7.4	7.4	6.7
Kisii	1.2	3.3	4.9	6.8	7.6	7.5	7.7	7.1
Kisumu	1.7	2.9	4.3	5.8	6.6	7.1	7.1	6.5
Siaya	1.3	2.8	4.6	5.8	6.4	6.8	6.7	6.3
South Nyanza	1.2	2.9	4.6	6.1	7.1	7.4	7.6	6.7
WESTERN	1.1	3.1	4.6	6.3	7.2	7.8	8.7	7.3
Bungoma	1.2	2.8	4.2	6.0	7.2	8.2	8.3	7.2
Busia	1.2	3.4	4.7	6.3	7.1	7.2	7.8	7.0
Kakamega	1.0	3.1	4.7	6.5	7.3	8.0	8.2	7.4

Source: Computed from the 1979 census data.

be the greater effects of mortality among the aged women in districts with relatively low fertility rates, while little differences in mortality were experienced among younger females in the whole of Western Kenya.

7.12 Partial Correlation between Proportions of Widowed Women and Total Fertility Rate.

The analysis of the relationship between proportions of widowed women aged between 15 and 49 years (K4), and current total fertility rate (Y1) showed that in any one calender year of reproduction widowhood depresses current total fertility rate, while with increased duration of reproduction its negative effectiveness declined substantially. According to Table 24, the proportion of widowed females between 15 and 49 years (K4) was found to have a very strong negative correlation with current total fertility rate (Y1). The derived zero-order partial correlation coefficient was r14 = -0.8003. However, with more years of reproduction the relationship declined substantially to yield a weak negative correlation of r24 = -0.1213. This finding endorses the proposition that, with increased duration of reproduction, effects of K4 on Y2 is mediated by other intervening forces.

These intervening forces according to the 1969 census were education and urban residence. The proportion of widowed females of reproductive lifespan had a strong negative correlation with the proportion of women living in urban centres (X7) as r47 = -0.9354. The proportion of women with secondary education (X5) also yielded r45 = -0.8253. The same direction of association occurred when the proportion of women with primary education was examined (see Table 25).

In 1979 the same direction of association was observed except with two variables, namely illiteracy (X2) and infant and childhood mortality (X9). The latter two variables yielded zero-order partial correlation coefficients of r42 = 0.4961 and r49 = 0.9045 respectively. This indicated that as the proportion of illiterate women increased, the proportion of widowed women also increased. This was expected because as argued in Chapter 6, the majority of illiterate women were in polygamous unions arising from levirate marriages. The level of widowed women was also found to correlate positively with reported number of children dying by age-group of mothers (X9). This is also a logical result because children whose fathers had died were exposed to greater societal insecurity and might experience relatively high mortality rates.

7.13 Step-wise Regression Analysis between Total fertility Rate and Proportion of Widowed Women

Empirical results of the 1969 census data indicate that the predictive role of proportions of widowed women aged between 15 and 49 years (K4) on current total fertility rate (Y1) was negative and somewhat small. The computed β - coefficients were -3.032 and -1.176 for Nyanza Province and Western Province respectively (see Appendix 10 and Appendix 11). A t-test of the significance for this causality was performed on the null hypothesis (H_o) that the effect of variable K4 on variable Y1 is equal to zero; against the alternative hypothesis (H_a) that the effect of variable K4 on variable Y1 is not equal to zero. Using a two-tailed t-test with n = 7 and df = (n - k) = 1, the observed t_{cr} at $\alpha = 0.05$ and

α = 0.01 were 12.706 and 63.66, respectively. The computed t-value (t-cal) for Nyanza Province was 1.69 and for Western Province 7.56. Since t-cal is less than t-cr for both provinces, we accept the null hypothesis and conclude that the effect of proportions of widowed women (K4) on current total fertility rate (Y1) was not statistically significant from zero at the 0.05 level of significance.

Further reference to the effect of proportions of widowed women (K4) on lifetime total fertility rate (Y2) yielded the expected results only in the case of Western Province. According to the results of Appendix 10 and Appendix 11, the variable K4 yielded a strong negative predictive role on variable Y2. The computed β - coefficients were -22.22 and -36.88 for Nyanza Province and Western Province respectively. This indicates that an increase in proportions of widowed females (K4) greatly depressed lifetime total fertility rate (Y2). A t-test for significance however, indicates that the effect of variable K4 on variable Y2 was statistically significant from zero at the 0.05 level of significance, only, in Western Province (see Appendix 10 and Appendix 11).

In order to determine which socio-economic and situational variables could function directly or indirectly through variable K4 to influence total fertility rate, a step-wise regression model was used. According to the 1969 and 1979 census data as indicated by Appendix 15, the following variables had positive effect on variable K4 as indicated by their β - coefficients; the proportions of females of upper primary education (X4); the proportions of females of secondary education (X5); the proportions of females urbanized (X7); the proportions of females using contraceptives (X8); and infant and childhood mortality rate (X9). A t-test for significance of these effects, found only variable X4, X5, and X9 of 1979 to exert effects which were statistically significant from zero at 0.05 level of significance (see Appendix 15).

In addition, the variables identified to exert negative effect on variable K4 were as follows; the proportions of females illiterate (X2); the proportions of females of lower primary education (X3); and the dummy variable (X6). A t-test for significance, again found only variable X2 to exert negative effect which was statistically significant from zero at 0.05 level of significance.

In summary, the impact of widowhood as a predictor of fertility rate and trend should be conceived in the context of levirate marriage which reduces reproductive time lost due to the death of a spouse. Since the majority of women marry when they are still young at a time when their fecundity levels are also high, the loss of a husband, if followed immediately with re-marriage as is the case amongst most ethnic groups of Western Kenya, enabled the woman to achieve her family size goals. But for the aged woman, whose fecundity level is declining, the death of a husband is traditionally not followed immediately with re-marriage as such women may have elderly sons and daughters who may offer immediate social security.

It is possible for high infant mortality regions also to experience high fertility rates. This was the situation in most of pre-Industrial Europe and is still the condition in some of the developing countries today and the Western Kenya region is no exception. It is unquestionable that such societies have cultural norms which favour early marriage patterns.

The institutionalization of early age at marriage under such circumstances aims at the realization of progeny before the mortality of the couples. However, with increasing life expectancy accruing from declining mortality trend, a sustained high fertility rate in the phase of socio-economic development becomes a serious economic liability. Lastly, the impact of mortality on fertility should also be considered as possibly suppressing the fertility response if maternal death rates are extremely high in a region.

7.14 The Fertility levels of Divorced and Separated Women.

The fertility rate of divorced persons tend to be relatively much lower than fertility rate of persons in stable current marriages. The rationale for this proposition is that divorce and separation increase time lost in reproduction. In an African traditional setting, it is much easier for a widowed person to re-marry than for a divorced person, because of the marital obligations attached to divorce and separated persons. It was, therefore, observed that fertility of such females tend to be extremely low as depicted by Table 30.

It was evidenced that the mean parity per divorced and separated women aged between 15 and 49 years was slightly higher in Western Province than in Nyanza Province though the observed difference was rather small. Reference to the individual districts again isolates Bungoma (3.8), Kisii (4.0) and Kakamega (3.6) as having, on average, relatively high births per divorced and separated women. The districts with a relatively low total fertility rate per divorced woman were Kisumu, Siaya and Busia districts. With the exception of Kisumu district, the other two apparently had relatively low proportion of divorced and separated women as depicted by Table 17.

Table 30: Average Parity of Divorced and Separated Women in Western Kenya during 1979

PROVINCE/ District	Age-groups in Years							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	All
NYANZA	1.0	2.0	3.2	4.6	5.6	6.2	6.5	3.4
Kisii	1.0	2.1	3.7	5.6	6.9	7.1	8.4	4.0
Kisumu	1.0	1.9	3.0	4.0	5.1	5.9	5.6	3.1
Siaya	0.8	1.9	2.9	4.2	4.5	5.4	5.2	3.1
South Nyanza	0.8	2.1	3.2	4.6	5.9	6.2	6.8	3.4
WESTERN	1.0	2.0	3.0	4.1	5.1	5.7	5.6	3.5
Bungoma	1.0	2.0	3.2	4.2	5.3	6.2	6.4	3.8
Busia	0.9	1.8	2.9	3.9	4.9	5.3	4.1	3.1
Kakamega	1.0	2.0	3.0	4.3	5.2	5.7	6.1	3.6

Source: Computed from the 1979 census data.

7.15 Partial Correlation between Proportions of Divorced Women and Total Fertility Rate

Divorce or separation should have a negative relationship with fertility rates and trend. This proposition was found to be partially true. Reference to Table 24 indicates that, pooled data for Western Kenya showed that the proportions of females aged between 15 and 49 years (K5) have a strong positive correlation with current total fertility rate (Y1). To illustrate, the computed zero-order partial correlation coefficient was r15 = 0.7976.

It is plausible to argue that women who divorce or are separated usually do so because of childlessness; a factor which could be attributed to partial infertility. Consequently, if such a woman is re-married to somebody else, then her fertility could be restored. Furthermore, most divorcees get re-married quickly, particularly when they are still young. This, therefore, enables them to continue with their normal sexual life without losing much reproductive time. This practice, as already stated, was found to be prevalent in Western Kenya.

However, with more duration of marriage, the association between divorce and fertility rate exhibit the expected negative association. The proportion of divorced and separated women (K5) when correlated with lifetime total fertility rate (Y2) yielded a negative association because r25 = -0.0715. This implied that divorce and separation had a rather weak but depressing relationship with lifetime total fertility rate (Y2). In reality, the few divorced or separated women who failed to get re-married were mostly those who suffered from permanent sterility.

According to the 1969 census data, the proportion of divorced and separated women of reproductive lifespan (K5) showed strong positive correlations with proportion of illiterate women (X2) because r52 = 0.6977. The proportion of childless women dying by age-group of mother (X9) yielded r59 = 0.9029, and proportion of women using contraceptives (X8) yielded r58 = 0.7532. In fact, the death of children was found to be the main cause of divorce and separation in Western Kenya. It is common among Luo and Luhyia ethnic groups to divorce or experience temporary separation with women who experience high rates of pregnancy wastage or infant and childhood mortality rates. Female educational attainment showed weak and positive association though the trend had changed by 1979.

The 1979 census data showed that, proportion of divorced women aged between 15 and 49 years (K5) had a strong positive correlation with proportion of total adult women at risk of divorce (X1) as r51 = 0.6030; proportion of women with lower primary education (X3) as r53=0.5538. The proportion of women with other socio-economic characteristics had a moderately strong positive association. The only negative association by 1979 was realized between proportion of children dead by age-group of mothers (X9) as r59 = -0.3671; and proportion of females with upper primary education (X4) with r54 = -0.0095. The observed change from a positive association in 1969 to a negative association implied that infant and childhood mortality rates, as well as, having upper primary level of education were no longer important grounds for divorce.

7.16 Step-wise Regression Analysis between Total Fertility Rate and Proportions of Divorced Women

Reference to Appendix 11 indicates that the predictive role of proportions of divorced and separated women aged between 15 and 49 years (K5) on current total fertility rate (Y1) was moderately positive. The observed β - coefficient was 2.17. This indicates that, in any one calender year, a rise in the number of divorced and separated women increased the level of current total fertility rate in Western Kenya. This is probably true because most of these women often rush to major urban centres of the region and engage into prostitution. Since few of these women initially use modern contraceptive methods, they run the risk of conception. In addition, it was observed that some of these women who are divorced because of sub-fertility often get remarried and some later become pregnant.

In order to test the significance of the effect of divorce or separation (K5) on current total fertility rate (Y1), a two-tailed t-test was performed using a null hypothesis (H_0), that the effect of divorce or separation (K5) on current total fertility rate (Y1) was equal to zero, against the alternative hypothesis (H_a), that the effect of K5 on Y1 was not equal to zero. With n = 7 and df = (n -k) = 1, the observed t-cr at α = 0.05 and α = 0.01 were 12.706 and 63.66, respectively. Since the t-cal was 14.16 which is greater than the observed t-cr of 12.706, we reject the null hypothesis and conclude that the effect of divorce or separation on current total fertility rate was statistically significance.

Further reference to the effect of divorce or separation (K5) on lifetime total fertility rate (Y2) also yielded the expected results. According to Appendix 11, the effect of K5 on Y2 was negative and very strong indeed, because the β - coefficient was -79.43. This indicates that an increase in divorce and separation with increased duration of marriage depresses lifetime total fertility rate. A similar two-tailed t-test led to the rejection of the null hypothesis. In other words, divorce and separation significantly depressed lifetime total fertility rate at 0.05 level of significance.

In order to determine which socio-economic and situational variables could function directly or indirectly through variable K5 to influence variable Y1 and variable Y2, a step-wise regression model was used. The results of this analysis are indicated by Appendix 16. On the basis of the 1969 and 1979 census data, the following variables had positive effect on divorce or separation; total females of lower primary education (X3); total females residing in urban centres (X7); total females using contraceptives X8; and the number of children dying by age-group of mother X9. On the other hand, the variables with negative effect on variable K5 were; total females of upper primary education (X4); total females of secondary education (X5); and total illiterate females (X2). Note that a two-tailed t-test when applied found majority of these observed effects to be statistically insignificant at 0.05 level of confidence. (see Appendix 16).

In summary, marital instability should be perceived as reinforcing the desire for self-reliance particularly among women whom circumstances may force into prostitution or engage in sex-roles which compete with childbearing functions. These factors are more likely to influence the individual's perception of ideal family size norms. Under situations of desperation associated with marital instability, resort to contraception or abortion is most likely. Consequently, conception and gestation rates could be suppressed causing low fertility rates. All these factors function differently depending on the societal level of modernity. It must, however, be realized that sometimes infertility or sub-fecundity reinforces the level of marital instability.

7.17 Fertility Level of Polygamous Women

There is some evidence associating marital instability, as caused by polygamy, with low fertility levels. Evidence from the study area based on monogamous women showed that such women had relatively higher total fertility rates compared with women in polygamous unions.

According to Table 31, the pooled sample survey data of 1978 shows that differences in total fertility rates between women in polygamous unions and those in monogamous unions were somewhat important only in Western Province, with a difference of about 16%.

Furthermore, the mean births per woman in polygamous unions tended to be slightly higher in Western Province than in Nyanza Province by 2.4%. This difference was, therefore, too small and negligible. But, among the younger females aged between 15 and 29 years, there was evidence that mean parity of such women in Nyanza Province exceeded significantly mean parity of such women in Western Province. The noted variation was about 16.2% among women aged between 25 and 29 years (see Table 31). Yet, among the older women above the age of 20 years, the mean parity of such women in Western Province exceeded the mean parity of polygamous women in Nyanza Province. The difference ranged between 7.7% among women aged between 40 and 44 years and 13.9% among women aged between 45 and 49 years.

These differences were, nevertheless, small except for the last age-group which contributed minimally towards total fertility

Table 31: Average Parity of Women in Monogamous and Polygamous Unions in Western Kenya in 1978.

PROVINCE	15-19	20-24	25-29	30-34	35-39	40-44	45-49	All
				Monogamous Unions				
Nyanza	0.6	2.2	4.0	5.4	6.4	7.0	7.2	4.5
Western	0.3	1.8	3.6	5.7	6.8	8.0	8.4	5.0
% difference	50.0	18.2	10.0	5.5	6.3	14.3	16.7	11.1
				Polygamous Unions				
Nyanza	0.6	2.0	3.7	4.9	5.9	6.5	6.5	4.1
Western	0.3	1.5	3.1	5.0	5.9	7.0	7.4	4.2
% difference	50.0	25.0	16.2	10.2	0.0	7.7	13.9	2.4

Source: Computed from the 1978 Sample Survey data.

rate. The small differences noted could be accounted for by regional variations in mortality rates. The relatively high mortality rates in most districts of Nyanza Province except Kisii district, forced young women into polygamous unions due to levirate marriages. The infertility of first wives also reinforced the high incidence of polygamy. There was evidence from the 1969 census data that, relatively more women suffered from sub-fecundity in Nyanza Province compared to the situation in Western Province (Republic of Kenya, 1969)[1].

7.18 Partial Correlation between Proportions of Women Polygamous and Total Fertility Rate

It was observed from the pooled data of the 1978 Sample Survey that the relationship between the proportion of women aged between 15 and 49 years who were in polygamous unions (K10) and the total fertility rates of the region was equally strong and positive as was in the case with monogamous unions.

The zero-order partial correlation coefficients of the two marital types were very close because r1.10 = 0.5326 and r2.10 = 0.4536. These coefficients pertain to women in polygamous unions. Note that, these correlation coefficients compare favourably well with those of women in monogamous unions as r19 = 0.5210 and r29 = 0.4566 for the current total fertility rate and lifetime total fertility rate respectively.

Further reference to Table 26 suggest that the proportions of polygamous women (K10) was positively related with proportions of women in self-employment (X7), because r10.7 = 0.932; and the relationship with proportions of females of African Religion (X4) as r10.4 = 0.5754. These findings conform to reality, because polygamy is common among non-christians. Women in polygamous unions also engage in self-employment or wage employment to supplement their income and obtain some form of security.

In conclusion, it is plausible to accept the proposition that polygamous unions contribute slightly more to the total fertility rate of a region during the initial stages of reproduction. However, with a longer duration of marriage, it is monogamous unions which contribute much more to regional fertility rates, _ceteris paribus_.

This proposition is justifiable because in the case of one person with several wives, there is a greater chance for him to have a large family size in the initial stages of reproduction. But, with increasing time endogenous and exogenous forces such as sub-fecundity, reduced coital frequency, poor husband-wife communication, begin to influence the average total births per woman in the family.

7.19 Summary

The foregoing analysis has revealed that, among the nuptial variables in the research model of chapter 1, only the following are important positive predictors of current total fertility rate: total currently married women aged 15-49 years (K3), and total divorced and separated women aged 15-49 years (K5). These two nuptial variables exerted positive effects which were statistically significant at 0.05 level of significance. These other two nuptial variables namely; total single females aged 15 – 49 years (K1), and median age at first marriage (K7) were also observed to exert positive effect on current total fertility rate, though such effects were found to be statistically insignificant at 0.05 level of significance. Furthermore, the only nuptial variable observed to exert a negative effect on current total fertility rate was total widowed women aged 15-49 years (K4). However, the observed effect in both Nyanza Province and Western Province was found to be statistically insignificant at 0.05 level of significance (see Appendix 10 and Appendix 11).

The combined effect of all the above mentioned nuptial variables on current total fertility rate (Y1) was substantial. All these nuptial variables explained 99.9% in the varience of current total fertility rate. From a two-tailed t-test with a sample size of n = 7, and df = 1, we concluded that the effects of these noted nuptial variables were statistically significant from zero at 0.05 level of significance.

Furthermore, the effect of nuptial variables on lifetime total fertility rate (Y2) can be summarized as follows; the only two nuptial variables observed to exert positive effect were total ever-married women aged 15-49 years (K3), and median age at first marriage (K7). Though the effects of these two nuptial variables were observed to be positive, such effects were, however, statistically insignificant at 0.05 level of significance. In fact, most nuptial variables exerted a negative effect on lifetime total fertility rate (Y2). Those yielding negative predictive roles were: total widowed women aged 15-49 years (K4); and total divorced and separated women (K5). These two nuptial variables exerted negative effects which were statistically significant from zero at 0.05 level of significance. These other two nuptial variables, namely, total single females aged 15-49 years (Kl), and total currently married women (K3), only in Nyanza Province, exerted negative effects which were not statistically significant from zero at 0.05 level of significance.

The combined effect of the designated nuptial variables again explained 99.9% in the varience of lifetime total fertility rate (Y2). Again, using a two-tailed t-test of hypothesis, we conclude that the effect of these nuptial variables on lifetime total fertility rate was significantly different from zero at 0.05 level of significance (see Appendix 11).

It should be noted that, the negative effect of most nuptial variables on lifetime total fertility rate suggest that other intervening socio-economic and situational variables that might have had strong effect with nuptial variables influence lifetime total fertility rate indirectly. The variables noted as having a strong direct effect on total fertility rates were infant and childhood mortality (X9), and contraceptive use (X8). Therefore, the other socio-economic phenomena, namely illiteracy or education, employment and income, urban residence, and religion, must be perceived as having their strong influence on total fertility rates through their strong correlation with nuptial variables. This nature of association is examined later. For this reason, verification of the research hypotheses as stated in chapter 1, must await the analysis contained in the next chapter.

References

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2. CBS/G.K. 1980: Kenya Fertility Survey 1977-78 and World Fertility Survey, First Report, Vol. 1, 1980. Published by Central Bureau of Statistics/Ministry of Economic Planning and Development, Nairobi.

CHAPTER 8

8.0 ANALYSIS OF EMPIRICAL RESULTS ON SOCIO-ECONOMIC VARIABLES

8.1 Introduction

In the previous chapter, it was demonstrated that, the direct impact of most nuptial variables on current total fertility rate was mediated by socio-economic and situational variables. It was further observed that, the direct and indirect effect of socio-economic and situational variables was greater on lifetime total fertility rate. It was also proposed that, of the listed socio-economic and situational variables, only contraceptive use (X8) and infant and childhood mortality rate (X9) could exert direct impact on fertility level.

The main objective of this chapter is, therefore, to correlate statistically socio-economic and situational variables with the total fertility rate. The aim is to show the directional effects of selected predictor variables on the total fertility rate as required by the second research objective, and to fulfil the demand of the fourth research objective, namely: to demonstrate that socio-economic factors influence fertility not only directly, but also indirectly through their impact on nuptial variables. Such analysis should help in identification of relevant variables for policy actions which should help to reduce the high fertility rates experienced in the region. The last part of the chapter is devoted for verification of the research hypotheses.

8.2 Educational Attainment and Total Fertility Rate

The relationship between educational achievements and fertility level is indirect. According to the most recent fertility survey in Kenya, women with few years of education were found to have higher fertility than women with no education. (CBS/GK, 1980)[1]. This finding was consistently endorsed by the sample survey data of 1978 as indicated by Table 32. It should be realized that

Table 32: Mean number of live births per woman by educational attainment for all districts in W. Kenya in 1978

Level of education	15 - 24 years only			25 - 34 yrs		35 - 44 yrs		45 +	
	Never	Ever	All	Ever		married		only	
	married	married	unst	unst	stand	unst	stand	unst	stand
no education	0.3	1.8	1.5	4.6	4.6	7.1	7.0	7.8	7.7
1 - 4 years	0.2	2.0	1.2	4.9	4.8	7.8	7.8	8.1	8.1
5 - 8 years	0.2	1.7	0.9	4.6	4.7	7.2	7.3	8.0	8.1
9 + years	0.2	1.5	0.6	3.5	4.6	6.0	6.0	6.0	6.0

Source: Computed from the 1978 sample survey data.

Key: unst. for unstandardized rate
stand. for standardized rate.

this finding holds true only among females with lower and upper primary levels of education. Infact, the difference seems to hold mostly among females over 25 years of age. It must also be noted that, insignificant differences in fertility level exist between women with lower primary level of education and those with upper primary level of education. However, fertility level begins to decline significantly with secondary and university education.

8.3 Partial Correlation Analysis between Educational Attainment and Total Fertility Rates

According to Table 33, the correlation between proportions of illiterate women aged between 15 and 49 years (X2) and current total fertility rate (Y1) yielded a zero-order partial correlation coefficient of $r12 = 0.9004$. This magnitude of positive association between these two variables renders lack of education (illiteracy) to rank second after infant and childhood mortality rate (X9) as variables with strong positive correlation with current total fertility rate within the Western Kenya region.

Though previous studies established that the fertility level of illiterate women was relatively lower than the fertility level of women with primary education in Kenya, (CBS/GK, 1980)[2], it ought to be emphasized that, these differentials in fertility levels between illiterate women and women with primary education were very small as depicted by Table 32. In addition, the proportions of women with primary education in most rural environments of Kenya tend to be much lower when compared with proportions of illiterate women. This finding was consistent with the situation in Western Kenya.

Further reference to Table 33, shows that the association between proportions of women with lower primary education (X3) and current total fertility rate (Y1) was moderately strong. The computed zero-order partial correlation coefficient was r13 = 0.6869, while the association between proportions of women with upper primary education (X4) and current total fertility rate (Y1) yielded a zero-order partial correlation coefficient of r14=0.4199. Lastly, the association between proportions of women with secondary education (X5) and current total fertility rate yielded a result of r15=0.5597.

Table 33: Zero-order partial correlation coefficients for socio-economic variables and total fertility rates in 1969.

Variable	Description	Y1	Y2
X_1	total adult females aged 15-49 years	.6735	.2325
X_2	total illiterate females aged 15-49 years	.9004	.2001
X_3	females with lower primary education 15-59 yrs	.6869	.0362
X_4	females with upper primary education 15-49 yrs	.4199	.1726
X_5	females with secondary education 15-49 years	.5597	-.0687
X_6	dummy variables (number childless)	.6882	-.7953
X_7	total female residents of urban centres	.7635	-.0388
X_8	total females using contraceptive methods	.4502	-.1830
X_9	number of children dying by mothers age-group	.9447	-.1665

Y1 = Current total fertility rate

Y2 = Lifetime total fertility rate.

But, the association between the level of female illiteracy (X2) and the level of females with primary education (X_3; X_4) with lifetime total fertility rate (Y2) yielded weak but still positive association. In fact, it was only the proportions of females with secondary education (X5) which yielded a negative correlation because r25 = -0.0687. The same direction of associations between education and fertility was also observed for the 1979 census data.

8.4 Step-wise Regression Analysis between Total Fertility Rate and Educational Attainment.

Reference to the β - coefficients of Appendix 17 and Appendix 18, for the 1969 census data, reveals puzzling results on the effect of educational attainment on current total fertility rate (Y1). These results are puzzling because of the nature of regional differences observed. To illustrate, in Nyanza Province, only the following educational variable had positive effect on current total fertility rate (Y1); the proportion of females of upper primary education (X4), with β - coefficient of 0.822. In Western Province, the educational variables exerting positive effect on current total fertility rate (Y1) were; proportions of females of lower primary education (X3), with β - coefficient of 0.836; and, proportion of females of upper primary education (X4), with β - coefficient of 0.264.

Furthermore, the educational variables which exerted negative effect on current total fertility rate (Y1), in Nyanza Province, were as follows; the proportion of females illiterate (X2), with β - coefficient of -0.298; and, the proportion of

Table 34: Correlation coefficient matrix for socio-economic variables

	X1	X2	X3	X4	X5	X6	X7	X8	X9
X1.	1.000 (1.000)								
X2.	.8121 (.0925)	1.000 (1.000)							
X3	.9742 (.9828)	.7423 (-.0019)	1.000 (1.000)						
X4.	.9290 (.9575)	.5493 (-.1915)	.9470 (.9715)	1.000 (1.000)					
X5.	.9122 (.9338)	.5787 (-.2123)	.9739 (.9186)	.9638 (.9689)	1.000 (1.000)				
X6.	.2684 (.8568)	.3289 (-.3155)	.4252 (.8820)	.1978 (.9425)	.4507 (.9044)	1.000 (1.000)			
X7.	.9616 (.4065)	.7852 (-.4599)	.9882 (.3726)	.8989 (.5156)	.9486 (.6098)	.4973 (.4268)	1.000 (1.000)		
X8.	-.2844 .8669	.3057 (.3556)	-.3243 (.8570)	-.5994 (.7611)	-.4757 .6894	.2946 (.6098)	-.2273 (.1923)	1.000 (1.000)	
X9.	.4501 -.6060	.8424 .6367	.4321 (-.6453)	.1289 (-.7656)	.2663 (-.8014	.5939 (-.6876)	.5234 (-.8378)	.7088 (-.3455)	1.000 (1.000)

Key: Bracketed values are for 1979
- others for 1969.

females with secondary education (X5); with β - coefficient of -4.316. In Western Province, the educational variable with negative effect on current total fertility rate was proportion of females illiterate (X2), with β - coefficient of -0.055. In order to determine the significance of these effect on current total fertility rate (Y1), the hypotheses tested were stated as follows; (i) the null hypothesis (H_o) was that, the effect of educational attainment on current total fertility rate was equal to zero; and, (ii) the alternative hypothesis (H_a) was that, the effect of educational attainment on current total fertility rate was not equal to zero. With a sample size of 7 and df = 1, the t-cr observed at $\alpha = 0.05$ and $\alpha = 0.01$ were 12.706 and 63.66, respectively. However, according to Appendix 17 and Appendix 18, the computed t-calc for only two educational variables, namely variables X3 and X4, of Western Province, are observed to be greater than the values of t-cr given. It was, therefore, for only the proportion of females of lower primary education (X3); and, the proportion of females of upper primary education (X4), that the null hypothesis was rejected and the conclusion made was that the effects of variables X3 and X4, of Western Province, on current total fertility rate (Y1) were statistically significant from zero at 0.05 level of significance. In a nutshell, the effects of the other educational variables on current total fertility rate, were not statistically significant from zero at 0.05 level of significance (see Appendix 17 and 18).

Further reference to the effect of educational attainment on lifetime total fertility rate (Y2) reveals the expected results for both provinces. It is observed that educational attainment exerted negative effect on lifetime total fertility rate (Y2). To illustrate, in Nyanza Province, the proportion of illiterate females (X2), yielded β - coefficient of -13.102; while in Western Province, the proportion of females of lower primary education (X3), yielded β - coefficient of -27.617; the proportion of females of upper primary education (X4), yielded β - coefficient of -23.234; and, the proportion of females with secondary education (X5), yielded β - coefficient of -220.789. A t-test, following the specifications of Appendix 17 and Appendix 18, indicates that all these negative effects were not statistically significant from zero at 0.05 level of significance.

The mechanisms through which illiteracy and education among females of reproductive cohorts function should be perceived in the following context. First, illiterate women have low standards of hygiene for maternal and child-care. Since the majority of these women live in rural areas where accessibility to adequate medicare is still relatively low, these women are likely to experience high infant and childhood mortality rates. For this reasons, such women are likely to cherish large family size norms and will work toward the attainment of large families.

It is important to realize that some formal education raises the individual standards of hygiene. Such people are also more likely to reside in urban centres, have employment and income and, thus generally have relatively better access to medicare which finally reduces the incidence of infant and childhood mortality rates among them. The immediate repercussions of these modernization processes will be an increase in survival rates among children and mothers. Hence, the positive association noted with current total fertility rate (see Table 34).

Education also has reverse effects especially on lifetime total fertility rate. According to R.A. Henin, "secondary education which should involve many years of schooling, is probably a pre-requisite for a woman to change her attitude towards family size". (R.A. Henin, et al. 1980).[3] This notion was endorsed by the sample survey data of 1978. It was noted that in general, the awareness and effective use of modern contraceptive methods somewhat increased with the level of education (see Table 35). Though the proportions of current users of modern contraceptives were found to be small and there were insignificant variations between districts, it should be noted that, the use of traditional methods of contraception were not investigated. It was also observed that, the use of modern contraceptive methods tended to be confined to women who had already achieved large family sizes. In other words, the population at greatest risk of pre-marital pregnancy, namely those aged between 15 and 24 years, never used modern contraceptive methods because some of these women were still in educational institutions.

Moreover, the relationship between educational achievements (number of years spent schooling) and fertility is seen better if the proportions of single population or its role as a reinforcing factor in delaying marriage is considered. The pooled data for Western Kenya in 1978, as summarized by Table 36, indicates the relationship between education of females and their age at first marriage. There is evidence again that, the level of female education is positively associated with the age at first marriage. Implicit in this relationship is the increasing proportions of single females as the age of first marriage rises.

Table 35: Percentage of women using contraceptives by level of education for Western Kenya in 1978.

Contraceptive use	Level of Education: no education	Std. I-IV	Std. V-VIII	Std. IX	All
% of women who have never used any contraceptive method	12	20	26	35	24
% of women currently using contraceptives	6	13	34	47	32

Source: Computed from the 1978 Sample Survey data.

Table 36: Female education and age at first marriage for ethnic groups in Western Kenya

Index of measurement	Women currently aged between 15 and 24 years: no education	Std I-IV	Std V-VIII	Std IX +	All
Median age at first marriage	16.5	17.5	18.1	21.5	18.5
Singulate mean age at marriage	17.8	19.1	20.5	22.5	19.0

Source: Computed from the 1978 Sample Survey data.

A study carried out in Ghana by J.G. Bhatia, (1978)[4] found that low educated and non-educated persons who were of low social status and in low paying jobs were often conditioned to work for a long time before accumulating enough wealth for bride-price. It is, therefore, seen that whether high age at marriage or low age at marriage is influenced by education depends on the kind of society one is examining. In other words, the relationship between education and age at first marriage can be non-linear.

Education should be perceived as a deterrent to increasing incidence of polygamous unions because educated women often disapprove of such practices. There is some evidence on the basis of information on Table 37 that the proportions of non-educated women in polygamous unions significantly exceeded the proportion of women with secondary education in such unions. But, the noted differences between districts of Nyanza Province and those of Western Province were very small indeed and can be described as negligible.

Table 37: Percent of women aged 15-49 years in polygamous unions by levels of education

Region	Non educated	Std I - IV	Std V - VIII	Std IX +	All Women
Nyanza Province	30.1	23.7	18.6	6.9	30.5
Western Province	29.9	22.5	15.9	5.7	29.7

Source: Sample Survey data of 1978.

Education could influence marital behaviour in many ways. Apart from expanding human horizon, it raises also human expectations and aspirations which are vital in determining human life styles. For example, a significant parameter in any life style, which is influenced by education, is taste. The significance of taste is its direct correlation with the level of societal affluence which obviously create demand for goods and services that compete directly with childbearing activities. The ultimate consequence of such competition is often deleterious to marriage as an institution for it raises prospects for divorce, separation, and murder (homicide).

It is further noted that, though the Presidential Decree on free primary education boosted female education between 1965 and 1979, most girls were saved from coercion into early marriage, because previously, dowry received from early marriage contracts was used to educate their brothers. Since the cost of secondary education is still the responsibility of parents, in communities where male progeny is culturally desirable, most females still cannot continue with secondary education because they have to be married or are forced into marriage in order to assist their brothers' further education through the dowry system. This situation accounts for the extremely low proportions of females with secondary and post-secondary education throughout Western Kenya.

In summary, non-educated women were found to have the and no income, African religious beliefs, customary marriage and high incidence of polygamy, lack of land title deed and, high infant and childhood mortality rates. Conversely, educated women were found to have Western religious beliefs, were also employed and earning some income, some were living in urban centres, were also using modern contraceptive methods and had a tendency to marry late. (see Table 34). In conclusion, the regression results should be interpreted with caution because of the small sample size and limited degrees of freedom.

8.5 Occupation, Income, and Fertility

According to the 1978 sample survey data, there were little variations in total fertility rate between unemployed women and those in self-employment or wage employment as summarized in Table 38. However, these statistics should be interpreted with caution as the number of women respondents by different occupational categories was rather small.

Table 38: Mean number of live births per women by age-groups and type of occupation

Type of occupation	Current age of women in years							
	15 - 24		25 - 34		35 - 44		45+	
	Never married	Ever married	unst.	stand.	unst.	stand.	unst.	stand.
unemployed	0.3	1.6	4.4	4.3	4.3	7.3	7.4	7.4
self-employed	0.2	1.7	4.6	4.5	4.5	7.0	7.5	7.6
wage-employment	0.2	1.7	4.6	4.5	4.6	7.3	7.5	7.5

Source: Computed from the 1978 Sample Survey data.

Key: stand. = for standardized rate
unst. = for unstandardized rate.

The impact of employment or unemployment on fertility must be perceived as indirect. Such association can be positive or negative for either the current total fertility rate or the lifetime total fertility rate as depicted by Table 39.

Table 39: Zero-order partial correlation coefficients for socio-economic variables and total fertility rates in 1978.

Variable description		Y1	Y2
X1.	total adult females sampled aged 15-49 years	-.9124	-.9359
X2.	total female Protestants aged 15-49 years	-.9324	-.9529
X3.	total female Catholics aged 15-49 years	-.8686	-.8947
X4.	total females of African religion aged 15-49 yrs	.3923	.3793
X5.	females in household units with land title deed	-.9433	-.9569
X6.	total females unemployed aged 15-49 years	-.9715	-.9771
X7.	total females in self-employment aged 15-49 yrs	.2730	.2372
X8.	total females in wage-employment aged 15-49 yrs	.0295	-.0225
X9.	total females earning no monthly income (15-49) years)	-.9678	-.9777
X10.	total females earning less than Ks 500 per month (15-49 years)	.1789	.1368
X11.	total females earning between Ks 500-999/- per month	.2057	.1726
X12.	total females earning over Ks 1000 per month	.6470	.6251

Y1 = Current total fertility rate

Y2 = Lifetime total fertility rate.

8.6 Partial Correlation Between Occupation, Income and Total Fertility Rate

Reference to Table 39 suggests that, the proportions of unemployed women of reproductive age-groups, as well as the proportions of such women who did not receive any annual income (X6), yielded strong and negative association with current total fertility rate (Y1) and lifetime total fertility rate (Y2). The computed zero-order partial correlation coefficients were r16 = -0.9715, and r19 = -0.9678, for the two variables respectively (see Table 39).

Furthermore, the proportion of women aged between 15 and 49 years who were in self-employment (X7); wage employment (X8); and, were therefore receiving some amount of annual income exhibited weak but positive association with current total fertility rate (Y1). The derived zero-order partial correlation coefficients were as follows; for self-employment, r17 = 0.2730; for wage employment, r18 = 0.0295; and for females earning income above Kshs 1000/- per month (X12), r1.12 = 0.6470. For lifetime total fertility rate (Y2), the directions of these correlation did not change though they were relatively much weaker (see Table 39).

8.7 Step-wise Regression Analysis between Total Fertility Rate and Employment

The results of Appendix 19, indicates the expected results on the effect of occupation and income on current total fertility rate (Y1). It is observed, that the following variables had positive effect on variable Y1; the proportion of females in self-employment (X7); the proportion of females earning Kshs 500-999/- per month (X11); and the proportion of females earning over Kshs 1000/- per month (X12).

Table 40: Correlation coefficient matrix for socio-economic variables of 1978

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12
X1	1.000											
X2	.9895	1.000										
X3	.9790	.9412	1.000									
X4	-.0913	-.1688	-.0392	1.000								
X5	.9473	.9497	.9165	-.2125	1.000							
X6	.9317	.9578	.8685	-.2917	.9808	1.000						
X7	.0760	-.0177	.1681	.7452	-.2003	-.2747	1.000					
X8	.2833	.1971	.3919	.3357	.0139	-.0735	.8431	1.000				
X9	.9596	.9748	.9079	-.2330	.9864	.9954	-.1878	.0057	1.000			
X10	.0716	-.0060	.1729	.2545	-.2164	-.2660	.8242	.9103	-.1874	1.000		
X11	.1109	.0345	.2004	.6419	-.0503	-.1593	.7218	.7183	-.1077	.4450	1.000	
X12	-.3395	-.3882	-.3034	.8683	-.4882	-.5484	.7283	.4187	-.5061	.3284	.7645	1.000

Source: Computed from the 1978 Sample Survey data.

The other socio-economic variable namely, the proportion of females unemployed (X6) elicited negative effect on current total fertility rate (Y1). The derived β - coefficient for these variables were as follows; for unemployment (X6), -12.442 for self-employment (X7), 27.380; for income between Kshs 500 and Kshs 999/- per month (X11), 18.577; and for earnings above Kshs 1000/- per month (X12), 120.64 (see Appendix 19).

In order to test the significance of the effect of occupation and income on total fertility rates, a null hypothesis (H_o) stating that, the effect of occupation and income on current total fertility rate (Y1) was equal to zero was tested against an alternative hypothesis (H_a) stating that, the effect of occupation and income on current total fertility rate (Y1) was not equal to zero. With a sample size of 7, and df = 1, the t-cr observed at $\alpha = 0.05$ and $\alpha = 0.01$ were 12.706 and 63.66, respectively. A summary of t-cal for each of the stated variables is given in Appendix 19. It is evident from the Appendix 19, that the null hypothesis was accepted for each of the variables and, we conclude that the effect of occupation and income on current total fertility rate (Y1) was not statistically significant from zero at 0.05 level of significance. This finding, therefore, does seem to endorse the research proposition that nuptial variables are relatively more important as determinants of current total fertility rate (Y1).

Further examination of the effect of occupation and income on lifetime total fertility rate (Y2), yielded somewhat expected results. the variable observed to exert a positive effect on lifetime total fertility rate (Y2), was namely, the proportion of females in households with land title deed (X5). The computed β - coefficient for X5 was 10.769. Note that the other variables such as the proportion of females in self-employment (X7); and, the proportion of females earning no income (X9); were found to exert negative effect on lifetime total fertility rate (Y2). The computed β - coefficients were as follows; for X7, -14.943; and for X9, -4.727. In order to determine whether these effects were satistically significant from zero, t-tests were performed using the data given in Appendix 19. A null hypothesis (H_0) stating that, the effect of occupation and income on lifetime total fertility rate (Y2) was equal to zero was accepted at α = 0.05. This is because t-cal for all variables cited were less than observed t-cr at α = 0.05 (see Appendix 19). It is, therefore, concluded that the positive and negative effects of occupation and income variables on lifetime total fertility rate (Y2), were not statistically significant from zero at 0.05 level of significance.

It should be realized that, occupation and income function through age at first marriage; divorce and separation; widowhood; and, better prospects for nutrition as predictor variables of total fertility rate. The 1978 sample survey data as indicated by Table 41 suggest that, the unemployed females in the study region tended to marry early. Explicitly stated, women with better economic security in the form of self-employment, or wage-employment, somehow, tended to remain single for a relatively much longer time because their median age at first marriage and singulate mean age at first marriage tended to be higher than that of unemployed women. This probably give such women, physical and psychological maturity to face problems of matrimony. Hence, the observed positive effect between some variables of occupation and income on total fertility rates.

Table 41: Age at first marriage by type of occupation for Western Kenya in 1978.

Index of measurement	Women aged between 15 and 24 years		
	Unemployed	Self-employed	Wage-employed
Median age at first marriage	16.9	18.6	21.5
Singulate mean age at marriage	17.9	19.5	22.5

Source: Computed from the 1978 Sample Survey data.

In the developed western countries the common tendency has been for white collar occupations to have a relatively higher age at first marriage compared to the blue collar jobs (D.J. Bogue, 1969).[5] However, in most African countries this difference is not yet well established. The marketability of the single populations in developing countries is increasingly being influenced by occupation and income.

Those employed in the formal sector are supposed to have a relatively higher age at first marriage than those in self-employment or employed in the informal sector. Employment in the formal sector often require many years of basic formal education, professional training, or on-the-job experience. Under such circumstances it is expected that individuals will defer marriage before attaining the required qualification(s) or some form of job security. On the other hand, those in the informal sector where relatively less skill is required and opportunities for self-employment are also relatively more promising, experience circumstances which favour marriage at convenience. It must, however, be emphasized that the behaviour of the unemployed is relatively more open to individual decision-making.

J.G. Bhatia (1978)[6] studying occupational differences in age at first marriage in Ghana found that occupational differences among males were significant though very little variations were observed among unemployed males. In fact, when age and other variables were controlled then initial significant differences found among various occupational groups disappeared among employed males. Similarly, among the women, those in farming and trading occupations tended to have the same age at first marriage which was slightly higher than that of unemployed women. It is, therefore, concluded that the impact of occupations on age at first marriage depends on the society one is examining. In other words, the relationship between occupation and nuptiality can be non-linear.

In Africa where agriculture is mainly the source of livelihood, the demand for labour and the desire to acquire more land for settlement have been reinforcing factors in the incidence of polygamy. This has been a common phenomena in regions where a communal land tenure system is prevalent. In addition, African business men also have a tendency to polygamy. Marrying many wives increases the prospect of self-sufficiency in labour supply at the individual family unit. Investment in more wives has therefore been a traditional system of banking wealth although the practice is bound to decline with increased socio-economic developments.

It is, therefore, proposed that agricultural subsistence economy is more prone to polygamy as indicated in Table 42. There is evidence that the incidence of polygamy was relatively

Table 42: Percentage incidence of polygamy by types of occupations in Western Kenya

Type of occupation	Current age of women in years	
	15 - 34	35 - 49
unemployed	27.9	33.7
self-employed	28.2	30.4
wage-employment	22.6	24.5

Source: Computed from the 1978 Sample Survey data.

high among unemployed and self-employed women, but rather low among women in wage-employment. It is further noted that, insignificant variations existed between women in self-employment and those without employment. This finding was partly endorsed by J.G. Bhatia, (1978) who found the proportion of polygamous husbands higher among farming and trading occupations than in any other livelihood in Ghana. In addition, the occupational status of the wife was observed to yield no significant differences.[7]

In African cultural setting, the husband makes the final decision on when and how many wives to marry. Conclusively, little or no consultation is made with the existing wife or wives about any intention to marry. However, in circumstances where the education, employment, or income of a wife give her greater leverage to influence household decision-making process; she may succeed in stopping the husband from marrying another wife. In most cases, such a woman has to put up with the decision of the husband or be faced with divorce or separation. It is for this reason that the occupational characteristics of females tend to have least impact on the incidence of polygamy as being the senior wife does not offer full guarantee that a woman will remain in a monogamous union especially if she is barren.

Further reference to the study by J.G. Bhatia (1978) indicates that the found marital instability to be relatively higher in white collar jobs and trading occupations than in any other occupation.[8] It is plausible to argue that while collar jobs and trading occupations are associated with more opportunities for extra-familial commitments than is the case with blue-collar jobs.

Lastly, the increasing income of females should limit the marketability of females. In African cultural setting, such a factor raises the social status of a woman thus ultimately undermining the sexual inequality preference which most males cherish. This could account for the increasing incidence of divorce and separation experienced mostly in urbanized areas.

In summary, the dominant socio-economic characteristics of unemployed females, viz females without annual income were: high levels of illiteracy; African religious beliefs; customary marriage and high incidence of polygamy; high infant and childhood mortality rates; and, were married in households in which household-heads had no land title deed. (see Table 40). On the other hand, the self-employed or those in wage employment had dominant characteristics of those with formal educational attainment as already noted.

8.8 Religion and Fertility Levels

The analysis of research data suggests there was no significant difference in total fertility rate between the observed religious denominations. However, females of the 'African religion' consistently had relatively lower fertility levels although the difference was very small, and even negligible.

Catholics in general also tended to have slightly higher total fertility levels as protrayed by Table 43. Note that districts found to be dominated by Catholics such as Kisii district have on average a very high fertility level. Anyway, the observed insignificant differences between christians and non-christians suggest religious beliefs have no effect on the fundamental causes of differential fertility within Western Kenya. Though other studies within Kenya have found Muslims generally to have relatively lower total fertility rates than christians, the confinement of Islam along the coastal zone of Kenya suggests that other ecological

Table 43: Mean number of live births per woman by religious sects

Type of religion	Current age of women in years							
	15 - 24		25 - 34		35 - 44		45 +	
	Never married	Ever married	Ever Married Only unstand.	stand.	unstand.	stand.	unst.	stand.
Protestants	0.2	1.8	4.7	4.6	7.3	7.4	7.8	8.1
Catholics	0.3	1.9	4.8	4.8	7.6	7.6	8.6	8.4
African religion	0.2	1.7	4.6	4.5	7.1	7.4	8.1	8.1

Source: Sample Survey data of 1978.

factors such as malaria and the high incidence of veneral diseases and not religion per se could account for the noted low fertility of Muslims.

8.9 Partial Correlation Analysis between Religion and Total Fertility Rate

According to Table 39, the proportion of productive women of Protestant and Catholic denominations portrayed strong but negative associations with both current total fertility rate and lifetime total fertility rate. In other words, Western religious beliefs tended to depress current total fertility rate and lifetime total fertility rate.

The derived zero-order partial correlation coefficients between proportions of protestant women and total fertility rates were r12 = -0.9324 and r22 = -0.9529 for the current total fertility rate and lifetime total fertility rate respectively. The same direction of association emerged when proportions of Catholic women were analysed.

It was only with African religious belief in which a moderate but positive association emerged. The computed zero-order partial correlation coefficients between proportions of women of African religion (X4) and current total fertility rate (Y1) were r14 = 0.3923 and, r24 = 0.3793 for the lifetime total fertility rate (Y2). This suggested that such women harboured large family size norms and worked to realize the birth of many children. This type of association, however, does not indicate the predictive role of religion as a determinant variable of total fertility rate. In order to determine the effectiveness of religion, then stepwise regression analysis is necessary.

8.10 Step-wise Regression Analysis between Total Fertility Rate and Religion

Reference to Appendix 19 that, among the variables on religion, only the proportion of female Catholics aged between 15 and 49 years (X3), and the proportion of females of African religion (X4) exerted negative effect on lifetime total fertility rate (Y2). The observed β - coefficients were -12.597 and -12.338 for X3 and X4, respectively. The statistical significance of these relationships were examined at $\alpha = 0.05$ level of significance as may be observed from Appendix 19. It was, however, concluded that the effect of religion on lifetime total fertility rate (Y2) was not statistically different from zero at 0.05 level of significance.

However, the statistical significance of the effect of religion in marital behaviour could be sought by examining its impact on marriage types and marriage patterns. Such impacts were examined in a demographic study for Tanzania (R.A. Henin, et al. 1973).[9] Another study in Ghana by J.G. Bhatia, (1978)[10] also found polygamy to be readily acceptable among Moslem and African religions but resented by christians. This study, however, found Catholics to be more tolerant. For this reason, one expects christianity to be positively associated with current total fertility rate (Y1). This, however, was not the case in Western Kenya. Appendix 19 indicates that none of the variables on religion was included in the model of current fertility determinants. This implies that the role of religion was negligible in predicting current total fertility rate. This finding, therefore, seems to be consistent with the results of other researches carried out in West Africa as has already been noted. Nevertheless, a negative effect of religion is observed only with respect to lifetime total fertility rate (Y2) (see Appendix 19).

The most important effect of christianity is probably its influence on marriage patterns. Christianity has often advocated civil or church marriage as opposed to customary and consensual marriage. Christianity is also proposed to encourage greater marital stability as christian doctrine loathe extra- marital sexual relations. Furthermore, the christian doctrine against pre-marital sex and its emphasis of formal education also indirectly encourage higher age at first marriage.

Reference to Table 44 shows the median age at first marriage was nearly the same for all christian denominations and non-chritians, though there was a tendency for non-christians to delay age at first marriage.

Table 44: Median age at first marriage by current age and religious groups

Religious Groups	Current age of women in years						
	15-19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49
Protestants	17.5	18.0	17.5	17.4	17.0	17.5	17.5
Catholics	17.0	18.0	17.2	17.3	17.1	17.0	17.3
African Religions	17.8	18.1	17.2	17.5	17.5	17.1	17.5

Source: Computed from the 1978 Sample Survey data.

In summary it is the belief of some African scholars that christian education (teachings) in Africa have little effect on the incidence of polygamy because in African cultural setting, societal rewards for polygamy exceed punishment accorded such status.

The dominant socio-economic characteristics of christian women were basically the same as those with primary education, while those with African religious beliefs were dominated by self-employment and income.

8.11 Urbanization and Total Fertility Rate

There was evidence from the 1978 data that, completed family sizes of women residing in urban centres within the Western Kenya region was not much different from the completed family sizes of women residing in rural areas.

According to Table 33, utilizing the 1969 and 1979 data, the association between proportions of urban women of reproductive age-groups (X7) and total fertility rates yielded correlation coefficients of $r17 = 0.7635$ and $r27 = -0.0388$ for the current total fertility rate and lifetime total fertility rate respectively. It is, therefore, expected that in the initial stages of socio-economic developments the rate of female urbanization increases total fertility rate, while in the later stages urbanization reduces fertility level.

Note that in the initial stages of socio-economic development the influx of rural women to urban areas exposes such women to better medicare, and nutrition. During such periods, the extended family interactions with the rural populace is still dominant, these urban families are likely to retain large family size norms; a factor reinforced by better infant and childhood survival rates in the urban centres.

However, with increased socio-economic development, economic pressure of urban settlements reinforced by increased exposure to education and disintegration of kinship system, should force urban residents to implant into their families the desire for small family size norms.

The relationship between urbanization and fertility rate should, therefore, be indirect. Urbanization functions through its effect on marital variables, such as age at first marriage, marital instability, etcetera.

If the median age at first marriage is considered, it was apparent that no significant differences emerged between rural women and urbanized women as indicated by figure 19 and appendix 9. This finding was plausible because in the study region the so called urban centres are still dominated by rural influences due to the extension of extended family relations between rural and urban areas. Explicitly stated, in small rural centres it was difficult to get a large sample size of people born in urban centres who had never lived in the rural areas until the time of their marriage.

It should also be realized that the relationship between urbanization and nuptiality could be confused by the association between urbanization and education. This association was moderately strong as depicted in Table 34. To illustrate, the computed correlation coefficients between urbanisation (X7) and primary education (X3) was r37 = 0.3726; r47 = 0.5156 for lower and upper primary education (X4) respectively in 1979. Further association with secondary education (X5) yielded r57 = 0.6098 for the same period. Note that the observed relationship between urbanization and other socio-economic variables does not indicate the effectiveness of urbanization processes as determinant of total fertility rate. For this reason, step-wise regression analysis must be used.

8.12 Step-wise Regression Analysis between Total Fertility Rate and Urbanization

The absence of the proportions of females urbanized (X7), as one of the variables in the regression equation of determinants of current total fertility rate (Y1); probably suggests that the effect of variable X7 on variable Y1 was negligible (see Appendix 17 and Appendix 18). Note also that in chapter 6, it is stated that in 1969 only 0.21% of the reproductive females in Nyanza Province were urbanized. The proportion of females urbanized in Western Province was also very low approximating 0.82% of all reproductive women.

However, further reference to the effect of female urbanization (X7) on lifetime total fertility rate (Y2) yields a different picture. It is observed from Appendix 17 that the derived β - coefficient is -199.147. This noted strong negative effect of variable X7 on variable Y2 implies that, arise in the proportion of females urbanized (X7) would depress the level of lifetime total fertility rate Y2. A two-tailed test of hypothesis based on the results in Appendix 17 leads to the conclusion that the effect of female urbanization (X7) on lifetime total fertility rate (Y2) is not statistically different from zero at 0.05 level of significance. This weak negative predictive role of urbanization should be conceived in the relationship between urbanization and other forces.

Urbanites are likely to be more educated than their rural counterparts not with respect to educational level, but with respect to general awareness of the environmental problems and prospects which may affect their livelihood. Urban residents also have greater prospects for working in modern employment sectors and thus be exposed to greater opportunities for participating in non-child-bearing functions which compete effectively with family activities.

In addition, urban centres offer greater prospects for equality among the sexes because of greater access to societal institutions safeguarding individual rights. All these factors could create chances for high divorce rates in urban centres.

The rate of urbanisation in Western Kenya has been accelerating due to agricultural revolutions. Consequently, massive rural-urban migration streams often characterised by marked differentials in age-sex structure could create an urban population composition and structure which create unfavourable 'marriage markets'. In nearly all the urban centres of Western Kenya, the male population exceeded the female population. The consequence has been a changing attitude in the value of marriage with respect to the incidence of polygamy and desired family size.

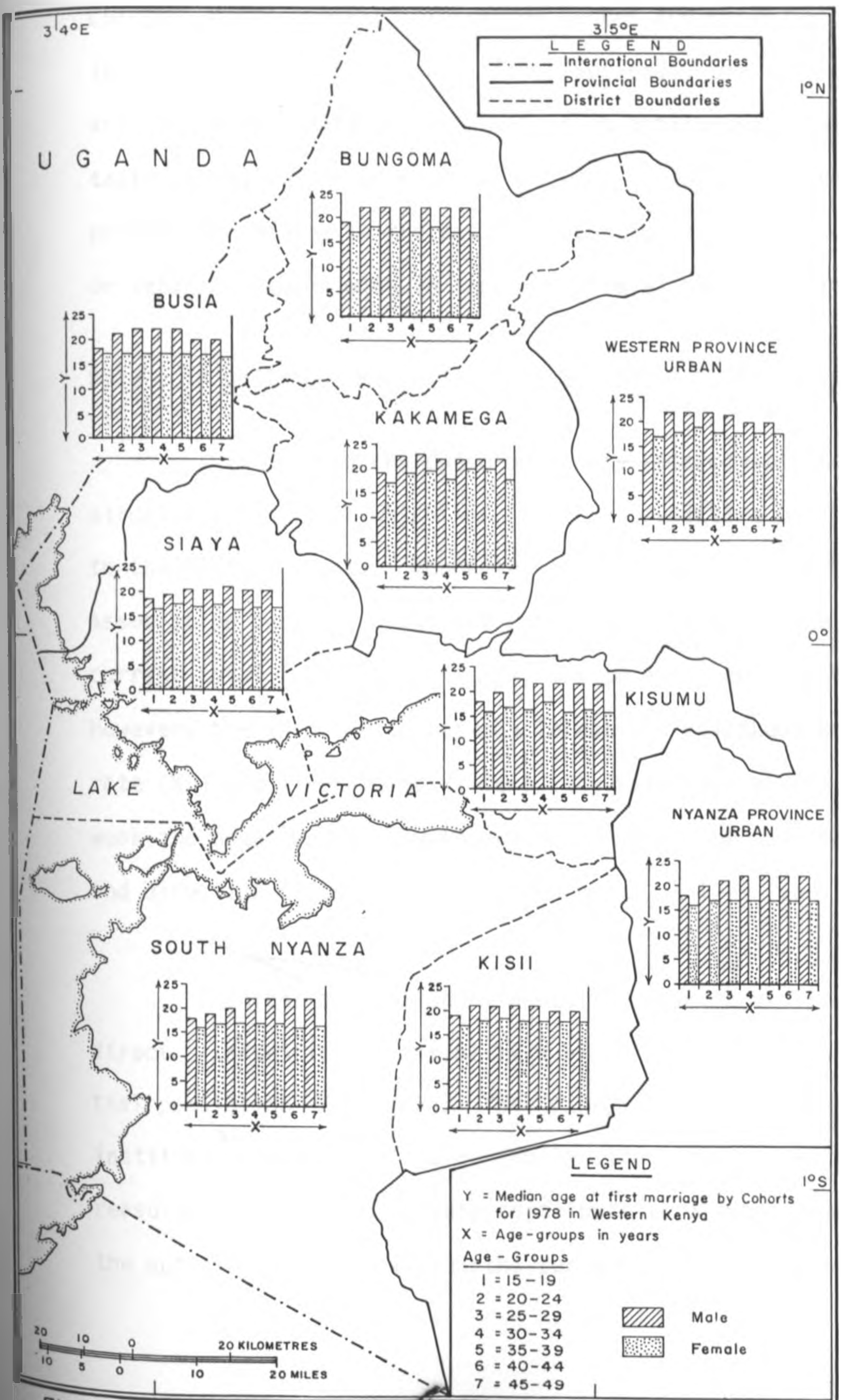

FIG. 19. MEDIAN AGE AT FIRST MARRIAGE BY COHORTS FOR 1978 IN WESTERN KENYA.

Urbanization processes act as a catalyst in societal change. Hence, social integration forces are slowly eroded with increasing levels of urbanisation. Societal norms of behaviour are gradually modified to meet changing attitudes, values, and taste at individual or societal level. It is, therefore, not surprising to realize an increasing proportion of single, divorced or separated women with an increasing level of urbanisation.

8.13 Childhood Mortality Rate and Total Fertility Rate

Infant and childhood mortality rate constituted another situational variable which had negative predictive roles in relation to the fertility rate. According to the 1969 census data, the association between infant and childhood mortality rate (X9) with current total fertility rate (Y1) was positive because r19 = 0.9447. However, the association between infant and childhood mortality rate (X9) and lifetime total fertility rate (Y2) yielded a rather weak and negative value with r29 = -0.1665. The same magnitude and direction of association was observed in 1979 (see Table 33).

Infant and childhood mortality rate, apart from its direct attrition of actual live births, also reduces the potential population of mothers. This factor also reinforces societal institutionalization of large family size norms. For these reasons, it should positively contribute to a substantial change in the actual number of live births per woman during any one calender year. But, with increased duration of marriage, its effectiveness is reduced by other forces of modernity such as improved medicare and increasing use of modern contraceptive methods. Nevertheless, infant and childhood mortality rate should still exert a negative effect on lifetime total fertility rate. This association, however, must be weak because of the effect of other socio-economic and situational variables on infant and childhood mortality rate.

There is evidence from Table 34 that, high infant and childhood mortality rate was common among illiterate women. The noted zero-order partial correlation coefficients were r92 = 0.8424 for the 1969 data and r92 = 0.6367 for the 1979 data. Its association with other socio-economic variables by 1979 was negative, thus implying relatively low infant and childhood mortality rates among educated women, women residents of urban centres, and women using modern contraceptive methods. In order to a certain the predictive role of infant and childhood mortality rate (X9) on total fertility rates, a regression model is used again.

8.14 Step-wise Regression Analysis between Total Fertility Rate and Infant and Childhood Mortality Rate

The results of Appendix 17, indicates expected results on the effect of infant and childhood mortality rate (X9) on current total fertility rate (Y1). It is observed that, in any one calender year, as the level of variable X9 rises current total fertility rate (Y1) also tend to rise. This positive predictive role of variable X9 on variable Y1 is indicated by the β - coefficient of 3.478 (see Appendix 17).

In order to test the strength of the observed effect of variable X9 on variable Y1, the following hypotheses were stated namely (i) the null hypothesis (H_o) that, the effect of infant and childhood mortality rate on current total fertility rate (Y1) was equal to zero; against (ii) the alternative hypothesis (H_a) that, the effect of infant and childhood mortality rate on current total fertility rate (Y1) was not equal to zero. With a sample size of n = 7 and df = (n - k) = 1, a two-tailed t-test at α = 0.05 and α = 0.01 yielded values of 12.706 and 63.66, respectively. Since t-cal is 4.08 (see Appendix 17) then the null hypothesis is accepted and we conclude that the effect of infant and childhood mortality rate (X9) on current total fertility rate (Y1) is not statistically significant from zero at 0.05 level of significance.

However, further reference to the effect of infant and childhood mortality rate (X9) on lifetime total fertility rate (Y2) yields a different picture. It is observed from Appendix 17 that the derived β - coefficient is -17.115. This noted negative effect of variable X9 on variable Y2 was again tested on the basis of the following hypotheses. The null hypothesis (H_o) stated that, the effect of variable X9 on variable Y2 was equal to zero. The alternative hypothesis (H_a), however, stated that the effect of variable X9 on variable Y2 was not equal to zero. Therefore, with a sample size of n = 7 and df = (n = k) = 1, the observed t-cr at α = 0.05 and at α = 0.01 were 12.706 and 63.66, respectively. Since t-cal is 5.40, which is less than 12.706, then the null hypothesis is accepted and, we conclude that the effect of variable X9 on variable Y2 was not statistically significant from zero at 0.05 level of significance. This finding is consistent with reality, because with increasing forces of modernization the negative effect of infant and childhood mortality on total fertility rate is weakened.

8.15 Land Ownership and Total Fertility Rate

The proportion of reproductive women who were married to household-heads who possessed a land title deed (X5) was noted mostly in Kisii district, Kakamega district, and Bungoma district. The association between the proportions of such women and total fertility rate yielded strong but negative correlations as r15 = -0.9433 and r25 = -0.9669 for current total fertility rate (Y1) and lifetime total fertility rate (Y2), respectively. This can be verified from Table 39. The noted association is difficult to explain as one would have expected a positive association, especially, with respect to current total fertility rate (Y1); because in such districts, as was already noted, majority of women were in self-and-wage employments. Nevertheless, it is possible that, with increasing incidence of land consolidation, shortage of land for settlement could be a deterrent to early marriage and polygamous marriage. Furthermore, land consolidation could reinforce individual desire for a small family size. Anyway, in order to determine the effectiveness of land ownership as a predictor of total fertility rate a regression model is used again.

8.16 Step-wise Regression Analysis between Total Fertility Rate and Land Ownership

Appendix 19 again indicates that the variable (X5) was not included in the regression model on determinants of current total fertility rate (Y1). This, therefore, suggests that its importance in predicting current total fertility rate (Y1) was negligible. However, its relationship with lifetime total fertility rate (Y2) was noted to be statistically significant. The effect of variable X5 on variable Y2 yielded a β - coefficient of 10.769. A two-tailed t-test of the significance of this causal effect was based on the results given in Appendix 19. These results lead to the conclusion that, the effect of variable X5 on variable Y2 is statistically significant from zero at 0.05 level of significance. This finding suggests that as the number of women in households with land title deed (X5) increased, the level of lifetime total fertility rate also increased.

8.17 Summary

The foregoing analyses in this chapter lead to the following specific conclusions.

(a) Female educational attainment (lower and upper primary education) has statistically significant positive effect on current total fertility rate. Yet, higher educational attainment yields a negative effect on lifetime total fertility rate. This negative effect, however, is not statistically significant.

(b) Occupation and income variables (self-employment and monthly income above Kshs 500/-) had statistically insignificant positive effects on current total fertility rate. However, the effect of these variables on lifetime total fertility rate was noted to be negative though again statistically insignificant.

(c) Religion has statistically insignificant effect on lifetime total fertility rate.

(d) Female urbanization has probably a negligible effect on current total fertility rate, though its effect on lifetime total fertility rate is observed to be negative and statistically insignificant.

(e) Infant and childhood mortality rate has a positive effect on current total fertility rate, though the observed effect was statistically insignificant. Furthermore, the effect of infant and childhood mortality rate was observed to be negative and statistically insignificant.

It is evident from these observations that socio-economic and situational variables are relatively less important compared to nuptial variables as predictor variables of current total fertility rate. However, their importance as predictor variables of life-time total fertility rate has been verified by the analysis of each socio-economic and situational variable. The task at hand now is to test the two broad hypotheses of the research model as stated in chapter 1.

8.18 Testing Operational hypotheses

The results of Appendix 20, give a summary of all the important determinants of the total fertility rate. The variables have been ranked in order of significance which is determined by the value of the zero-order partial correlation coefficients.

It is observed from the Appendix 20 that, the listed socio-economic variables and situational variables are relatively more numerous compared to the list of nuptial variables. In fact, proportions of children dying by age-group of mothers (X9), proportions of illiterate women (X2), proportions of divorced and separated women (K5), proportions of urbanized women (X7), and proportions of women with lower primary education (X3), etc.; were found to be positively associated with the current total fertility rate. In other words, as the number of women with such characteristics increased, current total fertility rate also increased. In the list of these variables, only proportions of divorced and separated women (K5), and proportions of currently married women (K3), emerged as significant catalysts of current total fertility rate among the list of nuptial variables. These two nuptial variables yielded respectively zero-order partial correlation coefficients of r15 = 0.7976 and r13 = 0.5075.

It should be noted that, the statistical test for the predictive role of each variable in the fertility equation has already been completed. For this reason, validation of the research hypotheses as stated in chapter I requires a new approach in order to consider the collective role of nuptial variables versus socio-economic and situational variables as determinants of total fertility rate.

Testing the research hypotheses required a system of standardizing female socio-economic and situational characteristics. This was achieved by instructing the computer to categorize all reproductive females of the 1978 sample survey into two groups. The first group consisted of women with these characteristics: rural residence; illiterate (non-educated); unemployed and earning no regular income; African religion; and married to household-heads without land title deed. On the other hand, the second group consisted of women with the following characteristics: urban residence; educated; employed and earning income; protestants or catholics; and had land title deed.

Case 1: Current Total Fertility Rate

hypothesis

H:0. The following nuptial variables (age at first marriage, marital status, and marriage type and pattern) are less important than socio-economic variables (education, employment and income, religion, contraceptive use, and land-ownership) as predictor variables of current total fertility rate.

Nuptial variables	Average parity (1978)	Correlation coefficients (1969)
Single women	0.7	0.1349
Currently married	2.4	0.5075
Widowed women	3.1	0.8003
Divorced/Separated women	2.0	0.7976
Women in monogamous unions	2.0	0.1308
Women in polygamous unions	1.8	0.1218
	Σ =12.0	Σ =2.4929
	$\bar{x}$ = 2.0	$\bar{x}$ =0.4155

Socio-economic variables	Average parity	Correlation coefficients
Lower primary education	1.2	0.6869
Upper primary education	0.9	0.4199
Secondary education	0.6	0.5597
Self-employed	1.7	0.2730
Wage-employed	1.7	0.0295
Protestant women	1.8	-0.9324
Catholic women	1.9	-0.9696
Urban residence	1.7	0.7103
Land title deed	1.7	-0.9433
	Σ =13.2	Σ =-0.0650
	$\bar{x}$ = 1.47	$\bar{x}$ =-0.0072

NB: Age at first marriage and contraceptive use have been excluded in the above table partly because their significance has been already examined.

It is observed that, with respect to current total fertility rate, the nuptial variable with maximum average parity is widowed women (3.1). It has also the highest value of zero-order partial correlation coefficient of r14 = 0.8003. Furthermore, the nuptial variables with the least average parity is single women (0.7). This variable, however, does not yield the lowest value of observed positive zero-order correlation coefficients. In fact, it is women in polygamous unions which yielded the lowest positive value of zero-order partial correlation coefficient of r1.10 = 0.1218. Lastly, the modal value of average parity is 2.0.

Focussing on the results of the listed socio-economic and situational variables, the average parity of women with these characteristics is 1.47 children per woman. It also has a relatively low mean of correlation coefficients of r = -0.0650. The socio-economic variable with the maximum average parity is Catholic women (1.9), while the highest positive value of zero-order partial correlation coefficient is observed among urban residents, r17 = 0.7103. In addition, socio-economic variable with the least average parity is secondary education (0.6), while the least positive zero-order partial correlation is noted with wage-employment, r18 = 0.0295. The modal value of average parity is noted as 1.7.

In summary, a logical statistical comparison of the computations is given below:

Current Fertility Rate Analysis

Index of measurement	Average Parity: nuptial variables		Average Parity: Socio-economic variables	Correlation Coefficients: nuptial variables		Correlation Coefficients: Socio-economic variables
Mean	2.0	>	1.333	0.4155	>	- 0.0650
Maximum	3.1	>	1.9	0.8003	>	0.7103
Minimum	0.7	>	0.6	0.1218	>	0.0295
Mode	2.0	>	1.7	0.7976	>	0.7103

In conclusion, for the current total fertility rate, there is statistical evidence as portrayed in Case 1, that nuptial variables are more important than socio-economic and situational variables as predictor variables of current total fertility rate. So we reject the null hypothesis and accept its alternative hypothesis.

Case 2: Lifetime Total Fertility Rate

For the lifetime total fertility rate, socio-economic and situational variables dominate the list of significant predictor variables (see Appendix 21). It was observed that high income (X_{12}), proportion of single females of reproductive age-groups (kl), and the number of women belonging to the African Religion (X4) had moderate but significant positive association with lifetime total fertility rate. The unique role of high income as years of reproduction increased was not consistent with expectation. However, it is plausible to argue that, income *per se* encourages the desire for a large family size if other variables such as education and employment are controlled. This suggestion has been supported by several economic models of differential fertility analysis and is more meaningful in the African setting where wealth is an important index of status (Cochrane S.H., 1979[11]; Abu-Lughod, 1965[12]).

Further reference to the Appendix 21, identifies unemployment or lack of income among women, land consolidation (X5), Western religion, and the median age at first marriage (k7) as very important depressing variables of lifetime total fertility rate. The dominance of socio-economic variables again renders acceptance of the second null hypothesis as verified by the following analysis.

Hypothesis 2:

H:O. The noted nuptial variables are less important than the noted socio-economic variables and situational variables as predictor variables of lifetime total fertility rate.

Nuptial variables	Average parity	Correlation coefficients
Single women	4.1	0.4475
Currently married women	8.2	0.0628
Widowed women	8.1	0.1213
Divorced/separated women	6.1	0.0715
Women in monogamous unions	7.8	0.0855
Women in polygamous unions	7.0	0.0612
	Σ=41.3	Σ=0.8498
	$\bar{x}$= 6.88	$\bar{x}$ =0.1416

Socio-economic variables	Average parity	Correlation coefficients
Lower primary education	8.1	0.0362
Upper primary education	8.1	0.1726
Secondary education	6.0	- 0.0689
Self-employed	7.6	0.2372
Wage-employed	7.5	- 0.0225
Protestant women	8.1	- 0.9529
Catholic women	8.4	- 0.8947
Urban residence	8.1	0.6745
Land title deed	8.3	- 0.9569
	Σ= 70.2	Σ= -1.7754
	$\bar{x}$= 7.8	$\bar{x}$= -0.1973

The computed mean parity for nuptial variables is 6.9, with the mean of correlation coefficients as -0.1416. The nuptial variable with the maximum average parity is currently married women (8.2). However, it is the proportion of single women which yielded the highest value of positive correlation coefficient of r12 = 0.4475. In addition, the minimum value of average parity is also noted among single women (4.1), while the least positive zero-order partial correlation coefficient is noted with women in polygamous unions, r2.10 = 0.0612. The modal value for average parity is 8.2, while for correlation coefficients it is 0.4475.

Further reference to the socio-economic variables indicates that, the computed mean of average parity is 7.8, while the mean for zero-order partial correlation coefficients is -0.1973. The socio-economic variable yielding maximum average parity is Catholic women (8.4), while the least average parity is yielded by secondary education (6.0). In addition, the socio-economic variable yielding the highest value of positive zero-order partial correlation coefficient is urban residence, r27 = 0.6745. The minimum value of correlation coefficient of r = -0.0225 is noted with wage-employment. The modal values are 8.1 births noted with primary education, Protestant women, and urban residence. On the other hand, the value of r = 0.6745 is regarded to represent the modal class of positive correlations coefficients.

In summary, a logical statistical comparison of the computations is given below:

The Lifetime Total Fertility Rate Analysis

Index of measurement	Average		Parity	Correlation Coefficients		
	nuptial variables		Socio-economic variables	nuptial variables		Socio-economic variables
Mean	6.9	<	7.8	0.1416	<	- 0.1995
Maximum	8.2	<	8.4	0.4475	<	0.6745
Minimum	4.1	<	6.0	0.0612	>	0.0362
Mode	7.8	<	8.1	0.4475	<	0.6745

In conclusion, for the lifetime total fertility rate, there is statistical evidence as portrayed in case 2, that nuptial variables are less important than socio-economic and situational variables as predictor variables of lifetime total fertility rate.

8.19 Conclusion

The analysis of chapter 8, has directly supported the proposition that nuptial variables have relatively greater impact on current total fertility rates. However, with respect to lifetime total fertility rate socio-economic and situational variables become relatively more important determinants. Though the study has identified the most significant variables which tend to have strong correlations with total fertility rates, it should be realized that the list of programmed variables is not exhaustive.

Despite the noted awareness, it is hoped that the list of variables given constitute a comprehensive body of the most significant and related phenomena which could constitute appropriate policy variables. These variables could be examined further to identify relevant policy instruments which could be utilized to control rapid rates of population growth in the region. It is for this reason, that the next chapter is devoted for identification of policy instruments.

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CHAPTER 9

9.0 SUMMARIZED FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

9.1 Summary

The fundamental objective of this study was to analyse theoretically and statistically the relationship between nuptial variables and the total fertility rate. The study, therefore, focusses on the following hypotheses: (i) nuptial variables are less important than socio-economic variables as predictor variables of current total fertility rate; (ii) nuptial variables are less important than socio-economic variables as predictor variables of lifetime total fertility rate.

The study had its objectives as: (i) to portray a spatial structure of total fertility rates and nuptial levels, (ii) to show the directional effects of selected predictor variables on total fertility rate, (iii) to investigate the strength of the relationship between each of the nuptial variables and total fertility rate, (iv) to demonstrate that socio-economic and situational factors influence fertility not only directly but also indirectly through their impact on nuptial variables, and (v) to identify appropriate policy measures for fertility control in Western Kenya. The achievement of these objectives required the utilization of the sample survey data of 1978 to be supplemented with population census data of 1969 and 1979.

In the context of the first research objective, the regional variations in response errors were observed to affect reported total fertility rates, particularly, in the districts of Nyanza Province. However, on the basis of estimated total fertility rates by the Brass P/F ratio method, the whole of Western Kenya in 1979 was found to constitute a near homogeneous zone of high total fertility rates. The total fertility rates were found to range between 7.7 births per woman reaching menopause in Siaya district and 10.2 births per such a woman in Kisii district.

The regional pattern of fertility take-off was also observed to be similar among most districts and the tempo of fertility decline commenced after the age of 27 years. As a result of this, the entire study area had a broad-peak fertility schedule. In addition, female age-groups between 20 and 39 years were found to be crucial in the study of fertility levels. Furthermore, the proportions of women aged between 15 and 49 years who were childless were observed to be relatively high throughout the region. Such proportions ranged between 21.3% in South Nyanza district and 27.0% in Kisii district and, showed a tendency to increase despite the noted increasing trend in overall total fertility rate between 1969 and 1979.

Focussing on the regional structure of nuptial variables, the proportions of single females aged between 15 and 29 years as a ratio of all reproductive women were found to be significant in all districts; because this proportion exceeded 13.0% of all reproductive women in every district, and tended to increase between 1969 and 1979. Universal marriage was also observed as a common demographic phenomenon in all districts. The lowest percentage of currently married women of reproductive cohorts was 64.4% in Kisii district according to the 1979 population census. Most districts also exhibited a declining trend in the proportion of such women between 1969 and 1979. Moreover, the proportions of widowed women of reproductive cohorts were also found to be relatively small and confined to women aged between 35 and 49 years. Similarly small regional proportions of divorced and separated women were observed. However, divorce and separation were relatively high among young women aged between 25 and 29 years, especially among urban residents. Such women also had a tendency to re-marry immediately, thus minimizing the duration of reproductive time lost due to marital disruption. Polygamy as an element of marital instability affected approximately one-third of all reproductive women. In addition, the high incidence of polygamy affected mostly young and illiterate women.

With reference to the regional structure of socio-economic and situational variables, and how such variables affected nuptial variables, it was observed that the level of female illiteracy was relatively high, reaching a maximum level among women aged between 25 and 29 years. Yet, the rate of female illiteracy was on the decline especially among younger women aged between 15 and 29 years This was attributed to the effect of the Presidential decree on free primary education. But not much increase was observed in the proportion of women with secondary and post-secondary education; because of the cost of secondary education and the high population growth rate in the region which annually expanded the base population eligible for secondary school enrolment.

Female unemployment was observed as relatively high in most districts except in Kisii and Bungoma districts. Women in self-employment were also relatively more numerous amongst women aged between 25 and 29 years; particularly in districts with relatively better developed small scale commercial farming namely Kisii, Kakamega, and Bungoma. Clearly, the majority of such women in such regions were more able to earn regular income.

Lastly, the regional structure of child mortality rates showed that districts in Nyanza Province, except Kisii district, had relatively high child mortality rates, i.e. South Nyanza had 246/1000; Kisumu 240/1000; Siaya 237/1000; and Kisii only 129/1000. These mortality rates did not compare favourably with the child mortality rates of 162/1000 for Bungoma district and 161/1000 for Kakamega district. These variations were caused by factors such as a high incidence of malaria, tsetse fly, poor nutrition, and little regional accessibility to health institutions.

The analysis of the second up to the fifth research objectives necessitated the application of step-wise regression analysis because this method is recommended for isolating predictive value of each variable in a complex set of variables with non-linear relationships. Therefore, on the strength of β - coefficients, the nuptial variables which emerged as relatively good predictor variables of current total fertility rate (Y1) were: the proportion of total adult females aged between 15 and 49 years (K1), with β - coefficient of 0.3920 for Nyanza Province and β - coefficient of 0.0499 for Western Province; the proportion of currently married women aged between 15 and 49 years (K3), with β - coefficients of 0.7881 and 0.4527 for Nyanza Province and Western Province, respectively; the proportion of women widowed aged between 15 and 49 years (K4), with β - coefficient of -1.1763 for Western Province; and the proportion of divorced and separated women aged between 15 and 49 years (K5), with β - coefficient of 2.1696 for Western Province. The effect of all these nuptial variables on current total fertility rate (Y1) were found to be statistically significant from zero at 0.05 level of significance.

For the lifetime total fertility rate (Y2), the following nuptial variables emerged as good predictor variables; age at first marriage (K7) with β - coefficient of 118291.93 for Nyanza Province; the proportion of currently married women aged between 15 and 49 years (K3), with β - coefficients of -54.379 and 8.3300 for Nyanza Province and Western Province, respectively; the proportion of widowed women aged between 15 and 49 years (K4), with β - coefficient of 36.884 for Nyanza Province; and the proportion of divorced and separated women of reproductive lifespan (K5), with β - coefficient of -79.433 for Western Province. All these coefficients were found to be statistically significant from zero at 0.05 level of significance.

When socio-economic and situational variables were incorporated in the analysis, it was found that most of these variables were also good predictor variables of total fertility rate. For the current total fertility rate (Y1), the variables which had statistically significant effects were: the proportion of females aged between 15 and 49 years of lower primary education (X3), with β - coefficient of 0.836 in the case of Western Province; the proportion of women aged between 15 and 49 years of upper primary education (X4), with β - coefficient of 0.264 (see Appendix 18). In addition, the proportion of females aged between 15 and 49 years, who were using contraceptives (X8), had β - coefficients of -12.211 and -4.081 for Western Province and Nyanza Province, respectively. All these coefficients were also statistically significant from zero at 0.05 level of significance.

Further reference to lifetime total fertility rate, indicates the following socio-economic and situational variables as important negative predictor variables: the proportion of illiterate women aged between 15 and 49 years (X2), with β - coefficient of -13.102 in the case of Nyanza Province; the proportion of females aged between 15 and 49 years of upper primary education (X4), with β - coefficient of -23.234; the proportion of females aged between

15 and 49 years of lower primary education (X3), with β - coefficient of -27.617 in the case of Western Province; the proportion of females aged between 15 and 49 years who were urbanized (X7), with β - coefficient of -199.15; and infant and childhood mortality rate (X9), with β - coefficient of -17.115. It should, however, be emphasized that all these negative effects on lifetime total fertility rate (Y2) were not statistically significant at 0.05 level of significance. Note also that, the other variables also found to exert some effect on lifetime total fertility rate were the proportions of female Catholics (X3), and the proportion of females using modern contraceptive methods (X8).

Conclusion

In the context of the present and future levels of socio-economic developments of Western Kenya, socio-economic and situational variables will continue to be relatively more important determinants of lifetime total fertility rate. This is because of the observed high correlation coefficients derived in the association between socio-economic and nuptial variables. In fact, the research found only childhood mortality rate and contraceptive use among women exerted direct impact on total fertility rate. The other variables influenced fertility strongly but indirectly through impact on age at first marriage, marital stability or instability, and frequency of re-marriage.

This research, therefore, suggests the following factors as crucial in any population control policy:

(a) research is needed to investigate further the changing relationship between nuptial factors and the following variables: socio-economic; cultural; situational; and political factors. Emphasis should be on the appropriate minimum legal age at first marriage that will be acceptable to all ethnic and racial groups in Kenya.

(b) mass education of the population is needed to create awareness for the need to control population growth.

(c) improved medicare that will benefit majority of the rural population in order to raise life-expectancy at birth.

(d) an income policy that will benefit majority of the rural womenfolk and help raise the overall standards of living for all people.

(e) an institutionalized system of reward and punishment for those who comply or refuse to implement the government's policies on population.

From the foregoing analysis, the following policy recommendations emerge as most likely to be effective:

(a) age at first marriage policy

(b) education policy

(c) employment and income policy

(d) health care policy

(e) land adjudication and consolidation policy

(f) urbanisation policy

(g) family planning policy.

9.3 Recommendations for further research

Since Western Kenya was observed to be experiencing the accelerated impact of large-scale and small-scale commercial farming in a manner never experienced before 1969, social scientists ought to carry out research to find out the impact of this accelerated rural agricultural revolution on family formation and dissolution. Research is needed to identify how changing individual and societal perceptions of the rural environment, as reinforced by spatial diffusion of small scale commercial farming, may influence ideal family size norms in such areas and to suggest an acceptable legalized minimum age at first marriage which is beyond the present minimum age of 18 years for girls and 20 years for boys. Such research activities should identify appropriate policy instruments for enforcing such a law among different ethnic and racial groups in Kenya regardless of their religious or cultural backgrounds.

It was observed that the most important female age-groups in the study of fertility are those between 20 and 39 years. These were the age-groups containing the most active women who were engaged mostly in self-employment and wage-employment. Clearly, these were cohorts with a high propensity for migration. Research is, therefore, needed to establish the impact of migration on family size norms within a rural setting and to identify a threshold level in income after which either fertility declines or rises with income. Economists should determine a threshold level appropriate to the Kenyan situation. Such studies should separate price-effect from substitution-effect when associating income with fertility levels. It is only after such investigations have been made that relevant policies on employment and income can be formulated to reduce fertility levels.

In addition, it is recommended that, education policy should be formulated to help reduce large family size norms among the populace. For this reason, there is a dire need for research in appropriate curriculum structure which could be introduced at different levels of education, starting from the primary level and extended to encompass adult education too.

Lastly, it is desirable to expand this research to cover the whole of Kenya in order to see whether the relationship between nuptiality and fertility may change especially in regions with significant variations in socio-economic developments.

9.4 Recommendations to Policy Makers

There is ample evidence from this research and other past studies on determinants of fertility that predictor variables of fertility vary significantly in a spatio-temporal context. There is evidence again that the composition and structure of predictor variables of fertility alter their hierarchy of importance with time as the society moves along the path of socio-economic development.

The situation studied in this thesis, therefore, renders identification and formulation of relevant anti-natalist policies, as well as implementation of such policies, rather complex because of an obvious need to review such policies and to change them with changing processes of modernity. For this reason, it is futile to over-emphasize one policy aspect at the expense of other aspects of the policy. This has been the problem affecting the family planning programme in Kenya. This study recommends the following policy alternatives;

(a) Age at first marriage policy

In Western Kenya, the increasing level of median age at first marriage was observed to depress lifetime total fertility rate

The analysis of singulate mean age at first marriage and the median age at first marriage indicated that the majority of females marry at ages far below 21 years. Similarly, most men marry at ages far below 25 years. The Marriage Bill of 1978 stipulates the minimum age at first marriage as 18 years for women and 20 years for men. But, for Muslims, it could be as low as 9 years.

The law on age at first marriage should definitely be repealed and the minimum age at first marriage raised. Note that this research found the tempo of fertility decline commences after the age of 27 years. For this reason, raising the minimum age at first marriage for women too close to this age is most desirable.

The immediate problem would be to determine the most acceptable minimum age at first marriage for all ethnic and racial groups in Kenya regardless of their religious convictions and cultural backgrounds. This problem, however, could be solved through research and public debate.

Implementation of such a law is possible; because churches, chiefs, and other government officers who have been performing marriage ceremonies could be barred by law from performing marriages below the stipulated legal ages at first marriage. The incidence of consensual marriages, or trial marriages, below the stipulated ages, could also be checked if an institutionalised system of punishment affects couples and their parents-in-law.

Chiefs and clan elders could also be given authority to implement these measures in rural environments.

Such a policy cannot be implemented in isolation without defining institutionally rewards for those complying with the legalized age at first marriage. It is realized that in Kenya, most females who complete primary education at the ages between 13 and 16 years never proceed with secondary education; either because of failure, or refusal by parents or guardians to meet their cost of secondary education.

In most communities male education is given preference. Thus young girls, whose parents cannot afford their education, are coerced into early marriage or turn to nearby urban centres in search of employment. It is, therefore, the frustrations confronting these school leavers which expose them to greater risks of pre-marital pregnancy resulting in an high incidence of illegitimate births. Note that one research finding was that increasing proportions of single females could raise the level of fertility ceteris paribus. Does this imply that raising the legal age at first marriage, which definitely increases proportions of single females in a community,is undesirable as the society developes This may not necessarily be the case in a real situation, because the analysis assumed other variables constant.

It is, therefore, suggested that for an age at first marriage policy to be successful, the length of primary education should be extended. The stipulated 8 years of primary education would, therefore, be satisfactory only if the majority of females completing primary education have greater access to secondary education. This research has established that, increasing the proportion of reproductive women with primary and secondary education increases too the current total fertility level. But, increasing also the proportion of reproductive women with upper primary and secondary education reduces too the lifetime total fertility level. For this reason, secondary education is more desirable as stated by R.A. Henin, et al. (1980). The argument is that with secondary education effective desire to limit family size begins.

It should be emphasized that, with secondary education, the age at first marriage is likely to be raised among most women *ceteris paribus*. Females with secondary education are also relatively more mature mentally and could effectively benefit from sex-education which should be an integral part of the secondary education curriculum. Secondary education could also change their tastes, attitudes, and other matters likely to influence their perception of ideal family size norms. In a nutshell, secondary education for females should be considered as an institutionalized system of reward for late age at marriage. Clearly, the Kenya Government should provide free secondary education to only girls. If the cost is unacceptable, then a subsidized system is feasible.

(b) Education policy

The effectiveness of formal education as a predictor variable of fertility is like that of a double-edged sword. Little formal education (primary education) has been observed to increase the current total fertility rate. However, upper primary education, secondary education, and post-secondary education were observed to effectively reduce lifetime total fertility levels.

Since the cost of providing free secondary education is likely to be substantial, other alternative measures in the realm of education are needed. Note that, this research found that increasing levels of illiteracy among reproductive women (non-educated) also increases current total fertility rates. For this reason, the government still has to combat the problem of illiteracy.

It is, therefore, suggested that a population education policy is the best remedy under such circumstances. Population education should be a well institutionalized programme which is geared to reach young people and adults in a different way. Under such a programme educational institutions commencing with lower primary schools should have well tailored curricula on problems of population size, composition and structure, growth rates and, mobility in the context of national development. The ideals of nuclear family and extended family systems should also be analysed. Moreover, for young people, sex-education and counselling on sexual relations, marriage, and veneral diseases should be part of the institutionalized policy of population education.

The adults, who in most cases have already attained their desired family sizes, could still be reached through Adult Literacy Classes. Their curriculum of population education, apart from incorporating some of the subject matter for young people should also incorporate such ideals as having a small family, a healthy family, providing better nutrition, arguments for and against late age at marriage for their children, ideals of monogamous unions, etc.

The objective of population education is to effectively neutralise effects of little formal education by changing attitudes on large family size norms, contracting early marriage and reducing incidence of polygamy. Although some of these educational developments might increase current total fertility rate, they are also likely to have depressing effect on lifetime total fertility rate.

(c) Religious Education Policy

Just as J.G. Bhatia (1978) in his study of fertility determinants in Ghana concluded that Western religion has a negligible effect on total fertility rate, this research also found that in the context of Western Kenya, Western religion had insignificant effect on both current total fertility rate and lifetime total fertility rate. Despite this finding, societal investment in Christian education is still likely to be rewarding. It is plausible to suggest an intensification of christian religious education to reinforce moral restraint among young people and to discourage the incidence of polygamy, divorce and separation. It is unquestionable that, such demographic changes may initially increase fertility rates; but with more years of socio-economic development such demographic changes are likely to have depressing effects on lifetime total fertility rates.

(d) Employment and Income Policy

Another area for policy action pertains to female employment and income. Several studies cited in the literature review reveal a threshold level in income after which fertility levels begin to rise on decline. This particular research for Western Kenya found that as the number of reproductive women earning over Kshs 1000/- monthly increased, the current total fertility rate also increased. Other employment variables had negative effect on current total fertility rate. However, with respect to lifetime total fertility rate, it was found that self-employment, tended to exert a significant positive effect.

The research also found unemployment or lack of income among women tended to depress both current total fertility rate and lifetime total fertility rate, assuring other variables constant. One should expect unemployment or lack of economic security among reproductive women to increase fertility levels particularly current total fertility rate as unemployment and illiteracy are highly correlated. Explicitly stated, unemployed single women who are exposed to greater economic insecurity are likely to rush into early marriage thus increasing the level of fertility rate. Moreover, unemployed and illiterate women who were married were expected to cherish large family size norms which could increase their total fertility rate.

In reality the research finding that unemployment and no income among reproductive females reduces fertility especially lifetime total fertility rate, assuming other factors constant, is justifiable. First, unemployed and illiterate women experience relatively high infant and childhood mortality rate as already observed. Therefore, if their number increases with time, their total contribution to the lifetime total fertility rate is likely to be negative, assuming other factors constant. Note that, illiteracy is also negatively related to lifetime total fertility rate. Second, this study found majority of unemployed and illiterate women, who were married, in polygamous unions.

It must also be realized that the majority of unemployed women were still at school and the contribution of such women to the structure of the lifetime total fertility rate is likely to be negative. Lastly, the unemployed women who become pre-maritally pregnant often rush into marriage where they either become self-employed in agriculture or engaged in other business activities. Some also succeed in getting wage-employment. All these factors confuse the relationship between female unemployment and total fertility rate. One could further argue that the unemployed or illiterate women who are not married will have a relatively low fertility rate, as such women are likely to cherish high moral restraint as safeguarded by cultural norms of reproduction. In communities where pre-marital sexual relations are common, the unemployed and illiterate adult women who become pregnant often rush to nearby urban centres to seek for jobs as house maids or often engage in prostitution.

Increasing the level of female unemployment as a policy to reduce lifetime total fertility rate is unacceptable. On the other hand, increasing the level of female employment assuming other factors constant is also likely to increase the current total fertility rate. This is a clear indication that, among the majority of ethnic groups in Kenya, if large family size norms are still harboured then the mere increament of female employment and income will only raise the total fertility rate. This is consistent with the Theory of Demographic Transition which predicts a rising trend in total fertility rate in transitional stages of socio-economic development (D.J. Bogue, 1969).

However, employment of females, especially in the formal sector, could become an effective instrument if rewards and punishments are well defined. For example, attractive terms of service could be stipulated for unmarried women, while stiff punishments for married women could be formulated with regard to maternity leave, pregnancy on the job and child care. However, the problem will still be with the bulk of self-employed women in rural and urban centres. Despite these problems of female employment, it is suggested that more job opportunities should be created for women.

This is likely to create functional conflicts between extra-familial activities and childbearing activities. More women will become self-reliant thus avoiding unnecessary pre-mature (early) marriages which are the norm as a means of social and economic security. Employment conditions will expand the horizons of less educated women thus bringing them into contact with the information necessary for limiting family sizes.

(e) Health Care Policy

The proportions of children dying by age-group of mothers were found to be the most significant negative predictor variable of lifetime total fertility rate. This research found that as infant and childhood mortality rate increased, lifetime total fertility rate also declined. It is this experience of high mortality rate among children and adults that reinforces the institutionalization of large family size norms in developing societies.

So long as the survival rate of infants and children is very low and the overall life expectancy is also low, no rational woman will accept limiting her family size. Note that the level of infant and childhood mortality rates are excessively high in the Lake Victoria basin, the coastal zone, and the arid and semi-arid areas of Kenya. The high mortality conditions of the Lake Victoria Basin and the Coastal zone can partly be attributed to the prevalence of malaria in such regions. Eradication of malaria in these areas should be given priority.

An intensified health care policy is, therefore, needed to raise substantially infant and childhood survival rates in Kenya. Such a policy should focus on the adult mortality rate in order to raise the overall life expectancy of the population. Such a policy will initially boost the total fertility rate; but with more time parents would change their attitudes toward large family size norms infavour of small family size norms.

Such a health care policy should encourage public and private investment in community health by increasing the supply of clean water to rural areas, providing greater accessibility to more rural health centres and teaching the general public about better sanitary conditions, nutrition, and housing. Lastly, the present mobile health clinics for maternal and child-care should be extended to more rural environments.

(f) Land Adjudication and Consolidation Policy

Possession of a land title deed was observed to have a positive effect on lifetime total fertility rate. This is probably true in the context of Western Kenya, where agricultural loans or loans from other financial institutions, obtained because of the availability of land title deed, as a security, has been invested in more wives. Otherwise, one can also argue that, land title deed helps one to obtain income which can be invested to increase ones economic status through generation of more income and, this may encourage a couple to desire for more children.

Land title deed can only be issued in areas with completed adjudication and consolidation programs. In such circumstances, land becomes an important economic asset. Though one would expect income derived from such assets to be invested in more wives in the initial stages, scarcity of land caused by land consolidation encourages population migration to urban centres. It also encourages situations of delayed marriage as land fragmentation is possible only to a given land-size and early marriage could encourage further fragmentation of land under the traditional system of inheritance.

It is, therefore, suggested that laws limiting land fragmentation to economically viable sizes, depending on the ecological potential of the region, should be institutionalized and brought into operation. Moreover, the rural populace should be encouraged to regard land labour as an alternative source of employment and income. This could be enhanced if the National Social Security Fund is extended to cover rural farmers.

(g) Urbanization Policy

Though several studies have found insignificant differences in fertility levels between urban and rural women, urbanization processes raise current total fertility levels though with more time they should depress lifetime total fertility levels. For this reason, they offer a suitable policy for long-term reduction of total fertility rate.

It is not simply urban residence which is considered in this context, but rather the totality of urban processes such as greater accessibility to mass media, provision of recreational facilities, and entertainments, accessibility of social clubs for exchange of ideas, etc.

The diffusion of such processes could be achieved by the creation and establishment of more rural service centres which will become the focal points of diffusion of innovative processes.

(h) Family planning policy

The effectiveness of the use of modern contraceptive methods as a direct depressant of total fertility rate is unquestionable. However, this research found the proportions of reproductive women in Western Kenya who have adopted such methods of fertility control to be very small and insignificant.

For this reason, there is dire need to re-evaluate the family planning programme approach especially among the majority of illiterate women in rural areas. In reality, some level of formal education is needed among these women to enhance the prospects for effective utilisation of modern contraceptive methods. For this reason, more programmes are needed on the knowledge and practice of contraceptive methods.

The diffusion of family planning ideas should also focus on the target population at greatest risk, namely the adolescent population and young mothers who have not attained their desired family sizes. This method is likely to have greater effects if the commercial aspect of supplying contraceptive methods is minimized and instead more medical examinations are accorded women to identify which particular method is suitable for an individual woman.

The effectiveness of such methods could also be enhanced if all rural service centres have family planning clinics which are permanent and are run on daily basis. This would enable more women to have access to such facilities especially in rural areas where communication is a major problem. Intensified use of mobile family planning clinics should also be encouraged. However, such projects have little prospects of succeeding unless rural access roads become all weather roads. In addition, social workers could be employed at sub-locational level to follow up family planning adopters and to advise them on their problems especially in situations where cultural conflicts arise.

Lastly, the most important method of fertility control which should be encouraged is abortion. At the moment, abortion is illegal in Kenya except under special medical conditions. Neveretheless, there is no doubt that the rate of illegal abortions and concomittant cases of infanticides have reached an alarming proportion in Kenya to-day.

It is, therefore, suggested that abortion should be legalized without any condition. The desire to abort should be left to the individual to cater for the interest of the religious sector of the community. It should, however, be administered by well qualified people under the modern medical conditions or well recognized traditional abortionists who have been doing the trade in different ethnic groups.

In conclusion, it must be emphasized that, these suggestions on family planning methods can only be effective if a well tailored institutional system of reward and punishment is effected. Moreover, the system can only be effective if the other alternative methods are also institutionalized instead of relying only on one method which has been the family planning approach.

Appendix 1: Percent of Women 15 years and over by 5-year age-group and number of children ever-borne in 1979.

Number of Children ever Borne/District	15-19 %	20-24 %	25-29 %	30-34 %	35-39 %	40-44 %	45-49 %	Average %
			Age-group	in	Years			
1-4 Children:								
Kisii	23.4	65.8	45.2	14.8	8.5	6.0	6.1	31.3
Kisumu	29.6	63.6	44.8	22.8	16.7	14.7	15.0	34.7
Siaya	25.9	66.7	46.1	23.5	18.7	17.0	17.9	32.7
South Nyanza	29.1	41.6	43.7	21.6	15.4	13.8	13.3	30.2
Bungoma	22.0	72.2	53.4	20.2	12.9	10.0	10.2	34.9
Busia	26.9	72.5	53.4	23.3	16.6	14.6	14.5	35.9
Kakamega	20.4	66.7	50.9	21.2	13.1	10.6	10.0	31.8
5-6 Children:								
Kisii	0.4	7.5	30.9	27.5	15.1	10.3	10.1	11.7
Kisumu	0.4	7.2	25.8	23.0	15.7	12.0	12.3	11.9
Siaya	0.3	6.7	26.0	24.3	16.9	14.6	14.1	13.1
South Nyanza	0.5	5.0	26.4	22.8	16.7	13.2	12.5	11.3
Bungoma	0.2	4.8	29.9	30.2	14.6	9.9	9.5	11.7
Busia	0.2	6.4	26.5	27.0	18.6	14.5	12.6	12.7
Kakamega	0.2	5.4	27.5	29.3	16.5	11.8	10.9	11.9
Over 7 Children:								
Kisii	0.1	2.2	16.0	51.8	72.0	78.7	79.0	24.5
Kisumu	0.0	2.5	13.0	40.8	55.6	61.7	61.5	22.8
Siaya	0.1	2.3	27.3	40.2	53.6	57.7	56.7	28.0
South Nyanza	0.1	2.0	15.4	44.8	58.6	64.0	65.4	22.9
Bungoma	0.0	1.1	9.7	44.6	68.7	75.6	75.8	23.6
Busia	0.0	1.8	10.7	42.7	58.2	64.5	66.2	24.6
Kakamega	0.1	2.0	10.8	42.4	51.8	63.2	65.3	22.3

Source: Computed from the 1979 Census data.

Appendix 2: Percent distribution of age-specific fertility rates per woman for Western Kenya in 1978

Age-group in years	Reported A.S.F.R. per woman	% of total A.S.F. Rate	% Accumulated
	NYANZA PROVINCE		
15 - 19	.131	8.6	8.6
20 - 24	.354	23.2	31.8
25 - 29	.357	23.4	55.2
30 - 34	.261	17.1	72.3
35 - 39	.206	13.5	85.8
40 - 44	.164	10.7	96.5
45 - 49	.055	3.5	100.0
Total	1.528	100.0	-
	WESTERN PROVINCE		
15 - 19	.136	8.4	8.4
20 - 24	.354	21.8	30.2
25 - 29	.382	23.5	53.7
30 - 34	.308	19.0	72.2
35 - 39	.238	14.7	87.4
40 - 44	.163	10.0	97.4
45 - 49	.043	2.6	100.0
Total	1.624	100.0	-

Source: Computed from the 1978 Sample Survey data.

Appendix 3: Proportion of females in unstable marital statuses for Western Kenya in 1978

Age-group in years	NYANZA PROVINCE				WESTERN PROVINCE		
	Proportion of total females	Proportion of females divorced	Proportion of females widowed	Proportion of females polygamous	Proportion of females divorced	Proportion of females widowed	Proportion of females polygamous
15 - 19	1.000	.011	.002	.333	.009	.001	.308
20 - 24	1.000	.027	.008	.279	.026	.005	.283
25 - 29	1.000	.027	.021	.284	.031	.010	.321
30 - 34	1.000	.024	.049	.310	.030	.025	.333
35 - 39	1.000	.019	.075	.316	.026	.046	.288
40 - 44	1.000	.018	.128	.308	.024	.080	.263
45 - 49	1.000	.016	.188	.286	.024	.125	.265
% Standardized	-	2.0	4.6	30.5	2.2	2.7	29.9

Source: Computed from the 1978 Sample Survey data.

Appendix 4: Percent of females illiterate in Western Kenya during 1969 and 1979

		Age-group in Years						
REGION	Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
NYANZA PROV.	1979	4.6	7.1	7.7	7.5	7.1	7.0	6.8
	1969	12.6	12.4	14.1	11.9	10.6	8.0	7.7
Kisii Dist.	1979	3.9	6.7	6.7	6.5	6.3	6.0	5.2
	1969	14.1	13.2	14.6	11.6	9.7	6.4	6.0
Kisumu "	1979	4.2	6.9	7.4	7.0	6.7	6.6	6.8
	1969	12.6	11.2	13.6	11.2	10.1	7.9	7.7
Siaya "	1979	4.2	6.5	8.2	8.3	8.2	9.2	9.2
	1969	10.1	11.3	13.2	12.5	11.8	9.3	9.7
S.Nyanza "	1979	5.7	7.9	8.8	8.3	7.5	7.1	7.0
	1969	13.4	13.7	14.8	12.3	10.7	8.2	7.4
W. PROVINCE	1979	5.2	7.5	7.0	6.2	6.4	6.2	6.0
	1969	9.8	9.6	10.8	10.3	9.5	6.9	7.0
Bungoma Dist.	1979	3.8	6.4	6.0	5.6	5.6	5.6	5.1
	1969	8.2	8.7	8.6	9.4	8.9	6.8	6.4
Busia "	1979	7.6	9.7	9.3	8.4	8.0	8.1	7.7
	1969	11.5	12.3	14.7	12.9	11.5	7.9	7.8
Kakamega "	1979	5.0	7.4	6.7	5.7	6.3	5.9	6.0
	1969	9.8	7.8	9.2	8.7	8.2	5.9	6.8

Source: Computed from the 1969 and 1979 Census data.

Appendix 5: Percent of females by years of Schooling Completed in 1969 and 1979 (Std. I - IV only)

		Age-group in Years						
REGION	Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
NYANZA	1979	5.2	3.3	2.6	1.9	1.4	1.1	0.8
PROVINCE	1969	3.8	2.0	1.6	1.0	0.6	0.3	0.2
Kisii	1979	5.5	3.5	2.6	1.8	1.3	0.8	0.5
District	1969	5.2	2.2	1.5	0.8	0.4	0.2	0.1
Kisumu	1979	4.5	3.2	2.6	1.8	1.4	1.1	0.9
"	1969	3.4	1.9	1.7	1.0	0.7	0.3	0.2
Siaya "	1979	4.6	2.6	2.3	1.9	1.5	1.5	1.2
	1969	3.4	2.1	1.8	1.3	0.9	0.4	0.1
S.Nyanza "	1979	5.6	3.6	2.9	1.9	1.4	1.1	0.9
	1969	3.2	1.7	1.3	0.8	0.5	0.3	0.2
WESTERN	1979	4.8	2.7	2.3	1.9	1.8	1.4	1.1
PROVINCE	1969	4.7	2.8	2.7	1.9	1.2	0.5	0.2
Bungoma	1979	5.8	3.2	2.5	2.0	1.8	1.3	1.0
District	1969	5.7	3.1	2.8	2.1	1.4	0.5	0.0
Busia "	1979	5.2	2.6	1.9	1.6	1.1	0.9	0.7
	1969	2.9	1.8	1.6	1.0	0.4	0.2	0.1
Kakamega "	1979	4.2	2.6	2.3	2.0	2.0	1.7	1.3
	1969	5.5	3.4	3.8	2.7	1.9	0.9	0.4

Source: Computed from the 1969 and 1979 Census data.

Appendix 6: Percent of females by years of Schooling Completed in 1969 and 1979 (Std. V - VIII only)

		Age-group		in		Years		
REGION	Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
NYANZA PROVINCE	1979	12.2	6.0	3.8	1.8	0.8	0.5	0.3
	1969	6.1	3.1	1.2	0.8	0.3	0.3	0.2
Kisii district	1979	14.8	6.4	4.0	1.7	0.6	0.2	0.1
	1969	6.9	3.9	1.1	0.7	0.1	0.1	0.1
Kisumu "	1979	11.8	6.8	4.3	2.1	1.0	0.7	0.3
	1969	6.8	3.4	1.7	1.0	0.4	0.3	0.2
Siaya "	1979	11.2	5.6	3.8	2.0	0.9	0.7	0.4
	1969	5.4	2.3	1.1	0.8	0.5	0.4	0.3
S. Nyanza "	1979	10.6	5.4	3.5	1.5	0.8	0.5	0.3
	1969	5.2	2.8	1.0	0.7	0.3	0.3	0.2
W. PROVINCE	1979	12.4	5.8	4.2	2.7	1.3	0.7	0.4
	1969	8.9	5.4	2.3	1.4	0.7	0.6	0.3
Bungoma district	1979	13.7	6.7	5.0	3.1	1.5	0.6	0.3
	1969	11.2	7.5	3.2	1.7	0.5	0.5	0.2
Busia "	1979	9.7	4.4	2.8	1.6	0.7	0.4	0.2
	1969	5.3	2.9	1.1	0.7	0.6	0.4	0.2
Kakamega "	1979	12.6	5.7	4.2	2.8	1.4	0.8	0.4
	1969	10.1	5.8	2.5	1.8	0.9	0.8	0.5

Source: Computed from the 1969 and 1979 Census data.

Appendix 7: Percent of regional variations in income levels by age-group of Women in Western Kenya in 1978

	Age-group in years						
A. NO INCOME	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Kisii District	81.5	29.5	28.1	14.3	16.7	30.8	30.0
Kisumu "	91.9	84.4	75.9	75.0	66.7	78.9	76.5
S.Nyanza "	92.3	74.3	66.7	64.0	72.7	72.2	60.0
Busia "	92.3	95.5	94.7	94.1	81.3	92.3	91.7
Bungoma "	88.0	50.0	16.7	33.3	33.3	41.7	30.0
Kakamega "	90.6	59.1	36.8	43.8	35.7	30.8	41.7
B. LESS 499/- Monthly							
Kisii District	11.1	50.0	40.6	80.9	16.7	61.5	60.0
Kisumu "	2.7	9.4	10.3	12.5	14.3	10.5	11.8
S.Nyanza "	2.6	20.0	26.7	16.0	18.2	16.7	33.3
Busia "	4.2	4.5	5.3	5.9	6.2	7.7	8.3
Bungoma "	8.0	36.4	33.3	33.3	25.0	33.3	40.0
Kakamega "	3.1	18.2	36.8	25.0	35.7	53.8	33.3
C. BETWEEN 500/- AND 900/- Monthly							
Kisii District	5.6	18.2	28.1	4.8	55.5	7.7	10.0
Kisumu "	2.7	3.1	10.3	8.3	9.5	5.3	5.9
S. Nyanza "	5.1	5.7	6.7	12.0	4.5	5.5	6.7
Busia "	4.2	9.1	0.0	0.0	12.5	0.0	0.0
Bungoma "	4.0	9.1	22.2	20.0	25.0	8.3	20.0
Kakamega "	3.1	18.2	21.1	25.0	21.4	7.7	16.7
D. OVER 1000/- Monthly							
Kisii District	1.8	2.3	3.1	0.0	11.1	0.0	0.0
Kisumu "	2.7	3.1	3.4	4.5	9.5	5.3	5.9
S. Nyanza "	0.0	0.0	0.0	8.0	4.5	5.6	0.0
Busia "	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bungoma "	0.0	4.5	27.8	13.3	16.7	16.7	10.0
Kakamega "	3.1	4.5	5.3	6.2	7.1	7.7	8.3

Source: Survey data 1978.

Appendix 8: Regional Variations in Percent of Household heads without land title deed by age-group of Women in 1978

	Age Group in Years						
Nyanza Province	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Kisii	11.1	18.2	12.5	19.0	22.2	15.4	10.0
Kisumu	43.2	34.4	34.5	33.3	42.9	26.3	17.6
Siaya	63.3	37.5	28.6	26.3	35.3	37.5	20.0
S. Nyanza	71.8	40.0	30.0	24.0	40.9	44.4	33.3
Western Province							
Busia	80.8	59.1	52.6	52.9	56.3	53.8	25.0
Bungoma	80.0	59.1	16.7	20.0	25.0	25.0	10.0
Kakamega	21.9	18.2	10.5	12.5	14.3	15.4	16.7

Source: Sample Survey data of 1978.

Appendix 9: The Median Age at First Marriage by Cohorts for 1978 in Western Kenya

District	Age-groups in Years						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Kisii							
Male	19.0	21.0	21.0	21.0	21.0	20.0	20.0
Female	17.0	18.0	18.5	18.0	18.0	18.0	18.0
Kisumu							
Male	18.0	20.0	23.0	22.0	22.0	22.0	22.0
Female	16.0	17.0	16.5	18.0	16.0	16.5	16.0
Siaya							
Male	18.0	19.0	20.0	20.0	20.5	20.0	20.0
Female	16.0	17.0	16.5	17.0	16.0	16.5	16.5
S. Nyanza							
Male	18.0	19.0	20.0	22.0	22.0	22.0	22.0
Female	16.0	17.0	17.0	17.0	17.0	16.0	16.5
Busia							
Male	18.0	21.0	22.0	22.0	22.0	20.0	20.0
Female	17.0	17.0	17.0	17.0	17.0	17.0	16.5
Bungoma							
Male	19.0	22.0	22.0	22.0	22.0	22.0	22.0
Female	17.0	19.0	19.5	18.0	20.0	20.0	18.0
Kakamega							
Male	19.0	22.5	23.0	22.0	22.0	22.0	22.0
Female	17.0	19.0	19.5	18.0	20.0	20.0	20.0
Nyanza Urban							
Male	18.0	20.0	22.0	22.0	22.0	22.0	22.0
Female	16.0	17.0	17.0	17.0	17.0	17.0	17.0
Western Province Urban							
Male	18.5	22.0	22.0	22.0	21.5	20.0	20.0
Female	17.0	18.0	19.0	18.0	18.0	18.0	18.0

Source: Survey data of 1978.

Appendix 10. Step-wise Regression Results

1969 Census Data For Nyanza Province

Current Total Fertility Rate (Y1)

Variable description	β-Values	Standard Error Values	F-calc Statistics	t-cal	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
K4.	-3.032	1.795	2.85	1.69	12.706	63.657
K1.	0.392	0.083	22.37	4.73	12.706	63.657
K3.	0.788	0.099	62.31	7.89	12.706	63.657
K6.	1.293	0.211	37.41	6.12	12.706	63.657
K7.	4732.363	2671.716	3.14	1.77	12.706	63.657
(Const)	−97133.590	44807.595	4.69	2.17	12.303	63.657

R^2 = 0.9991 n = 7

F = 209.73 df = (n-k) = 1

Lifetime Total Fertility Rate (Y2)

Variable description	β-Values	Standard Error Values	F-calc Statistics	t-cal	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
K2.*	57.446	4.004	205.84	14.35	12.706	63.657
K3.	-54.379	4.622	138.45	11.77	12.706	63.657
K7.	118,291.928	15,713.352	56.67	7.53	12.706	63.657
K6.	3.036	0.699	18.88	4.35	12.706	63.657
K4.	-22.215	7.838	8.03	2.83	12.706	63.657
(Const)	-1,921,715.053	325,122.579	34.94	5.91	12.706	63.657

* Significant at 0.05 level of significance

R^2 = 0.9999 n = 7

F = 1956.11 df = (n-k) = 1

Appendix 11. Step-wise Regression Results

1969 Census Data For Western Province

Current Total Fertility Rate (Y1)

Variable description	β-Values	Standard Error Values	F-calc Statistics	t-cal	t - Statistics $\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
K3.*	0.453	0.013	1076.54	32.81	12.706	63.657
K1.	0.050	0.006	65.76	8.11	12.706	64.657
K5.*	2.170	0.153	200.40	14.16	12.706	63.657
K4.	-1.176	0.156	57.13	7.56	12.706	63.657
K6.	0.026	0.015	2.93	1.71	12.706	63.657
(Const)	-5450.658	459.033	140.99	11.87	12.706	63.657

* significant at 0.05 level of significance.

R^2 = 0.9999   n = 7
F = 6361.61   df = (n-k) = 1

Lifetime Total Fertility Rate (Y2)

Variable description	β-Values	Standard Error Values	F-calc Statistics	t-cal	t - Statistics $\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
K1*	-1.511	0.048	992.03	31.50	12.706	63.66
K6*	-8.809	0.116	5744.94	75.80	12.706	63.66
K3*	8.330	0.107	6016.96	77.57	12.706	63.66
K5*	-79.433	1.193	4433.86	66.59	12.706	63.66
K4*	-36.884	1.211	927.15	30.45	12.706	63.66
(Const)	8933.840	3572.850	6.25	2.50	12.706	63.66

* significant at 0.05 level of significance

R^2 = 0.9999   n = 7
F = 15894.27   df = (n-k) = 1

Appendix 12. Step-wise Regression Results

1969 Census Data For Total

Single Females aged 15 - 49 Years (K1)

Variable description	β-values	Standard Error values	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X4	0.955	0.237	16.2	4.02	12.706	63.66
X6	-1.175	0.186	39.9	6.32	12.706	63.66
X9	-3.069	1.487	4.3	2.07	12.706	63.66
X1	0.613	0.132	21.5	4.64	12.706	63.66
X2	-0.385	0.297	1.7	1.30	12.706	63.66
Const.	−8331.284	27503.568	0.1	0.32	12.706	63.66

R^2 = 0.9999   n = 7
F = 1514.59   df = (n-k) = 1

K1 For 1978 Survey

Variable description	β-values	Standard Error values	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X6*	1.247	0.003	248239.27	498.24	12.706	63.66
X8*	-0.303	0.009	1241.03	35.23	12.706	63.66
X2*	-0.472	0.004	15483.70	124.43	12.706	63.66
X10*	-0.338	0.008	1668.25	40.84	12.706	63.66
X11	-0.067	0.008	64.77	8.05	12.706	63.66
Const.*	-8.689	0.558	242.41	15.57	12.706	63.66

* significant at 0.05 level of significance.

R^2 = 1.00   n = 7
F = 5369791.45   df = (n-k) = 1

K1 For 1979 Census Data

X6*	1.057	0.031	1166.10	34.15	2.57	4.03
X2	0.107	0.105	1.04	1.02	2.57	4.03
X5	-0.057	0.114	0.25	0.50	2.57	4.03
X7*	-1.100	0.304	13.12	3.62	2.57	4.03
X8	-0.049	0.142	0.12	0.35	2.57	4.03
X9*	-0.118	0.043	7.47	2.73	2.57	4.03
X3	-0.663	0.278	5.69	2.38	2.57	4.03
X1	0.063	0.062	1.04	1.02	2.57	4.03
Const.	8440.312	7257.706	1.35	1.16	2.57	4.03

R^2 = 0.9999 ; F = 20361.23   n = 14 : df = 5

Appendix 13. Step-wise Regression Results

1969 Census Data For Total

Currently Married Women Aged 15 - 49 Years (K3)

Variable description	β - values	Standard Error values	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X8	70.683	6.938	103.8	10.19	12.706	63.66
X4	8.048	1.032	60.9	7.80	12.706	63.66
X7	9.857	10.805	0.8	0.89	12.706	63.66
X1	-3.013	0.514	34.4	5.86	12.706	63.66
X6	-2.716	0.627	18.7	4.32	12.706	63.66
(Const)	-68810.225	68021.621	1.0	1.00	12.706	63.66

R^2 = 0.9962 n = 7
F = 52.68 df = (n-k) = 1

K2 For 1978 SAMPLE SURVEY DATA

Variable description	β - values	Standard Error values	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X8	2.066	0.008	71524.85	267.4	12.706	63.66
X7	1.152	0.011	10340.41	101.7	12.706	63.66
X11	-0.754	0.014	2954.48	54.4	12.706	63.66
X12	1.555	0.057	755.53	27.5	12.706	63.66
X9	0.009	0.007	182.89	13.5	12.706	63.66
(Const)	22.159	0.682	1056.66	32.1	12.706	63.66

R^2 = 1.00 n = 7
F = 334699.41 df = (n-k) = 1

K3 FOR 1979 CENSUS DATA

V. description	β-value	S. Error	F-calc	t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X8	0.204	0.174	1.37	1.17	2.57	4.03
X6*	-0.851	0.027	965.53	31.07	2.57	4.03
X1*	1.308	0.043	935.96	30.59	2.57	4.03
X9	-0.186	0.022	70.13	8.37	2.57	4.03
X5	-0.803	0.083	93.84	9.69	2.57	4.03
X4	-0.631	0.112	32.02	5.66	2.57	4.03
X7	0.052	0.128	0.16	0.40	2.57	4.03
(Const)	926.833	0.128	0.05	0.22	2.57	4.03

* significant at 0.05 level of significant

R^2 = 0.9998: F = 5037.75 n = 14
df = n-k = 5

Appendix 14. Step-wise Regression Results

1969 Census Data For K7

Variable description	β-values	Standard Error values	F-calc Statistics	t - Statistics t-calc	t - Statistics $\frac{\alpha}{2}$=.025
X8	0.002	0.002	2.06	1.44	12.706
X2	-0.003	0.001	26.35	5.13	12.706
X9	0.001	0.001	0.53	0.73	12.706
X6	-0.002	0.001	13.97	3.74	12.706
X7	0.003	0.001	4.43	2.11	12.706
(Const)	40.509	9.038	20.09	4.48	12.706

R^2 = 0.9926   n = 7

F = 26.71   df = n-k = 1

1978 SAMPLE SURVEY DATA FOR K7

Variable description	β-value	Standard Error values	F-calc Statistics	t - Statistics t-calc	t - Statistics $\frac{\alpha}{2}$=.025
X6	-0.137	0.027	26.87	5.18	12.706
X9	0.086	0.027	10.47	3.24	12.706
X5	0.062	0.013	22.77	4.77	12.706
X2	0.073	0.025	8.80	2.97	12.706
X1	-0.040	0.018	5.15	2.27	12.706
Const.	33.177	5.069	42.85	6.55	12.706

R^2 = 0.9973

F = 72.87

n = 7

df = (n-k) = 1.

Appendix 15. Stepwise Regression Results

1969 Census Data For (K4)

Variable description	β - values	Standard Error values	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X7	+ 0.688	0.231	8.9	2.98	12.706	63.66
X2	- 0.187	0.022	71.7	8.47	12.706	63.66
X6	0.217	0.021	103.2	10.16	12.706	63.66
X9	+ 1.224	0.128	91.1	9.54	12.706	63.66
X5	+ 0.782	0.146	28.8	5.37	12.706	63.66
Const.	-4467.363	1852.441	5.82	2.41	12.706	63.66

R^2 = 0.9992 n = 7

F = 263.65 df = (n-k) =1

1979 Census Data For (K4)

Variable description	β - values	Standard Error values	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X9*	0.229	0.040	32.97	5.74	2.57	4.03
X6*	- 0.096	0.030	10.12	3.18	2.57	4.03
X3	- 0.169	0.200	0.71	0.84	2.57	4.03
X4*	0.232	0.056	16.98	4.12	2.57	4.03
X5*	0.315	0.055	32.79	5.73	2.57	4.03
X2*	- 0.318	0.093	11.76	3.43	2.57	4.03
X7	0.572	0.275	4.33	2.08	2.57	4.03
X8	0.016	0.136	0.01	0.10	2.57	4.03
Const	—5956.211	4907.904	1.47	1.21	2.57	4.03

*significant at 0.05 level of significance.

R^2 = 0.9959 n = 14

F = 150.56 df = (n-k) = 5

Appendix 16. Step-wise Regression Results

1969 Census Data For (K5)

Variable description	β - values	Standard Error values	F-calc Statistics	t - Statistics t-calc	t - Statistics $\frac{\alpha}{2}$=.025
X9	-1.491	1.507	0.9	0.948	12.706
X8	3.488	2.868	1.5	1.225	12.706
X3	0.169	0.197	0.7	0.837	12.706
X7	1.538	2.281	0.5	0.707	12.706
X5	-0.295	0.686	0.2	0.447	12.706
(Const)	-10602.751	15861.341	0.5	0.707	12.706

R^2 = 0.9378 n = 7

F = 3.02 df = (n-k) = 1

1979 CENSUS DATA FOR (K5)

Variable description	β - values	Standard Error values	F-calc Statistics	t - Statistics t-calc	t - Statistics $\frac{\alpha}{2}$ = .025
X8	0.018	0.019	1.00	1.00	2.57
X6*	-0.051	0.003	222.85	14.93	2.57
X4	-0.023	0.021	1.21	1.1	2.57
X1*	0.072	0.017	18.11	4.26	2.57
X9	0.006	0.004	1.71	1.31	2.57
X2*	-0.075	0.025	9.14	3.02	2.57
X7*	0.075	0.029	6.78	2.60	2.57
X5	-0.035	0.017	4.15	2.04	2.57
(Const)	-135.893	1562.011	0.01	0.10	2.57

* significant at 0.05 level of significance.

R^2 = 0.9988 n = 14

F = 521.41 df = (n-k) = 5

Appendix 17. Step-wise Regression Results

1969 Census Data For Nyanza Province

Current Total Fertility Rate (Y1)

Variable description	β-value	Standard Error value	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X9	3.478	0.853	16.64	4.08	12.706	63.66
X8	-4.081	0.816	25.04	5.00	12.706	63.66
X4	+0.822	0.197	17.40	4.17	12.706	63.66
X5	-4.316	1.387	9.68	3.11	12.706	63.66
X2	-0.298	0.107	7.71	2.78	12.706	63.66
(Const)	677.904	6944.204	0.01	0.10	12.706	63.66

R^2 = 0.9999   n = 7

F = 1403.67   df = n-k = 1

Lifetime Total Fertility Rate (Y2)

Variable description	β-value	Standard Error value	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X8	249.978	36.20	47.69	6.90	12.706	63.66
X9	- 17.115	27.39	0.39	0.62	12.706	63.66
X7	-199.147	36.86	29.19	5.40	12.706	63.66
X2	- 13.102	2.56	26.24	5.12	12.706	63.66
X6	- 10.383	2.32	19.96	4.47	12.706	63.66
(Const)	-29974.810	199529.28	0.02	0.14	12.706	63.66

R^2 = 0.9998

F = 880.62

df = (n-k) = 1.

Appendix 18. Step-wise Regression Results

1969 Census Data for Western Province

Current Total Fertility Rate (Y1)

Variable description	β-value	Standard Error value	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X8*	-12.211	0.014	818509.054	904.7	12.706	63.66
X4*	0.264	0.006	1975.148	44.4	12.706	63.66
X3*	0.836	0.008	11367.031	106.6	12.706	63.66
X1*	+ 0.227	0.005	1921.962	43.8	12.706	63.66
X2	- 0.055	0.006	90.231	9.5	12.706	63.66
(Const)*	-5155.532	255.438	407.358	20.2	12.706	63.66

* significant at 0.05 level of significance

R^2 = 1.00 n = 7

F = 481119.73 df = n-k = 1

Lifetime Total Fertility Rate (Y2)

Variable description	β - value	Standard Error value	F-calc Statistic	t - Statistics t-calc	$\frac{\alpha}{2}$= 025
X4	-23.234	5.705	16.58	4.07	12.706
X1	1.505	1.743	0.75	0.87	12.706
X3	-27.617	3.417	63.33	8.08	12.706
X5	-220.789	29.236	57.03	7.55	12.706
X8	224.322	30.649	53.57	7.32	12.706
Const.	- 29746.723	99908.881	0.09	0.30	12.706

R^2 = 0.9996

F = 487.58

df = (n-k) = 1

Appendix 19. Stepwise Regression Results

1978 Sample Survey Data

Current Total Fertility Rate (Y1)

Variable description	β - value	Standard Error value	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025	$\frac{\alpha}{2}$=.005
X6	- 12.442	4.784	6.76	2.60	12.706	63.66
X12	120.650	38.476	9.83	3.13	12.706	63.66
X7	27.380	12.858	4.54	2.13	12.706	63.66
X11	18.577	8.898	4.36	2.09	12.706	63.66
X1	9.218	5.128	3.23	1.80	12.706	63.66
(Const)	1025.105	1080.930	0.89	0.94	12.706	63.66

R^2 = 0.9962 n = 7

F = 51.84 df = (n-k) = 1

Lifetime Total Gertility Rate

Variable description	β - value	Standard Error value	F-calc Statistics	t - Statistics t-calc	$\frac{\alpha}{2}$=.025
X9	- 4.727	0.413	131.227	11.45	12.706
X4	-12.338	6.957	3.145	1.77	12.706
X3	-12.597	1.904	43.763	6.62	12.706
X5	10.769	1.702	40.020	6.33	12.706
X7	-14.943	2.754	29.442	5.42	12.706
(Const)	312.293	184.536	2.864	1.69	12.706

R^2 = 0.9997 n = 7

F = 737.87 df = n-k = 1

Appendix 20 A List of Significant Fertility Determining Variables for Western Kenya

Variable Code	Short run Period — Variable description	Simple"r" Value	Rank
X9 -	Number of children dying by age-group of mothers	0.9447	1
X2 -	Number of reproductive women who were illiterate	0.9004	2
K5 -	Number of divorced/separated women aged 15-49 years	0.7976	3
X7 -	Number of reproductive women residing in urban centres	0.7635	4
X3 -	Number of reproductive women with lower primary education	0.6869	5
X12 -	Number of reproductive women earning Ksh 1000/-p.a	0.6470	6
X5 -	Number of reproductive women with secondary education	0.5597	7
K3 -	Number of women currently married	0.5075	8
X4 -	Number of women with upper primary education	0.4199	9
K2 -	Number of women ever-married	0.3938	10
$X4_{78}$-	Number of women of African religion	0.3923	11

Negative association

Variable Code		Simple"r" value	Rank
$X6_{(78)}$-	Number of reproductive females unemployed	-0.9715	1
$X9_{(78)}$-	Number of reproductive females earning no income	-0.9678	2
$X5_{(78)}$-	Females married to husbands with land title deed	-0.9433	3
$X2_{(78)}$-	Number of reproductive female Protestants	-0.9324	4
$X3_{(78)}$-	Number of reproductive female Catholics	-0.8686	5
$K4_{(69)}$-	Number of females widowed	-0.8006	6

Source: extracted from Tables 31, 32, 40 and 41.

Appendix 21 : A List of Significant Fertility Determinants for Western Kenya in the Long run Period

Variable description	Positive association	Simple "r" value	Rank
X12 - Number of reproductive women earning over Ksh 1000/- p.a.		0.6251	1
K1 - Number of reproductive women single		0.4475	2
$X4_{(78)}$ - Number of reproductive women of African Religion		0.3793	3
	Negative associations		
X9 - Number of reproductive women illiterate		-0.9777	1
X6 - Number of reproductive women unemployed		-0.9771	2
X5 - Women married to husband with land title deed		-0.9569	3
$X2_{(78)}$ - Number of reproductive women Protestants		-0.9529	4
$X3_{(78)}$ - Number of reproductive women Catholics		-0.8947	5
K7 - Median age at first marriage		-0.4036	6
K2 - Total reproductive women ever-married		-0.3983	7

Source: extracted from Table 31, 32, 40 and 41.

Appendix 22: THE QUESTIONNAIRE

PART I

QUESTIONNAIRE FOR ALL HOUSEHOLD-HEADS

Interviewer's name ....

Date of interview ....

Time interview started ....

Duration of Interview ....

CASE SERIAL NUMBER

A AREA IDENTITY NAME

a1. Province ....

a2. District ....

a3. Location ....

a4. Sub-Location ....

a5. Village ....

a6. Town ....

a7. Estate ....

a8. House No. ....

A) LIST OF HOUSEHOLD MEMBERS

Note: Interviewers should remember that household members include all persons eating together or close together in the same compound at the site of household (i.e. traditional huts of villages for wives and unmarried children) include also persons who receive from or contribute to the household more than half of their income. Also those who are temporarily away but qualify to be members as children in school or visiting relatives.

PERSON'S NAME START WITH THE HOUSEHOLD HEAD	RELATIONSHIP TO THE HOUSEHOLD HEAD	AGE IN YEARS	SEX CODE: 1=MALE 2=FEMALE	PRESENTLY LIVING IN THE HOUSEHOLD CODE: 1-YES; 2-NO	SINGLE Yes/No	MARRIED Yes/No	YEAR OF MARRIAGE	WIDOW Yes/No	SEPARATED Yes/No	DIVORCED Yes/No	IS HEAD MONOGAMOUS Yes/No	IS HEAD POLYGAMOUS Yes/No	TRIBE	LEVEL OF EDUCATION COMPLETED i.e.Std.I Std.II,III,IV etc.	PLACE OF BIRTH					
															DISTRICT	LOCATION	SUB-LOCATION	TOWN OR VILLAGE	RELIGION	

Household No..................

PART I

B. QUESTIONNAIRE FOR ALL ADULT MALES OVER 15 YEARS (SINGLE MEN ONLY)

b1. Are you the head of this household? Yes/No............

b2. If yes, what is your name?............................

b3. If not, what is your relationship to the household head? ....

b4. Are you married? yes, no, won't say ....

b5. If not married, could you please give reasons? ....
....

C. MARRIED MEN ONLY

c1. At what age were you first married? ....

c2. Please, state the year you were first married ....

c3. Was your first marriage in (a) church? code yes/no .....
(b) customary ....
(c) civil ....
(d) consensual ....

c4. What was your level of education at the age of first marriage? code yes/no
no education ....
primary education ....
secondary education ....
other professional training ....

D. INTERVIEWER I have noticed you have more

d1. than one wife. Is this true? Yes/No ....

d2. If yes, why did you decide to marry many wives?

Code Yes/No.

To secure more land ....

To manage well family business ....

To increase social prestige ....

First wife had no children ....

To assure more children survive ....

Other reasons specify ....

....

....

....

E. MARRIAGE FREQUENCY

INTERVIEWER Some men for some good reasons often do not live together with all their wives probably because some wives are working elsewhere, or may even be separated or divorced. Please, give information about all your wives who are presently not living in this household. Include too, those who died.

el.

ORDER OF WIVES	IS SHE DIVORCED?		IS SHE SEPARATED?		DID SHE PASS AWAY?	
	IF YES YEAR	DURATION OF STAY WITH YOU IN WEEKS	IF YES STATE YEAR	DURATION OF STAY WITH YOU IN WEEKS	IF YES AGE AT DEATH	YEAR OF DEATH
1st wife						
2nd wife						
3rd wife						
4th wife						
5th wife						
6th wife						
7th wife						
8th wife						
9th wife						
10th wife						

INTERVIEWER. Please carefully probe for the cause of divorce and separation.

Note some people divorce because of infertility of couples, sickness, sexual misconduct, witchcraft, etc. Please could you say why it was necessary for you to divorce or live separately?

e2.

ORDER OF WIFE	SEPARATED OR DIVORCED	SUMMARY OF REASONS GIVEN
1st wife	....	
2nd wife	....	
3rd wife	....	
4th wife	....	
5th wife	....	
6th wife	....	
7th wife	....	
8th wife	....	
9th wife	....	
10th wife	....	

INTERVIEWER In life it is common to have men re-united to their wives after a period of divorce or separation.

e3. Have you ever re-united with any of the women who was once separated or divorced? Yes/No/Won't say ....

....

If yes, for how long were you separated or divorced? Please give these information ....

e4. ORDER OF WIFE	DURATION OF SEPARATION IN MONTHS	NO. OF CHILDREN OF THE WOMAN BEFORE SEP.	AFTER SEPARATION
1st wife	....	....	....
2nd wife	....	....	....
3rd wife	....	....	....
4th wife	....	....	....
5th wife	....	....	....
6th wife	....	....	....
7th wife	....	....	....
8th wife	....	....	....
9th wife	....	....	....
10th wife	....	....	....

F. LAND INFORMATION

f1. Do you have your own piece of land?

Yes/No/Won't say ....

f2. If yes, what is the size of your land?

number of hectares ....

f3. Have you consolidated your land?

Yes/No/Won't say ....

f4. When did you consolidate it? State the year ....

f5. How many wives did you have before land consolidation?

....

f6. How many wives have you married after land consolidation?

....

f7. Do you intend to marry more wives because your land is large?

Yes/No/Won't say/Don't know ....

....

G. MIGRATION INFORMATION

g1. Were you born here or elsewhere? Yes/No/Won't say ....

g2. If no, how many kilometres is your home from here? kms ....

g3. State the location of your parents home

Sub-location ....

Location ....

District ....

Town ....

g4. When did you migrate to live here?

....

g5. When you first migrated to this place, did you leave behind, some members of the family?

Yes/No/Won't say ....

g6. Who were left behind? Code Yes/No

Wives ....

Children ....

Other relatives ....

g7. For how long were they left behind?

State number of months ....

State number of years ....

H. HEALTH DATA

h1. Do you suffer from any physical deformity?

Code Yes .... No .... Won't say....

----

h2. Please, state the nature of your deformity
Code Yes/No

Paralysis ....

Blindness ....

Deaf ....

Dumb ....

h3. What is the most common sickness or disease that attack residents of this region? Code Yes/No

Malaria ....

Bilharzia ....

Dysentry ....

Others specify ....

....

I. EMPLOYMENT DATA

i1. Are you currently employed or self-employed?

Yes .... No. .... Won't say .....

....

i2. Could your job be classified as any of the following? Code Yes/No

Business ....

Farmer ....

Unskilled labourer ....

Domestic servant ....

Clerical ....

Teaching ....

Secretarial ....

Fisherman ....

Trader ....

Herdsman ....

Doctor ....

Receptionist ....

Accountant ....

Administrator ....

Engineer ....

Others name ....

i3. Does your work require you to make trips away from home?

Yes/No ....

i4. What is the longest period you have been away in months?

Number of months ....

Date it started ....

J. INCOME DATA

j1. You said you are presently working, what is your average income per month in Kenya shillings

KShs. ....

j2. Do you have any other sources of income?

Yes ....

No ....

Won't say ....

j3. How much do you receive from these sources per month? KShs. ....

Interviewer to write a brief comment about interview

....

....

....

....

....

....

....

....

Appendix ___.   Household No..........

PART II

K. QUESTIONNAIRE FOR ALL ADULT FEMALES AGED 15 YEARS AND ABOVE

k1. case serial no. of household-head ....

k2. case serial no. of the woman ....

k3. Is the woman the head of the household? Yes/No.....

k4. If not, what is her relationship to the household-head? ....

NONE-MARRIED WOMEN (ONLY THOSE NEVER MARRIED)

INTERVIEWER

k5. These days women, even school girls get pregnanted accidentally. Please, by any chance have you given birth to a child?

Yes ....

No ....

Won't say ....

k6. If yes, how many are still alive?

boys ....

girls ....

Total ....

k7. How many have passed away?

boys ....

girls ....

Total ....

k8. At what age did you have your first live birth?

....

k9. When did you have your last birth? ....

state the month ....

state the year ....

L. INTERVIEWER

These days women who are pregnant may find themselves in certain situation in which due to ill-health or other worries they may loose a preganancy accidentally.

11. Have you ever lost a pregnancy accidentally?

please include short-lived pregnancies and babies born dead.

Yes/No/Won't say ....

12. If yes, how many pregnancies therefore have you lost accidentally or through induced abortion?

.......................lost accidentally

....................lost by induced abortion.

13. How old were you when you first lost a pregnancy accidentally or through abortion? ....

....

14. Do you intend to marry?

Yes/No/Won't say ....

15. In your opinion what is the ideal age at marriage?

....

M. <u>MARRIAGE HISTORY</u> (Ever married women only, i.e. currently married, divorced, widows)

m1. At what age were you first married? ....

m2. Was your first marriage: Yes/No

In church ....

Customary ....

Civil ....

Consensual ....

m3. How many years have elapsed since you married your present husband?

Number of years ....

Or number of months ....

m4. What was your level of education by the time of your first marriage?

illiterate ....

If primary level state standard ....

If secondary state form ....

If university state so ....

If any other professional qualification state

....

....

N. MARRIAGE FREQUENCY

INTERVIEWER: In life some people marry more than once because of several reasons i.e. dowry not paid etc.

n1. Is this your first marriage? Yes/No/Won't say.....

n2. If yes, how many times have you been married?

....

n4. NOTE: The interviewer should probe to find out the cause of divorce or separation.

CODE	Causes
______	infertility of the other sex
______	failure to pay dowry
______	employment factors
______	chronic disease of the other sex
______	sexual misconduct
______	witchcraft
______	failure to produce the desired sex of children
______	general domestic quarrels
______	other reasons.

O. PREGNANCY HISTORY

c1. Just before your first marriage had you ever given birth?

Yes   No   Won't say

4TH MARRIAGE	3RD MARRIAGE	2ND MARRIAGE	1ST MARRIAGE	ORDER OF MARRIAGE
				Age at marriage
				Age at end of marriage
				Duration taken in weeks
				MARRIAGE FREQUENCY No. of children had during this marriage: MALES
				MARRIAGE FREQUENCY No. of children had during this marriage: FEMALES
				Was husband monogamous Yes/No
				Was husband polygamous Yes/No
				No. of other wives belonging to the husband
				Was bride price completed? Yes/No
				Reasons for breaking up the marriage (see the Code)

	1	2	3	4	5	6	7	8	9	10	11	12
Order of Birth												
Name of Child												
Present age if alive												
TIME OF BIRTH: Month e.g. 1,2,3,4,etc.												
TIME OF BIRTH: Year												
Sex: Male/Female												
How many months of pregnancy												
Born before or after marriage BM = 1 AM = 2												
Currently living in the household (Yes/No)												
If dead, age at death												

Order of marriage and order of Birth	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3
Name of child															
Present age if alive															
TIME OF BIRTH: Year															
TIME OF BIRTH: Month e.g. 1,2,3,4,etc.															
Sex: Male/Female															
Months of Pregnancy															
Currently living in the Household (Yes/No)															
IF DEAD Age at death															
Year															
Month e.g. for children 1, 2, 3, 4, etc.															

o3. From previous information given it is evident that you have been married more than once. Could you please give the following information about all children ever born to you whether still alive or dead including those of the husbands you have left.

Note: Include children of pre-marriage date

o4. Do you have adopted children?

Yes No Won't say

o5. If yes, complete the table below:

	Name of child	Age of child	Sex of child M=1 F=2	where is the mother (Check code)
1				
2				
3				
4				
5				
6				

Note: Interviewer to code the column for the mothers whereabout by using information below.

CODE

1. Mother is dead
2 Mother is divorced
3 Mother is separated
4 Don't know

P. PREGNANCY LOSSES, STILLBIRTH, MISCARRIAGES

Interviewer: (All women single, married and divorced)

There are certain situations in which women due to ill-health or other worries may loose a pregnancy accidentally.

p1. Have you ever lost a pregnancy accidentally? Please include short-lived pregnancies and babies born dead.

p2. How many months were you pregnant before the pregnancy ended?

..............months

p3. How many pregnancies therefore have you lost accidentally or through induced abortion?

Number lost accidentally (spontenously)..........

Number lost by induced abortion ....

p.4 Between which of the live children did it occur?

Interviewer to check

Between .... and ....

Between .... and ....

Between .... and ....

Q. DIVORCEE, WIDOWS, AND SEPARATEES

INTERVIEWER. It is apparent that you are divorced, separated, or a widow. Please, could you provide the following information?

Category	Year of occurrence	Age at occurrence	Number of live births since it occurred	Number of dead children since it occurred
Divorced	....	....	....	....
Widow	....	....	....	....
Separate	....	....	....	....

R. INTERVIEWER. It is common in life to have women living alone because their husbands are working elsewhere, or because they are separated/divorced.

R. If your husband is living elsewhere, in your opinion what to you think is the cause of your separation or divorce? Interviewer to probe for any of the following reasons.

Code Yes/No

Infertility of the other sex ....

Failure to pay dowry ....

Employment factors ....

Chronic sickness ....

Sexual misconduct ....

Witchcraft ....

General domestic quarrels ....

Poverty in the home ....

Other reasons specify ....

r2. Are you intending to re-marry?

Code Yes/No/Won't say

....

r3. Has one of your brothers in-law inherited you according to the customs?

Yes ....

No ....

Won't say ....

S. MIGRATION

s1. Is this your place of birth?

Yes ....

No ....

Don't know ....

s2. If no, when did you come to reside here? ....

....

s3. If no, how many kilometres is your parent's home from here? Kms ....

....

s4. Please name where you were born?

	Name	Code
Sub-location	....	....
Location	....	....
District	....	....

T. URBANIZATION DATA

t1. How far is the nearest marketing centre from your place of residence? Kms ....

t2. How far is the district town from your place? Kms ....

t3. Do you sometimes read any of the local dailies? Yes/No ....

t4. Do you have relatives living in same towns? Yes/No ....

....

U. FAMILY PLANNING INFORMATION

u1. In your opinion what is the ideal family size in Kenya? ....

u2. Do you listen to family planning lessons in the radio? ....

u3. Do you know of any natural method of preventing pregnancy? Yes/No ....

....

u4. Have you ever put such method into practice? Yes/No ....

u5. Do you believe breast-feeding prevents pregnancy?

Yes/No ....

....

u6. Do you know of any methods of carrying out abortion?

Yes/No ....

....

u7. Do you attend family planning clinics? Yes/No ....

....

u8. How far is the nearest of these institutions from your home?

	Code	Kms
Family planning clinic	....	....
Health centre	....	....
Hospital	....	....

V. HEALTH DATA

v1. In your opinion what is the most common disease in this area that causes loss of pregnancy?

state ....

....

....

v2. Have you ever suffered from such a disease?

Yes/No ....

....

....

v3. Did your sickness cause pregnancy loss?

Yes/No ....

....

v4. In your opinion what causes infertility among women in this area? Please mention them ....

....

....

....

v5. Do you have any physical deformity? Yes/No ....

.... e.g. paralysis, blindness, dumb.

....

W. EMPLOYMENT DATA

w1. Are you employed at present?

Yes ....

No ....

Won't say ....

w2. Could your work fall in any of these categories?

	Code	Yes/No
work for family	....	
domestic servant	....	
agricultural labour	....	
business	....	
clerical	....	

teaching profession ....

secretarial ....

mechanic ....

unskilled labour ....

others ....

w3. Does your work require you to make trips away from home? Yes/No ....

w4. How much do you earn from your job/work in Ksh per month? ....

w5. Do you have other sources of income? Yes/No ......

....

w6. How much do you receive from these other sources per month Ksh. ....

<u>INTERVIEWER:</u> to write a brief comment on the interview.

....

....

....

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